

A Primer on Health Impacts of Development Programs

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Cover: Development programs in various sectors impact on health. Photos show Asian Development Bank (ADB)-supported projects in water (center right)—Punjab Rural Water Supply and Sanitation, India; agriculture (lower right)—Lodoyo Irrigation, Indonesia; education (lower left)—Emergency Schools Restoration, Sri Lanka; energy (center left)—Renewable Energy Development, India; and transport (upper left)—Metro Manila Air Quality Improvement Sector Development, Philippines. The urban development sector (upper right) is illustrated by one of the community water points installed in Baumiabad Mirpur and other Dhaka slums with assistance from an NGO. Photos: ADB files except water, Steven Griffiths; and urban development, Halsey Street.

FOREWORD

The Asian Development Bank (ADB) is committed to the millennium development goals (MDGs) as a measure of poverty reduction in the Asia-Pacific region. The MDGs for health are critical because the region has the highest incidence of preventable deaths among women and young children.

This Primer emphasizes that environmentally friendly policies in all sectors of development will improve the health of human populations in a way that complements the benefits from health services. The benefits to the poor from designing development policies with environmental health as an objective are significant. The poor are most likely to be harmed by poor quality of air, food, water, and shelter; and environmental pollution tends to concentrate in workplace and residential settings where the poor cluster with few or no options. Protecting health and the environment “raises all boats,” the poor more than others.

This publication signals ADB’s awareness that good health can and should be a crosscutting objective of all development programs receiving assistance. This will inform decisions about the nature of investments in all sectors and we hope that health impact assessment of development programs and projects will influence the development community about raising the health and productivity of the poor through multiple pathways, not just health services.

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PREFACE

This Primer will assist Asian Development Bank (ADB) staff and developing member countries in the Asia-Pacific region in identifying important health impacts of their development programs and projects, which can be considered within the project preparatory stage. Seven chapters deal with development sectors supported by ADB, providing a background discussion, key issues and key questions for task managers and country counterparts, a prototype project, frequently asked questions and best practices, and important references. The prototype project demonstrates how to include good practices within the project cycle to be able to reduce negative health effects and improve health outcomes for the communities and beneficiaries of projects. The user should select the issues and questions most relevant to the specific project being developed. At the end of the Primer is a glossary and a bibliography grouped by sector.

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1

HEALTH, ENVIRONMENT, AND DEVELOPMENT

A shared health, environmental, and development agenda could address the large share of the burden of disease that is environmentally related. World Health Organization.

History teaches that the improvement of human health at the population level is largely determined by good policies that protect the environment and people, that raise the quality of working and living environments, and that assure the permanence and safety of life's necessities—air, water, food, and shelter—as widely as possible. The advent of health services and modern medicines as a response of the State to demands for health care by the public occurred late in the mortality transition of the industrializing West, as Thomas McKeown (1976) famously showed. Health services are a 20th century concept and practice, but the secular decline in mortality in northern Europe occurred long before. McKeown showed that between 1700 and the 1970s, the American standardized death rate declined by 35 points and the British rate by 21 points. About 70% of the American decline and about 50% of the British decline took place before 1911. Modern medicine (e.g., antibiotics) is a 20th century intervention and access to health services of life-saving potential was remote for most people during this rapid mortality decline.¹

By the process of elimination, McKeown concluded that improved nutrition was the main cause of mortality decline, supported by gradual improvements in the quality of the physical environment that influenced the health of the burgeoning industrial working class.

Of necessity, the industrial revolution focused on increasing yields of a broad range of staple foods to ensure the quantity and adequate quality of the working people's diet. This prevented urban riots and stabilized parliamentary government through wage-food price parity.

Parallel political advances for housing quality, safe water supply, and environmental sanitation reduced respiratory and pulmonary illness and child stunting.

Nobel Laureate Robert Fogel studied the changes in height and weight of European populations (England, Wales, and Scandinavia) during the same period. Changes in average body size of men and women were assumed to be a proxy for increased brain development, reduced stunting and obstetric risks from environmental causes, better diet, improved immune response from good nutrition, and lifespan. Using accepted econometric methods, Fogel demonstrated that more than half of long-term economic growth in northern Europe during the height of the industrial revolution was attributable to the dramatic rise in human physical stature (increased height and weight from birth). Fogel used established models

¹ This observation is in keeping with the history of health in the developed world, where life expectancy increased from about 50 years to 75-80 years during the 20th century. Of the 25-30 years of increased life expectancy seen in that century, about 80% can be attributed to public health measures (improved water and sanitation, nutrition, immunizations, decreased environmental pollution, reductions in major injuries, and healthier and safer work places) and only about 20% to technical advances in health care.

concerning the predictive power of height and body mass index with respect to morbidity and mortality at later ages (Fogel 1993, 1994).

The point is that just as health services are viewed as the provision of the right to health, regardless of the political influence of the sufferer, improvement of the natural and human environments for life and work address mortality and disability arguably as profoundly as the cumulative impact of health services. At the same time, the balance between environmental and social determinants of health will arguably vary from one setting to another, with a bias toward the environmental determinants in political systems where dealing with social issues is blocked by major disparities in power.

THE ENVIRONMENTAL WEDGE: HEALTH, WEALTH, AND EQUITY

Human resources economics have demonstrated the positive correlation between income per capita and health, but only recently has the literature recognized that health is fundamental to sustained economic growth. Healthier populations have lower mortality and fertility rates and higher labor productivity, and are more inclined to invest in higher levels of skills training for themselves and education for their children, leading to higher permanent incomes, savings rates, and national investment over time. Improvements in population health set in motion a virtuous cycle of rising incomes and poverty reduction (Bloom and Canning 2000).

Health equity, normally relegated to abstract reflections on social justice, has concrete influence on sustained economic growth. According to Sen (2002), countries that pursue “growth-mediated” processes often find that inequalities in income persist or exacerbate inequalities in health, and reduction of income poverty alone does not necessarily catalyze health equity. Given the acceptance that health is a universal human right, inequalities in health can be seen as a transitional state of affairs in developing societies struggling to raise incomes, and are viewed as inequities only when they are avoidable, unnecessary, and unfair. Sen argues that countries adopting “support-led” processes are more likely to address the socially controllable determinants of health that include establishing levels of basic human needs by essential services for all and by pro-health policies assuring education and health care for all, food security, water supply, and public sanitation at a minimum.

The main assumption of this Primer is that all countries, regardless of income level or natural endowment, can adopt environmental prudence as the decision rule that shapes public policy across all development sectors and avoids inadvertent harm to the health of the poor and vulnerable, especially women and children. To an extent, health-friendly infrastructure policies may be easier to implement than pro-poor policies favoring/targeting health care for the poor, because inequalities in income, education, and health are a powerful determinant of persistent poverty in developing countries. As demonstrated below, the environmental determinants of health are very powerful in low-income countries, and it would be a cruel delusion to wait for economic growth and rising incomes to solve environmental problems that can and should be urgently addressed. Environmental protection and preventive health strategies are closely interconnected.

ASSESSING RISKS TO HUMAN HEALTH

According to the World Health Organization (WHO), almost one third of the global disease burden can be attributed to environmental risk factors. That means that preventive strategies can be deployed by many sectors in society to avert harm in the form of death, disability, and illness. Current assessment of trends in global health includes a ranking of risk factors that contribute to the burden of disease to life and disability, expressed as disability-adjusted life years (DALYs).² The World Health Report (2002) ranked the risks of death and DALYs lost globally, with interesting implications for environmental health planning. This approach is more expressive than simply ranking diseases because many risks are mediated by influences in the physical and policy environments (natural resource endowments, home and work environments, food and price policies, trade agreements, and subsidy structures, among others). Health risks may not display their full impact until well into the future; policies and actions should be based on current prevalence and projected trends in major risk factors.

The ordering of major health risk factors in developed and developing countries shows similarities and differences (Table 1.1). In the poorest regions of the world, childhood and maternal underweight, unsafe sex, unsafe water and sanitation, poor hygiene, indoor smoke from solid fuels, and various micronutrient deficiencies are major contributors to loss of healthy life. In both developing and developed regions, tobacco, alcohol, high blood pressure, and high cholesterol are major causes of the disease burden.

Several striking features emerge. First, despite clear differences driven by wealth and degree of industrialization, there is a convergence of risks throughout the world, albeit with varying weights. Most of these risks can be influenced by prudent management of the natural, work, and policy environments to a degree not appreciated before.

Table 1.1 Leading 10 Risk Factors that Contribute to the Burden of Disease

Developing countries		Developed countries
High Mortality	Low Mortality	
1 Underweight	Alcohol	Tobacco
2 Unsafe sex	Underweight	Blood pressure
3 Unsafe water	Blood pressure	Alcohol
4 Indoor smoke	Tobacco	Cholesterol
5 Zinc deficiency	Body mass index	Body mass index
6 Iron deficiency	Cholesterol	Low fruit & vegetable intake
7 Vitamin A deficiency	Iron deficiency	Physical inactivity
8 Blood pressure	Low fruit & vegetable intake	Illicit drugs
9 Tobacco	Indoor smoke	Underweight
10 Cholesterol	Unsafe water	Iron deficiency

Source: World Health Report 2002

² A composite index of health linked to a productive life referred to as a “year of healthy life saved.” DALY is a weighted index that takes into account loss of life, morbidity, and disability and their collective impact on productivity. The leading risk factors globally (in DALYs) are child and maternal underweight, 138 million; unsafe sex, 92 million; high blood pressure, 64 million; tobacco, 59 million; and alcohol, 58 million. These make up more than a fourth of total disease burden as a group.

Second, developing countries suffer most or all of the burden from many of the leading risks.

Third, infrastructure policies in developing countries will be influenced to reallocate resources to health-promoting investments if the healthy and productive lives of the poor are factored into the equation. This is because such investments often reach the general population more effectively than efforts to target health services to the very poor. The benefits of safe water, sanitation, and energy for household use make a compelling case to improve population health.

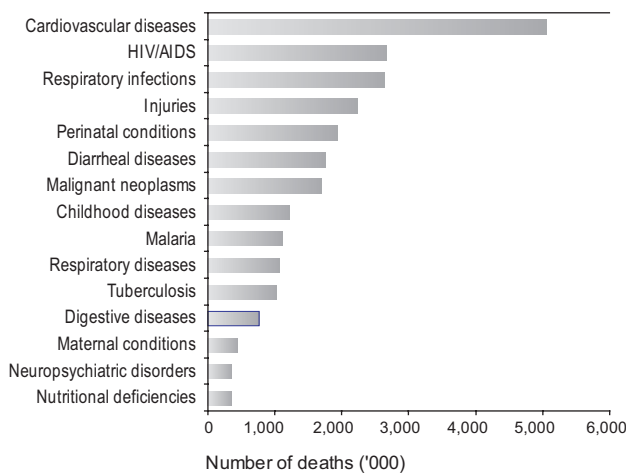
Fourth, the key role of nutrition in health worldwide, and selecting the correct policies to influence nutrition status, is evident. According to Ezzati et al. (2002, 2003), about 15% of the global disease burden can be attributed to the joint effects of “undernutrition”—child and maternal underweight and micronutrient deficiencies. But diet-related chronic diseases (cardiovascular disease, diabetes, and obesity) also have substantial dietary determinants: high blood pressure, high cholesterol, high body mass index, and low fruit and vegetable intake. The latter set of risk factors accounts for almost the same proportion of disease burden as undernutrition.

Fifth, the broad overlap of risk factors in all three types of countries (Table 1.1) suggests that while lifestyle matters, policies that shape collective and individual “choice” may matter even more. Of deep concern is the inexorable progress of tobacco in destroying lives across all country types. Tobacco’s contribution to the global disease burden is predicted to increase

to about 8.3 million deaths and 124 million DALYs by 2020, with more than 70% of these in developing countries (Institute of Medicine 1998). It has been suggested that core policies that evenly reduce risk factors across populations could add a decade of healthy life expectancy globally.

The leading causes of death in the poorest, high-mortality countries (Figure 1.1) show the difficulty of the poor in gaining healthy years of life unless health is seen as an environmental and development issue of great importance. Eight of the top 10 killers in the poorest countries (except for perinatal conditions and childhood diseases) have a heavy environmental burden that coherent policies could reduce markedly. For example, cardiovascular disease (#1) and cancer³ (#7) can be reduced by

Figure 1.1 High-mortality Developing Countries: Deaths in 2001 Attributable to 15 Leading Causes



Source: WHR 2002

³ The International Agency for Research on Cancer (2002) projects a 50% increase in cancer cases to 15 million by 2020, most of the increase in developing countries. Four fifths of cervical cancer deaths occur in developing countries (precipitated by infections in early life) and one fourth of all cancers in poor countries are precipitated by preventable infections (Hepatitis B and C, and human papillomavirus (HPV)). Through the cooperation of economic sectors with the public health services and regulatory authorities, one third of cancers can be prevented and another third can be detected early and treated. The core strategy (not yet deployed in developing countries) is tobacco control; infection control; promotion of healthy diets through public education and supportive price, trade, and agricultural policies; a curable cancer program; and palliative care.

healthy dietary strategies, workplace safety, air pollution abatement, and publicly supported exercise programs. The HIV/AIDS pandemic (#2) can only be averted if seen as a broad development and security issue, requiring cross-sectoral preventive strategies to alter risky behaviors and create affordable treatment regimes. Reducing injuries (#4) and accidents in transport, workplace, and home requires new approaches to safety management and accountability. New approaches to land-use management and community protection are needed to reduce diarrheal diseases (#6) and malaria (#10). The point is clear.

CHILD HEALTH AND THE ENVIRONMENT

Some 40% of the environmentally related disease burden falls on children less than 5-years old (the “under five” group), who account for only 10% of the world’s population. Thousands of children die daily from polluted drinking water and contaminated food. The effects of climate change and air pollution are more damaging to children than to adults, with a growing toll of early deaths. Ten million children under five in developing countries die needlessly each year, and the capacity of health services to cope with this load is limited. Environmental protection through safe energy and safe water and sanitation would reduce deaths from diarrhea and pneumonia by millions each year, and create a new child health revolution. Global immunization and child survival programs do not easily reach the poorest children and the remotest regions in the developing world, where investments in environmentally benign technologies would reap the greatest benefits. The main environmental problems for children are the following.

- *Water and sanitation.* Polluted drinking water and lack of adequate sanitation are responsible for 1.8 million deaths annually, mostly poor children under five suffering from severe diarrhea in developing countries. Some 80–90% of diarrheal disease events are environmentally related. Children drink twice as much water as adults, so the frequency and severity of diarrhea are proportionately higher. Public health programs worldwide have done a good job of saving one million lives each year through case treatment over the last 10 years, but diarrhea prevalence is still very high because of inadequate investment by countries in water supply and sanitation. Children who survive frequent diarrhea bouts early in life are likely to be stunted and frail, with negative consequences later in life.
- *Lead in ambient air and residential materials.* Urban Asian children are regularly exposed to 15 micrograms per deciliter, 50% higher than the United States Center for Communicable Diseases’ “level of concern” where neurological damage and permanent IQ loss have been demonstrated in young children; 80% of Karachi children exceed that level of concern in average blood levels, compared to only 4% of American urban children.⁴ Removing lead from gasoline is the single greatest step to prevent lead poisoning.

⁴ Over the last quarter century, the mean lead blood level of children in the United States fell by 80%, and the number of children with elevated blood levels declined by 90%, because of stricter regulation that gradually detoxified the air, water, and food supply (Perkle et al. 1994). Lead paint is the only remaining contaminant in older, substandard housing. For Karachi data, see Rahbar et al. (2002).

- *Outdoor air pollution.* Outdoor pollution has doubled child asthma rates over the past decade in many Asian cities and communities near major highways, and damages immature lungs, often permanently.
- *Indoor air pollution.* Indoor pollution from biomass fuel combustion causes millions of respiratory and pulmonary injuries to young children, and life-threatening illness to their mothers exposed to carcinogens released by traditional cooking stoves. Indoor air pollution is responsible for a considerable portion of the acute respiratory infections that kill children under five in the developing world.
- *Pesticides.* Pesticides used in agriculture affect the health of thousands of child laborers and children in plantations and other formal agricultural production industries where exposure to toxic chemicals is continuous. Respiratory and pulmonary illnesses, plus acute toxic poisoning in agricultural communities where pesticide-laced irrigation systems pollute groundwater and wells used for residential needs, are other causes of death and disability for young children. Obviously, children absorb greater concentrations per unit body weight through inhalation, ingestion, and contact with the skin, and are less protected because of immature immune systems. Even small doses of neurotoxins can drastically impair the learning process in children.
- *Life-cycle risks.* Life-cycle risks to physical and mental development of children include poor nutrition and inappropriate food policies including subsidies to non-nutritious foods. Rising obesity in school-age children is a stark contrast to pervasive undernutrition in the region, but both states (over- and undernutrition) diminish potential and shorten life.
- *Climate change and other global environmental issues.* Children are disproportionately vulnerable to global environmental problems, such as climate change, the depletion of the ozone layer, and the loss of the planet's biological diversity (WHO, UNICEF, and UNEP 2002).

REPRODUCTIVE HEALTH AND THE ENVIRONMENT

There are clear and present environmental risks for reproductive health in both sexes, and these risks are greater in the developing world. Lead⁵ is a well recognized reproductive toxin that accumulates in the environment. The extent of potential harm that chemicals used in agriculture and industry do to human reproductive health and functions is not yet clear. Known mutagens and teratogens have been widely used throughout Asia in the past, but over time they are gradually becoming subject to regulation, although full population protection is far from assured. The gray (but alarming) area concerns the endocrine disruptor chemicals (EDCs),⁶ chemicals that include

⁵ While many developing countries are moving to unleaded gasoline, this does not deal with the substantial amounts of lead already in the environment because metals are indestructible; hence, lead and carcinogens like cadmium will continue to pose an untreated problem for unborn generations.

⁶ Defined by WHO as "exogenous substances that alter function(s) of the endocrine system and consequently cause adverse health effects in an intact organism, or its progeny, or (sub)populations."

natural and synthetic hormones, pesticides, monomers, additives in the plastics and detergent industries, and persistent environmental pollutants. At present, it is difficult to demonstrate a direct link between exposure and effect, but the multiagency-supported International Programme on Chemical Safety (IPCS 2002) has initiated a long-term research program on EDC effects.

Based on published studies, the human health effects potentially linked to EDC exposure include breast, prostate, and testicular cancer; diminished semen quantity and quality; and impaired behavioral/mental, immune, and thyroid function in children. Some EDCs, e.g., DDT, may interfere with the processes that control development and growth of children. Infants and toddlers are at special risk, because of the crucial role that the endocrine system plays in development. Potential ecological effects include altered sex differentiation, malformations in reproductive organs, altered immune function, and altered population levels.⁷ Hormonal disruptions affect developing organisms more severely and permanently than adult organisms. Under WHO leadership, regional health risk assessments are ongoing and should be watched carefully for guidance on restricted production and trade practices in the chemical industry.

ADULT HEALTH AND THE ENVIRONMENT

The emerging role of adult health in the economic welfare of developing countries cannot be overly emphasized. Working-age adults are the economic engine for growth and development. Economic growth requires a sophisticated and skilled work force that can utilize resources efficiently. The “disposable worker” idea runs contrary to sustaining a skilled and experienced work force that can be efficient.

Developing nations now face a set of new adult health problems superimposed on traditional health concerns. By 2020, with the exception of subSaharan Africa, all countries are expected to have more deaths from chronic noncommunicable diseases than all communicable diseases combined. Even in the face of an expanding HIV/AIDS epidemic, the so-called western diseases (cardiovascular diseases, hypertension, cancer, chronic respiratory diseases, diabetes, among others) will be the major causes of mortality even in the poorest nations. Changes in nutrition, increased smoking habits, greater environmental pollution, and increased workplace hazards are the main reasons for the shift from communicable to noncommunicable causes of mortality and morbidity. This is not to say that communicable diseases will decline to the extent that noncommunicable diseases increase, but rather that developing nations will have to contend with a double burden of diseases. Reducing the effects of risk factors that can be minimized is of major importance if developing countries are to be spared some of the economic implications of the epidemic of adult diseases.⁸

⁷ These effects have been observed in invertebrates, fish, amphibia, reptiles, birds, and mammals.

⁸ Private communication from Dr. Ian Greaves, University of Minnesota School of Public Health.

GLOBALIZATION AND HEALTH

Economic globalization has been described as a “mixed blessing” for health (McMichael and Beaglehole 2000). Global environmental changes include “altered composition of the atmosphere, land degradation, depletion of terrestrial aquifers and ocean fisheries, and loss of biodiversity... Contemporary public health must therefore encompass the interrelated tasks of reducing social and health inequalities and achieving health sustaining environments.”

Consider the visceral public reaction to the Asian brown cloud⁹ that has threatened millions of Asian lives and dimmed hopes for a better future. There are no panaceas, but this draws attention to health as a regional public good and to the intersectoral linkages needed to create development and economic policies that create and sustain such goods. The controversial role of trade, given the fractious closure to the World Trade Organization (WTO) September 2003 meeting in Cancun, is easier to avoid, but it is argued that without breakthroughs in trade policy it will be difficult to alter the social determinants of health.

FRAMEWORK AND STRUCTURE OF THE PRIMER

This Primer examines the heavy weight of environmental factors on disease burden of the poor in developing Asian countries, and discusses effective policies, programs, and project design principles that will help poor countries meet the millennium development goals (MDGs) for health described in Figure 1.2.

The Primer focuses on sectors of the economy that have powerful influence on the determinants of health: agriculture and forestry, water and sanitation, energy, transport, urban development, and education. It explores the opportunities for the public and private sectors to interact with civil society for health improvement as a governance triumph and safeguard, and concludes with reflection on regional public goods for health and environmental protection as a challenge for governments and development partners collectively.

The sectoral chapters are the core and address the decision-making framework of a minister or a program manager in a development agency. Each chapter asks and attempts an answer to four questions: How can sectoral policies and strategies be shaped to reach their technical objectives while protecting and promoting human health at a high level? If existing approaches inadvertently harm human health, how can programs take midcourse corrective actions that improve the healthy life expectancy of the poor? What are the key issues and questions that a minister or program manager needs to consider in designing an effective and sustainable set of initiatives that promote health as a defining development outcome? Are there referenced “best practices” for pro-health sectoral strategies and examples of model programs with potential for replication?

Underlying these questions is the quest to identify performance indicators that monitor progress toward the health MDGs and true poverty reduction. Improvement in population health emerges from this exercise as a common coin whose expenditure will

⁹ According to a recent WHO report, this cloud covers the entire South Asian subcontinent with a mixture of combustion particulates of fossil fuels and biomass that is constantly replenished by economic and domestic activities of one third of the global population, but is also fragmented and recirculated as pollution concentrates worldwide.

Figure 1.2 Health-related Millennium Development Goals

Goal # 1: Eradicate Extreme Poverty and Hunger

- Target: halve, between 1990 and 2015, the proportion of people who suffer from hunger
- Indicators: prevalence of underweight children under five years of age; proportion of population below minimum level of dietary energy consumption

Goal # 2: Achieve Universal Primary Education

- Target: ensure that, by 2015, children everywhere, boys and girls alike, will be able to complete a full course of primary schooling
- Indicators: net enrollment ratio in primary education; proportion of pupils starting grade 1 who reach grade 5; primary completion rate; literacy rate of 15 to 24-year olds

Goal # 3: Promote Gender Equality and Empower Women

- Target: eliminate gender disparity in primary and secondary education, preferably by 2005, and to all levels of education no later than 2015
- Indicators: ratio of girls to boys in primary, secondary, and tertiary education; ratio of literate females to males among 15- to 24-year olds; share of women in wage employment in the nonagricultural sector; proportion of seats held by women in national parliament

Goal # 4: Reduce Child Mortality

- Target: reduce by two thirds, between 1990 and 2015, the under-five mortality rate
- Indicators: under-five mortality rate; infant mortality rate; proportion of 1-year-old children immunized against measles

Goal # 5: Improve Maternal Health

- Target: reduce by three quarters, between 1990 and 2015, the maternal mortality ratio
- Indicators: maternal mortality ratio; proportion of births attended by skilled health personnel

Goal # 6: Combat HIV/AIDS, Malaria and Other Diseases

- Target: have halted by 2015 and begun to reverse the spread of HIV/AIDS
- Indicators: HIV prevalence among young people aged 15 to 24 years; condom use rate of the contraceptive prevalence rate; number of children orphaned by HIV/AIDS
- Target: have halted by 2015 and begun to reverse the incidence of malaria and other major diseases
- Indicators: prevalence and death rates associated with malaria; proportion of population in malaria-risk areas using effective malaria prevention and treatment measures; prevalence and death rates associated with tuberculosis; proportion of tuberculosis cases detected and cured under directly observed treatment short-course (DOTS)

Goal # 7: Ensure Environmental Sustainability

- Target: integrate the principles of sustainable development into country policies and programs and reverse the loss of environmental resources
- Indicator: proportion of population using solid fuel
- Target: halve by 2015 the proportion of people without sustainable access to safe drinking water
- Indicator: proportion of population with sustainable access to an improved water source, urban and rural
- Target: by 2020 to have achieved a significant improvement in the lives of at least 100 million slum dwellers
- Indicator: proportion of urban population with access to improved sanitation

Goal # 8: Develop a Global Partnership for Development

- Target: in cooperation with pharmaceutical companies, provide access to affordable essential drugs in developing countries
- Indicator: proportion of population with access to affordable essential drugs on a sustainable basis

revalue a range of investments by generating a powerful stream of benefits through heightened awareness of new design possibilities across all development sectors.

The structure of the sectoral chapters follows a common format. First, indicators of potential impact of health interventions, including the relevant MDGs, are set out. An overview of health-related issues in the sector follows and the key issues are detailed in tabular format. Some key questions that a minister, project officer, or project assessor could ask in relation to improving health outcomes are provided, and a prototype project is outlined to show how health interventions have benefited or would benefit the project outcomes. A set of frequently asked questions is given next to increase the knowledge of project officers on the nature of the health issues in the sector. A glossary at the end of the book explains the technical terms used. Finally, some best practices with regard to improving health are provided. References to sources used and to further information close each chapter.

The last two chapters step beyond the confines of individual sectors dominated by the public sector at country level. The chapter on Public-Private Partnerships takes the issues further than what might be supported with standard loans to the public sector and places sustainable health and environment in a broader context of interested parties and advocates. Through examples, the chapter illustrates how public-private partnerships with civil society have worked effectively. These are time-consuming relationships to create, but the sustainability of initiatives funded by development partners will increasingly depend on these types of partnerships.

The final chapter presents a priority set of “regional public goods” to sustain health and environment that are far reaching in their potential importance. The common problems and solutions to environmentally-related health issues argue that regional solutions should be effective and well received. ADB is one of several regional development institutions that can help facilitate these solutions.

Toward Health Impact Assessment as a Decision Tool for ADB and Development Partners

The Primer does not attempt to make any original contribution to health impact assessment (HIA) methodology (for which see ADB 1992; Birley 1995; and WHO 2001c). The Primer is a practical decision tool for project managers in ADB and similar agencies, as well as their counterparts in ministries of developing countries. For ADB officers, the sectoral reviews are intended as an additional reference in designing their projects from the initial preparatory stage to the appraisal and ultimately the implementation phase. Experienced ADB specialists in all the covered sectors provided invaluable assistance in defining relevant issues and questions and in devising prototype projects that incorporate health protection and/or health monitoring as core components. Thus, the Primer is both a “building block” toward a formal HIA process and a work in progress that needs continuous updating based on informed experience and reflective practice.

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2

AGRICULTURE AND FORESTRY SECTOR

AREAS OF POTENTIAL IMPACT

Millennium Development Goals

Eradicate extreme poverty and hunger (#1)

Reduce child mortality (#4)

Ensure environmental sustainability (#7)

Additional Indicators*

Indicators

- Prevalence of underweight in children (under-five years of age)
- Proportion of population below minimum level of dietary energy consumption
- Under-five mortality rate
- Infant mortality rate
- Proportion of land area covered by forest
- Proportion of population with sustainable access to an improved water source
- Pesticide residue levels in drinking water
- Concentration of nitrates and nitrites in freshwater
- Proportion of population living in high-risk malaria areas

* Requires special survey if not found in government agencies

OVERVIEW

Agriculture and its allied sectors of forestry and fisheries drive rural development all over the world. Crop yields provide subsistence and income; the forest is a source of food, fuelwood, and housing; and fisheries offer the protein needed for better nutrition. The agriculture sector contributes to the lives of poor people, especially in addressing hunger and extreme poverty, improving productivity, and promoting the ability of people to achieve their physical and intellectual potential. Sustainable agriculture¹⁰ provides the livelihoods of farmers, especially the poor living in subsistence settings within neglected agroecological zones.

According to the Food and Agriculture Organization of the United Nations (FAO), wood-based fuels are the dominant source of energy for more than 2 billion poor people in developing countries, with about 80% of them using nonwood forest products for health,

¹⁰ Defined as “ecologically sound, economically viable, socially just, culturally appropriate and based on holistic scientific approaches, including indigenous and community-based knowledge systems.” World Summit on Sustainable Development, Johannesburg, September 2002.

income, and nutritional needs. The potential positive effects of forests on nutritional well-being and poverty reduction are many in forestry development projects. In rural areas, fuelwood, forest raw materials, employment in forestry activities, and traditional medicines bring essential income to many households.

Medicines from tree products for both humans and livestock help reduce the incidence of infections that contribute to or worsen malnutrition. Medicines from the forest are especially important for populations with no access to other types of medication. Forests and trees contribute to nutrition by providing many edible products, such as wild leaves and fruits containing vitamins; seeds, nuts, roots, and tubers supplying fats and carbohydrates; and mushrooms, gums, and saps providing protein and minerals. Local people often depend on wild animals to supply most of their protein requirement. Forest foods contribute to diet diversity, supplying nutrients and minimizing seasonal or emergency nutrient shortfalls.

However, people dependent on agriculture, forests, and fisheries have their own share of disease burden. In this regard, prevention of exposure to health risks is the most effective means of protecting farmers and families and the population in general.

In developing countries, health effects from agricultural practices arise partly because of lack of education on the potential hazards involved. About 70% of freshwater used by humans goes to irrigated agriculture. This irrigation water becomes agricultural runoff laden with pesticides, fertilizers, and pathogens. Optimum pesticide and fertilizer applications to crops could avoid excessive inputs that will only be wasted and end up polluting rivers, lakes, groundwater, and soil. Workers can be exposed to toxic chemicals in a number of ways when spraying pesticides: inhalation; absorption through the skin; and ingestion if they eat, drink, or smoke without first washing their hands, or if drinking water has become contaminated with the chemicals.

Some agricultural projects are shifting to cash crops that replace subsistence crops. This has been proven to lead, under certain conditions, to malnutrition not just of children but also adults, especially women. The importance of dietary quality, such as presence of micronutrients in food, has proven effective in terms of disease prevention; yet agricultural projects normally focus only on crop yields. Undernourished people are less productive and cannot obtain food, which makes them susceptible to communicable diseases. The effects of malnutrition, especially on children, include less than average weight or height, reduced mental aptitude, blindness, cretinism, anemia, and poor skin conditions.

Both health and nutrition are affected when agricultural practices contribute to loss of genetic resources for crops and biodiversity more generally, and when plant resources used for traditional medicine and dietary diversity vanish. Misuse of irrigation for agriculture often leads to waterlogging and salination, and both conditions foster rapid proliferation of mosquito species adapted to these habitats, sometimes resulting in serious outbreaks of vector-borne diseases that kill or disable farm workers or members of farm families. Negative health effects of dams and irrigation in the spread of vectors and for water pollution should be considered in agricultural projects by including a monitoring subcomponent when a pattern of population risk exists.

Improving nutrition security of the poor requires more than increasing food production. Effective programs stress food production that raises yields and dietary quality, and link production to employment and microcredit programs to women, whose education and social status largely determine the health and development of young children. Plant breeding programs and community development programs that are targeted to improving nutrition raise schooling achievement and save mothers' lives independent of health service access.

There are obvious economic incentives to include health concerns in agriculture projects. Developing countries and development agencies usually spend less than 5% of their budget on health services, and much less than that on primary health care for the poor. A large part of their budget is spent on infrastructure and agriculture projects, especially in agricultural economies with predominantly rural populations. The negative health impacts of such projects represent a hidden cost that is transferred as a disease burden to be addressed by the health sector.

There are other health-related concerns within the agriculture sector that project staff should also address. Some of these may not be within the direct realm of health but could serve as indicators of any potential health impacts. Some of the following topics, like those above, can be addressed also in the initial project design.

1. Dangerous storage practices and misuse of pesticides as an occupational hazard
2. Reuse of pesticide containers for water storage or makeshift housing parts
3. Overuse of fertilizers and pesticides discharged into irrigation return flow (agricultural runoff) and to rivers and streams
4. Improper use of pesticides and fertilizers, which reduces crop yield
5. Water salinity due to excess irrigation
6. Reuse of contaminated water for irrigation
7. Contamination and build-up of pesticides, heavy metals, and pathogens in the food chain
8. Expansion of habitat of disease vectors
9. Resistance of aquatic insects
10. Over-extraction of groundwater for irrigation, lowering the water table
11. Competitive use of water between agriculture and domestic users
12. Pesticide exposure for workers, women, and children; impact on mortality of children and women, and reproductive health of adults
13. Conversion of primary forests to cropland and impacts on flooding, cropland waterlogging, and morbidity/mortality from vector-borne diseases and enteric diseases
14. Monitoring child health variables as a general rule in project areas
15. Water efficiency in agriculture, equitable access in water users' associations (WUAs)—related to food security of the poor, and impact of drought on household food security and child malnutrition

KEY ISSUES FOR PROJECT MANAGERS

Health Issue	Cause and Exposure	Possible Intervention	Health Benefit
Malaria, Japanese encephalitis, Lymphatic filariasis	Increased breeding sites along forest-fringe areas, hill creeks, lagoons, and irrigation systems	Removal of weeds and plants; canal or river flushing; proper siting of settlements; health education; increased surveillance and insecticide-treated mosquito nets; infrastructure design; water management practices	Reduced incidence of malaria; reduced pesticide usage; improved water management
	Increased breeding sites in ricefields and in seepage areas along canals	Synchronized irrigation for planting and harvesting; biological controls; larvicides	
Schistosomiasis (Bilharzia)	Exposure in ricefields, ponds, irrigation canals infested with flatworm larvae	Environmental modification; health education; access to sanitation, chemotherapy	Reduced incidence of schistosomiasis; improvement in child growth
Pesticide poisoning	Occupational exposure during spraying and applications	Personal protective equipment	Safe identification, procurement, distribution, application, and disposal of agrochemicals Reduced pesticide-related illnesses (acute/chronic mutagenic and carcinogenic) improved productivity
	Accidental ingestion of pesticide liquids and pesticide-laden foods	Awareness campaign; introduction of integrated pest management	
	Drinking from contaminated water sources	Provision of safe domestic water supply	
Malnutrition	Reduced subsistence crops and fish	Crop diversity; homestead production, vegetable and fruit cultivation; fortification; biofortification	Increased school attendance and higher aptitude; lower under-5 mortality rate; increased child weight and height; reduced child/maternal morbidity and mortality
	No access to micronutrients, leading to deficiency	Link with government programs to provide supplemental micronutrients	
Diarrhea and waterborne diseases	Lack of domestic water supply and sanitation; poor personal hygiene, such as hand washing; poor infant feeding practices	Provision of integrated water and sanitary facilities at household or community level; hygiene education	Lower under-5 mortality rate; fewer emergency visits to hospital

KEY PROJECT QUESTIONS

1. Does the initial environmental examination consider health-sensitive locations within the project sites?
2. What are the key health determinants and how will they be affected by the project?
3. Is the project located in a malaria endemic area? Are there malaria prevention measures in place? Are they adequate to address the changed situation?
4. Is the project located in a schistosomiasis endemic area? Are there prevention and control measures in place? Are they adequate to address the changed situation?
5. Is there room in the project design for different irrigation options (surface/overhead), water management practices, infrastructure components, crop selection or others?
6. Will the government provide subsidy for pesticides and fertilizers? Subsidies often result in excessive application of chemical inputs and both environmental and health damage.
7. Are water supply and sanitation facilities adequate in the project sites? Will they be affected by the project?
8. If groundwater is the source of water supply, is water quality monitored and ensured under the new conditions?
9. As part of capacity building of farmers and WUAs, is there provision for health awareness linked to agricultural practices?
10. Do the WUAs include women?
11. Will the WUAs carry out regular maintenance of irrigation canals? Will there be a sufficient economic basis to ensure maintenance once the project is operational?
12. What are the major nutrition problems of the area?
13. Who uses the forests and to what extent (food production, income, fuelwood)?
14. Are there enough subsistence crops to provide for the nourishment of the farmers and their families?
15. Are there enough food supplements from the government accessible to lactating mothers and their children?
16. Are there hygiene education programs in schools and health centers?
17. Is the health service aware of the proposed project in their area? Do they have the capacity to deal with pesticide poisoning and vector-borne diseases?
18. Is there a pattern of in-migration in the area and does this present a risk of imported parasites being transmitted to local inhabitants?
19. Are migrants to the area at risk from local vector-borne diseases?
20. If large groups enter or leave because of employment opportunities, can the project support a health surveillance activity to prevent disease outbreaks from parasites acquired away from “home”?

PROTOTYPE PROJECT

Indonesia: Participatory Irrigation Sector Project

A proposed ADB loan to Indonesia is aimed at sustainable management of water resources and irrigation infrastructure and facilities in a framework of decentralized government. The project includes (i) strengthening local capacity for sustainable irrigation management, (ii) improving the performance of irrigation schemes, and (iii) strengthening the water resources information system.

At the initial environmental examination, problems related to nonpoint sources of agricultural pollution were noted, although Indonesia had withdrawn subsidies for pesticides and fertilizers to avoid overuse. Agricultural extension programs also covered the economic and health effects of pesticides. Nevertheless, farmers and their families would continue to be exposed to pesticides during spraying applications, mainly through inhalation and dermal contact. The project can provide more information to farmers on proper use of agrochemicals and personal protection measures as part of the proposed capacity building. The health services can also be strengthened to deal with accidental cases of pesticide poisoning by additional training and provision of medication.

During the operational stage of the project, the water users' association and the communities could be provided with additional awareness training to make sure that the irrigation canals are maintained properly, not only for successful delivery of water but also to avoid them becoming breeding sites for mosquitoes and other disease vectors. Canal weeding has been found to be an effective prevention tool for malaria and even for schistosomiasis. When communities upstream use irrigation canals for bathing and washing of clothes, the health of downstream communities is placed at risk due to pathogens, soaps, detergents, and bleach. The contaminated irrigation water could convey enteric pathogens, promote algal blooming, and increase levels of persistent detergents. The water users' association could make sure that irrigation canals are being used for the intended purposes only by raising awareness on the direct link between water usage and potential environmental and health impacts.

Prepared with the help of Mr. M. Jamilur Rahman, Southeast Asia Department

FREQUENTLY ASKED QUESTIONS

1. What vector-borne diseases are relevant to agricultural development and agricultural practices?

Malaria, filariasis, dengue, yellow fever, Japanese encephalitis, schistosomiasis, onchocerciasis, and leishmaniasis are of importance in agriculture. All of them are transmitted by such vectors as mosquitoes and flies except schistosomiasis, which is transported by a tiny snail. Most of these diseases are linked to rice production.

2. What is schistosomiasis? What are its symptoms and how is it prevented?

Schistosomiasis is the second most important parasitic infection after malaria. Infection occurs when free-swimming flatworm larvae (cercariae) penetrate human skin to develop as eggs in the bladder or liver. Following infection, the signs are rashes or itchy skin and two months after infection, fever, chills, cough, and muscle aches may occur, as the parasites mature. Untreated infections can result in blood in urine and stools, and enlarged liver and spleen. In children there is a negative impact in terms of growth, nutritional status, and cognitive development.

Infected humans excrete parasite eggs with feces or urine into water and the eggs hatch, releasing larvae that in turn infect tiny aquatic freshwater snails, where the parasite multiplies. Rural people may be exposed to the cercariae during farming, fishing, tending domestic animals, and even swimming. Chemotherapy with praziquantel targeted at school-age children and high-risk groups reduces morbidity, but it is best for people to recognize the snail species and to avoid exposure by not entering infested water.

Infrastructure improvements are critical. Community and household sanitation facilities prevent contamination of water sources. Protected pathways from farm to fields minimize exposure, especially for children. Protected drinking water sources also prevent infection by parasites.

3. What emerging issues in agriculture have potential to affect human health?

- Genetically modified crops
- Viruses (from livestock or wild animals) that are transferred to humans
- Pesticides that mimic hormones and interfere with reproductive systems
- Tradeoffs between high-yield variety crops and pesticide use

4. What is the Stockholm Convention on POPs (persistent organic pollutants) and what are they?

The Stockholm Convention is an international legally binding instrument to reduce and eliminate the production and use of POPs. These are chemicals that remain intact in the environment for long periods, become widely distributed geographically, accumulate in the fatty tissue of living organisms, and are toxic to humans and wildlife. In implementing the Convention, governments commit to take measures to eliminate or reduce the release of POPs into the environment. Nine out of the 12 POPs chemicals are pesticides: DDT, aldrin, dieldrin, endrin, chlordane, heptachlor, hexachlorobenzene, mirex, and toxaphene.

FREQUENTLY ASKED QUESTIONS (Continued)

5. **In evaluating health impacts of agriculture projects, which agencies can be consulted to obtain the best source of health and monitoring information?**
 - Health statistics from departments of health and health districts
 - National and regional census office
 - Environmental monitoring agencies
 - Health surveillance agencies (also nongovernment organizations [NGOs])
 - Water and agriculture agencies
 - Aid and development agencies
 - United Nations agencies, such as WHO, United Nations Fund for Children (UNICEF), and United Nations Population Fund
 - Local health NGOs

6. **What international guidelines are used for safe use of pesticides in agriculture?**
 - a) International Code of Conduct on the Distribution and Use of Pesticides (FAO) www.fao.org/waicent/FaoInfo/Agricult/AGP/AGPP/Pesticid/Code/PM_Code.htm
 - b) International Programme on Chemical Safety (WHO) www.who.int/pcs/

BEST PRACTICES IN IRRIGATION

Design

- Weeds and grasses are removed from irrigation canals regularly to eliminate the breeding habitats of mosquitoes.
- If domestic wastewater is reused for agriculture, it is suitably treated to reduce pathogens and heavy metals to an acceptable level. (Bos et al. 2003)
- Adequate water supply and sanitation are provided so that irrigation canals are not used for drinking, swimming, washing of clothes, defecation, or bathing.

Operations

- Water quality of rivers, irrigation return flow, and groundwater should be monitored occasionally for pesticides and fertilizers to detect contamination and growth of blue-green algae or water hyacinths.
- In farmer field schools, farmers should learn about the proper application of pesticides with emphasis on personal protection, in the context of integrated pest management.
- Local groups, such as people's organizations, WUAs, and cooperatives should be formed to promote equitable use of water and awareness of the links between health and agriculture.

WEB SITES AND REFERENCES

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<http://www.cgiar.org/iwmi/pubs>
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3

WATER AND SANITATION SECTOR

Water promises to be to the 21st century what oil was to the 20th century: the precious commodity that determines the wealth of nations. Fortune.

AREAS OF POTENTIAL IMPACT

Millennium Development Goals

Eradicate extreme poverty and hunger (#1)

Reduce child mortality (#4)

Ensure environmental sustainability (#7)

Additional Indicators

Indicators

- Prevalence of underweight in children (under-5 years of age)
- Under-five mortality rate
- Infant mortality rate
- Proportion of population with sustainable access to an improved water source
- Proportion of people with access to improved sanitation
- Improved conditions for slum dwellers
- Prevalence of disease outbreak from diarrhea and cholera*
- Concentration of physicochemical contaminants in drinking water**
- Presence of fecal coliform in freshwater**

* Available from local health centers, hospitals, ministries of health

** Requires sampling and analysis if not available from monitoring agencies

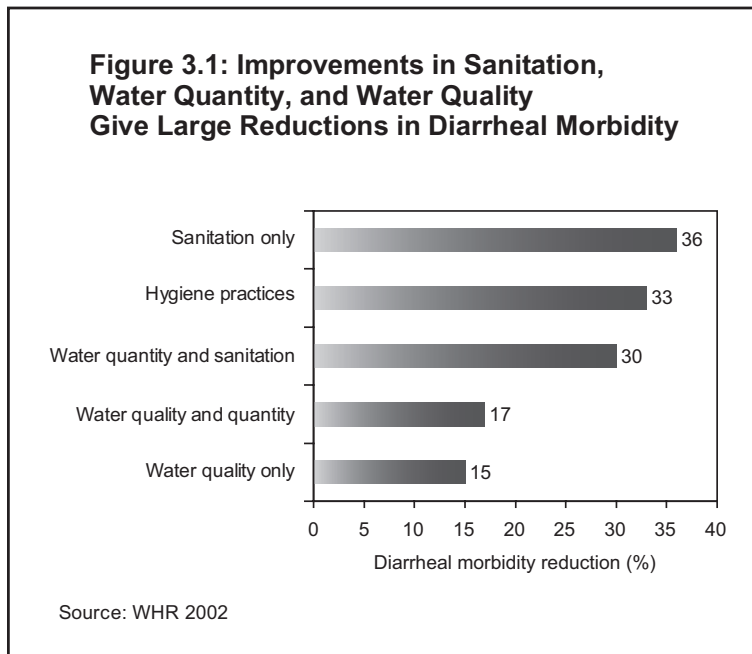
OVERVIEW

Water is fundamental for life and health and it cuts across the main development agenda of poverty reduction and sustainable development. The average water share of ADB lending and technical assistance has increased with its “Water for All” sector policy. ADB’s water projects have been mainly for irrigation and drainage followed by water supply and sanitation. Often, there is competition for water between irrigation and industrial, commercial, and household purposes, which compromises the needs of people. While irrigation takes up 70% of the total freshwater supply in the world, less than 10% is available for human consumption. This precious commodity should be protected and used judiciously to improve people’s lives.

Poor women and children are particularly affected by lack of access to safe water supply because they have to fetch and carry water from remote places, leading to exposure to schistosomiasis and malaria. With limited water, they tend not to drink and cleanse adequately, thus promoting water-washed and waterborne diseases. Inadequate water, sanitation, and hygiene are primary causes of diseases such as malaria, cholera, dysentery, schistosomiasis, infectious hepatitis and diarrhea, and trachoma associated with 3.4 million deaths each year. Essential to primary health care and health promotion is access to safe water sources. Water availability as part of disease prevention could solve more than half of the universal illnesses common to humanity.

In providing the hardware of water supply and sanitation, hygiene education has been recognized as a critical disease intervention measure. WHO and UNICEF estimate that approximately 1 billion cases of diarrhea occur each year with 3.3 million deaths, mostly among children under five. However, it has been proven effective that hand washing with soap and water after using the toilet and disposing of children’s feces can reduce diarrhea by 35% or more. It is, therefore, important to effect behavioral change as part of projects in this sector by encouraging personal and domestic hygiene.

Water sector programs are critical to saving lives of young children, and ensuring that the physical and mental development of preschoolers allows them to learn well, to complete schooling, and become productive adults. The benefits increase when water and sanitation are combined. For example, there are large reductions in diarrheal morbidity through improvements in water, sanitation, and hygiene practices, as shown in Figure 3.1.



A recent review of the contribution to global disease burden of poor water, sanitation, and hygiene estimates that these account for 4.0% of all deaths and 5.7% of the total disease burden (in DALYs) occurring worldwide, including diarrheal diseases, schistosomiasis, trachoma, ascariasis, trichuriasis, and hookworm disease (Pruss et al. 2002). These estimates are based mainly on intervention studies and are probably understated.¹¹ The proportionate burden is to be likely higher in poor developing regions.

The cross-sectoral issues involved in water-related projects will eventually include many stakeholders, such as WUAs and church groups, during project development and implemen-

ation. Both the positive and negative health outcomes of water development projects can be disseminated among these stakeholders as part of capacity building and information and education campaigns.

¹¹ For example, both malnutrition and vector-borne diseases (e.g., malaria) account for a considerable proportion of the disease burden, and are related to quality of water, sanitation, and hygiene; but because the attributable fraction of water-related disease burden is not precisely known, no estimate has been included in the water cluster.

Macro-planning issues also influence the prudent design, siting, and management of water resources to optimize human benefits, especially health of the poor. The relationship between forestry protection and sustainable watershed planning is obvious, but frequently overlooked for its potential benefits to human health. The impact of groundwater pollution on human health, as illustrated by the regional problem of naturally occurring arsenic contamination of groundwater, is exacerbated by the spread of shallow tubewell irrigation in South Asia and the Mekong basin. Another macro issue is the growing problem of water scarcity, whose primary impact is on expanding drought-prone areas, but whose secondary impact is on intermittent availability of water for nonagricultural uses, undermining household food security, and affecting health and nutrition status, especially of poor women and children.

Human right to water is indispensable for leading a healthy life in human dignity. It is a pre-requisite to the realization of all other human rights especially the rights to adequate food and nutrition, housing and education. Countries will be required to respect, protect and fulfill individuals' rights to safe drinking water and sanitation. This is a major boost in efforts to achieve the Millennium Development Goals of halving the number of people without access to water and sanitation by 2015. United Nations Committee on Economic, Cultural and Social Rights (145 countries)

KEY ISSUES FOR PROJECT MANAGERS

Health Issue	Cause and Exposure	Possible Intervention	Health Benefit
Malaria (caused by anopheline mosquitoes)	Increased breeding sites in water-filled excavations and along irrigation canals, streams, lagoons	Increased malaria surveillance and treatment, bed nets; removal of habitat	Reduced medical cost due to malaria and dengue; reduced school absenteeism; greater productivity
Dengue (caused by <i>Aedes</i> mosquitoes)	Possible epidemic if breeding sites increase near dwellings	Removal of mosquitoes and breeding sites, such as small water containers; biological control (e.g., copepods in Viet Nam); community participation	
Schistosomiasis (Bilharzia)	Skin penetration of free-swimming larvae (from snails) in infested water	Improved sanitation; provision of potable water; environmental modification of habitat; chemotherapy	Reduced infestation; increased child and adult productivity; reduced malnutrition
Diarrhea and other excreta-related diseases	Poor personal and domestic hygiene; contaminated food and drinking water	Hygiene education; provision of safe water	Reduced child underweight, stunting and wasting; reduced school absenteeism
Malnutrition	Loss of subsistence crops from drought or seasonal water losses	Alternate cropping; information campaign	
Arsenicosis, fluorosis, blue baby syndrome, lead poisoning	Chronic drinking of water contaminated with arsenic, fluoride, nitrates, and lead	Regular water quality monitoring; alternative source of safe water	Reduced morbidity and mortality in affected areas
Accidents and injuries	Heavy equipment and machinery during construction	Safety awareness and regulations	Increased productivity; reduced work days lost
Note: Some issues in the water sector are also found in agriculture and urban development sectors.			

KEY PROJECT QUESTIONS

1. How many people will be affected by the project during construction and operation? How many workers will be hired? Are occupational health and safety standards observed during construction? Is there an HIV/AIDS counseling and screening program on-site?
2. Is the hydropower/irrigation project located in a malaria endemic site?
3. Is mosquito control considered in possible breeding sites/nearby villages?
4. Is there a component for monitoring water quality, especially if used for drinking water?
5. Is there a component for monitoring wastewater effluent to make sure it meets environmental regulatory standards?
6. Is there a role for the private sector in the operation and maintenance of water supply and sewerage systems? If so, are they enforcing health and environmental standards and providing access to services for the poor?
7. Are wastewater treatment facilities adequately designed to prevent generation of flies and other vermin?
8. What types of sewage treatment works are in place? Will they create stagnant water and encourage breeding of pests and vectors?
9. Are tubewells or groundwater wells adequately designed and constructed to prevent contamination or infiltration? Will the water quality be monitored, especially for key parameters?
10. Will the design, construction, operation, and maintenance of water supply systems and latrines prevent insect breeding? Are they sited properly?
11. Does the proposed project include an appropriate health education component to encourage the use of latrines and hand washing after each use?
12. Does the project's information campaign include nutrition awareness, especially among women and children to make sure that they are not disadvantaged and become malnourished?
13. Is the health sector aware of the new project and its possible health impacts, and is it capable to deal with medical needs of the project? If not, is there provision in the project for medical attention when necessary?
14. Is the health sector included as part of capacity building and benefit monitoring before and after the project?
15. Will the major users have direct control over maintenance of the facility? If so, is there capacity building to prevent negative health impacts related to the project?

PROTOTYPE PROJECT

Pakistan: Punjab Community Water Supply and Sanitation Sector Project

ADB has approved a loan to the Housing, Urban Development and Public Health Engineering Department of Pakistan for the Punjab Community Water Supply and Sanitation Sector Project. This is the second phase of a successful rural water supply and sanitation project in the rural villages in Punjab Province. The new project has 4 components designed in consultation with the proponents and beneficiaries: a) water supply and drainage construction, b) capacity building, c) hygiene education program, and d) social uplift and poverty eradication program.

In addition to the provision of safe drinking water and drainage facilities, the project has addressed the development agenda of poverty reduction, environmental improvement, and women empowerment. The main beneficiaries are women and children who used to spend large amounts of time fetching water, causing the women to lose productive opportunities and children to lose educational opportunities. These groups also suffered significantly from waterborne diseases because of polluted water and high health care cost. As clean water supply is found at their doorsteps, these beneficiaries can be more productive. Most of the women will engage in income-generating activities like handicraft, embroidery, and tending livestock and poultry besides involvement in farm-related activities. Hygiene education materials will be developed and used among households and schools where water supply and latrines will be installed. It is anticipated that there will be a reduction in the incidence of waterborne diseases, an increase in household income, and increase in the enrollment of school children. The project contains the key components that assure optimum health benefit. Pre- and post-project surveys will be carried out using performance indicators to show how well this was achieved.

Prepared with the help of Mr. Shakeel Khan, Urban Development Specialist, South Asia Department.

FREQUENTLY ASKED QUESTIONS

1. What are the classes of communicable diseases associated with water?

- Water washed – preventable by washing and bathing, e.g., trachoma, scabies, and fungal skin diseases
- Water borne – preventable by clean water and sanitation, e.g., typhoid, dysentery and diarrhea
- Water contact – preventable by removing habitat, e.g., schistosomiasis and guinea worm
- Water related – preventable by removal of breeding site, e.g., malaria and dengue

2. What is a favorable habitat for vector mosquitoes?

Mosquitoes do not breed or live in waters deeper than about 1.5 meters, in the margins of reservoirs, canals, streams, lagoons, or in forest fringes. They prefer protected areas, where water contains aquatic vegetation and other floating material. Regular maintenance of shoreline and drainage is effective in controlling mosquitoes.

3. How far away from mosquito sources should resettlement be sited?

Apart from considerations of tradition and cultural background, settlements should be as far away from mosquito sources as possible, and at least 1.5 kilometers (km).

4. What precautions should be taken to reduce the risk of mosquito vector production in irrigation schemes?

Each flood period should be no more than 3–4 days. After removing the water, the areas should be allowed to remain dry for at least one day. Provide properly planned and maintained drainage to avoid creation of pools of water, which are mosquito habitats.

5. What naturally occurring chemicals found in water can cause diseases?

Arsenic, fluoride, lead, and cadmium have been found to be naturally occurring in groundwater wells of more than 20 countries. Chronic drinking of contaminated water laden with arsenic can result to hyperkeratosis, birth defects, reproductive problems, and various types of cancer, such as bladder, lung, skin, kidney, and liver cancer. Excessive fluoride can cause dental and skeletal fluorosis. Exposure to low levels of lead over an extended period can damage the brain, kidneys, nervous system, and red blood cells, especially of pregnant women and children. Lead can impair a child's development, resulting in learning disabilities or stunted growth.

6. What is the standard meaning of “reasonable access” to water?

According to WHO and UNICEF, “reasonable access” to water means availability of 20 liters per person per day from a source within 1 km of the user's house.

7. What indicators can be used to alert for possible future health impacts?

- Turbidity in drinking water (> 1 NTU [nephelometric turbidity unit])
- No water disinfection
- Access to water supply (< 50%)
- Access to sanitation (< 50%)
- Poor or inadequate health service

BEST PRACTICES IN WATER SECTOR PROJECTS

- Regular inspection of dams for any stress, leaks or potential dam failure with evacuation plan and emergency response preparedness.
- Reforestation of watershed of the dam and regular removal of debris on the reservoir.
- Public safety reports that are conveyed to the downstream communities.
- Collection of health statistics such as morbidity, mortality, accidents, and injuries over time.
- Routine monitoring of water quality of groundwater wells, rivers and lakes and coordination with environmental agency and the stakeholders.
- Personal protective equipment provided to workers during construction and operation of projects.
- Medical check ups and records as part of occupational health and safety policies.
- Regular maintenance of groundwater wells, hydrants, and ancillary structures to avoid leakages and puddles, which can result in intensive vector contact.

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4

ENERGY SECTOR

AREAS OF POTENTIAL IMPACT

Millennium Development Goals

Reduce child mortality (#4)

Improve maternal health (#5)

Ensure environmental sustainability (#7)

Additional Indicators*

Indicators

- Under-five mortality rate
- Maternal mortality ratio
- Proportion of population using solid fuels
- Carbon dioxide emissions (per capita)
- Proportion of households using coal, wood, or kerosene for cooking and heating
- Concentration of air pollutants in urban areas (particulate matter, oxides of sulfur and nitrogen, dioxide, lead)
- Number/type of polluting industries exceeding emission standards

* Requires special survey if not available from government agencies

OVERVIEW

The energy sector has traditionally been an important component of Asian economic growth and development, and a priority for ADB lending. Electricity provides convenience and amenities to everyday life by providing energy for lighting, heating, cooling, water supply, and power for computers and machinery in households, offices, and factories. It has become indispensable to modern living. Most ADB-supported projects have been on fossil fuel development with some on natural gas. During 1990–2003, only about 3% of the total lending share covered renewable energy sources. Residential uses of primary energy have received weak support relative to commercial and agroindustrial uses of energy.

Major air pollutants produced by power plants burning oil and coal include nitrogen oxides, sulfur oxides, hydrocarbons, dust, soot, smoke, and other suspended particulate matter that cause serious health problems including asthma, irritation of the lungs, bronchitis, pneumonia, decreased resistance to respiratory infections, cardiovascular diseases, various cancers, and premature death. The most vulnerable groups are workers, children, and the elderly.

Children are more susceptible to air pollution than adults. Studies indicate that exposure to air pollutants such as particulate matter, sulfate, sulfur dioxide gas, and ozone can result in reduced lung function, asthma attacks, and adverse birth outcomes, such as slowed development and low-birth-weight infants, coupled with higher premature births and increased hospitalizations, and possible increased risk of infant death. All of these adverse outcomes put children at risk for health problems later in life. Because of exposure to biomass smoke, around 2 million under-five children die annually due to acute lower respiratory infections, particularly pneumonia.

In recent years, there was a consensus in international agreements to place more emphasis on developing technologies that reduce adverse environmental impacts. There has also been an emphasis on less dependence on fossil fuels and to increase reliance on non- or less polluting sources of energy. However, in coal-rich countries like the People's Republic of China (PRC), it is difficult to expect a major switch in fuel mix in the foreseeable future. A good compromise would be to provide air pollution control facilities or use cleaner coals.

The importance of "green" or less polluting energy sources has been increasingly recognized in many parts of the world. An ADB loan to India promoted wind and biomass-based power through financing of self-sustaining investment in renewable energy and energy efficiency. Four ADB loans provided to the PRC supported increased use of natural gas in urban areas and environmental mitigation in heavily polluted areas by improving energy efficiency. From 1990 to 2000, wind power was the world's fastest growing energy source at 27% per year; it is less expensive than gas and coal-run electricity. Solar energy, along with hydrogen fuel, is also becoming popular, especially in Japan and Germany. In the Philippines, geothermal power contributes 18% of the total electricity output.

Biomass (fuelwood and charcoal) remains an important source of energy in South and Southeast Asia, providing about 20–80% of the energy demand, especially in poorer communities. For many hours of the day, women and children are most affected by the health impacts of wood energy and production. They use inefficient cooking stoves that emit carbon dioxide, methane, and particulates due to incomplete combustion, causing regular indoor air pollution. Typical 24-hour mean levels of fine particulates (PM_{10} [10 microns in diameter]), in homes using biofuels range from 300 to more than 3,000 milligrams per cubic meter (mg/m^3), exceeding the United States Environment Protection Agency standard of $150 mg/m^3$. Exposure to smoke and particulates leads to respiratory diseases and cancer. Women also experience severe backache because of poor ergonomics during cooking and carrying heavy loads of fuelwood. According to WHO, the global burden of disease attributable to indoor air pollution in developing countries is nearly 2 million deaths and 53 million DALYs lost, representing 4.3% of the global total DALYs.

KEY ISSUES FOR PROJECT MANAGERS

Health Issue	Cause and Exposure	Possible Intervention	Health Benefit
Accidents and injuries	Noise and vibration	Personal protective equipment for workers	Reduced absenteeism and improved productivity
	Heavy equipment and machinery during construction	Safety awareness and regulations; reliable and impartial inspection system	
HIV/AIDS and other sexually transmitted infections (STIs)	Migrant sex workers during construction	Routine medical test for infection, awareness campaign, provide condoms	Reduced cost of medical care and absenteeism
Cancers	Discarded transformers with oil-based PCBs	Use non-PCB oil; proper waste disposal	Reduced incidence of cancer mortality
	Carcinogens from coal and biomass burning	Use cleaner fuels	
Respiratory and cardiovascular diseases (coal/oil power plants)	Air pollution from fine particulates and gases	Air pollution control; higher stacks	Reduced incidence of morbidity and mortality among workers and nearby communities
Respiratory diseases (biomass)	Indoor air pollution from cooking with fuelwood stoves	More efficient cooking stoves, proper ventilation, alternative energy source	Reduced incidence of respiratory diseases among women and children
Malaria (hydropower)	Increased breeding sites in water-filled excavations during construction	Surveillance and treatment; environmental management measures	Reduced incidence of malaria
Poisoning (geothermal)	Hydrogen sulfide (H ₂ S) emissions; heavy metals from geothermal scale and sludge	Installation of H ₂ S concentration sensors; proper hazardous waste disposal	Reduced risk of contamination of air, water, and soil and minimized poisoning

KEY PROJECT QUESTIONS

1. How many people will be affected by the project during construction and operation?
Is there an HIV/AIDS counseling and screening program on-site?
2. Are air pollution control facilities included in the project design?
3. What types of air pollution control will be in place?
4. Are occupational health and safety standards observed during construction and operation of the power plant?
5. Is there provision for monitoring of ambient air quality?
6. What are the other sources of emissions in the project site?
7. Can the plant comply with air emission standards in the country?
8. Is the hydropower plant located in a malaria endemic site?
9. Is there a health service and is it capable of dealing with occupational injuries and diseases?
10. Is the health sector included as part of capacity building and monitoring?
11. Are women involved in the decision making for selection of alternative energy sources, especially for domestic purposes?

PROTOTYPE PROJECT

Dhaka Clean Fuel Project, Bangladesh

This 2002 energy project is primarily an economic growth and environmental and health improvement project. It is also aimed at improving the infrastructure for transmission and distribution of compressed natural gas (CNG) within the Dhaka region to improve the ambient air quality in the city and reduce the incidence of respiratory diseases, especially among the poor who are most vulnerable. The project components include a) construction of a 60-km extension of the gas transmission pipeline; b) construction of a gas distribution network; c) establishment of CNG filling stations; d) purchase of CNG-fueled buses, auto rickshaws, and conversion kits; and e) capacity building.

The capacity building and training will involve new safety codes and environmental management, such as emission standards and regulations related to the conversion and use of CNG equipment for the transport sector. In addition, the health benefits of CNG, a nonpolluting fuel, will be emphasized during the awareness campaigns among the general population.

There are obvious direct benefits that will be brought about by this project and one of them is improved air quality to approximately 10 million people in Dhaka, 36.6% of whom live below the poverty line. There will be improvement in health status of the general population, resulting in a reduction in household expenditures on medical services, thus indirectly contributing to poverty reduction. Once the national air quality standard is achieved for suspended particulate mater in Dhaka, it will likely result in a corresponding reduction of about 3,600 premature deaths, 10 million restricted-activity days, and 87 million days of respiratory symptoms per year.

The project could also develop a stronger link between the environment and health departments through monitoring and surveillance. The health department could establish disease surveillance systems within the radius of influence or airshed of the ambient air quality monitoring stations to acquire statistical data showing the improvements from the project. These data could be presented to the public and decision makers to demonstrate the positive health outcomes arising from the project.

An environmental management plan that will provide for the mitigation of adverse impacts (including impacts on population health) should ensure that the institutions involved will be responsible for implementation of the proposed measures.

Prepared with the help of Mr. Carl Mats Elerud, South Asia Department.

FREQUENTLY ASKED QUESTIONS

1. What is particulate matter (PM) and how is it harmful to humans?

Particulate matter is a mixture of combustion particles, sulfate aerosols (including droplets of sulfuric acid), and nitrate aerosols, as well as particles from soil or sea spray. Most monitoring stations measure only its concentration without any detail on composition. Particles of more than 10- μm diameter are stopped in the upper respiratory ducts and appear less harmful. Between 2.5 μm and 10 μm , the inhalable particles penetrate more deeply into bronchi and bronchioles; particles smaller than 2.5 μm reach the alveoli of the lungs. Studies of adult mortality from cardiovascular diseases due to air pollution attribute most of the risk to particulate matter smaller than 2.5 microns ($\text{PM}_{2.5}$). In the past, most monitoring stations have measured PM_{10} ; in recent years some have also measured $\text{PM}_{2.5}$. The average ratio of $\text{PM}_{2.5}/\text{PM}_{10}$ is 0.60, based on typical ambient concentration data in the United States and the European Community, but the ratio is higher in developing countries, especially where fossil fuels are used.

2. Which renewable energy technologies have potential as future electricity sources in Asia?

Off-grid solutions to rural energy systems as alternatives to the high cost of electricity grid extension are small-scale hydropower, wind energy, solar energy (solar photovoltaic cells, solar thermal power, and solar heating), biomass, hydrogen fuel, and geothermal energy. Hydropower, and wind, hydrogen fuel, and direct solar energy are inexhaustible. Recently, hydrogen fuel cells have been found most promising, especially in Europe and Japan, because they are cost-effective with little environmental and health risk.

3. What are the known environmental and health impacts of renewable energy sources?

For biomass, the technologies considered are combustion with steam turbines or gasification with gas turbines. There are significant health impacts from the air pollution emitted by the power plant and by the machinery needed for the production and transport of the fuel. For hydro, geothermal, photovoltaic, and wind power, there are no emissions from power generation, but there are upstream emissions from the production of the materials. The impacts of hydropower can range from beneficial (irrigation, flood control, or recreational facilities) to extremely harmful if large populations are displaced without compensation or if a dam breaks, and because of environmental and ecological changes. During exploitation and operation, geothermal power plants release high concentrations of hydrogen sulfide, which can be lethal at times; they also produce residues, such as sludges and scales, that may contain heavy metals.

FREQUENTLY ASKED QUESTIONS (Continued)

4. What major global initiatives deal with climate change, greenhouse gas reduction, and air pollution control?

- Implementation of the Kyoto Protocol and the Clean Development Mechanism
- Poverty and Environment Fund (ADB)
- Renewable Energy, Energy Efficiency, and Climate Change
- The Netherlands Cooperation Fund on Promotion of Renewable Energy, Energy Efficiency and Greenhouse Gas Abatement
- The Canadian Cooperation Fund on Greenhouse Gas Abatement, Adaptation and Carbon Sequestration
- The Danish Cooperation Fund on Renewable Energy and Energy Efficiency in Rural Areas and Market Towns
- Asia Least-cost Greenhouse Gas Abatement Strategy
- Global Environment Facility (accessible to ADB)

More information about each initiative is found in the respective websites in Annex 3 (energy sector).

5. What are the health effects associated with indoor air pollution from the use of biomass fuel?

Health effects associated with indoor pollution from biomass fuels are childhood acute respiratory infections, chronic obstructive pulmonary diseases, other respiratory diseases, adverse pregnancy outcomes (e.g., stillbirth, low birth weight), lung cancer, and eye problems. Generally, women are not sufficiently aware of the hazards and the need for ventilation, and do not relate smoke to health problems in their family.

6. What are the potential interventions for reducing indoor air pollution in developing countries?

WHO has recommended the following interventions:

- Improved cooking devices
- Alternative fuel-cooker combinations
- Reduced need for fire
- Improved ventilation
- Proper kitchen design and location of the stove
- Reduced exposure
- Avoidance of smoke
- Alteration of food preparation

Also, NGOs, such as women's groups and church groups, can participate in putting together projects to develop better-designed stoves. In addition, they can launch public awareness activities on the health effects of biomass smoke and on the use of efficient stoves and proper ventilation as good interventions.

BEST PRACTICES IN ENERGY PROJECTS

Hydropower

- Regular inspection of dams for any stress, leaks, or potential dam failure, with evacuation plan and emergency response preparedness.
- Reforestation of the dam's watershed and regular removal of debris on the reservoir.
- Public safety reports that are conveyed to the downstream communities.
- Collection of health statistics, such as morbidity, mortality, accidents, and injury over time.
- Monitoring downstream pools to prevent malaria transmission.
- Prevention of water pollution to nearby communities from poorly managed outflows of dam sites.
- Monitoring water quality within the contiguous watershed.

Thermal power

- Routine monitoring of ambient air quality and coordination with the environmental agency and stakeholders.
- Provision of onsite secure landfill for fly ash and bottom ash from coal power plants.
- Personal protective equipment for employees during construction and operation of power plants.
- Medical check ups and records included in occupational health and safety policies.

Renewable energy

- For household biomass energy use, efficient cooking stoves and proper ventilation.
- Calculate health "savings" from introduction of renewable energy in place of fossil fuels.

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5

TRANSPORT SECTOR

AREAS OF POTENTIAL IMPACT

Millennium Development Goals

Achieve universal primary education (#2)

Reduce child mortality (#4)

Improve maternal health (#5)

Ensure environmental sustainability (#7)

Additional Indicators*

Indicators

- Net enrollment ratio in primary education
- Proportion of pupils starting Grade 1 who reach Grade 5
- Literacy rate of 15–24-year olds
- Under-five mortality rate
- Infant mortality rate
- Maternal mortality ratio
- GDP per unit of energy use (proxy for energy efficiency)
- Concentration of air pollutants in urban areas
- Average road traffic volumes/densities (cars, trucks, buses, two-stroke engines)
- Proportion of population living in proximity to dense traffic

* Requires special survey if not available from government agencies

OVERVIEW

Transport and communication facilities have made the world a smaller and better place by linking people and improving their productivity. The transport sector has a far-reaching effect on the daily lives of people: it takes them to their destination and promotes their mobility to go to work, school, market, and recreation. Farmers and traders are able to transport their produce and goods to business centers. Sick people, especially women, can have access to health care facilities during emergencies. Workers can get to factories and offices and children can go to school. The link between transport and education is further reinforced in the Education Sector chapter (Ch.7).

While expansion of transportation networks yields positive benefits, like most infrastructure development, there are unintended effects on human health. WHO has

identified the following health issues in the transport sector in its 1999 Charter on Transport, Environment and Health: i) traffic crashes, often caused by high speeds, are a major cause of death and serious injury; ii) road transport is a major contributor to human exposure to air pollution; iii) increasing exposure to levels of traffic noise can damage hearing permanently; iv) physically active forms of transport offer significant positive health effects; v) heavy road traffic can divide communities and reduce social support; vi) vulnerable groups are affected by traffic—particularly people with disabilities, older people, children and young people, and people living or working in areas of high pollution and noise; and vii) traffic crashes can have devastating impact on low-income households and can contribute to poverty.

The various risk factors and causes of health effects in the transport sector are road safety, hazardous materials transport, airborne pollutants, noise, vibration, and heavy equipment use. There are two types of impacts related to roads and highways: temporary impacts associated with the construction phase and permanent impacts due to the road's existence, such as accidents, noise, and air pollution from motor vehicles. There is growing scientific evidence on health effects of air pollution. Country capacities must be strengthened to assess and manage these health risks. Traffic crashes put a huge burden on medical expenses. These could be significantly reduced through institutional and behavioral reforms that may take place over time beyond the life of the development activity.

Around 44% of the world's road deaths occur in Asia and the Pacific, despite the region's owning only 16% of total motor vehicles. In Asia alone, the costs of damage due to traffic crashes are about US\$24.5 billion every year (Jacobs and Aeron-Thomas 2000). This is more than the total assistance received (from all sources) by the region.

Every year more than 1.17 million people die in road crashes around the world with about 70% occurring in developing countries and 65% of deaths involve pedestrians and 35% of pedestrian deaths are children. Over 10 million are crippled or injured each year. It has been estimated that at least 6 million more will die and 60 million will be injured during the next 10 years in developing countries unless urgent action is taken. The majority of road crash victims (injuries and fatalities) in developing countries are not the motorized vehicle occupants, but pedestrians, motorcyclists, bicyclists and non-motorized vehicles (NMV) occupants. World Bank.

The Global Burden of Disease study undertaken by the WHO, Harvard University and the World Bank showed that in 1990, traffic crashes were assessed to be the world's ninth most important health problem. The study forecasts that by the year 2020 road crashes would move up to third place in the table of leading causes of death and disability facing the world community.

Road crashes can have particularly devastating effects on the poor. For example, 75% of all poor households affected by a road death in Bangladesh reported a decrease in their living standard compared to 60% of nonpoor households.

Emissions and noise from motor vehicles have been found to contribute significantly to air pollution, especially in urban areas. Exposure to outdoor air pollution, particularly fine particulates and lead, is associated with a broad spectrum of acute and chronic health effects ranging from irritation to fatal outcomes. Asthmatics, children, and the elderly are most vulnerable. Children in many developing countries have been found to

have elevated lead levels in their blood because of the continued use of leaded petrol. Excessive blood lead in children is associated with poor learning abilities, stunting, and misdemeanors. Noise pollution has often been overlooked as a high risk and stress factor, especially to women, children, and noise-sensitive people. According to WHO, regular exposure to noise at more than 55 decibels (audible; dB(A)) can lead to sleep disorders, hearing loss, depression, and a general negative effect on health and well-being.

Around 500,000 Asians die prematurely from air pollution every year, while 3.8 million suffer from health problems such as asthma and respiratory diseases. The burden in terms of health cost ranges from US\$392 million to US\$2.16 billion annually (ADB 2003b).

Development projects should promote the safe use of sustainable and environmentally acceptable modes of transport that are nonmotorized (such as walking and cycling), public/mass transport, and private motor vehicles. Countermeasures, such as public information on use of helmets and safer road environments (bicycle lanes and footpaths), need to be included to cater to the needs of such groups. Traffic management should include not only free movement of motorized vehicles but also making sure that people, especially vulnerable road users, can move freely without endangering their lives.

KEY ISSUES FOR PROJECT MANAGERS

Health Issue	Cause and Exposure	Possible Intervention	Health Benefit
Traffic crashes	Unsafe roads and highways; lack of proper road signs	Safety audits; improved emergency services; hazardous location improvement program; road safety public information campaign; improved regulation and enforcement	Reduced medical expenses; reduced disabilities and lives lost; reduction in annual recurring costs (1–2% of GDP/year)
Occupational accidents and injuries	Occupational exposure to dust, noise, and vibration; heavy equipment use during construction	Personal protective equipment; training in safer work practices; awareness campaign; skills training	Reduced accidents and injuries; reduced respiratory infections; prevention of accidents and reduced absenteeism
Respiratory diseases and asthma; child stunting; fatal cardiovascular disease; lung cancer	Airborne pollutants; smoke belching vehicles; fugitive dust	Vehicle maintenance; use of cleaner fuel; protective masks for workers; cleaner vehicle technology; transport and land-use planning; demand management	Reduced hospital admissions; increased child growth; and decrease in sickness and absenteeism
HIV/AIDS and other STIs	Commercial sex providers in construction camps and truck rest stops along major routes; infected workers	Information and education campaign for construction workers; medical screening before hiring; medical packages; provision of condoms in camp clinics	Reduction of possible outbreak of STIs around and beyond the informal settlements; reduced medical expenses and loss of lives
Mental health disorders; deafness	Noise pollution above 55 dB(A)	Noise control measures, such as barriers, and regulations	Increased school performance among children; reduced complaints from the public; better hearing
Reduction of child IQ	Lead and other pollutants in fuels	Regulations on vehicles and fuels; better quality fuels—reduction of benzene, volatile organics, lead, and sulfur in fuel	Enhanced learning and school performance

KEY PROJECT QUESTIONS

1. During the construction stage, are there measures to protect the sensitive population from noise and dust?
2. Are roadside sound barriers in place for noise control along major highways with nearby communities?
3. Are special speed reduction measures in place as rural roads pass through small roadside communities?
4. Is there provision for roadworks signs posted and laid out well to guide road users through new construction and road repair schemes?
5. Are there regulations prohibiting use of heavy equipment and trucks and buses along roads near residential areas at night?
6. Is there a permanent group formulating and coordinating road safety sector plans and implementing measures to permit safe and efficient use of roads?
7. Are occupational health and safety standards enforced during the construction and operation stage?
8. Is there a funded road safety program and awareness in government transport policies and are they implemented judiciously? Do the public sector and NGOs participate?
9. Is there air quality monitoring in place?
10. Is there a hazardous waste transport manifest system in the country? Is it strictly enforced and monitored?
11. Is there an information campaign for workers and communities on STIs including HIV/AIDS?
12. During the construction stage, do the workers have access to medical services? Are condoms available at the camp clinic or store?
13. Does the transport sector encourage use of clean fuels, such as low sulfur fuel, unleaded gasoline, or CNG whenever possible?
14. Is the health sector aware of the project and its possible health impacts? Are health professionals capable of recognizing and treating related illnesses? Should the project include training of public health managers on monitoring of sentinel sites to assess populations at risk from critical levels of exposure?
15. Will pollution arise from the project that will affect the health of pregnant women, young children, and the elderly? If so, is there a component for health impact monitoring?

The checklists of the ADB's energy sector should also be consulted.

PROTOTYPE PROJECTS

Metro Manila Air Quality Improvement Sector Development Program, Philippines

ADB has provided loans and a technical assistance grant to the Philippines implemented over 4 years (2000–2003) to promote policy reforms to improve air quality through the abatement of mobile and stationary sources of air pollution. This project cuts across various sectors, such as transport, energy, and industry. Previous studies have shown that the primary sources of air pollution in Metro Manila are from motor vehicles and power plants and boilers in various industrial processes. Air emissions, mostly due to lead and particulate matter, especially that less than 10 microns (PM₁₀), have exceeded the WHO guidelines and they have been reported to be adversely affecting public health. The country is expected to increase its efforts to improve its economy, such that air pollution from these sources is expected to increase considerably. The project is in support of the Philippine Clean Air Act in 1999 as Republic Act 8749.

The components include a motor vehicle inspection system, an industrial air emissions pollution abatement program, production of clean fuels, introduction of antipollution devices such as catalytic converters, a traffic management and road rehabilitation program, ambient air quality monitoring, raising public awareness, capacity building, and institutional development. The phases of the project allow various stakeholders from government, academe, private sectors (especially transport, industry, and energy sectors), and international and nongovernment organizations, to join in efforts to address the problem of air pollution in Metro Manila. This project shows that protection of public health and reducing incidence of acute and chronic respiratory diseases are best achieved through participation of relevant sectors outside the health sector.

There is also a public health monitoring study within this project, which is implemented jointly with the Government's Department of Health and WHO. This expands on the methodology used in the World Bank's URBAIR report, using population health and air pollution data to produce updated estimates of health impacts. Once completed, the data from this study will serve as the baseline reference for future surveillance of the impact of Clean Air Act implementation on public health.

*Prepared with the help of Mr. Charles Melhuish, Lead Transport Sector Specialist,
Regional and Sustainable Development Department.*

PROTOTYPE PROJECTS (Continued)

Preventing HIV/AIDS in Road Projects in Yunnan Province, PRC

This ADB project will implement a prevention program against HIV/AIDS and other sexually transmitted infections (STIs) in Yunnan Province in the PRC, where a major road project will be undertaken. The Western Yunnan Road Development Project (2003–2005) will build the Baoshan-Longling expressway to improve access between Ruili and Kunming. This will facilitate migration of poor and seasonal workers to other provinces, which may aggravate the spread of STIs to the outer communities.

At the onset, this project provides an “ounce of prevention” by anticipating the most important health risk at the construction stage and providing for control measures to mitigate the potential for disease outbreaks. Mainly coming from the floating population, hundreds of workers who are predominantly young and sexually active will be stationed in 14 worksites along the 80 km expressway. There will be interactions between the workers, service providers, and residents around the construction sites. ADB has provided assistance consisting of 4 components: advocacy, information and education campaign, comprehensive HIV/AIDS and other STI medical packages, and benefit monitoring and evaluation. Aside from the locally customized training and advocacy, condoms will be distributed within the first year of the project to provide extra protection.

While the issue of HIV/AIDS and other STIs is being addressed by the project, the presence of basic facilities, such as water and sanitation, in the construction camps should help to reduce also the possible outbreak of other common diseases such as diarrhea, hepatitis A, cholera, dysentery, and typhoid. This will assure the sustained productivity of the workers through less sickness and absenteeism.

Prepared with the help of Mr. Jean-Marie Lacombe, East and Central Asia Department.

FREQUENTLY ASKED QUESTIONS

1. **What is the acceptable sound level around residential areas?**

WHO recommends a maximum of 45–55 dB(A), especially between 7 pm and 7 am.

2. **What types of health effects have been identified from roads and highways?**

- Road traffic injuries
- Acute effects, especially for asthmatics
- Discomfort due to irritant compounds
- Disturbance due to noise and vibration
- Chronic effects, such as depression from excessive noise

3. **Why are traffic crashes increasing in low-motorized countries in Asia?**

- Increasing motorization
- Poor driving standards and little road-use awareness
- Lack of emergency services
- Poor roads/engineering/road safety systems
- Different traffic mix (more pedestrians, cyclists, motorcycles)
- Poorly maintained and overloaded public transport vehicles
- Poor pre-hospital care services, e.g., lack of trained trauma staff in hospitals/clinics, lack of ambulances

4. **What are the acute and chronic health outcomes that can be monitored?**

Acute outcomes. Daily mortality, respiratory hospital admissions, cardiovascular hospital admissions, emergency room visits for respiratory and cardiac problems, primary care visits for respiratory and cardiac conditions, use of respiratory and cardiovascular medications, days of restricted activity, work absenteeism, schooldays missed, self-medication, avoidance behavior, acute symptoms, physiological changes, e.g., in lung function

Chronic disease outcomes. Mortality (in infants and adults) from chronic cardiorespiratory disease, chronic respiratory disease incidence and prevalence (including asthma, chronic obstructive pulmonary diseases, chronic pathological changes), chronic change in physiological function, lung cancer, chronic cardiovascular diseases

Reproductive outcomes. Pregnancy complications (including fetal death), low birth weight, preterm delivery

5. **What is green transportation?**

The planning of education, social, and business services so as to reduce the need to travel over long distances, with emphasis on walking and cycling and creation of better and safer facilities.

6. **What air pollutants emitted by motor vehicles have known health effects?**

If the combustion of fuel is complete, carbon dioxide, nitrogen oxide, and water are produced. However, combustion in internal combustion engines is incomplete and produces 10,000–15,000 chemical compounds in the exhaust gases. The following have been reported to cause respiratory, cardiac, and circulatory diseases: particulates, nitrogen dioxide, sulfur dioxide, and carbon monoxide. The airborne pollutants implicated in cancer incidence are polyaromatic hydrocarbons, alkenes, and benzene.

BEST PRACTICES IN THE TRANSPORT SECTOR

- Increasing road safety through precautionary measures, such as road signs, road humps/bars (measures to slow down traffic at critical locations), proper road engineering to enhance road safety, vehicle maintenance, regulations and discipline (for both drivers and pedestrians), emergency response and services, and awareness campaigns.
- Reducing traffic noise through construction of traffic noise barriers (sound walls/fence), land-use zoning, and traffic rerouting. Sound abatement materials can be sawn timber, plywood, lightweight concrete, concrete, masonry, recycled material, and other absorptive material.
- Improving air quality through use of clean fuel (low sulfur and unleaded gasoline), cleaner vehicles, transport and land-use planning, regular maintenance of vehicles, emissions testing, and regular ambient air quality monitoring.
- Increasing access to public transport by charging reasonable fees for trains and buses and building safe arterial roads and public parking.
- Provision of sustainable modes of transport to reduce congestion and traffic bottlenecks.
- Creating streets that are friendly to pedestrians and vulnerable road users, with designated crossing lanes, speed limits, and road signs.
- Promoting cycling and walking by delineating special lanes for people and bicycles to reduce car use.
- Planning and building roads to increase access to food centers, health care centers, and schools.
- Use of NGOs and various stakeholders—concerned citizens, civic groups, academe, and public and private sectors—to monitor implementation of ambient air quality standards and use of cleaner fuels.

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6

URBAN DEVELOPMENT SECTOR

AREAS OF POTENTIAL IMPACT

Millennium Development Goals

Reduce child mortality (#4)

- Under-five mortality rate
- Infant mortality rate

Ensure environmental sustainability (#7)

- Proportion of people with access to sustainable access to an improved water source
- Proportion of people with access to improved sanitation

Additional Indicators*

- Prevalence of disease outbreak from dengue, diarrhea, and cholera
- Prevalence of underweight children (below 5-years old)
- Prevalence of stunted children
- Prevalence of acute respiratory tract infections

* Available from local health centers, hospitals, ministries of health, WHO, UNICEF, UNDP

OVERVIEW

Urban infrastructure planning is designed to improve population health, but this is under-appreciated by donors and urban stakeholders. The pentacle of urban engineering (provision of public taps, sanitation, solid waste and wastewater management, community drainage, and slum improvement) can improve the health of children and even help them grow taller. Normal engineering practice can improve health even more by siting infrastructure projects close to health services that reach out to urban slum communities. There are also challenges related to poor nutrition specific to urban areas, which will soon dominate the health profile of the poor everywhere. As a rule, children are the main beneficiaries of these promising approaches.

Integrated Infrastructure Investments Improve Health of the Urban Poor

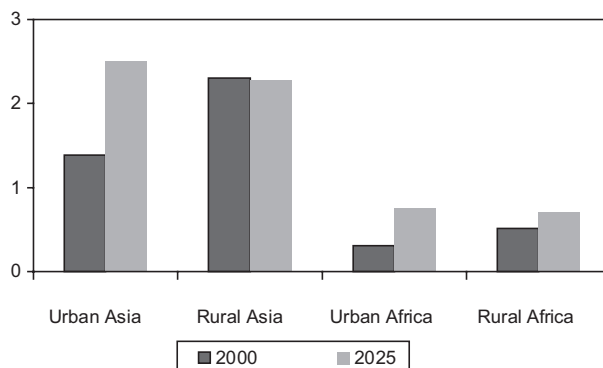
It is predicted that population in cities in the developing world will double in 25-30 years. Urban Asia's population is projected to exceed rural Asia by 2025, according to the UN's estimate,¹² and grow by one billion during that period. In many places in Asia, there is no mechanism in place to anticipate this huge population increase, which will exact a heavy toll on housing, employment, urban infrastructure, municipal services, and the environment in general. Around 80 million children are born each year and they add to the increasing population, especially in the urban areas. The urban-rural divide is rapidly changing and soon the distinction will be less pronounced. This is because peri-urban areas will integrate markets, altering cultural practices and attracting rural migrants in search of "city lights." To meet the needs of the future population, there are institutional and social barriers that need to be overcome by good governance and prudent planning of municipal services, housing, and social infrastructure, which will improve living standards and health conditions.

There are many social ills that especially affect the urban poor and low-income sectors in developing countries. These are worsening air quality and water pollution, lack of public sanitation and wastewater management, declining public safety, inadequate management of disaster risk, deterioration of trust among public officials, and an increasing social disintegration. All of these will contribute to all sorts of public health impacts that will reduce productivity, leading to increased poverty. Many illnesses, such as typhoid, dysentery, diarrhea, hepatitis, and other communicable diseases, are increased by poor food hygiene and dirty water in small grocery stores, wet markets, slaughterhouses, and mobile or roadside food vending. Often, the poor have no access to medical services when they get sick.

The typical concerns of urban development for the poor are security of tenure, slum

upgrading, environmental and sanitation service, water supply, wastewater management, drainage, solid waste management, and better air quality. The areas requiring more attention are low-cost housing as an alternative to "sites and services" planning for the informal sector and the involvement of the private sector, community, and NGOs to provide for these amenities, and their overall impact on health of the urban poor. ADB is involved with the Cities Alliance—"cities without slums"—cooperating with local authorities, governments, UN HABITAT, UNEP, and World Bank working with the urban poor especially in mega cities. WHO also has existing Healthy Cities programs in most developing countries.

Figure 6.1: Asia will Urbanize Rapidly in the Next 25 Years: Growth in Urban and Rural Population by Developing Region (billion)



Source: UN 1998

¹² See Figure 6.1.

Why is housing important as a policy concern for health, environment, and poverty reduction? For the urban poor, housing not only provides shelter but can also provide possibilities for income generation, such as food vending, tailoring, handicrafts and other small services, and sorting of recyclable materials, among others. Because of this, even households in the slum areas invest substantially in housing improvements and they become permanent squatters.

Children's health could be greatly improved through provision of adequate urban facilities at home and even at school. There is beneficial effect of proper housing, sewage, and solid waste disposal on the health status of children, school performance, and productivity. Improving the housing design and materials, such as roof, floor, window, interior space, and toilet was found to enhance the health status of children (and even the elderly) by reducing communicable diseases. The prevalence of malnutrition among young children, especially girls, can be reduced through solving other health problems. For example, providing water and sanitation may reduce hookworm infestation leading to improvement in iron status; malaria control may lead to improved folic acid status; measles vaccination may lead to better vitamin A status; while birth control may provide more food to the family especially children and women.

Siting of Convergent Services Improves the Poor's Health Even More

Urban engineers and health planners should work together so that the urban poor get the best of both worlds. Neither the availability of health services nor the proximity of a safe and clean environment is enough to ensure that healthy, strong, tall, and bright children will enter and complete school on time. But when planners site the services and infras-structure together, the synergies are dramatic and help children reach their parents' dreams. See "Best Practices" for further discussion.

Urban Programs Lift the Nutrition Security of the Poor

Stunting persists in urban poor children even when they have access to processed foods in urban markets, often denied or not affordable to rural children. Poor hygiene, in and around the home, combines with unbalanced diets and lack of exercise to produce stunted youth who show early signs of being prone to diabetes and obesity, along with markers of undernutrition (e.g., micronutrient deficiencies).

Urban programs can benefit nutrition of poor families in three ways:

- (i) school health programs that include diet plans and actively promote exercise programs for young children, because childhood obesity is a growing threat to Asia's urban children, with life-long risks to health and productivity;
- (ii) strengthening regulatory safety and inspection guidelines for food businesses and processed food industries, including "accuracy in labeling" for nutrients as a requirement for plant licensing; and
- (iii) restructuring food subsidy programs against the trend to provide cheap fats and sugars at the expense of child and maternal health.

Centralized fortification of essential foods like salt, flour, and cooking oils could be introduced as an urban initiative for later national expansion.

Cities drive all these trends nationally and municipal governments can be supported to reverse them. Costs to improve quality of life will continue to rise and it is important to share this burden with local authorities at the city or municipal level. Public and private partnerships with civil society are more productive when focused on common objectives, e.g., ensuring that all children get health care and attend school. Urban community funds supported by municipal government, private sector, and donors have proven helpful, while their partners have potential to implement pro-health infrastructure and services as subcontractors.

Examples of Negative Health Impacts without Proper Housing

1. Inadequate water and sanitation services, especially in low-income settlements, cause frequent diarrhea, cholera, child deaths, or stunting.
2. Poor ventilation and indoor air pollution cause asthma in children and the elderly, and lung and pulmonary diseases in the working-age poor.
3. Excessive cost of housing reduces food budget, possibly lowering nutritional intake, resulting in underweight children, late entrants to school.
4. Asbestos use for building material causes abdominal and lung cancers.
5. Overcrowding transmits diseases easily, causing outbreaks of communicable diseases.
6. Poor wastewater management results in helminth infections and stunting.

KEY ISSUES FOR PROJECT MANAGERS

Health Issue	Cause and Exposure	Possible Intervention	Health Benefit
Dengue and dengue hemorrhagic fever (DHF)	Mosquitoes breeding in small water collections in and around houses; inadequate drainage and flood control provide more prolific and dangerous breeding habitats	Removal of possible breeding places, maintenance of clean environment	Reduction in prevalence or probability of outbreak from dengue and DHF
Diarrhea and waterborne diseases	Lack of domestic water supply and sanitation, poor personal hygiene, such as hand washing; absence or lack of regular refuse collection	Provision of sanitary facilities, hygiene education, proper waste management	Reduction in prevalence or probability of outbreak from diarrhea and cholera
Malnutrition (under and over) <ul style="list-style-type: none"> • Micronutrient deficiencies • Child stunting • Obesity and diabetes 	Poverty, unemployment, food additives, and toxins	Skills training, livelihood projects including women, food supplements, food policies favoring fortification of staples, removal of subsidies on fats and sugars, water and sanitation	Reduction of child underweight, wasting and stunting, and obesity; child poisoning; reduced obesity and diabetes among working-age poor
Respiratory diseases	High population density, poor living conditions, overcrowding, poor ventilation, indoor air pollution; food allergens; poor outdoor air quality	Proper housing design, use of cleaner fuels for cooking and heating, settlement planning, provision of basic utilities	Reduction in maternal and child mortality, fewer cases of tuberculosis, asthma, upper respiratory tract infections
Excreta-related diseases	Lack of sanitary facilities, blocked drainage	Public toilets, especially in the slums; regular refuse collection	Prevention of outbreak of diarrhea and cholera, intestinal worms, reduced stunting
Disasters/Accidents	Traffic congestion	Proper road signs and traffic management	Reduction of traffic crashes and fatalities
	Flood-prone areas	Flood control, refuse collection, emergency services	Prevention of water-related diseases and drowning, skin infections

KEY PROJECT QUESTIONS

1. Is there affordable housing for the poor and low-income residents?
2. Is there adequate water supply in the community including the poor and informal settlers?
3. Are schools and public markets provided with communal taps and sanitation facilities including hand-washing stations?
4. Is there proper refuse collection and disposal? If not, will the project make sure these matters are properly addressed?
5. Are houses and apartment buildings provided with adequate ventilation and emergency exits?
6. Are latrines and toilets available to the project staff during construction?
7. Are housing projects located where women have better access to water and sanitation facilities, transport, and security?
8. Is there a public lighting system to make paths and streets safer for girls and women at night?
9. Within markets and grocery stores, are there food safety regulations in place and are they implemented?
10. Are there proper road and traffic signs along feeder roads and highways?
11. Is health care service accessible through center-based services and community outreach programs? Are health care units sited with public taps and sanitation?
12. Does the food policy and nutrition program for the poor promote obesity and diabetes through increased use of fats and sugars?
13. Do school health programs in slums promote good diet and exercise, with scheduled exercise weekly?
14. Can municipal governments work with the food industry to fortify essential foods at affordable prices?

PROTOTYPE PROJECTS

Mongolia: A, Provincial Towns Basic Services Project; and B, Integrated Development of Basic Urban Services in Provincial Towns Project

The Asian Development Bank supported two related projects in Mongolia dealing with improving urban services in provincial towns and cities, especially the *ger* areas (informal settlers in traditional circular tents). Project A, completed in 2002, covered 5 provinces in northwestern Mongolia. Project B, to be implemented in 2003, will improve facilities in 8 provincial capitals in eastern and central Mongolia. The projects provide improved and sustainable water supply, sanitation, solid waste management, public bathhouses, heating, and hot water supply.

In Project A, the beneficiaries were informed about the project through radio and television announcements and were consulted on proper location of water and bathing facilities. A hygiene committee was established in each project town and hygiene education was provided to local communities, particularly children through school visits. The project demonstrated improvement in access to basic services of the urban poor—almost 90% of the beneficiaries live in the *ger* areas, while the others live in apartments. Although there was no component for health impact monitoring, preliminary data collected by the public utility services organizations showed declining trends in incidence of waterborne and water-washed diseases, especially scabies that was reduced to 10% of former levels. The improvement in health status of the community through sanitation improvement, solid waste collection and disposal, and public bathhouse facilities was not evaluated but was assumed to be positive.

The lessons learned in Project A are being used in Project B to deliver basic services to the urban poor living in towns, which encompass about 50% of the population. There is prevalence of waterborne diseases among the informal settlements. Children in the *ger* areas are twice as likely as other children to have diarrhea and skin and eye infections. Women and children who are tasked with collecting water can have more time for child care, learning, and entrepreneurial activities. Community participation is a strong component and can be achieved through health education and public awareness programs. In this regard, additional links should be made between reduction in child undernutrition and the availability of water, sanitation, good hygiene practices, and health services. Diarrhea leads to a lower absorption of nutrients, dehydration, and lack of appetite. Urban projects like these provide opportunities to improve not only the physical environment but also the avoidance of malnutrition and other chronic diseases. This can be highlighted as part of the project's accomplishments during benefit monitoring and evaluation.

Prepared with the help of Ms. Kyoengae Choe, East and Central Asia Department.

PROTOTYPE PROJECTS (Continued)

Strategic Private Sector Partnerships for Urban Poverty Reduction in Metro Manila

The Asian Development Bank has provided assistance to the Philippines through Philippine Business for Social Progress. Around 23 communities in Metro Manila consisting of about 35,000 people, mostly severely poor, will benefit from this project.

Partnerships among private businesses, NGOs, and local government will be established to provide various urban poor services, such as housing, medical services outreach, education and training, waste management, and advisory services for small livelihood and microenterprise programs. It is expected that 9 city-level multisectoral coalitions will be formed with the concerned local government units, business sector, homeowners' associations (HOAs), and selected NGOs.

In addition to upgrading dwellings, the project also includes construction of water facilities, drainage, roads, reblocking, and other infrastructure. Maintenance of these facilities will be covered from the monthly dues of the HOAs. With strong support from the private sector, especially on the livelihood programs, it is expected that the people will have adequate food, shelter, and water to improve the quality of life in these communities.

Prepared with the assistance of Mr. Matthew Westfall, Southeast Asia Department.

BEST PRACTICES IN URBAN DEVELOPMENT PROJECTS

Two approaches have worked well in relating urban infrastructure projects to health outcomes for poor families, especially women and their young children.

Coordinating Health Interventions with Infrastructure Improvements

Improving health and nutrition of urban slum dwellers, especially poor children, requires a combined and coordinated set of health interventions and infrastructure improvements. Neither infrastructure improvements nor health services alone are necessary and sufficient to improve child health and growth. Child stunting in slums is persistent because of population density, frequency of diarrhea outbreaks, and unclean environment. Health services must involve community outreach, use local residents as paramedics, and integrate key health and nutrition interventions. This is because the poor use health facilities infrequently, and because health services must include healthy behaviors and environmental hygiene to have a sustained effect.

Community health outreach programs in slums should integrate essential nutrition activities and an essential health package (e.g., immunizations and oral rehydration therapy for diarrhea and cholera) into community health workers' programs and visits to primary health care centers. Introduction of a nutrition subcomponent in an urban project can be strengthened by incorporating the essential nutrition activities (ENA) package endorsed by BASICS II (a public health instructional and research package used widely in developing countries) and the United States Agency for International Development (USAID), based on a review of efficacy and effectiveness trials in many countries. There are six pro-nutrition activities: (i) exclusive breastfeeding for 6 months; ii) adequate and timely introduction of complementary feeding at about 6 months with continued breastfeeding for up to two years; (iii) care of the malnourished child; (iv) disease targeting and routine vitamin A administration for children 0–6 months and postpartum women; (v) iron-folate supplementation for pregnant women and children 6–24-months old; and (vi) household use of adequately iodized salt. These are the minimum nutrition interventions needed to address macro- and micronutrient deficiencies for which efficacy evidence is strong, and to contribute to the overall health status of women and children.

BEST PRACTICES IN URBAN DEVELOPMENT PROJECTS (Continued)

Project Siting

Project siting for urban health projects should be influenced by availability of public provision of water supply, sanitation, and wastewater management, and be complemented by health and nutrition information, education, and communications (IEC) campaigns by the community health outreach workers. A comparative study (Morris 2000) of Dhaka and Kathmandu showed that child health and growth (height and weight) improve when community health, ENA, and water supply and sanitation (WSS)/household hygiene are addressed as an integrated package, and preschool children grow optimally with fewest illnesses where public taps and sanitation raise the hygienic environment in the vicinity of the home. ADB's social sector divisions now have health and WSS specialists and this could be a fascinating test of the model that could well inform a new generation of ADB urban projects, both infrastructure and urban health.

Slum improvement projects should have an environmental health and hygiene monitoring system with three components: coverage of essential health and nutrition programs for poor mothers and children, communication campaigns in the community, and measurement of the impact of infrastructure improvements on health and nutrition.

To influence the behavior of communities to recognize the need for and proper use of sanitation facilities, the participatory hygiene and sanitation transformation (PHAST) process has been proven successful. The PHAST approach helps people to feel more confident about themselves and their ability to take action and make improvements in their communities. Feelings of empowerment and personal growth are as important as the physical changes, such as cleaning up the environment or building latrines.

Despite skepticism about its replicability, the Orangi Pilot Project (OPP) in Karachi, Pakistan in the early 1980s showed how very poor urban residents could create a low-cost sanitation program to address the failures of municipal government, create a large community-based urban development program that included essential health and family planning and literacy programs, especially for girls, and credit programs for women linked to low-cost housing, school improvement, and women's work centers. Charismatic leadership was necessary to launch OPP, but social mobilization and the leadership of women's groups have sustained it across decades. Evaluations by the Aga Khan Foundation have shown that social empowerment created essential services that improve child and family health, leading to greater community solidarity that has demanded responsiveness from government to meet other essential needs. The main question: is OPP a special case or the proven foundation of a people's movement for urban health that can be replicated through a participatory model in urban projects?

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7

EDUCATION SECTOR

AREAS OF POTENTIAL IMPACT

Millennium Development Goals

Achieve universal primary education (#2)

Promote gender equality and empower women (#3)

Indicators

- Net enrollment ratio in primary education
- Proportion of pupils starting Grade 1 who reach Grade 5
- Literacy rate of 15–24-year olds
- Ratio of girls to boys in primary, secondary, and tertiary education
- Ratio of literate females to males in 15–24-year olds

OVERVIEW

As early as 1948, the United Nations recognized education as a basic human right. Education provides the foundation for poverty reduction in terms of sustainable economic growth, social development, and good governance. Donors, including ADB, are committed to helping developing member countries achieve the millennium development goals by 2015, including achievement of universal primary education, and gender equality in primary, secondary, and tertiary education. Since 1990, ADB has been a major regional supporter of Education for All (EFA) and to achieve this requires an appreciation that poor health and nutrition status in a young child lowers the chance of entering and completing primary school; thus, more attention is needed to ensuring the healthiness of primary schoolers.

Many of the health problems of schoolchildren are associated with lack of clean water and poor sanitation, with the most prevalent diseases being diarrhea and helminth infections. The UN Sub-Committee on Nutrition reported that there is increasing evidence to support an association between widespread iron deficiency, iodine deficiency, and helminth infection and poor school performance.

A range of physical and social aspects of the school environment can influence child health: inadequate or lack of water and sanitation, contaminated drinking water, poor ventilation, noise, insufficient light or glare, dangerous buildings and furniture, and a hazardous location. For many children, going to school is the first opportunity to be exposed to a range of infectious diseases from other children of diverse backgrounds.

School-age children living in poor areas are also at a high risk of injury from road traffic accidents as they travel to and from school.

In many developing countries, there are more schools than clinics and more teachers than health workers. Linking health program delivery into the well-established education system has proven to be cost effective. Effective partnerships can be fostered between the two sectors, teachers and health workers, schools and community groups, and among the students in implementing school health and nutrition programs. Experience has shown that school-age children can provide effective links with their peers (older children teaching younger children). They can carry messages home to their families including younger siblings and connect with the wider community in conveying messages on personal hygiene, hand washing, infant feeding, home dietary planning, and food safety as well as promoting improved sanitation. Many opportunities exist within countries for partnerships of this kind in ADB-supported education projects and these should be explored whenever possible.

KEY ISSUES FOR PROJECT MANAGERS

Health Issue	Cause and Exposure	Possible Intervention	Health Benefit
Diarrhea	Poor hygiene behavior, lack of water and sanitation facilities, fecal-oral contamination	Access to safe water and sanitation, hand washing, good hygiene behavior	Reduced school absenteeism; improved child growth and learning
Helminth infection (intestinal worms)	Fecal-oral route of transmission	Mass drug treatment (deworming), improved sanitation and hygiene	Reduced micronutrient deficiency; improved school performance; improved growth
Malnutrition	Protein-energy and micronutrient deficiencies (vitamin A, iron, and iodine)	School feeding program, micronutrient supplementation; parent education	Reduced prevalence of anemia, and underweight, stunted, and wasted children, and other micronutrient deficiencies; reduced illness susceptibility
Malaria	<i>Anopheles</i> mosquito bites	Skills-based health education, impregnated bed nets	Reduced medical cost; reduced school absenteeism and illness susceptibility
Injuries and road crashes	Unsafe roads and highways; lack of proper road signs; hazards within school grounds	Guidelines and enforcement of road and school safety; removal of hazards	Reduced medical expenses from injuries
Substance abuse	Exposure and access to alcohol, tobacco, and drugs or a combination thereof	Counseling, information campaigns, more school security	Reduced incidence of juvenile fights; improved mental health
Respiratory diseases and asthma	Airborne pollutants; smoke belching vehicles; fugitive dust, molds	Proper ventilation, pollution control	Fewer cases of asthma and upper respiratory tract infections
HIV/AIDS and other STIs	(Both teachers and pupils) Unsafe sex, blood and fluid exchange	Health information, sex education campaign, reproductive health	Reduction of possible outbreak of STIs; reduced medical expenses and loss of lives; lower absenteeism; improved health and preparedness for post-school life
Cognitive impairment	Malnutrition (short and long term)	Long-term feeding programs; subsistence crops	Reduced child underweight, stunting and wasting; improved attention span and learning capacity
	Helminth infection	Micronutrient supplements, especially iron with deworming medication; hygiene behavior	
	Noise pollution above 55 dB(A), especially in schools near busy roads	Noise control measures such as sound walls/barriers and regulations against horn blowing	

KEY PROJECT QUESTIONS

1. Is there water? Running water? Hand washing facilities and toilets in the school? Are the facilities properly sited?
2. Does the proposed project include an appropriate health education component to encourage the use of latrines and hand washing after each use?
3. Are tubewells or groundwater wells adequately protected from possible contamination or infiltration? Will the water quality be monitored, especially for pathogens and toxic elements (e.g., arsenic)?
4. Will the design, construction, operation, and maintenance of latrines and other water flow environments (taps, sinks) prevent insect breeding, and reduce helminth and enteric infection?
5. Are roadside barriers in place for noise control along major highways?
6. Are there health and safety measures for the school environment including design and construction? Are health and safety standards enforced during the design and construction of school buildings?
7. Are health promotion and health prevention integrated into the early education and formal education curricula?
8. Are the schools constructed with regard to the seasonal climatic changes that will affect learning?
9. Is there malnutrition among schoolchildren, especially iron deficiency anemia (IDA) among young girls? If so, are there supplementary measures and school feeding?
10. Has the project explored forming linkages with country programs of agencies such as WHO, UNESCO, and UNICEF?
11. Do mothers and children have access to primary health care, proper nutrition, and micronutrient supplements?
12. Is there capacity building for local health workers to monitor children's growth, nutritional status, and provision of supplementary feeding?
13. Is there a community-training program for women on child development and child-rearing practices, especially on personal hygiene and interruption of the fecal-oral route of infection?
14. Are visiting nurse programs available (or some such mobile group) to support school clinics and make school visits periodically? Are the school clinics provided with weighing scales and growth charts? Are communities encouraged to participate in planning, designing, and implementation of integrated child development services?
15. Regarding school curricula, are there available materials on health, hygiene, and the human body for all ages? Are teachers trained regarding the use of this material?

PROTOTYPE PROJECT

Options for School Health Programs in Asia

The Education for All (2002) review in Dakar, Senegal launched the school health partnership, Focusing Resources on Effective School Health (FRESH) led by the World Bank and United Nation agencies, that emphasizes multisectoral approaches (education, health, and nutrition) in school settings. Today, governments, especially local governments, see value in providing awareness to students, teachers, and parents on a broad set of activities including HIV/AIDS, disease prevention, nutrition, mental health, safe water, and hygiene. Direct health and nutrition services can promote learning.

FRESH's core framework for action has four components:

- (i) *Health-related school policies* including skills-based health education and the provision of some health services. Policies are best developed by involving many levels including the national level, and teachers, children, and parents at the school level.
- (ii) *Provision of safe water and sanitation in schools*, linked to hygiene education.
- (iii) *Skills-based health education*, focused on the development of knowledge, attitudes, values, and life skills needed to make and act on the most appropriate and positive health-related decisions. Physical, environmental, and psychosocial health are all important. Awareness of personal and family hygiene, proper nutrition, infant care, and HIV/AIDS prevention are among the subjects.
- (iv) *School-based health and nutrition services*, such as
 - cost-effective investment in promoting learning and reducing dropouts through preschool programs to develop social and cognitive skills of preschoolers;
 - deworming and iron supplementation for primary schoolers to improve learning and memory, and reduce dropouts;
 - better school attendance and academic achievement, especially poor children, through school feeding (direct or take home), e.g., Bangladesh's Food for Schooling program has been favorably evaluated; youth development counseling on violence and substance abuse, teenage pregnancy, and sexually transmitted diseases;
 - health check-ups; and
 - school-based immunization programs as preventative measures.

FREQUENTLY ASKED QUESTIONS

1. How effective are school feeding programs?

School feeding programs are an intervention option that, under certain circumstances and administrative arrangements, can have an impact on nutritional status, learning ability, attendance (especially for girls), and drop out rates. The quantity and quality of food provided, the time of day it is provided, the nutritional status of the children, and the mechanisms for implementation (locally cooked by mothers vs. industry-produced foods) all affect the measured outcomes of a program. The impact will be increased by other inputs that affect school quality, such as teacher development, curriculum reform, and student assessment.

2. What are the key health issues particular to girls of school age?

IDA is a serious risk for school-age girls, because it compromises learning and sets a pattern that exposes them to grave risk later on in first pregnancy. Thus, IDA should be reversed as early as possible. Deworming followed by ferrous sulfate supplementation is cost-effective in primary schools where IDA prevalence is high. There is a higher prevalence of STIs/HIV/AIDs among adolescent girls than among boys. Girls are highly vulnerable to contracting infectious diseases for social, cultural, economic, and even physiological reasons. Vulnerability is increased by lack of education. The lack of adequate, separate toilets in schools is one of the main factors preventing girls from attending school, especially those starting puberty. Parents view this as both a health and security issue, as should school administrators.

3. What is skills-based health education, especially among school children?

Skills-based health education aims to help children develop the knowledge, attitudes, values, and skills including interpersonal skills, critical and creative thinking, decision making, and self awareness needed to make sound health-related and social decisions. For example, children can be trained to identify the causes and sources of diseases, to recognize the signs and symptoms, and where and how to get help for treatment.

4. What is basic education within ADB's definition?

Basic education refers to education provided for children aged 6–14 years, usually equivalent to primary and lower secondary school, or 9 years of schooling. This is considered the minimum for a person to contribute as an earning citizen and participate in national development.

5. What other international programs exist on school health that can be linked with ADB-assisted projects in developing countries?

Existing initiatives such as WHO's Health Promoting Schools and UNICEF's Child Friendly Schools are in most Asian developing countries. The program on Focusing Resources on Effective School Health (FRESH), developed by UNESCO, WHO, UNICEF, Education International, and the World Bank in partnership with the World Food Programme, Partnership for Child Development, and Save the Children (US), has the following goals: effective nutrition and health policies; adequate

FREQUENTLY ASKED QUESTIONS (Continued)

sanitation and access to water; delivery of effective life-skills messages about nutrition, health, and hygiene; and access to nutrition and health services.

6. What is a good strategy for health and hygiene education in schools?

A sample intervention on setting up a health and hygiene program in schools is a low-cost option that can pay big dividends in the form of preventive measures. With a few learning materials and in-service training, teachers could be relied on to implement the program. Charts and plastic models of body organs could be provided to demonstrate how the human body functions and how best to take care of them. These programs exist in all developed and some developing countries and can be easily provided as subcomponents in projects as a visible way to demonstrate the importance of basic education in providing externalities to society. Students also enjoy these programs.

BEST PRACTICES IN EDUCATION PROJECTS

- To assure enrolment of more girls and their completion of at least primary education, the following components have been found useful:

Successful educational programs in many countries consisted of adequate school infrastructure (including latrines/toilets, hand washing and drinking water facilities), along with greater focus on quality of teaching, available textbooks, teacher training, and increasing teachers' wages. Both school feeding and take home food programs have been successful but it is also important to provide school transport for girls for safety and security.

- For school feeding programs, the following have been successful:

Work with communities and village women associations on school feeding programs to assure their sustainability and possible influence on home feeding.

Supplement the school feeding programs with nutrition and health education, micronutrient enhancement, and deworming.

Target areas identified as being food insecure, with poor school attendance and/or with identified malnutrition problems in school-aged children that can be reasonably addressed through the quality and quantity of food provided in the program.

- For construction of toilets/latrines in schools, the following have been widely practiced:

The typical ratio of toilets (or latrines) to students varies worldwide depending on the resources, but there should be one urinal for every 50 boys, one toilet/latrine for every 100 boys, and one toilet/latrine for every 50 girls. Depending on the geology, a toilet/latrine should be located at least 20 meters from the source of water supply and should be sited in a convenient and safe location.

- To treat school children for helminth infections, the following drug treatment has been recommended by WHO:

In mass deworming treatment of children in schools where the prevalence of infections is 50% or greater, the recommended dosage is one dose of 400 mg albendazole and one dose of praziquantel at 40 mg/kg body weight. To avoid reinfection, it should be repeated after 4–6 months until eliminated.

- For the overall promotion and control of malaria in the community, schools have been successful partners through helping to promote a community-wide understanding of diseases and health issues with particular emphasis on the need for community-based control measures, such as the use of impregnated bed nets for malaria. Schools can serve as a focus for synchronized impregnation of bed nets and distribution.

WEB SITES AND REFERENCES

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<http://unesdoc.unesco.org/images/0012/001240/124086mo.pdf>
- Healthy Settings and Environment
http://www.wpro.who.int/themes_focuses/theme2/focus1/t2f1.asp
- School Health
<http://www.schoolsandhealth.org/>
- School-Age Children: their Nutrition and Health (SCN#25, December 2002)
<http://www.unsystem.org/scn/>
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8

PUBLIC-PRIVATE PARTNERSHIPS FOR PROTECTING HEALTH AND THE ENVIRONMENT

AREAS OF POTENTIAL IMPACT

Millennium Development Goals

- | | |
|---|---|
| Eradicate extreme hunger and poverty (#1) | Combat HIV/AIDS and other diseases (#6) |
| Reduce child mortality (#4) | Develop a global partnership for development (#8) |
| Improve maternal health (#5) | |

OVERVIEW

Historical improvements in health through parallel upgrading of environmental conditions have always depended on a rapprochement between government and the private sector, with validation by civil society. Society has not always been so civil, such as the urban protests in the 1830s that pitted municipal governments in England against the working poor over housing, water, and sanitation conditions. Contentious conditions exist throughout Asia, where infrastructure development and industrial practices often inadvertently threaten health of workers, communities, and children; and regulatory control of industry and trade is uneven at best.

But it need not be this way. Government and the private sector can be compatible collaborators in creating a workable framework for environmental and health protection. Good examples are water, food, and air. There are new, interesting approaches in Asia, discussed below, that tap the regulatory capacity of the public sector and the dynamic efficiency of the private sector. Both partners are clearly necessary to move Asian societies to a world-class level of health and productivity.

PARTNERSHIPS FOR A HEALTHY ENVIRONMENT

Water Quality and Access to Urban Poor

Debate over public-private partnerships for water at the Third Water Forum (Kyoto 2003) was polarized between those who saw an opportunity to blend efficiency with

governance for the poor, and others who foresaw the commodification of water as favoring cartels with special interests. Regardless of preconceptions, everyone agrees that promises to connect the urban poor with potable water supply of high quality are more often broken than kept. Typically, one third of urban dwellers are connected to piped water. Paradoxically, charging higher tariffs may be the shortest route to connecting the poor, who are willing to pay if the quality is good and the service reliable, while sustaining the financing of water supply. An ADB policy study on meeting the water needs of the urban poor concluded that establishing a water policy is crucial only if it is transparent; that hiking tariffs can help the poor not yet connected, because the “street” price sourced from vendors operating (often contaminated) water tanks is much higher than reasonable tariff-based increases; and that investments in large city water supplies should be financed directly from tariffs (McIntosh 2003).

The role of small-scale private water providers bears watching, based on successful experiences in Ho Chi Minh City, Manila, and Cebu (Philippines). Investments by small providers are increasing because of demand and willingness to pay by poor communities who are not likely to be served by the water utilities over the next decade. There is no secret to creating a profitable environment to these “water pioneers.” Here are the necessary success factors to matching supply and demand for poor families: a conducive legal framework that encourages longer-term investments by small providers; inclusion of these suppliers in water supply strategies by municipalities and donors; financial services that meet capital needs of the “pioneers;” a competent regulatory agency familiar with the small service sector; and continuous involvement of all stakeholders in planning and management of service provision.

Nutritionally Enriched Food for the Poor: the Agro-Industrial Partnership

Iron deficiency anemia (IDA) is Asia’s most prevalent and insidiously harmful nutritional deficiency. IDA affects 60% of Asian women of reproductive age, and 40–50% of preschoolers and primary graders. This causes up to one fifth of the maternal deaths in the developing world (severely anemic women are at this level of risk; 65,000 women in low-income Asia die annually from anemia (Horton 1999)) and IDA depresses language and reading skills, hence academic achievement, of young students. Little progress has been made in reducing clinical anemia in Asia, with dire consequences. All these factors inhibit income generation, and, hence, contribute to increased poverty. At the public level, the economic costs are also high. For Bangladesh, the economic cost of iron deficiency in children alone is nearly 2% of GDP (Horton 1999). A recent study finds that up to 4% of GDP is lost in developing countries depending on the average wage rate (Horton and Ross 2002).

Thus, Asia’s ability to reduce the alarmingly high rates of maternal mortality and cognitive impairment in children depends substantially on major efforts to reduce IDA. A clear strategy is urgently needed to reduce IDA among women of reproductive age and young children.

Regional Initiatives

ADB is supporting three regional initiatives that focus on the public and private sectors cooperating to solve the problem of IDA. Regional studies on food fortification and rice plant breeding are ongoing, with the expectation that by 2005, ADB will lead major initiatives

in the region to raise the iron density of essential staples consumed by the poor at affordable prices. A subregional initiative in the Trans-Caucasus Central Asia subregion is helping 6 countries fortify flour and salt through attention to integrated production, regulation, quality assurance, and trade.

Regional Investment Planning for Fortifying Essential Staples (2001–2004). The regional food fortification project focuses on iron fortification of wheat flour, cooking oil, complementary foods for infants, and condiments like soy sauce and fish sauce, all widely consumed by the poor in the region. PRC, India, Indonesia, Pakistan, Thailand, and Viet Nam are participating in the project. Iron fortification emerged as the top priority for concerted action at a regional strategy meeting hosted by ADB in February 2000. Prominent government food regulators and captains of Asian food industries pledged to cooperate in reducing micronutrient malnutrition in the region. The project has developed a set of 10-year country investment plans based on widely consumed pro-poor foods that will “carry” micronutrient fortificants, using agreed standards reached at regional workshops on food technology, regulation, and trade. ADB and other donors will assist the countries in moving their plans into reality.

Rice Plant Breeding/Biofortification for Asia (2001–2004). The second regional activity is rice plant breeding through a donor consortium led by ADB. A 4-year research study ending in 2004 is testing promising rice varieties with high iron and zinc density to ensure that their yield is adequate, that the iron and zinc are bioavailable to consumers, that consumers are willing to eat the varieties, that the production and dissemination of the new varieties is feasible for national agricultural research systems and seed companies, and that the rice will be affordable to the poor. Participants are national agricultural systems in Bangladesh, PRC, India, Indonesia, Philippines, Thailand, and Viet Nam.

Flour and Salt Fortification (2001–2003). The third regional activity, supported by the ADB-managed Japan Fund for Poverty Reduction, responds to the breakdown in production of fortified flour and salt in the Trans-Caucasus Central Asia subregion. The project is setting up production systems and building capacity for improved regulation, quality control, and trade of fortified flour and salt, so that poor women and their children will get adequate iron and iodine through daily consumption of these staples. Beneficiaries are Azerbaijan, Kazakhstan, Kyrgyz Republic, Mongolia, Tajikistan, and Uzbekistan. The potential for meeting the nutritional needs of the poor by mobilizing the combined contributions of the processed food and seed industries is enormous.

Clean Air

Air pollution kills almost half a million Asians every year, with motor vehicles as major contributors to the problem. In 2003, the Clean Air Initiative for Asian Cities (CAI-Asia), supported by ADB and partners from governments and the international automobile industry, launched a Dialogue for Cleaner Fuels in Asia with 12 major regional and national oil companies. The dialogue will identify important issues surrounding cleaner transport fuels and identify implications for the refining industry in Asia for producing cleaner fuels as part of an integrated strategy to improve air quality. The strategy also includes studying the health impacts of air pollution, improvements of air quality monitoring, and reducing emissions of in-use vehicles and was endorsed by the oil companies (see Box 8.1). The dialogue is the first regional effort of this scale to bring the oil companies in Asia together to discuss how they plan to introduce cleaner fuels for transportation in the region. CAI-Asia is facilitating the dialogue.

Box 8.1: Singapore Statement on Clean Air (edited)

We, the oil companies¹⁴ that produce and/or provide oil products for the Asian market share the concern that air pollution is a serious developmental problem and that for Asia to develop further it is important that citizens are able to enjoy air of a quality which, by recognized standards, such as those recommended by the WHO, should not cause them harm.

Air quality is affected by emissions from many sources but we recognize that the rapid growth in mobility in Asia has contributed to an increase in emissions in many cities, and that the expected continued growth in number of vehicles will further add to the problem. Countries and cities in Asia experience different levels and types of air pollution, and actions taken to reduce air pollution need to take this into consideration. Any action taken to address air pollution should be based on sound science.

To enable ambient air quality in Asian cities to meet appropriate standards will require the identification and implementation of location- and context-specific initiatives, which are based on sound science and which recognize the necessary balance between economic, environmental, and societal needs and impacts. In this regard, we believe it is appropriate that a range of solutions be considered with the aim of identifying those which lead to the most balanced, cost-effective initiatives involving an acceptable overall cost to society, government, and stakeholders.

We are committed to working with key stakeholders, including governments, academia, civil society, and equipment/vehicle manufacturers to contribute to the identification of sources of pollution, as well as the formulation of solutions, particularly those designed specifically to reduce emissions from mobile sources.

Fuel quality is one of four equally important enablers to reduce vehicle emissions, the others being cleaner engine technology, better vehicle and engine maintenance, and effective traffic management and transport planning schemes. All four of these need to be taken into account when considering optimum sustained solutions, the implementation of which will require integrated measures from a number of stakeholders.

We, the oil companies, appreciate the role taken by the Clean Air Initiative for Asian Cities (CAI-Asia) to initiate a dialogue among oil companies in Asia, and we express our full support for the goal of the dialogue: "To contribute to better air quality management in Asia." The active commitment and support of the auto industry to the dialogue process will be vital for its success.

¹⁴ The oil companies taking part in the launch meeting in Singapore on 21 July 2003 were Bangchak Petroleum Public Company, BP, ChevronTexaco, ExxonMobil, Indian Oil Corporation, Pakistan State Oil, Petron Corporation, PTT Public Company Ltd, Shell, Showa Shell Sekiyu K. K., Singapore Petroleum Company, Thai Oil Company Limited. Although not present at the launch meeting, other companies in the region are actively considering their participation in the dialogue.

THE HIDDEN COSTS OF POOR HEALTH IN THE WORKING ENVIRONMENT

The Lesson of SARS

The sudden emergence of the severe acute respiratory syndrome (SARS) virus in the PRC and its rapid spread as a threat to global health highlight the powerful link between health and economic development, if in a negative sense. The extraordinary ostracization of eastern Asia and the PRC testified to the credibility gap that weak governance communicates, when the health of the labor force in a globalized economy can no longer be guaranteed. Regional economic bodies, like the Association of Southeast Asian Nations (ASEAN), reacted to the SARS crisis as though the plague had closed down their economies more resolutely than the earlier financial crisis of 1997–1999 had done. In a sense, ASEAN was right. The weaknesses of public health surveillance in Asian developing countries were more paralyzing than the flaws in the banking system revealed a few years earlier, because the former urged isolation from the global community.

Captains of Asian industry could not guarantee the health and productivity of their skilled work force, and this is a fatal admission in an interconnected world of commerce. Many Asian companies are now strengthening their occupational safety and health programs, and demanding better health surveillance from their governments, as Asia slowly restores its reputation for discrete intercourse in commerce without conferring unintended harm to its business partners from outside the region. Yet at a less cathartic level, business practices in the region provide uneven support for worker protection; shoring up workplace programs will build confidence in Asia's role as corporate partner to the world. This is particularly true for medium-sized industries seeking to expand operations through trade-led growth.

Protecting Occupational Health and Safety Protects the Viability of Small Businesses

Small- and medium-scale enterprises (SMEs) contribute significantly to a country's economy. They provide opportunities and jobs for millions of people. The global contribution of SMEs to economic development is significant in both developed and developing countries. The number of SMEs is increasing because of the global trend for large companies to reorganize, downsize, outsource, and franchise. Yet, SMEs face many obstacles as they struggle to compete in difficult local business environments that favor larger firms. Recently, ADB has been involved in lending and assistance to SMEs.

The relative contribution of SMEs to total industrial environmental impact is not known, but because of their sheer number, their impact on the ecosystem and on population health could be substantial. The ILO states there are at least 250 million occupational accidents every year worldwide, resulting in at least 335,000 deaths. On a national scale, the estimated costs of occupational accidents and illnesses can be as high as 3–4% of a country's gross national product. Most SME activities are in the resource- and emission-intensive sectors, such as leather tanning, dry cleaning, metal finishing, printing and dyeing, food processing, fish farming, textile manufacturing, and chemical production. Although most of them have addressed their environmental and social impacts, many still lack awareness on how to deal with them in a structured way.

SMEs in Asia are known to have poor compliance with environmental and occupational health and safety regulations. Identified issues include poor ergonomic conditions; combined exposures to heat, noise, dust, heavy metals, and chemicals; inadequate lighting and ventilation; lack of access to water supply and sanitation; and inadequate health care benefits for workers including lack of first aid kits. Recording and notification of occupational accidents and diseases as part of a code of practice have not been practiced. In addition to labor standards, the ILO has been concerned with raising awareness and providing guidance on occupational and health matters, especially in developing countries where women and children have been used as workers. WHO has been promoting its Healthy Workplace setting and has published guidelines on how to achieve it (see the Web Sites and References section).

Air and water pollution as well as generation of solid and hazardous wastes are some of the common environmental problems faced by SMEs that could lead to direct or indirect health concerns, not just among the workforce but also to nearby communities. Developed countries have eased restrictions on export of hazardous industries and products, such as engines, vehicles, E-wastes (computers, television, air conditioners, and washing machines) that, at the end of their life, can pose disposal problems for importing developing countries.

Emerging “environmentally friendly” concepts have been applied successfully to industrial operations, which also promote good occupational health and safety. These are cleaner production technologies, design for the environment, pollution prevention, eco-industrial development, and the Healthy Settings approach. Where employers and employees appreciate the importance of protecting the environment, there is improved compliance with regulations, which will result in corresponding health protection.

KEY ISSUES FOR PROJECT MANAGERS

Health Issue	Cause and Exposure	Possible Intervention	Health Benefit
Accidents and injuries	Occupation-related, machines and heavy equipment use	Accident prevention training; formation of health and safety committee	Reduced absenteeism; reduced medical cost
Musculoskeletal disorders	Carrying/lifting heavy loads, poor ergonomic practices	Use of hand truck or forklift; alternate duties among workers	Improved productivity; reduced disabilities and workers' compensation
Noise-induced hearing loss or impairment	Continuous exposure to noisy machines and workplace	Noise barriers, such as sound walls; limiting employee exposure; personal protective equipment	Reduced preventable disabilities and workers' compensation
Skin disorders	Exposure to metal working fluids (coolants, lubricants)	Engineering and work practice controls; administrative controls; personal protective equipment	Reduced incidence of dermatitis
Silicosis, asbestosis	Construction work, mining, asbestos handling	Personal protective equipment	Reduced incidence of respiratory diseases
Lead poisoning	Lead smelting and refining, recycling of lead products, lead pipes for water supply	Environmental controls; personal protective equipment	Enhanced workers' performance
Food poisoning	Toxic waste disposal, contamination of food and drinking water	Proper waste disposal; enforcement of food safety regulations	Reduced workers' absenteeism
Cancer, birth defects	Chemical exposures from toxic organic solvents and oils	Personal protective equipment; emissions control	Reduced cancer deaths; reduced child birth defects

KEY PROJECT QUESTIONS

1. Are environmental and occupational regulations in place in the country? Are the regulations implemented properly?
2. Is there special attention given to the needs of women workers and child laborers in terms of health and safety?
3. Are there health care practitioners who are trained to recognize work-related diseases? Are there occupational health facilities?
4. Is there a reporting mechanism for accidents and work-related injury?
5. Are air emissions and water effluents compliant with ambient standards prior to discharge to the environment?
6. Are there government partnerships and incentives given to SMEs to help apply and maintain both economic practices and environmental protection?
7. Is there recycling infrastructure available to businesses? Are there environmental service providers?
8. Is there adequate allocation given to environmental controls and accident prevention measures?

PROTOTYPE PROJECT

Preparing the Small- and Medium-scale Enterprise Development and Export Expansion Program, Bangladesh

The Bank has provided a technical assistance grant to Bangladesh to help make small- and medium-scale business enterprises (SMEs) more competitive by providing an enabling environment, business development and support services, and access to financing. The focus will be in manufacturing, agribusiness, and information technology that are labor intensive and export oriented. SMEs contribute 40% of manufacturing output and employ about 80% of the industrial workforce of Bangladesh. SMEs operate in many sectors but mostly in the garment industry, providing 75% of the country's exports and employing 1.5 million workers (mostly women) and indirectly support employment of up to 15 million persons. SMEs are also active in the service sector and agriculture, where they supply farm inputs and market agricultural produce.

This project cuts across the industry and agriculture sectors. An important component of the project is the development of modules to introduce gender elements in SME development and measures to mitigate possible adverse social impact on women workers, especially during the scheduled expiration of the Multi Fibre Agreement in 2004. The ready-made garment firms and their supply industries are particularly vulnerable to loss of jobs through transfers of productive facilities to areas where quotas have yet to be exhausted under trade agreements. This has significant social implications including threat to food security for families, leading to malnutrition and psychosocial illnesses. This project will help develop other products and markets to diversify exports, which will reduce the impact on the workers and economy.

Providing for a healthy workforce would assure sustainability and steady supply of skilled manpower to boost the SMEs in Bangladesh. This project provides an opportunity to recognize these concerns in policy and reform agendas as part of planning to achieve economic growth of SMEs.

Project Officer: V. T. Velasco, South Asia Department.

FREQUENTLY ASKED QUESTIONS

1. What are the typical business activities of SMEs?

SMEs include a wide variety of firms—from village handicraft makers, small machine shops, and restaurants to computer software firms—with a wide range of sophistication and skills that operate in different markets and social environments.

2. What are the environmental issues faced by SMEs?

Many companies of this scale cannot afford to have their own environmental control measures, and pollution of air, water, and land may go unregulated. High organic loading and solid and toxic wastes are particularly critical because such wastes are often emptied directly to waterways or factory backyards. Specifically, the following environmental concerns have been experienced:

- pollution of drinking water;
- contamination of the food chain;
- occupational hazards;
- air pollution;
- slums and squatter settlement expansion around industrial sites;
- traffic accidents and injuries; and
- toxic waste disposal.

3. What is the range of hazards in the workplace?

- chemical hazards—arising from liquids, solids, dusts, fumes, vapors, and gases;
- physical hazards—noise, vibration, unsatisfactory lighting, radiation, and extreme temperatures;
- biological hazards—bacteria, viruses, infectious waste, and infestations; and
- psychological hazards—resulting from stress and strain.

4. What are the common occupational diseases found among SMEs?

- asbestosis—asbestos is common in insulation and automobile brake linings;
- silicosis—silica is common in mining and sandblasting;
- lead poisoning—lead is common in battery plants and paint factories; and
- noise-induced hearing loss, common in many workplaces including airports and workplaces where noisy machines, such as presses or drills, are used.

5. What are the potentially crippling health problems that can be associated with poor working conditions especially in the industrial sector including SMEs?

The long-term illnesses that can result from poor working conditions are heart disease; musculoskeletal disorders, such as permanent back injuries or muscle disorders; allergies; reproductive problems; and stress-related disorders.

FREQUENTLY ASKED QUESTIONS (Continued)

6. In manufacturing or resource extractive industries, what chemicals affect employees or the community and what are the symptoms?

The important chemicals with known adverse health effects are sulfur compounds (acid fog and smog), aniline, hexachlorobenzene (HCB), polychlorinated biphenyls (PCBs), methyl mercury, cadmium, chlorine, dioxin, and methyl isocyanate. Acute symptoms may be local (eyes, skin, respiratory tract, gastrointestinal tract) or systemic (central nervous system, circulatory system, gastrointestinal tract or blood). Delayed symptoms are usually manifested in respiratory tract, kidney, liver, or blood-forming organs.

7. What is personal protective equipment?

Personal protective equipment includes a variety of devices and garments to protect workers from injuries. It can be designed to protect eyes, face, head, ears, feet, hands and arms, or the whole body, e.g., goggles, face shields, safety glasses, hard hats, safety shoes, gloves, gowns, vests, earplugs, and earmuffs (see OSHA 1997).

8. What is the TRIPS Agreement and what are its relevant public health components?

The World Trade Organization Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS Agreement) is part of a wider national and international action that includes public health problems, such as HIV/AIDS, tuberculosis, malaria, and other epidemics and, in particular, endorses access to essential medicines for poor countries lacking capacity to manufacture the drugs themselves. The TRIPS Agreement also promotes labeling of milk to the effect that breastfeeding is better, and fortification of commonly consumed foods including flour, cooking oils, condiments, sugar, and salt, among others.

BEST PRACTICES IN THE INDUSTRIAL SECTOR

- Creation of a “healthy workplace” committee and position of health and safety representative (see WHO guidelines).
- Compliance with environmental regulations and occupational health and safety standards.
- Compliance with International Labour Organization Codes of Practice (see list below).
- Use of cleaner production technologies in manufacturing and service industries.
- Provision of personal protective equipment and regular medical check-ups by health personnel assigned in critical stations for workers at risk.
- Elimination of source of exposure and use of engineering and work-practice controls.
- Information and education campaign for workers and managers on specific hazards and control measures within their workplace.

Relevant International Labour Organization Codes of Practice

Safety and health in building and civil engineering work, 1972
Safe construction and installation of escalators. Recommendations adopted by the International Committee for Lift Regulations (CIRA) on 6 June 1972, 1976
Safe construction and operation of tractors, 1976
Protection of workers against noise and vibration in the working environment, 1977
Safety and health in dock work, revised edition, 1977
Safe design and use of chain saws, 1978
Guide to health and hygiene in agricultural work, 1979
Occupational exposure to airborne substances harmful to health, 1980
Safety in the use of asbestos, 1984
Radiation protection of workers (ionizing radiations), 1987
Safety, health, and working conditions in the transfer of technology to developing countries, 1988
Prevention of major industrial accidents, 1991
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9

REGIONAL PUBLIC GOODS FOR HEALTHY ENVIRONMENTS AND HUMAN DEVELOPMENT

Knowing is not enough; we must apply. Willing is not enough; we must do.
Johann von Goethe

OVERVIEW

In Asia, there is an opportunity to view the broader context of health, environment, and development through regional approaches linked to established global initiatives. Although ADB and other development partners have been operating at different levels, from national to regional and project to program, they could realize two desired outcomes—sustainable development and poverty reduction—through strategies that recognize the importance of improving the quality of life of people beyond the boundaries of sectoral programs and projects.

Regional public goods (RPGs) are increasingly seen as a viable option that developing countries and the donor community should use to address compelling problems of transnational scope. Infectious diseases that disrespect national borders, disputes over trade and fairness in international business practice, harmonizing regulations that govern the exchange of health goods and services, establishing fair and consistent prices for essential goods at the regional level, and coping with natural crises including the impact on economic migration, are all transboundary development challenges that call for solutions at a regional level.

RPGs respond to market failures, common among health-related policies and interventions, where investment particularly by the private sector may be constrained by disproportionate benefits accruing to the poor and lowered profits are expected. RPGs stipulate the provision of nonrival benefits so that one country benefiting does not provide obstacles to another from also benefiting; countries that do not pay for the RPG are not excluded from its benefits (i.e., benefits from an RPG are not held by a selective “club” of stakeholders, instead received by all parties). Also, RPGs reduce overall transaction costs for delivering benefits by spreading responsibility and building regional institutions that will assume the burden of sustained capacity building over the long term. Types of RPGs that would raise quality of life and productivity of Asian nations by linking sound environmental practices to protection of population health are

- curbing the spread of an infectious disease like AIDS or SARS that could rapidly reduce the population and reduce direct foreign investment in the region;

- improving the treatment for a deadly disease while ensuring the reliable access of the treatment(s) at affordable prices to sufferers within the region;
- designing protective safeguards to regional transportation networks (e.g., air pollution abatement and road safety standards' implementation and enforcement)
- promoting viable alternatives to fossil fuels for primary energy production and use by industry and homes;
- international agricultural research promoting human nutrition goals to support the millennium development goals to alleviate hunger, poor health, and low educability of poor children;
- trade reform that permits safe and efficacious essential medicines and foods to reach poor consumers in greatest need;
- regional water policies that address the spatial redistribution of the poor to urban areas (an inexorable trend) and direct integrated water, sanitation, and environmental hygiene programs to reach vulnerable women and children; and
- upgrading slums for survival, development, and educational achievement of tomorrow's labor force in the great cities of Asia.

Regional development banks may have an advantage over global organizations in providing technical and financial assistance to regional institutions for creating and sustaining RPGs, with minimal transaction costs. The long-term investment requirements of RPGs also fall within the capability of the regional development banks, so that their engagement in RPGs at an early stage could help to spur their initial momentum and ensure continuity. With that perspective as a guide, a compelling set of seven RPGs is described below that could form the basis for regional partnerships in health and the environment over the next decade, during which the MDGs for health, hunger, and education will either be realized or not. The contribution of rational environmental planning to health and productivity in the region will not be trivial.

ENERGY AND HEALTH

The effects of air pollution from burning fossil fuels are aggravated by climate change and global warming phenomena. Examples of regional effects are the formation of acid rain and greenhouse gases and most recently the Asian brown cloud hovering over most of South and Southeast Asia and moving northeast to Japan and North America. The impacts of global environmental phenomena on health are far-reaching as discussed in the Energy chapter. Acid rain would affect crops, trees, and water resources, threatening food security and leading to malnutrition and vulnerability to diseases. Global warming could increase cardiovascular, vector-borne, and respiratory diseases. There are cleaner sources of energy that could be explored further to reduce these health impacts and to realize better health outcomes for project beneficiaries. Several initiatives are proposed below.

ADB should continue working with WHO and other international agencies to study the gains in quality of life and savings in health cost through the use of cleaner fuel technologies in this region. UNEP has launched a Global Network on Energy for Sustainable Development to promote the research, transfer, and deployment of green and cleaner energy technologies to the developing world. Two initiatives in this network are cleaner power plants and renewable energy, discussed next.

A. Regional Assessment of Compliance of Thermal Power Plants to Set Up Air Pollution Control Facilities

Cleaner power plants could be achieved through cleaner fuel and pollution control. To reduce environmental and health impacts, the environmental assessment of donor-assisted projects requires mitigating measures, such as air pollution control facilities, to be implemented over the life of the project. The extent of compliance to such requirements among ADB member countries, especially those borrowing heavily for power plants, is not known. It would be useful to review the air pollution abatement measures recommended in these energy projects, especially for thermal power plants; the extent of their actual application; and the impact of the projects on population health. Such a review could provide lessons learned and best practices that could be documented for future projects and health impact assessment—both positive and negative—on the population.

B. Regional Strategy to Increase Usage of Renewable Energy, such as Wind, Solar, and Geothermal Energy

All major donors including ADB should make sure that lending or grant assistance does not promote or exacerbate regional air pollution. As fossil fuel use (especially coal and oil) will remain a major part of the energy source in most of Asia, there should be efforts to make it cleaner or to install air pollution controls. A more progressive move is to increase lending on renewable energy in areas of research, demonstration, and eventually implementation in both urban and rural settings. Among the important renewable energy sources, wind, solar, and geothermal power have been proven reliable and viable in this region.

The potential for these three renewable energy sources in Asia and the Pacific is enormous but not fully exploited. For example, there are geothermal areas identified and harnessed in PRC, Indonesia, Philippines, and Thailand. The life of a geothermal power plant can be decades and even a century, as is the case in Larderello, Italy, where a plant built in the early 1900s is still operational. Wind energy has been tapped in India to generate a total of 1,700 megawatts, ranking fifth in world wind use, while the PRC with 400 MW ranks ninth.¹⁵ Because solar power is abundant, it is gaining popularity in Cambodia, PRC, India, Thailand, and Pacific island countries. None of these power sources require burning; hence, there are no greenhouse gas emissions, no air pollution, and no acid rain precursors.

TRANSPORT AND HEALTH

A. Regional Assessment of Health Impacts of Air Pollution from Motor Vehicles

Air pollutants, such as particulates, lead, and aromatic hydrocarbons, are released to the environment from various types of motor vehicles. The multiple effects on population health, especially on children, the elderly, and pregnant mothers were

¹⁵ Cost of wind energy per kwh has declined tenfold in the last 30 years as demand and supply have expanded globally.

highlighted in the Transport chapter. In economic analyses of transport projects, the external and societal costs such as health benefits/impacts should be included in a social benefit-cost analysis.

The Bellagio Memorandum on Motor Vehicle Policy (2001) established principles for transport policy to address global environmental and health imperatives. Several global initiatives have emerged in the past years that encourage people and institutions to work together. One such initiative is the CAI (see Regional Initiatives, Chapter 8). ADB can continue supporting CAI-Asia to provide more capacity building and evidence-based studies on the improvement in health with the use of cleaner fuels. Documenting the impacts on child health and intelligence from gradual elimination of leaded fuels is especially important, because this will help many children enter and complete their expected level of schooling and continue along more productive pathways.

B. Road Safety Initiatives

One positive indicator of progress in any country is the presence of a well-developed road network that allows travel in and out of different locations. Highways and streets provide access for people and commodities in motor vehicles (such as trucks, vans, and cars), motorcycles, and bicycles. However, it does not follow that when roads are available, commuters observe road practices. The statistics on road accidents are staggering as reported in the Transport chapter. Traffic crashes have been important causes of fatalities but are not given proper attention as a major health issue in developing countries and those in transition. ADB could make sure that roads built from its assistance are safe and promote healthy and productive lives.

ADB has been cognizant of road safety issues in its transport projects but it could improve its performance in areas of institutional capacity building within countries to promote road safety. ADB could work in partnership with global and regional initiatives that support the promotion of road safety. Among these is the Global Road Safety Partnership (GRSP). GRSP is a global partnership between business, civil society, and governmental organizations collaborating to improve road safety conditions around the world. The World Bank initiated GRSP in 1999 to form alliances among stakeholders committed to improve road safety globally. According to GRSP, the huge economic losses due to road crashes inhibit economic development and perpetuate poverty. If deaths and injuries are reduced, there will be savings realized, which could be used for delivering better public services and improvement in health care.

AGRICULTURAL RESEARCH AND HEALTH

The important role of international agricultural research in creating public goods to reduce poverty by improving the nutrition status and household incomes of poor farmers is now accepted as a global challenge. The role of plant breeding to enhance human nutrition is an important step in addressing the small stature and low weight of Asian children, as well as the multiple micronutrient deficiencies that rob these children and their mothers of life, longevity, and full intellectual potential. The Consultative Group on International Agricultural Research (CGIAR) has approved a Global Challenge Program on Biofortification (through 2012) that endeavors to adopt nutritional quality

as a goal for plant breeding research in the most commonly consumed cereals, other staples, and legumes. This could emerge as an important pro-poor strategy for the future. The plant breeding strategy offers the opportunity to create an international public good through comprehensive benefits to producers and consumers with public health significance.

Given the high payoffs to reducing micronutrient deficiencies and the current reservations about conventional approaches to solve the problem quickly and completely, plant breeding has a place because of its potential coverage of entire Asian populations, especially the poor who derive most of their consumption from rice and other staple crops. The breeding strategy does not depend on shifts in behavior or preferences.

One such activity under this strategy supported by ADB is current regional research on rice biofortification (i.e., plant breeding research to load micronutrients into rice germplasm) to produce new varieties after adaptation trials in major Asian rice growing production systems. Increasing iron density has been the major goal because of the severe anemia problem in the region.

The CGIAR's challenge program also covers wheat, maize, beans, sweet potato, and cassava in the first phase, and later will cover the semi-arid coarse grains and legumes, all of which are critical to dietary adequacy and quality for poor Asians. Based on the rice experience to date, both the international and national agricultural research centers are highly motivated to move the research forward, provided that an interdependent set of evidentiary tests is satisfied prior to any landmark decision to mainstream the high-micronutrient traits in all elite breeding lines of the major crops. These tests are based on four questions: (1) Are iron-enhanced cereal yields high and will farmers adopt them? (2) To what extent is the extra iron bioavailable; to what extent is iron status affected? (3) What is the effect of milling and cooking of the iron-dense cereals on iron content and will consumers accept the biofortified varieties? (4) Is the strategy cost-effective; how high are benefit-cost ratios? Do they compare favorably with other approaches (e.g., fortification, supplementation, or other food-based strategies) in benefits delivered per unit cost? Biofortification is not viewed as a "a magic bullet" but a crucial niche in an integrated strategy to eliminate malnutrition.

The pathway from research to investment in a new line of cereal germplasm with nutritional traits is long and carefully paved, and international financial institutions like ADB have a role to play in supporting the investment decisions that will be made based on the research evidence.

TRADE AND HEALTH

The benefits of trade liberalization are often questioned, not least because of the impasse at the WTO Cancun talks on global trade and development (September 2003) that stymied progress in reducing subsidies from developed countries to agricultural products, among other areas. Nevertheless, all countries are permeable to the influences of globalization and two essential commodities needed by the poor—processed foods and medicines—can benefit from trade because international standards of quality, transparent pricing, and product labeling are required by the WTO agreements. Two new trade agreements have been forged that promise progress in food fortification and availability of essential drugs: addressing micronutrient deficiencies and diseases disproportionately suffered by the poor, respectively. ASEAN has recently signed a free

trade agreement with the PRC that could very well facilitate fair pricing, high quality, and universal access of commonly consumed commodities like processed foods and essential drugs. The other, a WTO agreement, states that patent rights should not stop poor nations from obtaining the drugs they need to prevent and treat disease. Details of these two agreements follow.

A. Creating an ASEAN-PRC Alliance for Nutritionally Fortified Foods

Food fortification is an essential element of national food policies in Asian and Pacific countries to ensure nutrition security for all their citizens. Asia is poised to apply food science and technology in the food industry and make strides in solving the lingering micronutrient deficiencies (vitamins and trace minerals) that impede human development (and indirectly economic development) on a massive scale. Three quarters of the children and adults suffering from micronutrient malnutrition in the world (iodine, iron, vitamin A, and zinc are the main culprits) are living in Asia, as are three quarters of the world's underweight and stunted children.

Food fortification is a proven technology that has been used in the industrialized world for 70 years. A mature food industry in Asia will soon be prepared to deliver micronutrients through fortified foods at the population level, substantially reduce maternal and young child deaths, and also help children achieve optimal physical growth and mental development at very low cost. The technical costs of production are not prohibitive. ADB has shown regional leadership in implementing fortification programs in Central Asia, and helping mainland Asian countries define through country investment plans a niche for the food industry to improve the health of the poor, as well as the educability of their children, through fortification of essential, commonly consumed foods. A variety of foods can deliver iron and reduce anemia (wheat flour, condiments like soy and fish sauce and monosodium glutamate), reduce vitamin A deficiency (cooking oils, margarine, sugar), reduce iodine (salt) and zinc deficiencies (wheat flour), and all forms of malnutrition in infants and very young children (through multiple micronutrient-enriched complementary foods).

The ASEAN-PRC free trade agreement offers an opportunity to place fortified foods in major production systems throughout this region. The proposed regional initiative would promote harmonization of standards to effect rapid adoption of fortified staples and to tap the power of regional trade to induce competition and institutionalize structural reform packages that will raise the credibility of ASEAN and PRC as formidable partners in global food trade. Donors, in collaboration with the ASEAN Secretariat, should examine how the ASEAN region can create common approaches to regulation, quality assurance and food control systems, and trade. Harmonization of all regulatory and trade protocols in the 11 nations with Codex Alimentarius standards for food safety and product labeling, as well as the WTO agreements with member states, should be attained by 2005.

B. Access to Essential Pharmaceuticals through Trade Liberalization

A breakthrough just before the 2003 Cancun trade meeting regarding the manufacture and trade of essential drugs for diseases afflicting the poor needs forward momentum. Under the TRIPS Agreement administered by the WTO, developing countries were until recently permitted to manufacture generic drugs only for their domestic markets, leaving the situation on importing cheap generic drugs unclear for countries without the ability to produce their own.

The stage for the breakthrough was set by the Doha Ministerial Declaration of 14 November 2001 to the effect that the TRIPS Agreement should allow countries to take appropriate measures to respond to public health emergencies. The Doha Declaration also agreed to extend exemptions on pharmaceutical patent protection for least-developed countries until 2016. While there has been disagreement on whether Doha was limiting coverage to a few drugs for treating common communicable diseases (especially HIV/AIDS, malaria, and tuberculosis)—a view held by the developed countries and major pharmaceutical multinationals—developing countries have held to the interpretation that TRIPS’ protection of patents should not apply to public health crises and epidemics.

The breakthrough agreement, announced on 30 August 2003, waives Article 6 of the TRIPS Agreement, in effect stating that patent rights should not stop poor nations from obtaining the drugs they need to prevent and treat disease. WTO member countries can use “compulsory licensing”¹⁶ to produce generic drugs for export to poor nations that lack the capacity to manufacture their needs at home. This is the right moment to implement the agreement with regard to production of essential drugs for two diseases that threaten to reach epidemic proportions in Asia: HIV/AIDS and cardiovascular disease (CVD). The risk factors that produced an AIDS pandemic in Africa over the last decade are present in Asia, particularly in clustered “hot spots” that could imperil 2 billion people. CVD is the leading cause of mortality in Asia, amid little notice or prevention capacity within public health services in the region. CVD drugs and antiretroviral (ARV) drugs for persons living with HIV/AIDS and opportunistic infections reach less than 5% of sufferers because of the high price and weak capacity to manufacture them in countries needing them. Wide disparity in pricing also introduces inequities: the ratio of multinational pharmaceutical companies’ ARV prices to a generic version produced in India is 40:1, but even within ASEAN there is a fourfold difference because of lack of competition and trade.

The recommendation is that ASEAN and PRC develop regional production, regulation, and trade agreements that will ensure availability of ARV and CVD drugs of world-class quality that are generically produced and affordably priced. Only 7 countries in developing regions (including PRC, India, Republic of Korea, and Thailand)¹⁷ have the capacity to use reverse engineering technology to produce the ARV cocktail needed by persons living with HIV/AIDS. Presumably, the same group could produce generic versions of key CVD drugs not yet available for the general public in developing countries.

Development partners in the donor community, led by WHO and possibly ADB, should be mobilized to meet the health crisis represented by the unchecked pandemics. Support to ASEAN-PRC essential drugs’ price minimization will be a key step, and may in time spark interregional trade in essential drugs to subSaharan Africa, which desperately needs the medications but cannot produce them at home (less than 1% of Africans living with HIV/AIDS receive the four-drug ARV cocktail). Before ASEAN and PRC can consider the best means to achieve regional standardization of drug quality, pricing, and distribution arrangements, regional technical assistance by an interested donor is needed to harmonize legislation in all the countries so that the compulsory licensing provision of the WTO waiver can be used by all for imports and exports. Donors should work with

¹⁶ A country can use a compulsory license to use an invention, which has been granted without the permission of the patent holder. WTO does not limit the reasons for issuing a compulsory license.

¹⁷ The others are Argentina, Brazil, and Mexico

ASEAN and WHO to ensure equitable access to ARV and CVD drugs throughout the ASEAN-PRC region.

URBAN DEVELOPMENT AND HEALTH

Water for Asian Cities

Based on an agreement between ADB and UN HABITAT in March 2003, an ambitious regional program for integrating water, sanitation, wastewater management, and solid waste disposal in Asia's urban slums has begun, with a projected investment level of US\$500 million in future ADB lending. This initiative has arisen from stakeholder participation and consultation processes, and the firm direction of the program was confirmed at special sessions at the Third World Water Forum in Kyoto. The objective is to provide integrated services for 10 million urban dwellers; to cover the region with representative "flagship" programs; to ensure beneficiary participation and ownership for sustainable service delivery; to adopt a total river basin systems approach within which reliable water availability and drinking water quality can be assured; to reduce nonrevenue water and develop local systems for governance and sustainable financing; and to promote good hygiene and health practices by linking infrastructure development to community health outreach programs. This is a promising model for bringing essential services to the urban poor and upgrading slums in line with the MDGs. Donor coordination and multiple donor partnerships should be developed using the ADB-UN HABITAT alliance as the prototype.

KNOWLEDGE MANAGEMENT

Regional Web Site and Database on Environmental Health

ADB has accumulated a wealth of experience in each of its member countries for all sectoral projects. The associated reports contain data and information that could be extracted to form a database of health indicators and outcomes, lessons learned, best practices, and recommendations for future work. Local counterparts could be involved in each project to carry out minor operations research or a special survey to obtain such information where it is not available. All of these could be processed to be part of a knowledge bank for health that would be a valuable resource for task managers, consultants, and member countries where a health dimension is included in project planning and implementation. The ADB website could host this information along with the health impact assessment guidelines, references, links to related websites, and related ADB publications. In this way, the power of the Internet would be fully used to improve people's health, reduce poverty, and achieve the MDGs.

PROTECTED ENVIRONMENTS PROMOTE HEALTH FOR ALL

The Alma Ata Declaration (1978) correctly proclaimed “health for all” as a right for humanity, and the world has built imperfect structures to extend this right to all peoples. This Primer offers another perspective on ensuring health for all, but the strategies offered herein are not a substitute for the expansion of health services and public nutrition to the remote corners of the developing world. Environmental health protection is a form of preventive health and, thus, enriches the paradigm of public health serving the poor and vulnerable. The complementarity of these two great movements for the right to health may provide a solution to the problem of international security that is second to none.

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ANNEX 1
MEMBERSHIP OF ADB SECTOR COMMITTEES

Agriculture, Natural Resources, and Rural Development Committee

Yuen Loh Yee, <i>Chair</i>	Javed Hussain Mir
Edy Brotoisworo, <i>Alternate</i>	Masahiro Otsuka
Pratima Dayal, <i>Alternate</i>	S. Tahir Qadri
Njoman Bestari	Joji Tokeshi
Richard Bolt	M.Jamilur Rahman
Brian Fawcett	Paolo Spantigati
Kunhamboo Kannan	Henry Tucker

Water Sector Committee

Wouter Lincklaen Arriens, <i>Chair</i>	Tetsuro Miyazato
Charles Andrews, <i>Co-Chair</i>	Shigehiko Muramoto
Nancy Convard	K. E. Seetharam
Ian Fox	Keiichi Tamaki
Rudolf Frauendorfer	Etienne van de Walle
Alain Goffeau	Christopher Wensley
Graham Jackson	Jo Yamagata
In-Ho Keum	Xiaoyan Ye
M. Akram Malik	Kenichi Yokoyama

Energy Committee

Mukhtar Ahmed, <i>Chair</i>	Dagmar Graczyk
Charles Melhuish, <i>Alternate</i>	Edu Hassing
Luigi Bodda	Haruya Koide
Seethapathy Chander	Anil Terway
Peter Choynowski	Yonhping Zhai

Transport Committee

Charles Melhuish, <i>Chair</i>	Pierre Poinsignon
Mukhtar Ahmed, <i>Alternate</i>	Nigel C. Rayner
Md. Alamgir Akanda	Manzoor Rehman
Sirpa Jarvenpaa	Sean O'Sullivan
Haruya Koide	Shonsu Tsukada

Urban Development, Municipal Services, and Housing Sector Committee

Allen Williams, <i>Chair</i>	Amy Leung
Charles Andrews, <i>Co-Chair</i>	Michael Lindfield
Gulfer Cezayirli	Sangay Penjor
Januar Hakim	Nigel Rayner
Hun Kim	Matthew Westfall

Education Sector Committee

William Loxley, <i>Chair</i>	Wendy Duncan
Joseph Michael Hunt, <i>Alternate</i>	Jeoung-Keun Lee
Paul Chang	Brajesh Panth
Kowsar Chowdhury	Valerie Reppelin-Hill
Shamsul Chowdhury	Etienne van de Walle
Marc Cohen	

Health, Nutrition, Population, and Early Childhood Committee

Joseph Michael Hunt, <i>Chair</i>	Rie Hiraoka
William Loxley, <i>Alternate</i>	Jacques Jeugmans
Indu Bhushan	Barbara Lochmann
Erik Bloom	Karima Saleh
Peter Choynowski	Lisa Studdert
Vincent de Wit	Takako Yasukawa
Maryse Dugue	Axel Weber
Cecile Gregory	

Finance, Industry, and Trade Committee

Henrike Feig, <i>Chair</i>	Renato Limjoco
D.R. Blarcom	Yeo Lin
Naomi Chakwin	Li-Gang Liu
Jurgen Conrad	Eric Manes
Lingling Ding	Luca Papi
Martin Endelman	Edgard Rodriguez
Chin Choon Fong	Julie Rogers
Shigeko Hattori	Virgilio Velasco
Jeffrey Liang	Winfried Wicklein
Werner Liepach	

ANNEX 2 GLOSSARY

ADB	Asian Development Bank.
Aedes	A genus of mosquitoes that transmit the viruses responsible for such diseases as dengue, encephalitis, and yellow fever.
Agrochemicals	Chemicals used in agriculture, such as fertilizer, pesticides and weed killers.
AIDS	Auto immune deficiency syndrome caused by infection with the human immunodeficiency virus (HIV).
Analysis	An examination in order to understand. See assessment.
ARV	Antiretroviral drug.
Asbestosis	A disease in which the lung tissue thickens in response to irritation by inhaled asbestos fibers and consequently obstructs respiration.
ASEAN	Association of Southeast Asian Nations.
Assessment	Examination in order to decide. See analysis.
Bacteria	Microscopic unicellular organisms. Those that may cause diseases are pathogenic bacteria.
Bilharzia	A disease, caused by infestation of the human body by the worms of <i>Schistosoma</i> , characterized by passing of blood in the urine or stool. Also called schistosomiasis.
Biofortification	Plant breeding to enrich nutrient content of staple crops, especially with micronutrients.
Blue Baby Syndrome	A condition, suffered by babies, of insufficient oxygen in the blood. The condition can be caused by nitrate ingestion usually from drinking water or milk. Also known as methemoglobinemia.
Bronchitis	A disease in which the lining of the bronchial tubes of the lungs is inflamed. It may be caused by bacteria, viruses, chemicals or other substances, such as asbestos and dusts.
CAI-Asia	Clean Air Initiative for Asian Cities.
Carcinogenic	A substance that induces the development of cancer.
CVD	Cardiovascular disease.
Children of School Age	Children 5–14 years of age.
Cholera	A highly infectious disease caused by <i>Vibrio cholerae</i> characterized by vomiting and watery stools, leading to rapid dehydration and death. It is spread by the fecal-oral route and contamination of water and food.

Chronic	Of a disease or disorder; developing slowly and persisting for a long time.
CNG	Compressed natural gas.
Codex Alimentarius	A list of international standards and codes of practice, approved by FAO and WHO, related to food quality, hygiene, contaminants, and additives.
Communicable Disease	Diseases that are transmitted from a person or animal to another via a host or agent such as insects, foods, and contaminated materials.
Conjunctivitis	An inflammation of the thin transparent lining of the eye (the conjunctiva). It is caused by viruses, bacteria, chemical substances or degenerative changes.
Consumption	Pulmonary (of the lung) tuberculosis leading to the destruction of the lung and wasting away of the body.
Cross-cutting Issues	Issues of concern to more than one sector.
CVD	Cardiovascular disease.
DALY	Disability-adjusted life years, expressed as years of life lost to premature death and also years lived with disability, adjusted for severity of the disability.
dB(A)	Decibels in the audible range.
DDT	A highly-toxic chlorinated organic insecticide with a long half-life.
Dengue	An acute tropical fever caused by a virus, occasionally fatal; also known as break-bone fever. The vectors are <i>Aedes</i> mosquitoes.
Dermatitis	An inflammation of the skin usually because of infection or irritation by chemical substances that come in contact with the skin.
Diarrhea	Persistent purging or looseness of bowels commonly due to infection by microorganisms, such as <i>Salmonella</i> .
Dysentery	Inflammation of the large intestine associated with the frequent passage of bloody stools caused by <i>Entamoeba histolytica</i> and <i>Shigella</i> species.
EDC	Endocrine disruptor chemical.
Effluent	Liquid industrial and agricultural waste; outflowing sewage during purification.
Encephalitis	Inflammation of the brain tissue.
Endemic	Of a disease or microorganism: indigenous to a geographic area or population.
Enteric	Pertaining to the intestines or gut.
Epidemic	The occurrence of a disease or illness that attacks great numbers

	of people in one place at one time clearly in excess of normal expectancy and spreads from place to place.
Epidemiology	The study of the geography, frequency, environmental, and behavioral causes and transmission of disease.
Excreta	Refers to feces and urine.
FAO	Food and Agriculture Organization of the United Nations.
Fecal-oral	Related to a route of transmission of pathogens that involves food, water or objects contaminated by fecal material entering the mouth.
Filariasis	A disease due to the presence of filarial worms in the blood and lymph nodes. The vector is a mosquito.
Focus	Point or region of greatest activity of a disease and/or its vector.
Food Security	Access to food for all people at all times, both physically and economically.
Food Fortification	Addition to a food of one or more nutrients absent or present only in minimal amounts. Examples include iodine to salt, vitamin A to sugar, iron to wheat flour.
GDP	gross domestic product
Groundwater	Water that occurs naturally beneath the ground surface and may include the fraction of the precipitation that infiltrates the land surface.
Hazard	Source of possible harm.
Health Hazard	A potential for causing harm to people.
Health Impact	A change in some health indicators among the vulnerable population that is reasonably attributable to the project.
Health Risk	The likelihood that a health hazard will cause harm to a human community.
Helminth	Round worms found in the intestines.
HIV	Human immunodeficiency virus that causes the auto immune deficiency syndrome (AIDS).
Host	An organism, on or in which a parasite lives and feeds.
Hyperkeratosis	Thickening of the superficial layer of the skin.
IDA	Iron deficiency anemia.
ILO	International Labour Organization.
Immunization	A process that induces or increases the capacity of a person or animal to resist infection.
Impact (of Project)	A term indicating whether the project has had an effect on its surroundings in terms of technical, economic, sociocultural, health, institutional, and environmental factors.

Incidence	The number of cases of a specified disease diagnosed or reported during a defined period of time, divided by the number of persons in the population in which they occurred.
Infectious	The ability of a disease organism to spread from one person to another.
Japanese Encephalitis	A mosquito-borne arbovirus that can cause severe or fatal disease.
Leishmaniasis	A disease caused by protozoans, transmitted by the bite of certain sandflies. Liver, spleen, bone marrow, and lymphoid tissues are favored sites of replication.
Malaria	A mosquito-borne disease caused by <i>Plasmodium</i> parasites. Symptoms include fever, chills, headache, nausea, muscle aches, tiredness, vomiting, diarrhea, anemia, and jaundice.
Malnutrition	Disorders resulting from an inadequate diet or from failure to absorb or assimilate dietary elements.
MDG	Millennium development goal.
Microenterprise	A business with up to 10 employees, total assets of up to US\$100,000 and total annual sales of up to US\$100,000.
Micronutrients	Trace nutrients necessary for the normal growth and maintenance of the body but required in very small amounts, such as vitamin A, iodine, iron, and zinc.
Migration	Permanent movement from one habitat or location to another.
Morbidity	The condition of illness or abnormality; the rate at which an illness occurs in a particular area or population.
Mortality	The condition of being subject to death; the death rate; the frequency or number of deaths in any specific region, age group, disease or other classification.
Noncommunicable	Cannot be spread from one person to another.
Occupational Disease	A disease common among workers engaged in a particular occupation brought about by the conditions of that occupation.
Onchocerciasis	A disease caused by the parasitic worm <i>Onchocerca volvulus</i> that is transmitted by black flies; also called river blindness.
Outbreak	A sudden occurrence of, or increase in, cases of a disease in a population in an area or locality.
Parasite	An organism that lives on or in another organism termed the host, and draws nourishment from it.
Pathogen	An organism that causes disease.
PCBs	Polychlorinated biphenyls.
PM	Particulate matter; subscript refers to size in microns.
POP	Persistent organic pollutant.

Prevalence	The number of people ill because of a particular disease at a particular time in a given population. Often expressed as a rate.
Resistance	The development of capacity by an organism to withstand the killing effect of a chemical or drug.
Respiratory	Pertaining to the lungs and the breathing apparatus of the body.
RPG	Regional public good
Runoff	Rainfall flowing over land without infiltrating it.
SARS	Severe acute respiratory syndrome.
STI	Sexually transmitted infection.
Schistosomiasis	A disease, caused by infestation of the human body by the worms of <i>Schistosoma</i> , characterized by passing of blood in the urine or stool. Also called bilharzia.
Sewage	Human excreta and waste water flushed along a sewer pipe.
Silicosis	A chronic lung disease caused by long-term inhalation of silica dust.
Small and Medium Enterprises (SMEs)	Small enterprise: up to 50 employees, total assets of up to US\$3 million and total sales of up to US\$3 million; medium enterprise: up to 300 employees, total assets of up to US\$15 million, and total annual sales of up to US\$15 million.
Smallholder	A farmer who owns a small area of land for subsistence farming.
Stunting	Chronic malnutrition, where weight-for-age and height-for-age are low but weight-for-height is normal.
Subsistence	Providing the bare necessities of living.
Surveillance	A continuing scrutiny of all aspects of the occurrence and spread of a disease that are pertinent to effective control. Alternatively, a special reporting system for a particular health problem for a limited time period.
Transmission	Any route by which a human being is exposed to an infectious agent.
TRIPS Agreement	Agreement on trade-related aspects of intellectual property rights of the World Trade Organization.
Tuberculosis	A chronic and disabling disease of the lungs, and less frequently other parts of the body, which is fatal if not treated.
Typhoid	An infectious disease in humans caused by <i>Salmonella typhi</i> bacteria. It is transmitted by the fecal-oral route and contamination of drinking water and food.
Underweight	A body mass index of less than 18.5 kg/m ² , or a body weight 10% or more below the desirable body weight standard.
UNEP	United Nations Environment Programme.
UNESCO	United Nations Education, Scientific and Cultural Organization.

UN HABITAT	United Nations Human Settlements Programme.
UNICEF	United Nations Children’s Fund
Vector	An animal, often an insect, transmitting an infection from person to person or from infected animals.
VAD	Vitamin A deficiency.
Vulnerable	Susceptible to be injured or damaged or hurt.
Wasting	Acute current, short-duration malnutrition, where weight-for-age and weight-for-height are low but height-for-age is normal.
WUA	Water users’ association.
WHO	World Health Organization.
WTO	World Trade Organization.
Z-score	The standard deviation of an international growth reference for an anthropometric indicator (such as weight-for-age, height-for-age, or weight-for-height).
Zoonosis	An infectious disease transmissible under natural conditions from animals to humans.

ANNEX 3 ADDITIONAL WEB SITES AND REFERENCES

General

- Country Health Profiles, Western Pacific Region
<http://www.wpro.who.int/chips/default.asp>
- Health Policy - Index to UN system programs
<http://esa.un.org/subindex/pgViewSites.asp?termCode=TB>
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<http://www.arts.mcgill.ca/152-497b/h2o/water/gwater/index.htm>
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<http://www.agius.com/hew/resource/ehia.htm>

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