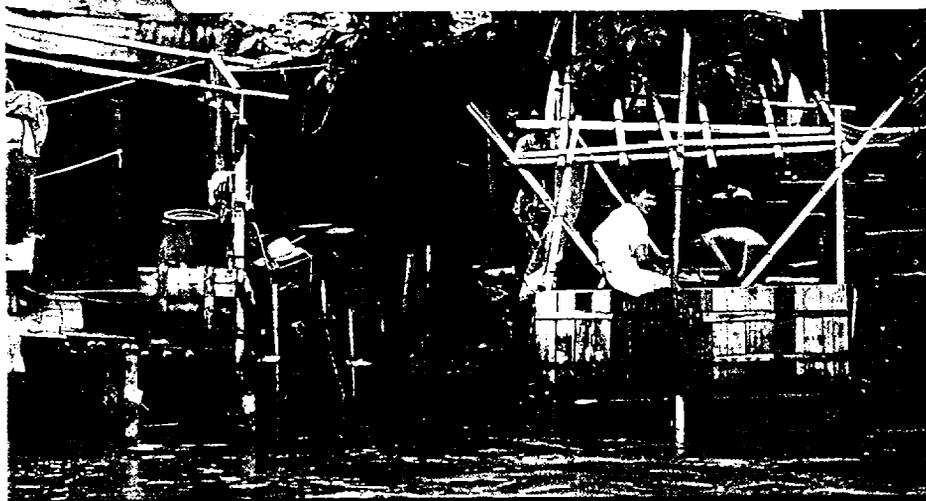


TOWARD AN ENVIRONMENTAL STRATEGY FOR ASIA

Carter Brandon
Ramesh Ramankutty

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*A Summary of
A World Bank Discussion Paper*



A WORLD BANK PUBLICATION

Toward an Environmental Strategy for Asia

**A Summary of a World Bank
Discussion Paper**

*Carter Brandon
Ramesh Ramankutty*

*The World Bank
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Foreword

During the past decade, the developing countries of Asia have exhibited vigorous economic growth unmatched elsewhere in the industrial or developing world. This impressive record, however, has been marred by significant deterioration of the environment. Rapid growth—especially in the region's cities and industries—has combined with high population densities and widespread poverty to produce excessive environmental degradation. Pollution of air, water, and land exceed WHO safety guidelines in many Asian cities. Land degradation, deforestation, and loss of biodiversity are widespread.

The environment in Asia is one of the greatest development challenges in the world today. The reason is not only the complexity of environmental issues themselves but also the complex linkages between growth, population, poverty, and the environment. Asia has already dramatically shown that economic growth can reduce population growth rates and the incidence of poverty. However, to sustain the recent economic gains, greater priority will need to be given to the development of sound environmental policies and of public and private institutions capable of implementing these policies.

While recognizing the environmental challenge in Asia, there are also opportunities that do not exist in many other parts of the world. First, of course, is the high rate of growth itself, combined with a high rate of domestic savings, which provides public and private capital to invest in the necessary technologies. Second, in East Asia the incidence of poverty is falling dramatically—from 30 percent of the population in 1970 to only 10 percent today. Third, Asian countries have generally embraced the principles of sound macroeconomic management. Good economic policies are, by and large, environmentally sound. In addition, the economic management skills demonstrated in Asia form the basis for additional policies that will be required to safeguard the environment. Finally, Asian countries have shown a commitment to health and education. This commitment not only helps create a popular base for environmental activism but also lays the foundation for building capacity in the region's environmental institutions.

At this point, what is most needed is the political will, commitment, and action—in the form of investments, education, and policy reform—

to reverse the alarming environmental degradation still being observed. The World Bank is committed to providing analytical, financial, and educational assistance to help shape these environmental actions over the next several critical years. This booklet, and the longer Discussion Paper that it summarizes, are part of the Bank's effort to assist countries in Asia in developing environmentally sound development strategies.

Toward an Environmental Strategy for Asia is intended to stimulate discussion on important environmental policy and investment issues. It stops short of giving definitive recommendations for any particular country, as this is beyond the scope of the exercise. By building on the World Bank's experience and analytical work in Asia, it offers a set of principles and priorities for addressing key environmental problems in Asia. In addition to being informative, it is our hope that this document contributes to the debate on environmental priorities, the role of the World Bank and other donors, and the need for concerted action across several fronts.

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Toward an Environmental Strategy for Asia

This booklet summarizes the findings and recommendations of a more detailed study that is being published by the World Bank as a separate Discussion Paper.¹ The study was undertaken to address the need arising from both within and outside the World Bank for (a) an assessment of the trends and impacts of environmental problems in Asia, (b) a synthesis of the World Bank's experience in assisting Asian countries with environmental management, and (c) a clear statement on World Bank principles and priorities for environment-related assistance in the near future. The study is intended for several audiences:

- For readers inside the World Bank, it provides an analysis of current environmental issues in Asia and a systematic treatment of topics that are appropriate to the Bank's future lending, research, and policy dialogue.
- For interested readers in Asia and elsewhere, it summarizes World Bank analysis of environmental issues in Asia and suggests a broad strategy for achieving environmental sustainability.

After briefly summarizing the nature and magnitude of environmental problems in Asia, the report presents the key components of a strategy to improve environmental management. The emphasis of this section is on a *process* for achieving sustainability—a process that must work within real institutional and resource constraints, and therefore must be continually updated as these constraints change. The policy and technical approaches to environmental problems that are proposed are clearly general, and must be tailored to the needs of any given country. Furthermore the relative priorities placed on more sustainable policies and environmental investments can only be determined by Asian countries and communities themselves.

The report then discusses environmental strategies for five different sectors—urban environmental management, industry, energy, natural resources, and water resources—in greater detail. Finally, the last section outlines the World Bank's potential role in assisting Asian countries to

address environmental issues. The environmental emphasis of the Bank's lending program and analytical work has grown over the last several years and is expected to grow further. However there are areas in which the Bank can potentially do more, as outlined in this report.

The State of the Environment in Asia

Economic and population growth has led to severe negative impacts on the Asian environment. Pressure on the region's resources is intense and growing. There are serious problems in the areas of urban environmental degradation, industrial pollution, atmospheric emissions, soil erosion and land degradation, degradation of water resources, deforestation, and loss of natural habitat. Questions about the sustainability of current economic growth are more than an abstraction concerning limits to growth. The real costs of environmental degradation are mounting, taking the forms of increasing health costs and mortality, reduced output in resource-based sectors, and irreversible loss of biodiversity and overall environmental quality.

These are strong statements about the state of the environment in Asia, but they are supported by available (though incomplete) data. The most reliable data on existing levels of degradation are on specific locations and are not geographically comprehensive. More comprehensive data, such as national vehicle registration and total industrial emissions, do not address ambient conditions directly but help illustrate worrisome trends that will continue to worsen without targeted efforts to change the direction of the trend.

There are several underlying causes of environmental degradation in Asia. The first—which Asia shares with most of the world—consists of fundamental market and policy failures concerning natural resources and the environment that have received little corrective action. These failures vary by resource and location, but are found in all sectors. A second cause is the strain on the resource base imposed by Asia's large and growing population, which is projected to rise from 2.8 billion today to 4.3 billion in 2025—and will represent over 50 percent of total world population by that time. This strain is exacerbated by the 700 million people currently living in absolute poverty. A third underlying cause is rapid urbanization and industrialization, which impose complex demands on the assimilative capacity of the environment, as well as on human and institutional abilities to respond. A fourth cause is the common perception (caused, in part, by lack of information) that there is a direct tradeoff between environmental protection and economic growth. This paper argues that there is, in fact, no tradeoff: rational policies will cost less to implement than the resulting reduction in

external costs, leading to a net increase in economic efficiency and social return on investment.

The environmental strategy presented here does not directly address population growth, although decreasing the rate of population growth would reduce a major source of environmental pressures. Similarly, the report does not question Asia's steady urbanization and industrialization, which reflect fundamental economic trends that can be made far more sustainable. Rather, the strategy proposes a framework for taking steps to minimize the environmental impacts of these major economic trends.

A Framework for Improving Environmental Management

The range of actions required to improve environmental management in Asian countries is extremely wide, from using innovative policy analysis and implementation to securing large amounts of new investment. The complexity of the actions required, combined with real financial and institutional constraints, means that the first element of any framework must be to set priorities.

Actions Required

PRIORITY SETTING. Priorities for action are ideally based on the collection and analysis of available data, careful valuation of the costs and benefits of various types of interventions, assessment of the administrative burden of alternatives, and participatory decisionmaking. Unfortunately, it is much easier to analyze the symptoms of nonsustainable development than to make difficult choices concerning priorities for intervention. How should countries set priorities between local and global pollutants, and between policy reform and capital investment? A full cost-benefit comparison of alternative scenarios is unrealistic because it requires too much data and covers too many hypotheticals. In practice, priorities are best set as the result of a process involving both technical and public inputs and taking into account scientific, economic, and medical evidence as well as the intensity of public concern over risk.

Ultimately, governments must decide on the basis of these inputs what level of environmental quality is politically and economically feasible and what instruments should be employed in achieving those environmental goals. The framework proposed in this report highlights four key areas for consideration when shaping national environmental strategies: adopting cost-effective policy instruments, improving institutional capacity, increasing public and private sector investments, and

fostering improved technology, even in areas not fully supported by the market.

POLICY REFORM. The second element in the framework is to design cost-effective policy instruments that minimize costs and economize on scarce administrative skills. Environmentally appropriate policies are not inconsistent with policies that foster growth and trade, but they do attempt to correct the bias of market and policy failures that lead to overexploitation of nonpriced and underpriced environmental resources. Although the exact descriptions and intensities of environmental problems vary by country, the underlying causes of the degradation vary little. The causes can be traced to both market failures (such as lack of information, price externalities, public goods and free riders, and inadequate property rights) and policy failures (concerning pricing or trade policies).

Policy reforms used to achieve improved sustainability can be clustered into three distinct but complementary groups:

- Market-based policies, which use pricing, taxes or marketable permits to modify behavior
- Regulatory or administrative policies that impose quantitative restrictions, enforce property rights, and screen investments (both public and private)
- Extraregulatory approaches to pollution control, such as the introduction of public disclosure requirements and the increased use of court systems in environmental liability suits.

Most Asian countries have developed environmental policies that draw heavily on the second group—which is consistent with the traditional path taken by the industrial countries as well—but less so on the more innovative approaches of the first and last groups. The emphasis on regulatory policies has had relatively high administrative costs, as well as relatively low economic efficiency. For both reasons, efforts to encourage reform in the other two groups promise both greater cost-effectiveness and better use of scarce administrative skills.

The most important type of market-based policy reform is pricing reform. “Full-cost” pricing (that is, removing subsidies and internalizing the externalities imposed by the resource use or pollution emitted) is fundamental to reducing the consumption of resources in virtually all sectors. Taxes or tradable permits levied on pollution and congestion are equivalent to raising the price on air, water, and land resources. Depending on the relevant elasticities, tax-based policies will lead to some increase in financial flows to the “owner” of the resource—which is often the government. These revenues can be reinvested in the resource itself, particularly in the case of investments in public infrastructure (for

example, in water supply and energy) and public goods (such as air and forests). In addition, both price increases and fiscal instruments can help stimulate technological adaptation that favors greater efficiency and reduced pollution.

Non-market-based policy reforms—including regulatory, legal, and administrative reforms—are required to complement market-based ones. No country has relied solely on market-based environmental policies to reduce pollution. The “command and control” approach to pollution control, in which governments specify allowable factory emissions and often even specify the technologies to be used, is very common. Examples of other types of non-market-based reforms are nontax methods to reduce transport emissions and congestion, such as emissions standards, aggressive vehicle inspection programs, traffic management, tighter zoning, and investments in public transit alternatives to private cars. (These steps have all been taken in Singapore.) Further examples for both the transport and energy sectors are programs to upgrade technologies and fuels, such as the introduction of unleaded gasoline in Malaysia and Thailand, switching from coal to natural gas in Seoul, and upgrading to higher grade coal in China. For the agricultural and forestry sectors, investments in technology development, information dissemination, and extension are required to introduce more sustainable practices. Improved land titling and resource tenure also show positive correlation with environmental management.

Although interest is rising, Asian countries have turned only recently, when at all, to innovations in the area of extraregulatory approaches to pollution control. For example, requirements for public disclosure of point-source pollution data can lead to direct negotiations between polluters and communities, consumer boycotts or liability court cases. Disclosure is relatively low cost, requires relatively little direct government involvement, and invokes the power of the market into the environmental arena. (Increased local participation, however, is not a substitute for more comprehensive environmental policies.) Although specific examples of direct community participation in industrial pollution control have arisen across Asia, no country has formalized the right of communities to know.

STRENGTHENING PUBLIC INSTITUTIONS. The third element in the framework is to build sufficient institutional capacity to accomplish the important steps of priority setting and policy reform. Institutions constrain the choice of policies. The policy mix must be weighed not only against an analysis of the efficiency of the approach but against a country’s ability to implement. Weak institutions typically lack both the technical skills and political authority to change the behaviors of firms, households, and farmers. Weak enforcement agencies often lack both the information (such as emissions data) and the means (such as consistent

and fair enforcement capabilities) to implement policy. Weak legal and administrative procedures undermine the government's ability to enforce resource tenure, particularly in agriculture and forestry.

Political commitment to protecting the environment is increasing throughout Asia. It is at the level of implementation—monitoring environmental impacts and enforcing regulations—that government institutions are weakest. For donors, an emphasis on institutions must mean more than working with environmental agencies: it also means commitment to the notion that environmental lending cannot be divorced from national policy and investment planning. Unfortunately, the countries most in need of environmental assistance are often those with the least absorptive capacity.

The technical areas in which Asian environmental institutions need strengthening range from the ability to set standards and analyze policy at the national level to the ability to perform actual monitoring and enforcement at the local level. Most environmental institutions would benefit from inviting broader participation—by the private sector, parastatals, nongovernmental organizations (NGOs), and community groups—in environmental assessments and other activities. Also, decentralization is a well-established trend in Asia. The decentralization of monitoring and enforcement authority for urban environments and industrial pollution can be positive for the environment, but only if local agencies have adequate resources, central support, and local accountability for achieving their mandates. Similarly, the decentralization of fiscal and planning authority for local infrastructure investments can bring public expenditures more into line with local environmental concerns. However, decentralization is a particularly multifaceted issue, and there are few successful Asian case studies from which to draw convincing lessons.

INCREASING PUBLIC AND PRIVATE SECTOR INVESTMENT. The fourth element in the framework is to mobilize private sector investment, in line with more sustainable pricing policies, and public sector investment, in line with environmental priorities. The overall costs of sustainable policies have been shown to be large in absolute numbers but small in relative terms: the World Bank estimates that developing countries need to expend 2 to 3 percent of gross domestic product (GDP) per year to achieve greater sustainability. In Asia this translates into about \$38 billion per year by 2000, two-thirds of which would be in East Asia.² The most financially viable environment-related investments are those that are good for both economic development and the environment, including energy conservation, waste minimization in industry (as opposed to end-of-pipe investments), recycling in the urban sector, fuel efficiency in the transport sector, soil conservation, and sustainable forestry.

Increased private sector investments should be promoted through pricing and policy reform and through improved access of the private sector to commercial loans, to supplier credits and, under special circumstances, to government incentives. Public sector investment decisions should incorporate shadow prices that reflect the full social cost of resource use. In the case of public infrastructure investments, donor support should be contingent on financial plans that encourage project cost recovery to the extent possible. When public investments address cross-border or global problems, such as global warming, ozone depletion, biodiversity, and pollution of the seas, strong arguments exist for international cost-sharing.

IMPROVED TECHNOLOGIES AND TECHNOLOGY TRANSFER. The last element of the basic environmental management framework is the need to foster technological improvements and efficiency gains, even when the research, development, and demonstration costs are not fully borne by the market. Improvements in productivity and efficiency are essential to making continued economic growth possible at a time of growing populations, urbanization, and industrialization, and of an increasingly degraded resource base.

Economic and trade openness is fundamental to technology transfer. In the polluting sectors (urban, transport, industry, and energy), "clean" technologies will be most available in those Asian countries with open trade regimes and business climates that foster foreign investment. Since many high-efficiency industrial and transport technologies pay for themselves over a few years, relatively little public sector intervention is required (except for, perhaps, information dissemination to smaller firms). However, in the "green" sectors (agriculture, forestry, and natural resources), public sector involvement in technical issues has a much higher priority, especially for devising sustainable production technologies for marginal agricultural lands and forests.

The Impact of Improved Environmental Management on the Poor

Strategies for achieving sustainability that use pricing and regulatory measures to reduce overexploitation of natural resources have direct and often inequitable impacts. Concern about the impact on the poor of improved environmental management is particularly great in South Asia, which has more than half the world's poor.

This concern is similar to that of ensuring social equity during periods of structural adjustment. For both structural and "environmental" adjustment, efficiency considerations should be paramount. Nevertheless, adverse impacts for certain population subgroups should be identified and addressed separately—and in a manner complementary to, not

substituting for, the underlying efficiency measures. For example, in cities the most important adverse impacts on the poor from full-cost resource pricing are likely to be in the areas of water, electricity, and fuel (including biofuels). Through the combination of market differentiation (a lower level of service for the poorest communities) and financially strengthened utilities, achieved, in part, through pricing reform, the option of cross-subsidization of the poorest communities becomes available.

The measures required to offset inequitable impacts of environmental policies will be very different in urban and rural areas. The urban poor are, disproportionately, victims of urban environmental degradation: they are less buffered than the nonpoor from water pollution, toxic wastes, solid wastes, high traffic, and air and noise pollution. Urban environmental investments will probably help the poor more than middle- and upper-income city-dwellers. Therefore, investments in urban environmental cleanup can be considered to be socially progressive.

However, in rural areas the poor are often disproportionately, and usually inadvertently, the perpetrators of environmental degradation. The environmental policies required to bring about increased sustainability involve both positive and negative impacts on the poor. Reforms in land tenure, to the extent that the poor gain tenure, would be positive. The truly landless, however, would be increasingly cut off as others gain title. Solutions to the landless poor have to be site and area specific. One trend that may help to relieve some of the pressure in East Asia is that the rural population is actually decreasing as urban populations grow. A second trend that should be supported through government and donor programs is the diversification of rural employment into nonfarm activities. Nonfarm employment is usually less resource-intensive than farming, and therefore has less environmental impact. Finally, expanded intensification on irrigated lands and higher value-added through mixed cropping on marginal lands should help to absorb the labor surplus of the rural landless poor.

Urban Environmental Management

Rapid urbanization, one of the most important demographic and social changes of the century, has both positive and negative environmental impacts. In Asia, eighty-seven cities have more than 1 million inhabitants; of these cities thirty-eight are in China and twenty-three in India. By 2005 more than half of the population in East Asia will live in urban areas. In South Asia the urban population will overtake the rural population by 2025 (figure 1). The negative environmental impact of cities comes from the high levels of pollution they engender. The positive impacts—which need to be more fully realized—are that pollution is

more concentrated and can potentially be addressed more cost-effectively and that pressure on rural lands is reduced to the extent that urban growth reduces rural population growth.

Urban pollution is caused by high population densities, rising urban income and consumption levels, and large industrial concentrations. Infrastructure and services are unable to keep up with these trends. Local governments lack the capacity to collect and dispose of municipal sewage and solid wastes, or to control emissions and toxic wastes. The concentration of wastes overwhelms the assimilative capacity of natural ecosystems. Human health is threatened by the highly concentrated discharges of pollutants in urban areas.

The cost to Asian economies of urban environmental degradation has not been calculated, but initial estimates show that the environmental costs of air and water pollution in Jakarta and Bangkok exceed \$1 billion and \$2 billion per year, respectively. Costs in Asia's other large cities are comparable. Furthermore, these costs are rising as safety thresholds for a large number of pollutants and toxics are exceeded in increasingly large geographic areas. These costs would be 10 to 40 percent higher if vehicle costs and the value of time lost in traffic congestion were included.

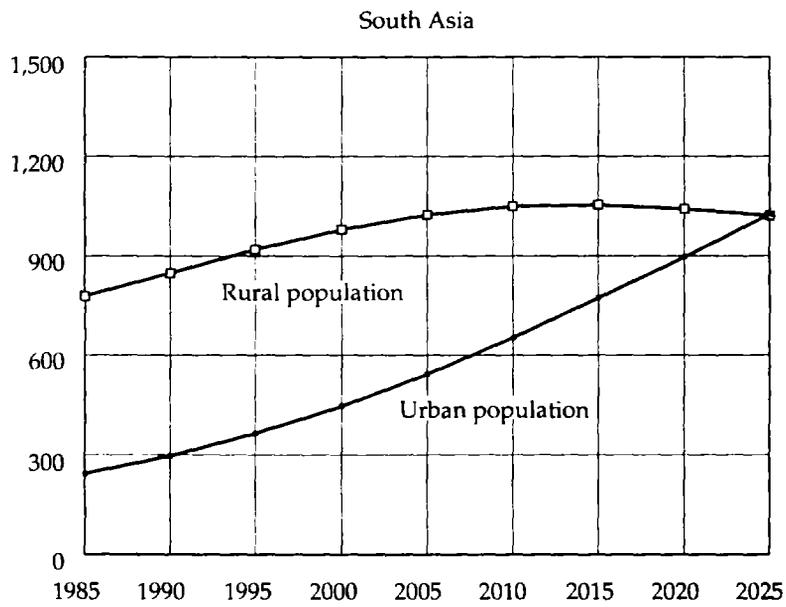
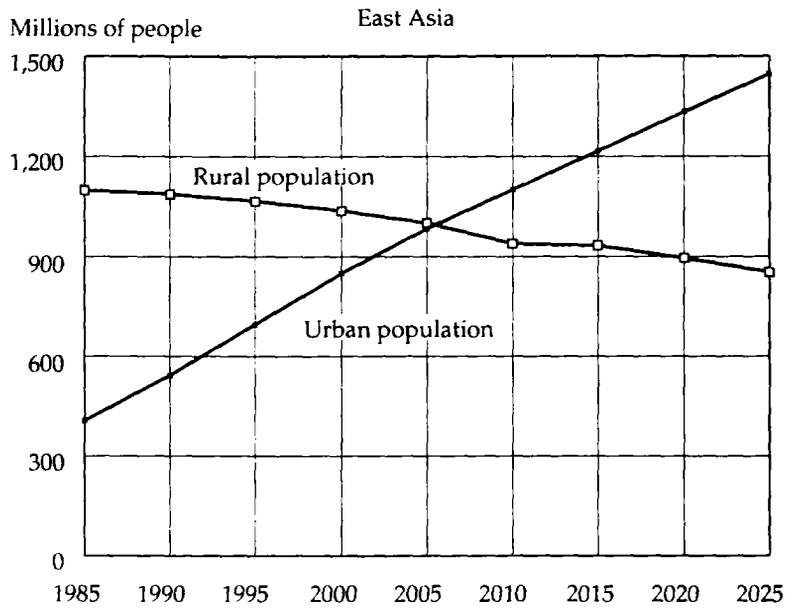
In general, four environmental problems need to be addressed in Asian cities: water pollution, air pollution, solid waste management, and inappropriate land use. Of the four, water and air pollution issues (including congestion) will require the greatest investment expenditure.

Water Pollution

Water pollution is largely caused by domestic sewage but is compounded by industrial wastes. Surface water contaminants such as fecal coliform and dissolved mercury often exceed recommended standards many times over. Groundwater resources also are increasingly polluted, both from industrial wastes and from salination due to overpumping. Given the lack of water treatment or alternative clean water sources, water contamination is a major health threat. Comprehensive water resource management, which encompasses the specific problems of urban water pollution but takes a far broader view of all demands (urban, industrial and agricultural) on a nation's water resources, will be one of the most difficult set of issues to be faced in Asia in coming years.

The health and welfare impacts of urban water pollution have to be tackled on two fronts: provision of safe water supply and reduction of effluents. On the water supply side, actions are required to improve cost recovery, conserve water, maintain infrastructure, establish financially strong and commercially oriented delivery institutions, and establish

Figure 1. Growth of Urban and Rural Population in Asia, 1985-2025



Source: United Nations, *World Urbanization Prospects 1990* (New York, 1991).

independent and effective regulatory institutions. On the pollution control side, the problem can be divided into municipal waste and industrial waste (which is discussed separately below). There is evidence of increasing public willingness to pay for sanitation services, although research is needed in more cost-effective and community-based approaches to sewerage and sanitation. Although the public sector is expected to continue to play an important role in water supply, treatment and disposal, it is important to encourage private sector and community participation—which may require that water and sewage tariffs be raised. Such efforts are already beginning in Asia.

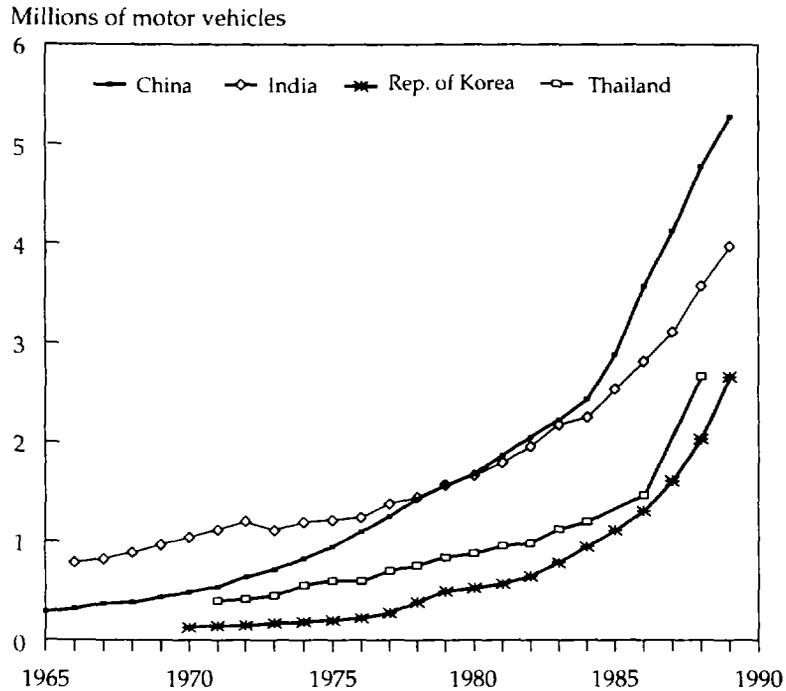
Air Pollution and Congestion

Urban air pollution is at critical levels. Data from the World Health Organization show that twelve of the fifteen cities with the highest levels of particulate matter, and six of the cities with the highest levels of sulfur dioxide, are in Asia. Of the seven cities in the world with the worst air pollution, five are in Asia: Beijing, Calcutta, Jakarta, New Delhi, and Shenyang. The trends for suspended particulate matter—the air pollutant with the most serious health impacts—are rising in virtually all Asian cities (except in the Republic of Korea), regardless of income level.

Urban transport is the largest cause of air pollution in most tropical and subtropical Asian cities. Vehicle populations are doubling every seven years (figure 2), and a large share of these are high-polluting two-stroke and diesel vehicles. Furthermore, fuels in Asia are among the dirtiest in the world, especially with regard to sulfur in diesel fuel and lead in gasoline. Industry and building heat sources are the other major sources of air pollution, particularly in the colder climates of northern India and northern China.

Reducing emissions in the urban transport sector requires attention to vehicles, fuels, and alternative modes of travel. (Air pollution strategies are described separately, below, for the industry and energy sectors.) Investment in unleaded fuels, taxes on leaded fuels, and tightened standards for vehicles are among the most important and cost-effective short-term changes to be made. Unleaded fuels are being introduced in Thailand and Malaysia. Low-cost responses to congestion include traffic management, bus lanes, and demand management (such as parking fees, staggered office hours, and carpooling). However, without the provision of transit alternatives to private vehicles, higher taxes and traffic management will simply make transit more costly but not much less congested. In other words, both carrots (transit alternatives) and sticks (taxes and traffic management) are required to reduce congestion and air pollution.

Figure 2. *Total Motor Vehicles in Use in Selected Asian Countries, 1965- 90*



Sources: Motor Vehicles Manufacturers Association, "World Motor Vehicles Data" (Detroit, Mich.: 1991); International Road Federation, "World Road Statistics" (Washington, D.C.: various years).

In East Asia capital-intensive investments in public transit are becoming increasingly viable because of massive congestion, rising incomes, and exponential growth in the numbers of vehicles. In South Asia the emphasis should remain on low-cost modes of public transit, except where congestion is extremely high.

Solid Waste Management

Asian cities have invested relatively little in solid waste management to date, and they tend not to recover costs. Recycling is limited to "rag-pickers" in the informal sector. Newer solid waste management approaches pursue opportunities for greater participation by private sector and community groups. Contracting out the management of transfer stations, treatment plants, landfills, and special industrial waste facilities

is a feasible option. Given the general lack of attention to solid waste issues in Asia, donor attention could be catalytic.

Inappropriate Land Use

In many Asian cities urban sprawl has grown at the cost of ecologically sensitive areas. The availability of good land for expansion on the urban fringe lags behind population growth. Also, the poor typically move to marginal lands such as waste dumps, hillsides, and sites adjacent to industries close to the city center, with environmental and health consequences. Given the scarcity of land in most Asian cities, high-density development should be encouraged. Urban zoning and related regulations (such as the Urban Land Ceiling Act in India) should be adjusted to allow greater private sector initiative in land development, but with tighter public oversight and environmental assessments of new developments. Careful placement of public infrastructure is fundamental, followed by reform of land titling and transfer procedures. Finally, government or environmental NGOs need to ensure that environmentally sensitive land is set aside for conservation use.

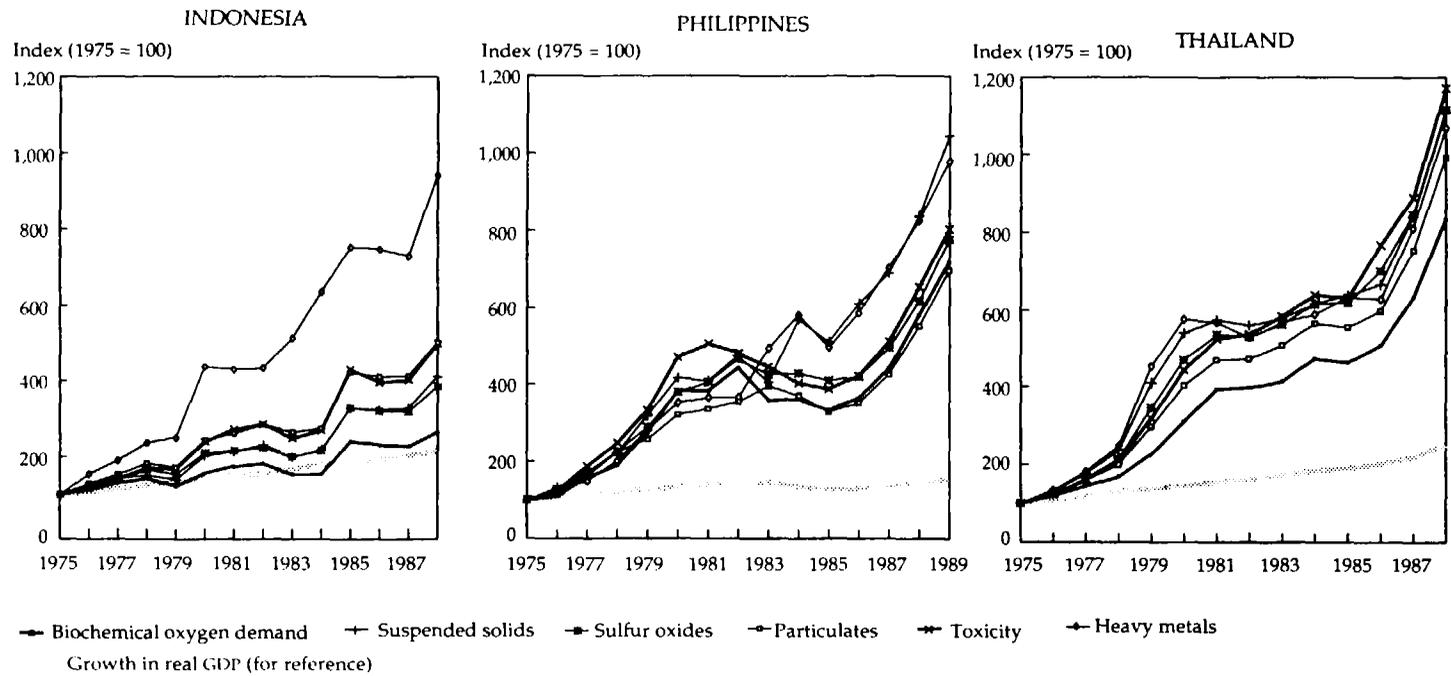
An Urban Strategy

To improve urban environmental management in these areas, the top priority is to strengthen the capacity of local governments. One broad area for work is increasing the capacity for planning and implementation. Most local governments in the region lack the capacity to carry out effective urban environmental planning and management and have an impossible task of brokering between national, provincial, and local agencies and interests. World Bank and United Nations Development Programme (UNDP) experience in six Asian cities has demonstrated the value of a collaborative approach—in which government agencies, the private sector, NGOs, and community representatives strive to achieve a consensus on priorities and strategies—provided that local governments are sufficiently strong to broker disagreements and execute decisions.³ The details of institutional roles, dispute resolution, and urban management techniques, however, are very city specific.

A second large area for urban capacity building is municipal financial management. In the context of tariff reform for local services, decentralization, and increased investment in infrastructure, the creditworthiness of cities and local utilities has become extremely important.

Although urban pollution problems are widespread across Asia, World Bank urban environmental lending is more concentrated in East Asia because of the region's relatively higher urban concentration and

Figure 3. *Estimated Total Industrial Pollution in Selected Asian Countries*



Note: These estimates are not based on Asian pollution data but are modeled by applying U.S. pollution coefficients to Asian output data. It is not known if they may be biased high or low.
 Source: Calculated using data from Industrial Pollution Projection System, World Bank (1992).

overall prosperity. The Bank has recently doubled its lending for urban environmental management (to a total of \$1 billion between 1993 and 1995), but it is still active in only twelve of Asia's eighty-seven largest cities. Expanding the Bank's work on institutional strengthening is probably as important to urban environmental quality management as its lending and should receive high priority.

Approaches to Industrial Pollution

The industrial sector in East Asia is now more than nine times its size in 1965, and in South Asia, four times larger. The total pollution load contributed by the industrial sector has grown exponentially. Estimates of industrial pollution in Asia indicate that emissions of sulfur dioxide, nitrogen dioxide, and total suspended particulates increased by factors of ten in Thailand, eight in the Philippines, and five in Indonesia between 1975 and 1988 (figure 3).⁴ Toxic pollutants, measured by an index of airborne, waterborne, and solid toxic wastes, also increased several times during this period. (It should be noted that these estimates are not based on direct measures of Asian pollution but are estimates derived from applying U.S. pollution coefficients to Asian industrial production data.) The public health impacts of these pollutants are compounded by the high geographic concentration of industry, especially in East Asia, and by water shortages in industrial areas, particularly during dry seasons, that often lead to high concentrations of pollutants in surface and groundwater.

To reduce industrial pollution in Asia, a multipronged approach is required. This must start with government commitment and a demonstrated will to clean up the most polluting industries. Effective pollution control systems require the removal of economic distortions (subsidies) and the definition of clear standards, followed by a combination of incentives, regulations, and monitoring activities to enforce the standards. This is already an enormous challenge, and some targeting will be required—for example, toward the most polluting subsectors or the most polluted regions.

If there is sufficient institutional capacity to implement industry-specific programs, some governments may also provide information and other incentives to encourage the adoption of clean technologies. Still, two difficult areas remain that require additional public resources and technologies: common treatment facilities for small and medium industries, and facilities for the treatment and disposal of toxic and hazardous wastes. Public sector leadership is required in both areas. Avoidance of these particularly difficult issues will only lead to higher mitigation costs in the future.

It is easier to clean up industrial pollution in a growing economy than in a stagnant one. Because of the magnitude of investment required,

higher growth allows for more rapid turnover of aging technology, more rapid restructuring of industry and its product mix, greater opportunities for attracting foreign partners and technology, and higher public revenues. In Indonesia it is projected that by 2010 new investment will account for 85 percent of total industrial capacity.

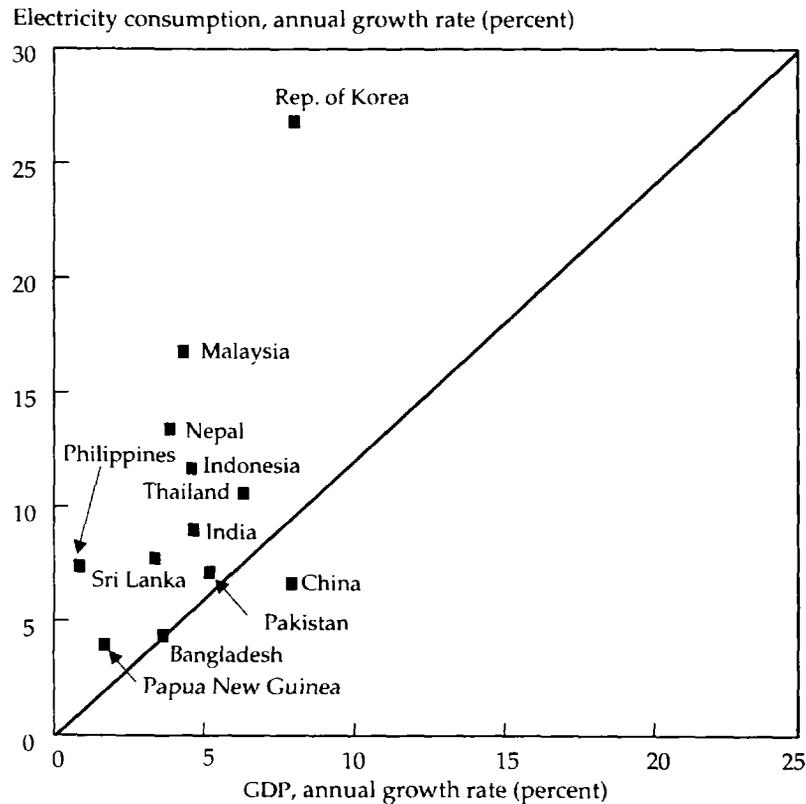
The World Bank has initiated three "first-generation" industrial pollution control projects in Asia, each of which takes a different approach. The Industrial Pollution Control Project in India focuses on the worst chemical sector polluters in four states; the Beijing Environmental Project takes an integrated approach to citywide industrial and urban pollution; and the BAPEDAL project in Indonesia focuses on the national environmental protection agency.⁵ Although the projects have different areas of emphasis—a subsector in India, a metropolitan area in China, and an institution in Indonesia—they all give top priority to strengthening government pollution control agencies. Building on this experience, the Bank is planning industrial pollution studies and projects in China, India, Indonesia, Malaysia, the Philippines and Thailand. While it is appropriate that more of the Bank's industrial pollution projects are located in East Asia than in South Asia, more work is needed in South Asia, particularly in Pakistan.

Minimizing Energy Sector Impacts

With Asia's high population and economic growth, energy demand there is doubling every twelve years (the world average is every twenty-eight years). The demand for electricity is growing even faster: two to three times faster than GDP for most of the newly industrializing East Asian countries and up to two times faster for most of South Asia (figure 4). The amount of investment planned in the Asian power sector during the 1990s (\$290 billion) is two-thirds of all new power investment being made in developing countries and would double Asia's capacity by 2000. Given that the energy intensity of Asian economies is among the highest in the world, about 20 percent of this planned investment could be avoided through aggressive energy efficiency programs.

The negative environmental impacts from the Asian energy sector are primarily attributable to high growth in energy use, inadequate pollution standards for thermal power plants, and high dependence on coal. Although Asia's emissions are small in relation to its population, the projected increases will have regional and global consequences. In absolute terms, Asia could easily exceed Europe in sulfur dioxide emissions by the year 2000 and surpass Europe and the United States combined by 2005. Asia is expected to catch up with all the industrial countries by 2015 in carbon dioxide emissions caused by the burning of fossil fuels.

Figure 4. *Growth of Electricity Consumption and GDP in Selected Asian Countries, 1980-90*



Source: World Bank data.

Energy use in Asia is heavily dominated by China and India. China alone consumes 55 percent of all energy in Asia, and India another 20 percent. Coal accounts for 92 percent of energy reserves for all of Asia, and China and India account for 94 percent of annual coal consumption. Both Chinese and Indian coals are fairly high in ash content, and some Indian coal is also relatively high in sulfur.

The least-cost approach to reducing the impending growth in emissions is to increase both supply-side and demand-side efficiency, while simultaneously promoting clean, renewable energy technologies. These goals will not be achieved unless energy subsidies are reduced. Many Asian countries show a pervasive bias toward low energy prices in

certain markets, including coal in India and China, electricity in South Asia, and kerosene and diesel in significant markets across Asia. (Cross-subsidy issues complicate the picture, but only rarely should energy sources be offered at below cost, which is now common.) Assuming an average energy price demand elasticity of minus 0.5, even a 10 percent price change in the direction of removing subsidies would immediately reduce all emissions by 5 percent—without allowing for the effects of price reform on supply-side efficiency.

After price reform, operational improvements and institutional strengthening in both regulatory agencies and utility companies will help foster energy efficiency and adherence to environmental standards. Not only would full-cost pricing serve efficiency and emissions objectives, it would also have a major impact on strengthening the power sector and encouraging private sector participation. One crucial benefit of increased commercialization of the power sector is the potential for tapping the private sector for investment capital needed to expand capacity.

Efficiency gains in Asia, on both the supply and demand sides, can realistically achieve a savings of 20 percent of the amount of raw energy being converted to electricity and can do so at higher rates of return than for investments in new generating capacity. A 20 percent efficiency gain by 2000 would reduce the level of new capital investment required by \$90 billion (50,000 megawatts). Not only are these savings very large, they are three times the cost of installing cleaner technologies on the facilities still to be constructed.

In addition to efficiency gains, additional measures for reducing the negative environmental impact of existing and future plants are required. As mentioned, the required capital expenditures for additional power capacity in Asia are \$290 billion for the 1990s, to be concentrated in China and India. This figure includes an estimated \$50 billion for necessary pollution control equipment. Unlike in industry, where many clean technologies and processes lead to significant savings, the cost of clean coal-fired thermal technology is almost entirely add-on. Therefore the highest priority in Asia is strategies to reduce the most damaging pollutants with the least possible expenditure for add-on technologies.

The first priority for pollution control equipment should be curbing emissions of particulates, which is important for human health. Particulate reduction is relatively cheap—1 to 2 percent of the total capital costs of thermal power. The second priority should be on finding the most cost-effective solutions for reducing sulfur emissions, which is usually coal beneficiation. More medium-term strategies include investments in expanding natural gas networks, hydropower, small rural renewable

energy systems, and cost-effective wind, solar, biomass, and geothermal installations that are large enough to be connected to the national power grid. All of these alternatives would become more viable with the full-cost pricing of fossil fuels.

World Bank policy requires government commitment to improving energy sector efficiency as a precondition for World Bank energy sector loans. This is important, since the main areas of sector reform—such as pricing reforms, transparent regulations, increased commercialization and corporatization of the energy sector, and supply-side technical efficiency—complement pollution abatement. However, additional Bank support is recommended in the areas of demand-side energy efficiency and renewable energy. Finally, the necessary large-scale investment in pollution control technologies will not be made unless Asian governments are convinced through clear economic and social analysis that they will realize commensurate benefits. An important role for the World Bank is to assist the efforts of Asian countries to analyze their energy-related environmental costs, benefits, and priorities and to help put in place regulatory systems designed to achieve their target pollution standards.

Natural Resource Management: Land, Forests, and Biodiversity

Arable land resources in Asia are facing intense pressure from farmers seeking to maintain food self-sufficiency. Forests and marginal lands are suffering from serious degradation for a variety of reasons, including excessive conversion to agricultural land, commercial logging, and excess demand for firewood and fodder. Asia faces the difficult problem of trying to secure production increases in agriculture and forestry without destroying remaining land, forest, and habitat resources.

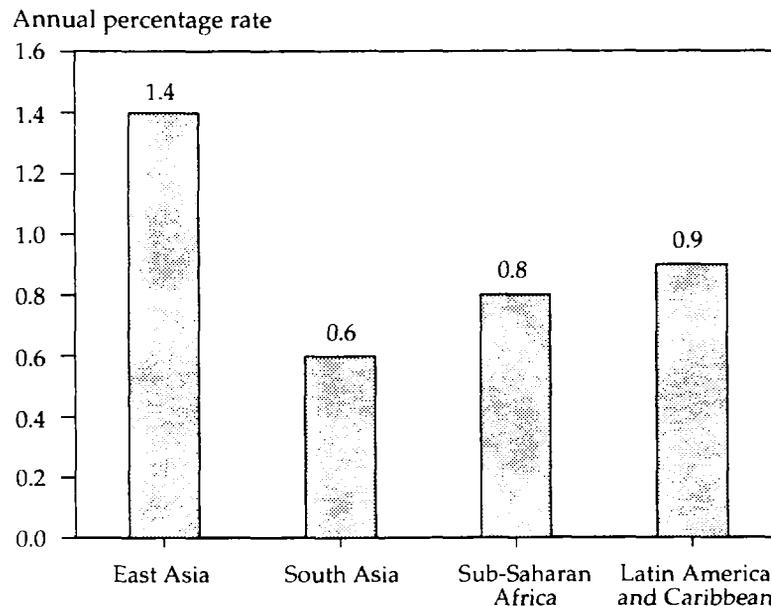
Land degradation is a significant problem across virtually all agroecological zones in Asia, although the nature and scale of this degradation vary widely among and within countries. Land degradation occurs in a variety of ways: nutrient depletion, structural decline and compaction, biological decline, chemical deterioration (for instance, through acidification or salinization), and soil erosion. Data on land degradation and soil loss are not widely available for Asia, and figures cited by international organizations are often contested by governments as too high. With this caveat, United Nations data suggest that erosion is particularly severe in India (where 50 percent of the total land area is considered degraded, although estimates of human-induced degradation are much lower), Viet Nam (also 50 percent), Thailand (34 percent), China (30 percent), and Indonesia (24 percent). Localized soil waterlog-

ging and salinity is most severe in India (27 percent of irrigated land), Pakistan (20 percent) and China (15 percent).

Among all tropical regions, East Asia experienced the highest rates of deforestation during 1981–90 (1.4 percent per year; see figure 5). Furthermore, deforestation rates in East Asia increased during the 1980s, in contrast to other tropical regions of the world. Once-dominant exporters such as Philippines and Thailand have exhausted their forests, and the remaining forest-surplus countries (Indonesia, Lao People's Democratic Republic, Malaysia, Myanmar and some of the Pacific Island nations) are facing excessive deforestation. South Asia has lower deforestation rates (0.6 percent) because of far fewer forest reserves. China and most of South Asia are net importers of wood and wood products, and by 2000 imports may cost nearly \$20 billion per year.

The underlying causes of land degradation, deforestation and biodiversity problems include: (a) market and policy failures—such as underpricing of resources, input subsidies, and lack of information

Figure 5. *Deforestation in Developing Regions, 1981-90*



Source: World Bank, *World Development Report 1992* (New York: Oxford University Press, 1992); World Resources Institute, United Nations Environment Programme, and United Nations Development Programme, *World Resources 1992-93* (New York: Oxford University Press, 1992).

about viable technologies on marginal lands—that lead to resource-degrading externalities; (b) a rapidly growing population that exerts pressure on land resources for both subsistence and commercial needs; (c) resource tenure structures that encourage short term exploitation rather than longer-term conservation; and (d) institutional weaknesses that encourage mismanagement of resources. The mix and influence of these factors vary widely from location to location, given the wide diversity in Asia.

A strategy for addressing natural resource degradation in Asia should address both the short and long terms. The immediate strategic objective should be to stabilize areas of rapid land, forest, and habitat degradation. The longer-term objective is to minimize the underlying causes, including causes in areas broader than agriculture and forestry, through such broader social reforms as land reform, population planning, and poverty alleviation. A sixfold strategy for breaking out of the current patterns of natural resource degradation is suggested:

- Aggressive promotion of locally relevant technical innovations that promote sustainable resource management, primarily through better-targeted research (see below), extension services, and expanded roles for farmer and community groups in these areas.
- Modification of policy and regulatory frameworks that encourage inappropriate resource use (for example, sector reforms in agriculture and forestry). Forestry pricing reform is particularly important, given the trade bias in some Asian countries that encourages excess logging.
- Strengthened land tenure. Tenurial rights and investments in conservation measures are correlated (although in South Asia the importance of communal lands makes the link less direct than in the land-surplus countries of Southeast Asia). Clarification of property rights, through expanded programs in land registration and titling, is more critical as population pressure increases, as open access and communal property rights systems break down, and as land values increase.
- Improvements in public sector capacity to design, target, implement, and ensure compliance with resource management programs, especially in forestry.
- Encouragement of public participation in decisionmaking through the promotion of education, mass-media coverage, NGO involvement, consultation with community-based farmer and land management groups, and local-level conflict resolution.

- Promotion of social programs in education, health, and population planning to help settle rural populations, and provide options that enable them to take a longer-term perspective in managing their family and land resources.

From the outset, it should be said that this strategy will fail if there is not a strong political commitment to rural sustainability. The agenda is too complex (requiring, for example, long-term commitment to introducing new production technologies) and politically charged (because of the high political cost of reducing “rents” in the forestry sector, of addressing community conflicts in protected areas, of facing the equity aspects of strengthened land tenure, and so on) to succeed otherwise.

To undertake this ambitious strategy, serious weaknesses and biases in public institutions must be addressed. Examples of shortcomings include irrigation authorities with a bias toward investment over management, and forestry institutions with a bias toward short-term commercial exploitation. It is not recommended that the powers of public sector agencies involved in agriculture, forestry, and park management be greatly expanded. Rather, existing institutions need to be recast and made more responsive to the wider range of issues at hand, including extension and other forms of information dissemination, applied research, decentralization, and participation.

Underlying this strategy are a number of difficult technical issues concerning natural resource management that impede the adoption of sustainable practices. The technical agenda for research and demonstration in Asia should extend in several directions:

- High-yield technologies and management practices for intensified agriculture that is environmentally sound. In the absence of surplus arable land, continued agricultural intensification is Asia’s highest agricultural priority. Continued intensification can also help reduce pressure on marginal lands and is therefore a strong environmental priority as well. Specific environmental concerns related to intensification are soil waterlogging and salinity, and adverse impacts from agrochemical use.
- Viable strategies for crop diversification on marginal lands that do not degrade land resources and could even rehabilitate them. (The priority strategy does not generally include the more expensive process of reclaiming heavily eroded lands.) Various models exist for developing agriculture on marginal lands, usually involving systems of diversified combinations of shrub, tree, and other crops with greater drought tolerance and better soil conservation characteristics than annuals. The difficulty of this strategy is that such cropping models are highly site specific and need to be tested and

adopted locally—preferably as part of a strengthened extension system working directly with farmers.

- Sustainable techniques for commercial forestry, natural forest management, and social forestry, with careful consideration of tenure and community organization issues.
- Management techniques for public and communal lands, especially forest lands in need of rehabilitation and forest reserves in need of protection.
- Preservation techniques, both physical and financial, for parks and protected areas. Physical techniques involve including communities on the perimeter of protected areas in integrated conservation and development projects (ICDPS). Financial techniques include broadening the financial base to support parks and protected areas, through such channels as direct fundraising, NGO support, and ecotourism.

In sum, reducing natural resource degradation involves more uncertainty and technical unknowns than do most areas of pollution abatement. The underlying causes of land degradation are all long-term problems with long-term solutions. Pricing reform and the strengthening of land markets and tenure systems will help, but even these must be combined with strong government and donor commitment to institutional reform and technical research, demonstration, and extension.

Water Resource Management

Problems related to water quality and quantity in Asia will worsen with economic, urban and population growth. Competition between users will increase; availability will constrain growth in areas such as northern China and southern India; and surface and groundwater quality will decline as it has in many areas, such as Bangkok, Jakarta, Jiangsu Province (China), Karachi, and Madras. The combination of surface water pollution and large withdrawals for agriculture is adversely affecting both river fisheries and coastal ecology. Finally, water resource development projects (such as dams, transfer schemes, flood control, and groundwater withdrawals), while having undisputed economic benefits, often have adverse environmental and social impacts. These impacts are often preventable, mitigable, or compensable—although with more effort than is commonly accorded today.

Improved water resource management and environmental protection of water resources are mutually reinforcing. Concern for both water quality and efficient use (that is, quantity) is implicit in improved water

resource management. Similarly, the need to preserve water quality and to minimize alterations to water-dependent ecosystems is imperative in environmental protection. The integrated water resource management approach adopted at the Dublin International Conference on Water and the Environment in 1992 and endorsed by the World Bank recognizes these complementarities and forms the basis for environmentally sound use of water resources.

On the basis of this emerging consensus, a five-element strategy is suggested for better and more environmentally sound water resource management in Asia:

- Immediate and low-cost actions to prevent further irreversible damage to water resources. Examples are enforcement of watershed and protected area designations; temporary storage for toxic wastes (while more permanent solutions are being sought); and tightened industrial zoning in areas of groundwater recharge.
- Water sector policy reform, with explicit recognition of water as an economic good. Water pricing can be used to signal users, promote efficiency, reduce pollution, and foster cost recovery. Market-oriented valuation can also help in resolving conflicting uses and in integrating water policy with land, industrial, agricultural, and environmental policies. Linking water policy with national development objectives also helps ensure that water resource management and price reforms recognize the needs of the poor.
- Legislative and institutional reform. Institutional reform should reflect the findings that (a) water sector institutions function more efficiently as they are decentralized to river-basin and subbasin levels, and (b) water service providers function more efficiently as they become more commercialized, with performance-based accountability. Both principles have broad implications for legislative reform, institutional strengthening, planning methodologies, water quality monitoring and enforcement, and the role of local groups.
- Improved water planning, project preparation and implementation, and maintenance. Market failures concerning upstream-downstream problems argue for adoption of the river basin as the basis for planning. Planning priorities include identifying, promoting and implementing nonphysical measures; repairing and upgrading existing infrastructure; improving real-time operations and maintenance; and planning and implementing projects that reflect multisectoral economic, social, and environmental priorities.

In deciding between water development options, full environmental and social costs must always be incorporated.

- Increased institutional capacity. Reform of the water resource sector will also require improved analytical capability for planning, management, and regulatory functions, especially as the system is decentralized. In this regard, improvements in data collection systems and data-sharing arrangements, both within and across river basins, are recommended.

Through country dialogue, technical assistance, and lending, the World Bank can be of great help in promoting the strategy outlined above. Although some Bank projects already incorporate elements of this strategy, the more broadly integrated approaches—such as multi-sectoral and market-oriented approaches—have not yet been widely adopted in Asia. A specific analytical area in which the Bank is placing immediate emphasis is incorporating full environmental and social costs into water resource planning. Decisionmakers are often deterred from making appropriate decisions because these costs are not included in the analysis. In the case of protecting watershed areas and water quality, the costs of doing nothing are underestimated, particularly in comparison with other sectors.

Real or impending water crisis areas should also receive priority World Bank attention. The examples are well known. China has long discussed a major transfer scheme between the Yellow and Yangtze rivers—a project whose economic and environmental costs and benefits need to be carefully assessed. Water conflicts exist in the Ganges–Brahmaputra delta between India and Bangladesh, and both countries are engaged in uncoordinated water resource development programs. There are current or potential water shortages in southern India and around the Mekong delta. Most major Asian cities have severe resource constraints. As a result of these and other water resource stress points, the World Bank is actively promoting its comprehensive water resource strategy.

The World Bank Environmental Strategy

Setting Priorities

This report has emphasized a framework for improving environmental management in Asia. The first step in that framework is for countries to establish priorities—a process that is analytically and (sometimes) politically difficult. The World Bank, through its analytical work and policy

dialogue, can help countries set priorities, accept the consequences of policy reform, narrow the terms of their environmental strategies, and implement selected instruments. To better support this process, the World Bank has stepped up its environmental lending, policy dialogue, and research.

Project Lending

Traditional World Bank lending has not addressed the full range of environmental problems. This is not surprising, since many environmental problems have only become widely recognized within the past decade. In response to these problems, the Bank has significantly increased its lending for the environment and has redesigned some of its approaches.

There are several substantive areas on which the Bank places high priority and in which it is pushing to expand its activities (see box 1). In the "brown" sectors, these areas are urban and industrial pollution, energy sector efficiency (as an initial priority within a larger energy sector environmental agenda), and urban transit. In the "green" sectors, these areas are soil protection and rehabilitation (each requiring dramatically different strategies depending on local conditions) and improved management of remaining forest resources. Comprehensive water resource management—which cuts across the brown and green sectors—is also a high World Bank priority, since the approach has only recently been introduced in Asia. The final area, institutional strengthening, underlies progress in virtually all sectors.

The recommended priorities are substantially but not fully represented in the 1993–95 World Bank planned lending program. The largest gaps concern definition of the fiscal and administrative details of cost-effective approaches to urban and industrial pollution; investment in energy efficiency and urban transit (two "win-win" approaches with economic as well as environmental benefits); lending that incorporates integrated approaches to water resource management; projects that address fundamental resource tenure issues in rural areas; and a long-term commitment to strengthening environment-related institutions in Asia. Obviously, the World Bank cannot adequately cover all of these areas single-handedly, and it can make greater efforts to work with other donors and in providing intellectual leadership to its borrower countries.

Environmental lending in Asia will roughly double between 1990–92 and 1993–95, from nearly \$600 million to \$1.2 billion per year, and from 6 or 7 percent of total lending to 12 percent (see figure 6). The fiscal 1995 estimates probably understate the eventual size, since the program will be partly based on analytical work now being done. Two-thirds of the Bank's Asian environmental lending will occur in East Asia. There, the

Box 1. World Bank Priorities for the Environment

<i>Sector</i>	<i>Status and needs</i>
Urban environmental management	Bank lending addresses urban pollution in only twelve of the eighty-seven cities in Asia with populations over 1 million. Incremental investment is especially required in India and East Asia. Activities designed to help improve urban environmental <i>management</i> —which would benefit more cities than those receiving Bank loans—should proceed in tandem with investment.
Industrial pollution control	Of the twenty-six countries in Asia, eight have serious industrial pollution problems. All need technical and financial assistance to address the problems, particularly in the areas of policy, enforcement, small-scale industry, and hazardous wastes. World Bank analysis may be as important as funding.
Energy pricing and efficiency	Energy subsidies are still pervasive in Asia and are a barrier to sectoral efficiency and emissions reduction. In addition, only three Asian countries are actively promoting energy efficiency strategies. Efficiency strategies are underinvested on both the supply and demand sides. Again, World Bank analysis may be as important as funding.
Urban transit	Vehicle emissions and urban congestion are growing exponentially across Asia. Only strategies that increase the cost of using private cars and provide alternatives can address both issues simultaneously. Asian investments in public transit, cleaner fuels, and vehicle standards are all increasing. There is a need for more World Bank involvement in these areas—including in mass transit, where viable.
Water resources management	Water quality is worsening, with major public and ecologic health costs. Increasing agricultural, industrial and urban demands are difficult to meet, given deteriorating quality. Rising costs force efficiency improvements and policy and institutional reform. Bank support for appropriate policies, multisectoral planning within river basins, and decentralized management are all recommended.

(Box continues on the following page.)

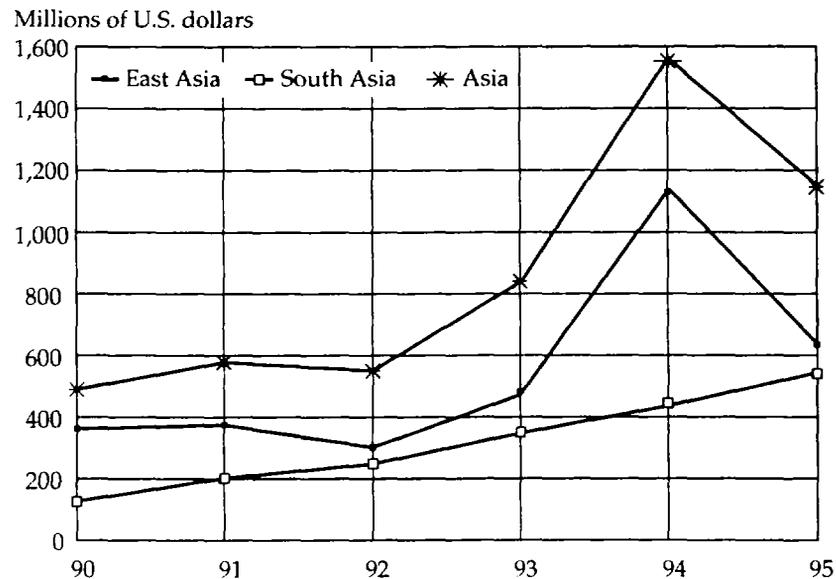
Box 1 (continued)

<i>Sector</i>	<i>Status and needs</i>
Sustainable agriculture	Agriculture on both irrigated and marginal lands is leading to excessive soil degradation. No country in Asia has the techniques and financing necessary for a concerted effort against soil degradation. Pricing reform and strengthening of land tenure will help but must be combined with strong commitment to institutional reform and technical research, demonstration, and extension.
Forest management	The World Bank has defined forest-surplus and forest-deficit Asian countries, with different strategies for each. In forest-surplus countries, pricing and trade policy reform are critical, along with improved management of public lands and research on more sustainable commercial and social forestry. In forest-deficit countries, management, tenure, pricing, protection of remaining reserves, and reforestation are important.
National and local institutions	Except for Japan and Korea, no Asian country has successfully implemented its approved standards and enabling legislation. Long-term support (five or more years) for policy implementation, monitoring and enforcement—using innovative means—are of the highest priority.

level of lending in the “brown” sectors is more than double that in the “green” sectors, although both are growing rapidly. In South Asia brown-sector lending also exceeds green-sector lending; while both are expanding, they are doing so at a slower rate than in East Asia. The sectors of lending reflect, to a large extent, the development priorities in the two regions. Not included in the above estimates are areas of Bank lending that indirectly help the environment, through such intermediate interventions as population planning, health and education programs, poverty alleviation, agricultural research, and sector reform. Also, the Global Environment Facility (GEF) is not included in these totals.

Investing in institutions is potentially the most cost-effective component of the Bank’s environmental strategy, since the basic policies and institutional characteristics of Asia’s fledgling environmental agencies will be largely shaped in the next five to eight years. Given that past

Figure 6. *World Bank Lending for the Environment in Asia, Fiscal 1990-95*



Source: World Bank data.

experience with traditional technical assistance shows it to be the weakest part of the Bank's portfolio, innovative approaches to institutional strengthening are needed, involving longer time horizons and more sustained resources.

Beyond Project Lending

Much of the World Bank's strategy for the environment extends beyond investment projects. The following areas require broad-based emphasis.

ACTIVE POLICY DIALOGUE. As mentioned, the World Bank—better, perhaps, than other donors—can help countries analyze and accept the consequences of policy reform, model scenarios for more sustainable growth, and refine the economic and administrative details of policy instruments.

INTEGRATING NATIONAL ENVIRONMENTAL ACTION PLANS (NEAPS). An important part of NEAPS is to merge environmental and development concerns. Priorities for the World Bank are not only to assist countries

to complete their NEAPs, but also to provide the ongoing support necessary to get NEAP recommendations implemented. NEAPs could also be used as a common framework for coordination of donor-funded, environment-related activities. In the future, planning exercises that are more targeted, geographically or sectorally, may be less unwieldy and less political than the first round of NEAPs.

STRENGTHENING ENVIRONMENTAL ASSESSMENTS (EAS). There is need to provide more sector-specific training on environmental assessment for task managers and borrower country officials. Increasing the capacity of key agencies in borrower countries to improve all EAS—whether tied to World Bank lending or not—is an important long-term goal.

STRENGTHENING CONSULTATION AND PARTICIPATION. The quality of project design, EAs, and implementation can be considerably improved by increased consultation with and participation by those affected by the project. Consultation refers to the process in which interested groups can express their opinions at discrete points during project design. Participation suggests a broader involvement by affected parties in both project design and implementation. (Participation can lead to the sharing of decisionmaking authority, whereas consultation does not.) For both, there is a need for improved field-oriented guidelines for Bank task managers and borrower country officials.

ESTABLISHING APPROPRIATE ENVIRONMENTAL STANDARDS. The environmental standards applied by the Bank in the assessment of urban, industry, and energy sector projects are being updated in order to make them more flexible and appropriate to project environmental assessment. There is a role for the Bank to assist Asian countries in adopting new standards, especially in shifting from concentration-based standards to load-based standards in the industry and energy sectors.

ENCOURAGING PRIVATE SECTOR INVOLVEMENT. Private sector involvement is essential in advancing the key elements of an environmental strategy. A one-sided “punitive” regulatory approach will be less effective than one in which industry is actively consulted on standards and engaged in self-monitoring. A favorable business environment will also help facilitate the mobilization of required capital, technologies, and service industries.

STRENGTHENING INTERNAL PROCESSES. The World Bank can do more to improve its internal processes, especially on projects with environmental or social impacts. Four areas are:

- Strengthening the Bank's role in project implementation. Without adequate supervision, the conditions imposed by environmental assessments may not be enforced, and the EA process itself will be marginalized.
- Strengthening the Bank's role in policy implementation. The Bank should increasingly address the "nuts-and-bolts" issues associated with policy implementation—taking into account the compromises necessitated by institutional weaknesses, corruption, and lack of data. Examples of ways to do this are: helping countries calculate optimal levels of pollution taxes, by pollutant; suggesting operational approaches to improved pollution monitoring, auditing, and enforcement; and introducing cost-effective approaches to data collection and use. As mentioned above, institutional strengthening and policy implementation go hand-in-hand and must be viewed as a long-term prospect.
- Expanding the Bank's analytical work program. There are gaps in the Bank's research program related to the environment. A few key areas for expansion are (a) learning from the experience of others, on both macro and sectoral levels; (b) valuation of environmental costs and benefits, for the purpose of setting investment priorities; (c) practical regulatory and institutional guidelines on approaches to urban and industrial pollution; and (d) innovative financing mechanisms for large sewerage and urban transit investments.
- Drafting detailed strategy or guidance documents for projects that address brown-sector pollution. The World Bank has recently completed strategies for Asian forestry, water resource, watershed management, and biodiversity projects. Similar work remains to be completed in the areas of urban environmental lending, industrial pollution, and energy.

Conclusion

Pursuing environmental sustainability in Asia is crucial in light of what is at stake. Both urban and rural problems are approaching thresholds of unacceptably high social and economic costs. The future environmental balance in Asia is also critical for the global environment, particularly for greenhouse gas emissions, forestry, and biodiversity. Although economic growth in Asian countries has given these countries some room to address environmental issues, the financial and technical resources required are beyond the capacity of any individual country or donor.

The World Bank's role, as described above, is to assist Asian countries to determine environmental priorities, identify sustainable economic

policies, estimate full project-level costs and benefits, and increase administrative skills for implementing the recommended policies and projects. As was emphasized at the outset, the Bank's strategy is to support a process for achieving sustainability—a process that must involve every government and most donors active in Asia. This document is only one element of the broader set of World Bank activities designed to contribute toward achieving greater sustainability in Asia.

Notes

1. *Toward an Environmental Strategy for Asia*, World Bank Discussion Paper 224, available in December 1993. The contents of the Discussion Paper are listed in the Appendix.
2. Dollars are current U.S. dollars. Billion is one thousand million.
3. The joint World Bank and UNDP Metropolitan Environment Improvement Program is working in Beijing, Bombay, Colombo, Jakarta, Kathmandu, and Manila.
4. These trends are for total pollution output and not for *ambient* pollution levels, about which less is known.
5. BAPEDAL is the Environmental Impact Management Agency of Indonesia.

Appendix

Contents of *Toward an Environmental Strategy for Asia*, Carter Brandon and Ramesh Ramankutty, World Bank Discussion Paper 224

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ACKNOWLEDGMENTS

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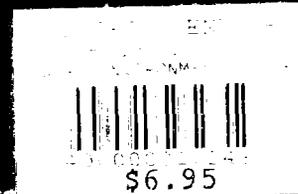
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