

Executive Summary

I. Environmental Management: a Key to Growth and Poverty Reduction

1. Bangladesh has achieved steady economic growth of almost 5% annually over the last decade, and while half the population still lives in poverty, this represents an improvement from 59% in 1990. Bangladesh has also demonstrated significant success in achieving the human development targets of the Millennium Development Goals (MDGs). In making further progress towards poverty reduction and human development goals, however, environmental challenges to natural resource productivity and human health will become increasingly important.
2. Although the total burden of disease in Bangladesh is comparable to other South-East Asian countries with high mortality rates, the share attributable to respiratory infections and diarrhoeal disease, both associated with poor environmental conditions, is significantly higher. Environmental health risks are also increasing rapidly as a result of industrial growth, which is the fastest in South Asia, and urbanization, which is occurring at double the rate of India and Pakistan. Almost all future population growth, forecast to be some 100 million over the next fifty years, is expected to occur in urban areas, underlining the growing importance of addressing urban and industrial contamination.
3. With population density among the highest in the world, pressure on natural resources in Bangladesh is necessarily high. Two-thirds of the land area is under crops, the highest proportion in South Asia. Cropping intensity is also the highest in the region, having increased by 25% over the last thirty years, and surveys provide evidence that agricultural inputs are imbalanced and nutrient mining is occurring. The share of land area under forest cover is the second lowest in the region, with natural forest cover halving since the 1960's, and most natural forests now significantly degraded. Protected areas cover the smallest share of any country in South Asia, and pressure on wetlands and aquatic life is a particular concern. As detailed in the Country Water Resources Assistance Strategy,¹ water quality and quantity are key determinants of outcomes in many sectors of the Bangladeshi economy, with both under pressure from industrial, urban and agricultural growth within the country and upstream. Bangladesh is highly vulnerable to the projected impacts of climate change, which will increase the already high risk of disasters, exacerbating existing vulnerabilities both to flooding and drought, and threatening agricultural productivity in coastal areas that face increasing salinity.
4. While emphasizing that economic growth is essential to reduce poverty, Bangladesh's National Strategy for Accelerated Poverty Reduction cautions that "A careful balancing act must be orchestrated where economic growth is maximised without compromising environmental protection..."² The Strategy explicitly recognizes both the dependency of the poor on natural resources, and the vulnerability of the poor to environmental health risks. This Country Environmental Analysis (CEA) reinforces the message that the linkages in the balancing act work in both directions: not only can economic growth compromise environmental protection, but environmental degradation threatens

¹ World Bank, 2005

² National Strategy for Accelerated Poverty Reduction, 2005, Section 5.H

economic growth. Together, the environmental impacts considered in this report account for economic losses equivalent to more than 4% of GDP, and these costs are felt most severely by the poor.

II. Selecting Environmental Challenges for Analysis

5. This CEA is intended to assist the Government, civil society and development partners of Bangladesh in identifying and addressing critical environmental constraints to sustainable, poverty-reducing growth. The initial set of issues chosen for analysis was selected jointly by the Ministry of Environment and Forest (MoEF) and the World Bank based on their relevance to growth and poverty reduction, as well as a consideration of the value of new analysis. These criteria led to a focus on five priority issues in the CEA, as follows:

- environmental risks to human health;
- protection of water quality in Dhaka;
- management of capture fisheries;
- sustaining soil quality; and
- strengthening institutions for environmental management.

These selected topics do not constitute an exhaustive list of environmental issues in Bangladesh. Urban environmental degradation, for example, extends beyond Dhaka; but with its population expected to grow fivefold in the next fifty years, the capital is clearly a priority, and provides lessons relevant to other cities. Similarly, natural resource concerns extend beyond the selected priorities of capture fisheries and soil quality, with forest management a prominent pending issue, as is adaptation to climate change.

6. Initial analyses of the selected issues were considered during a series of consultative discussions with key stakeholders, held in Dhaka in December, 2004. Subsequently, the draft CEA was discussed in July, 2005, at a workshop in Dhaka convened by MoEF, and inaugurated by the Minister of Environment and Forest. The final version of the CEA reflects the agreements reached during the workshop, and provides recommendations for more effective environmental management in each of the five selected priority areas.

III. Environmental Priorities for Additional Action

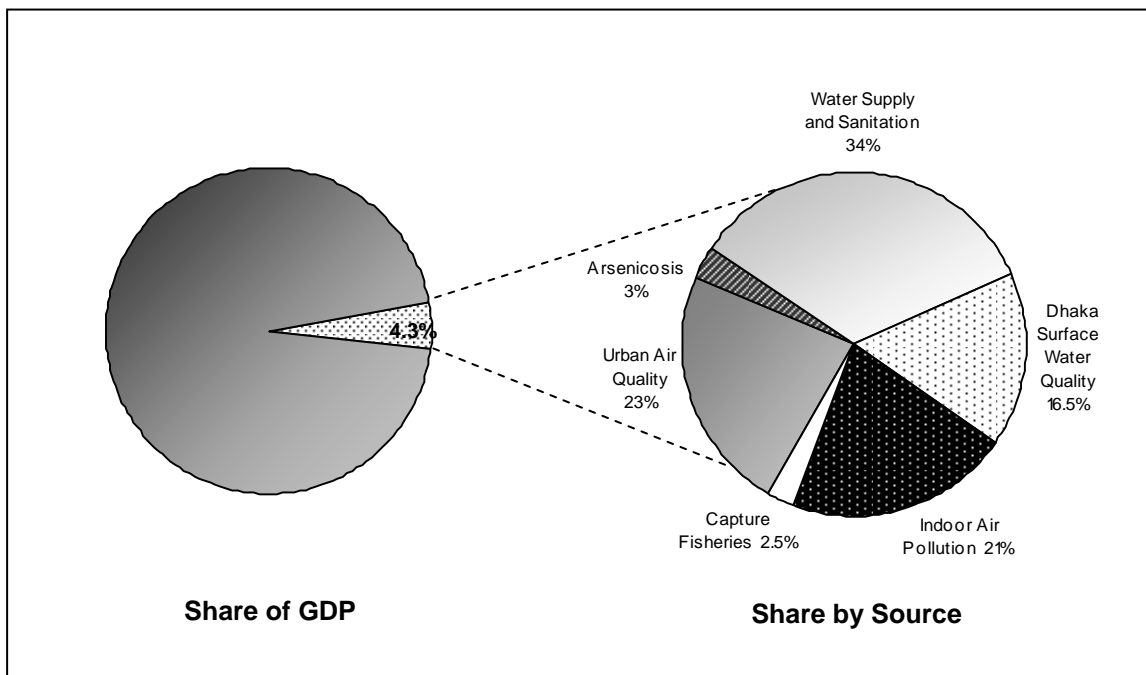
7. The estimated economic losses associated with the sources of environmental degradation selected for analysis in the CEA amount to more than 4% of GDP. The relative shares of the principal sources are indicated in Figure 1, below. Within the set of issues selected for analysis, a number of concerns are being addressed through initiatives that are already underway or planned, and a few pose risks that are relatively less pressing in the near term. The following three issues emerge, however, as priorities currently receiving insufficient attention given their relative significance:

- the threat of indoor and urban air pollution to human health;
- the need to better control urban and industrial effluent in Dhaka; and,
- the continuing decline of capture fisheries.

The economic losses associated with these three environmental challenges may together amount to more than 2.7% of GDP, in each case with the poor suffering disproportionately as a result. In addition to targeting greater effort towards these three priority concerns, the CEA also highlights the need to strengthen the institutional framework for environmental management through improvements in environmental governance.

8. This executive summary briefly summarizes the analysis and recommendations related to all five issues selected for consideration by the CEA, but focuses on the three priority areas for greater attention listed above, as well as the over-arching need to strengthen environmental governance.

Figure 1: The Economic Costs of Environmental Degradation



IV. Environmental Risks to Health: a Major Contributor to the Burden of Disease

9. While the total burden of disease in Bangladesh is comparable to other low income Asian countries, the share attributable to respiratory infections and diarrhoeal disease is significantly higher. Both are associated with poor environmental conditions, highlighting the relatively greater importance of focusing attention on environmental quality in Bangladesh. This report estimates that environmental factors account for as much as 22% of the national burden of disease, principally in the form of respiratory infections and diarrhoeal disease. Achievable goals for reduced exposure to environmental health risks could result in economic savings equivalent to as much as 3.5% of GDP. This would be achieved by improving access to adequate sanitation and safe water supplies, better hygienic practices, reducing exposure to indoor and urban air pollution, and to a lesser extent by the better management of agro-industrial toxics.

Improving Air Quality

10. Important efforts are underway to address a range of environmental health concerns in Bangladesh, in particular through the Total Sanitation Campaign and a variety of water supply initiatives. Indoor Air Pollution (IAP) remains almost entirely ignored, however, and urban air quality continues to deteriorate, despite a temporary improvement following the 2003 ban on two-stroke three-wheelers in Dhaka. This report estimates that the respiratory infections and disease caused by poor air quality, both indoor and urban, may contribute up to 10% of the total burden of disease, equivalent to the diarrhoeal disease caused by inadequate access to safe water, lack of sanitation and poor hygiene.

Reducing Exposure to Indoor Air Pollution

11. Inhaling smoke from burning biomass can have both temporary and permanent consequences for health, and recognition of the health impacts of IAP is growing worldwide. Poor households in Bangladesh depend heavily on wood, dung and other traditional fuels for cooking. As a result, the health impacts of IAP are significant, estimated to account for as much as 8% of the total burden of disease. Further evidence for concern is provided by a recent World Bank study, which detected dangerously high concentrations of particulates in indoor air for many poor households in Bangladesh. Particularly high levels of exposure to IAP were recorded for women and children under five.

12. Opportunities should be explored to integrate efforts for the mitigation of IAP into existing programs through the provision of both cleaner technologies and public information. Better ventilation and longer outdoor time for children may reduce IAP exposure, but achieving such behaviour change will require Government support for a public education effort explaining the health benefits. While support for cleaner fuel and cooking technologies may include a subsidy, at least in initial stages, the longer term goal should be to establish demand for the provision of such technologies by the private sector. The World Bank plans to provide further technical assistance to explore sustainable delivery models for the information and technology necessary to reduce exposure to IAP.

Expanding Efforts to Manage Urban Air Quality

13. Up to 10% of respiratory infections and disease in Bangladesh may be attributable to urban air pollution. While the problem is most severe in Dhaka, both because air quality is worse and more people are exposed, air pollution is a growing concern in other major cities. Measurements in Dhaka indicate that particulate matter is the most significant pollutant, and mobile sources remain the priority for emissions control. Unless there is a much stronger program of actions than at present, encompassing major secondary cities as well as Dhaka, urban air pollution will continue to worsen in line with the projected rapid rate of urbanization and rising incomes. Such actions should focus on gross diesel polluters, fuel quality, and the expansion of air quality monitoring both within the capital and to other cities. To help develop and implement such a program, the World Bank will continue to provide support for the Air Quality Management Project, and possibly a follow-up operation.

V. Protecting Environmental Quality in Dhaka

14. The environment of the capital city faces the triple threat of air pollution, inadequate solid waste management, and contamination of surface water. While initiatives are underway to better manage air quality and solid waste, little has yet been done to improve water quality, identified as a priority for World Bank engagement in the Bangladesh Country Water Resources Assistance Strategy.³ The total economic cost of the poor management of water resources in Dhaka is estimated at US\$670 million annually, including impacts on human health, as well as industrial and natural resource productivity. Unless prompt action is taken, these costs will continue to rise in line with Dhaka's continuing rapid growth, which suggests that the city may double in population by 2015, potentially making it the fourth largest city in the world. Given that economic activity in Dhaka contributes about one-fifth of the nation's GDP, environmental constraints to growth in the capital constitute a national priority.

The Impacts of Deteriorating Water Quality

15. Dhaka surface water is in very poor condition, especially in the dry season when dilution of contaminants is drastically reduced. There is only one sewage treatment plant at Pagla which is currently operating below capacity because of sewerage system failures, and few industries operate effluent treatment systems. Almost all the waste from humans, industry, and millions of farm animals, along with tonnes of pesticides and fertilizers, make their way into Dhaka's surface water untreated. As a result, many sections of the rivers and canals in the city and surrounding areas are biologically dead during the dry season, with most of this water unfit for any human use and likely to be dangerous to livestock. A particular concern in the dry season is the high level of ammonia in the raw water used by the Saidabad Water Treatment Plant, threatening the plant's ability to treat water to drinking quality standards. All Dhaka residents are impacted to some extent by deteriorating water quality, but the most vulnerable are the poor, who have few options for accessing clean water and little ability to move away from offensive locations next to polluted ponds, canals, and rivers.

Improving Water Quality: a Strategic Framework and Promoting Compliance

16. Interventions to improve the quality of surface water in Dhaka need to fit within an integrated strategy addressing water quality and supply, sanitation, and flood management, all as part of the broader urban planning framework. Poor environmental quality cannot be addressed by environmental authorities alone, but will require cross-sectoral coordination. An important element of the strategic framework will also be public provision of information to raise awareness of the causes and impacts of poor water quality, and to build support for the necessary investments and regulatory enforcement. Industrial discharges must be reduced if surface water quality is to be improved, which will require stricter enforcement of environmental clearance conditions and effluent standards. Greater regulatory and societal pressure will also stimulate demand for low cost waste minimization initiatives, which could be provided as part of a broader program of compliance promotion.

³ World Bank, 2005

Investing in Waste Treatment

17. Improving the quality of surface water in and around Dhaka will require significant public and private investment. The rehabilitation of the existing sewerage and drainage system is alone projected to cost about US\$100 million. Attracting private resources will require predictable and transparent enforcement, as well as the recovery of costs for urban services. In response to the Government's request, the Bank is helping prepare a project to improve water supply, sewerage, sanitation and storm water drainage services in Dhaka. A proposed separate initiative to strengthen the management of water resources will supplement these investments with support for low cost solutions targeting industrial effluent. Environmental compliance initiatives will form components of both these projects, as well planned support for private sector development.

VI. Natural Resources under Pressure

18. With population density among the highest in the world, pressure on natural resources in Bangladesh is necessarily high. Two-thirds of the land area is under crops, the highest proportion in South Asia, and the share under forest cover is the second lowest in the region. Deforestation in the 1980's averaged 3.3% per year, and in 1989 the Government issued a moratorium on felling in natural forests which continues to date. Official figures indicate a net rate of reforestation of about 1% annually during the 1990's, but the major areas of natural forest remain significantly degraded. Protected areas cover the smallest share of any country in South Asia, although pressure on biodiversity is close to the regional average, with approximately 17% of mammal species and 4% of bird species under threat.

19. Agriculture accounts for some 21% of GDP, and the ability of soil to sustain agricultural production is an issue of national concern. Declines in rice yields in some areas of Bangladesh in the mid-1990s led to a decline in soil productivity being inferred. Analysis of more recent data indicates, however, that yield trends are stable or increasing, and that earlier assessments were influenced by a period in which yields were below trend. Consequently it does not appear that agricultural production is declining as a result of a reduction in soil productivity. There remain causes for concern, however, including evidence that fertilizer inputs are imbalanced and nutrient mining is occurring, which suggest that greater attention to the monitoring of soil quality is warranted.

Capture Fisheries: the Threat of Collapse

20. Bangladesh's fisheries are estimated to provide two-thirds of the country's animal protein needs, which is twice the regional average and the seventh highest in the world. Capture fisheries and associated wetlands play a particularly important role in the nutrition and welfare of the poor. There is general consensus, however, that inland and coastal capture fisheries are in decline. Threats include losses of floodplain habitat due to agriculture and urbanization, lost connections along critical fish migration pathways, significant reductions in dry season river flows, over-fishing, and rapidly increasing industrial, human and agricultural pollution. Almost 30% of all inland fish species are in some danger of extinction, and there is a fear that the inland major carps, Indian Salmon and other coastal inshore fisheries, may be in danger of collapse. The consequences of a collapse would impact every citizen, but in particular the poor.

Reversing the Decline

21. As with all biological systems, recovery of the capture fisheries is possible if political will combines with good management. By late 2004 a remarkable recovery of Hilsa was seen, most likely as a result of Government management activities. The actions needed to reverse the decline of Bangladesh's capture fisheries are reasonably clear, and a framework for their implementation is provided by the Government's draft Inland Capture Fisheries Strategy. Within this framework, the key priorities to ensure the sustainable productivity of capture fisheries are (i) protecting dry season water flows; (ii) establishing both large and small sanctuaries; (iii) developing and implementing fisheries management regulations; (iv) adoption of an Integrated Coastal Resource Management framework; (v) enhanced monitoring of fisheries; and (vi) reduced barriers to the import of fish. The development of this strategy was supported by the World Bank through the Aquatic Biodiversity Conservation Project and the Fourth Fisheries Project, and the Bank is prepared to provide further assistance to support implementation of the strategy and to strengthen community management of fisheries. The Bank is also prepared to support the development of a strategic action plan for the management of marine and coastal resources in the Bay of Bengal, for which an ecosystem approach would be adopted to foster regional collaboration in addressing the transboundary issues.

VII. Environmental Governance: An Over-Arching Agenda

22. Across all of the issues examined in the CEA, an over-arching theme that emerges is the need to improve environmental governance to strengthen incentives for behaviour and investments that lead to better environmental quality. The most important governance elements to support such incentives are access to environmental information, transparency and consultation for accountable decision-making, adequate institutional capacity for credible enforcement, and economic policies that promote improved environmental performance.

Access to Environmental Information and Awareness of Environmental Risks

23. The current paucity of environmental information and understanding in Bangladesh constrains decision-making at all levels. At the household level, for example, greater awareness of the risks of indoor air pollution could significantly reduce exposure through simple changes in behaviour. Nationally, the sustainable management of capture fisheries requires information on necessary dry season flows, and the monitoring of soil productivity depends on the development of appropriate indicators of soil quality. Greater access to environmental information and understanding of the impacts of degradation will also create demand for environmental investments. Public investment in the necessary infrastructure to protect water quality around Dhaka will require strong civil society support, based on an understanding of the costs of inaction. Private investment to control pollution will require public pressure for compliance, based on information regarding sources of pollution and their performance.

Transparency and Consultation for Accountable Decision-Making

24. Transparency and public consultation are essential elements of environmental decision-making, strengthening the accountability of environmental institutions and thereby building their credibility. There is considerable scope to introduce greater transparency and

broaden consultation in environmental management in Bangladesh, not least in the core function of reviewing Environmental Assessments (EAs). At the local level, for example, the issuance of No Objection Certificates could be subject to consideration by an open meeting of the Union Parishad, and at the national level all EA information should be publicly available, with high-risk projects presented for public review.

Institutional Capacity for Credible Enforcement: Strengthening the Role of the DoE

25. As the credible threat of regulatory enforcement is central to environmental governance, so too is the establishment of the institutional capacity to deliver such enforcement. For this reason, implementation of the Department of Environment's (DoE's) Strategic Plan is essential to strengthen environmental governance in Bangladesh, as it will provide the DoE with the resources and incentives it needs to fulfil its mandate. Despite its critical and wide-reaching mandate, the DoE currently receives less than 1% of MoEF's annual budget, which itself is less than 0.5% of the Government's total revenue and development budget. In addition to a significant increase in resources, a key element of the Strategic Plan is the creation of civil service cadre positions for DoE staff, which will do much to improve the quality of applicants and strengthen incentives for staff performance. Implementation of the Strategic Plan will also allow the DoE to bring more environmental cases to court, which is essential to build the credibility of the Government's environmental intentions. Stronger environmental enforcement capacity is also necessary outside the DoE, particularly for sustainable management of natural resources. The recent success of the Department of Fisheries in protecting the hilsa, for example, serves to demonstrate the potential effectiveness of regulatory enforcement in ensuring the long-term productivity of the nation's capture fisheries.

Economic Policies and Incentives for Improved Environmental Performance

26. While information and regulatory enforcement help establish incentives for improvements in environmental quality, these are most effective when combined with supportive economic policies. For example, the reduction of duties and other barriers on the import of fish would increase supplies, and thereby reduce the intensity of the exploitation of Bangladesh's capture fisheries. An important element in the battle to curb urban air pollution will be to ensure that the sulphur content of imported diesel is reduced to 500 ppm, reflecting the economic cost of the health damage caused by lower quality fuel. Economic incentives can also be used to complement regulatory approaches to improve environmental management. In the case of industry, there is scope for this to be achieved through the promotion of waste-minimization and eco-labelling initiatives. While this would primarily attract export-orientated businesses, particularly in the garment manufacturing and aquaculture sectors, consideration could also be given to the promotion of an eco-label for the domestic market.

VIII. Conclusion: Key Actions and World Bank Support

27. The economic losses resulting from the environmental impacts considered in this report are equivalent to more than 4% of Bangladesh's GDP. Among these impacts, three sources of environmental degradation stand out as currently receiving insufficient attention given their relative significance: (i) indoor and urban air pollution, (ii) the degradation of water quality in Dhaka, and (iii) the decline of capture fisheries. The economic losses

associated with these three concerns alone may amount to more than 2.7% of GDP. The report proposes a set of actions in each of these areas, and also identifies a series of measures that could be taken to strengthen environmental governance, which forms an overarching constraint to improved environmental management across all issues. While the report estimates the economic losses associated with the environmental impacts considered, it does not provide a benefit-cost or cost-effectiveness analysis of the proposed mitigating actions. It will be important to examine the costs of the proposed actions in more detail as an element of the follow-up work in each of the priority areas. The proposed actions are summarized below, with an indication of potential World Bank support in each area.

Reducing Exposure to Air Pollution

28. Key actions to reduce exposure to indoor and urban air pollution include:

- Integrate the mitigation of IAP into existing energy and public health programs through the provision of both cleaner technologies and public information;
- Support a public education effort on IAP explaining the health benefits of better ventilation and longer outdoor time for children;
- Promote cleaner fuel and cooking technologies, with the aim of establishing demand for private sector provision of such technologies in the longer term;
- Expand urban air quality management activities, focusing on gross diesel polluters, fuel quality, and the extension of air quality monitoring within Dhaka and to other cities.

The World Bank plans to provide technical assistance to explore sustainable delivery models for the information and technology necessary to reduce exposure to IAP. The Bank will also continue to provide support for the Air Quality Management Project, and possibly a follow-up operation to expand urban air quality management activities.

Improving Water Quality in Dhaka

29. Key actions to improve water quality in Dhaka include:

- Develop an integrated framework to address water quality and supply, sanitation, and flood management in Dhaka;
- Provide public information to raise awareness of the causes and impacts of poor water quality;
- Support stricter enforcement of environmental clearance conditions and effluent standards;
- Provide technical assistance for low cost waste minimization initiatives, as part of a broader program of compliance promotion; and
- Invest in water supply, sewerage, sanitation and storm water drainage services, as well as low cost solutions targeting industrial effluent.

The Bank is preparing to support investments in water supply, sewerage, sanitation and storm water drainage services in Dhaka. A proposed separate operation to strengthen the

management of water resources would supplement these investments with support for appropriate industrial effluent treatment technologies, as well as environmental compliance initiatives. This support will draw on planned analytical work and technical assistance to identify policies for more effective management of industrial pollution and the promotion of cleaner production in the Greater Dhaka area.

Reversing the Decline of Capture Fisheries

30. Key actions to reverse the decline of capture fisheries include:

- Establish and ensure minimum dry season water flow requirements for capture fisheries.
- Establish both large and small scale sanctuaries for protection of capture fisheries.
- Develop and implement fisheries management regulations.
- Adopt an Integrated Coastal Resource Management framework.
- Enhance monitoring of capture fisheries.
- Reduce barriers to the import of fish.

The Aquatic Biodiversity Conservation Project (closed in 2005) and the Fourth Fisheries Project (closing in 2006) were supported by the World Bank, and among other achievements led to the development of the Government's draft inland capture fisheries strategy. The Bank is prepared to provide further assistance to support the implementation of this strategy and to strengthen community management of fisheries. In addition, the Bank is also prepared to support regional collaboration to develop a strategic action plan for the management of marine and coastal resources in the Bay of Bengal.

Strengthening Environmental Governance

31. Key actions to strengthen environmental governance include:

- Implement DoE's Strategic Plan.
- Create cadre positions for DoE staff.
- Make environmental assessments and information related to the environmental clearance process publicly available, including through the internet.
- Mandate public consultation on environmental assessments of high risk projects.
- Require consideration of No Objection Certificates at open meetings of Union Parishads.
- Delegate responsibility for environmental clearance of less polluting facilities to local authorities.
- Publish a national environmental scorecard annually.
- Publish the environmental performance of selected high-priority industrial facilities.
- Provide DoE with legal assistance in bringing environmental cases to court.

Given the availability of technical assistance resources for DoE, the most important role for the World Bank will be to help address the revenue budget implications of the Department's Strategic Plan through the Bank's dialogue with the Ministry of Finance and the ongoing program of development policy lending. The need to implement the DoE's Strategic Plan is reflected in the policy matrix for the series of Development Support Credits supported by the World Bank, and will continue to be incorporated in future development policy lending discussions. World Bank support for the strengthening of local government provides an additional avenue to increase consultation and accountability for environmental decision-making at this level.

32. The technical assistance, investment and budget support operations discussed above are reflected in the World Bank's Country Assistance Strategy (CAS) for the period FY06-09. Appendix III provides a summary of the key products, and indicates the principal environmental management outcomes associated with each. Such initiatives will complement the investment support and technical assistance being provided by other development partners to strengthen environmental management in Bangladesh.

33. The Government's strong commitment to the MDGs is reflected in the National Strategy for Accelerated Poverty Reduction, and achievement of two of the MDGs in particular is closely dependent on improvements in environmental management. Meeting the target for reduction in child mortality under Goal 4 will require continued reductions in environmental health risks, particularly those leading to respiratory infections and diarrhea, which together account for about a quarter of under-five deaths. Meeting the targets to ensure environmental sustainability under Goal 7 will require renewed effort to strengthen environmental governance, reverse the loss of natural resources, and reverse the degradation of urban environmental quality. While the Government has made important strides towards these targets, this report highlights a number of sources of environmental degradation that merit greater emphasis. Initiatives to undertake the key actions summarized above will not only bring Bangladesh closer to achieving its targets under the MDGs, but will significantly contribute to the removal of environmental constraints to poverty-reducing growth.