

India

**Strengthening Institutions for Sustainable
Growth**

Country Environmental Analysis

South Asia Environment and Social Development Unit

South Asia Region



World Bank

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Foreword

Robust economic growth has brought immense benefits to the people of India -- incomes have increased, poverty has fallen and industrialization has accelerated. This remarkable progress, however, creates significant challenges for managing pressures on natural resources and the environment, necessary for sustaining these accomplishments. Recognizing these challenges the Government of India has articulated the National Environmental Policy (2006) which calls for a fundamental shift in the priority given to the environment and the regulatory approach to environmental management.

This report by the World Bank is a contribution to the process of detailing and implementing this strategic vision of the Government of India. It is the product of close collaboration between the Ministry of Environment and Forests (MoEF) and the World Bank, with active participation of the Ministry of Power, the Ministry of Industry and the Ministry of Shipping, Road Transport and Highways.

The study highlights the importance of strengthening institutions for environment management in sustaining and accelerating India's strong growth performance. Specifically, it analyzes and identifies opportunities in institutional development and capacity building measures to strengthen monitoring and enforcement of environmental compliance and enhances environmental performance in the three major sectors – power, industry and highways. It proposes a program of specific actions to significantly increase the capacity of environmental institutions, sectoral agencies and communities to match the growing demands of economic growth and public awareness.

Importantly, the study followed a highly consultative process, which has enhanced its practical value by contributing to developing a commonly shared vision on the way forward and reconciling the perspectives of diverse stakeholders. The report reaches out to a wide audience and also brings a rich variety of knowledge and practices to the attention of specialists and the concerned public.

I believe that the report findings and recommendations would help moving the agenda forward in implementing the National Environmental Policy and supporting India's development goals.

Dr. Prodipto Ghosh
Secretary
Ministry of Environment and Forests
Government of India

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Acronyms and Abbreviations

ADB	Asian Development Bank
BOD	Biochemical Oxygen Demand
CDM	Clean Development Mechanism
CEA	Central Electricity Authority
CEM	Continuous Emissions Monitoring
CETP	Common Effluent Treatment Plant
CII	Confederation of Indian Industries
COD	Chemical Oxygen Demand
CPCB	Central Pollution Control Board
CREP	Corporate Responsibility for Environmental Protection
CRRRI	Center Road Research Institute
CSE	Centre for Science and Environment
CTE	Consent to Establish
CTO	Consent to Operate
DoE	Department of Environment
EA	Environmental Assessment
ECOP	Environment Codes of Practices
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
EMS	Environmental Management Systems
ENVIS	Environmental Information System
ESI	Environmental Sustainability Index
ESMAP	Eergy Sector Management Assistance Programme
ESPP	Environmental Social Policy & Procedures
FHWA	Federal Highway Administration
FICCI	Federation of Indian Chambers of Commerce
GDP	Gross domestic product
GHG	Greenhouse gases
GoI	Government of India
GoK	Government of Kerala
IDA	Industrial Development Authority
IEA	International Energy Agency
IFC	Information and Facilitation Counter
IRC	Indian Roads Congress
ISO	International Organization for Standardization
LCA	Life Cycle Assessment
LLDA	Lake Laguna Development Authority
MNES	Ministry of Non-Conventional Energy Sources
MoEF	Ministry of Environment and Forests
MoNRE	Ministry of Natural Resources & Environment
MNES	Ministry of Non-Conventional Energy Sources
MoEF	Ministry of Environment and Forests
MoNRE	Ministry of Natural Resources & Environment
MoP	Ministry of Power
MoRTH	Ministry of Road Transport & Highways (Now known as the Ministry of Shipping, Road Transport and Highways)
MVA	Megavolt-ampere
MW	Megawatt
NEP	National Environment Policy
NGO	Non-Government Organizations
NHAI	National Highways Authority of India
NHPC	National Hydro Power Corporation
NIMBY	Not in My Back Yard
NIRD	National Institute of Rural Development
NITHE	National Institute of Training of Highway Engineers

NO _x	Nitrogen Oxides
NPV	Net Present Value
NTPC	National Thermal Power Corporation
OECD	Organization for Economic Cooperation and Development
PCB	Pollution Control Board
PIL	Public Interest Litigation
PowerGrid	Powergrid Corporation of India Limited
PPP	Purchasing Power Parity
PROPER	Program for Pollution Control, Evaluation, and Rating
PWD	Public Works Department
R&M	Renovation & Modernization
RSPM	Respirable Suspended Particulate Matter
RTIA	Right to Information Act
SCC	Supreme Court Cases
SMEs	Small and Medium Enterprises
SPCB	State Pollution Control Board
SPM	Suspended Particulate Matter
SSI	Small-Scale Industries
TA	Technical Assistance
T&D	Transmission & distribution
TRI	Toxics Release Inventory
UNDP	United Nations Development Program
UNEP	United Nations Environment Program
USEPA	United States Environment Protection Agency
UTPCC	Union Territory Pollution Control Committee
VFG	Vital Few Goals
VOC	Volatile Organic Compounds

CURRENCY EQUIVALENTS

Exchange rate of the Indian Rupees for US\$ 1.00

Fiscal year	Annual average rate (Rs)
2000–01	45.6844
2001–02	47.6919
2002–03	48.3953
2003–04	45.9516
2004–05	44.9315

FISCAL YEAR

April 1 – March 31

Executive Summary

1. For over a decade, from the early 1990s, India has experienced one of the fastest economic growth rates in the world, averaging over 6 percent and reaching 7-8 percent per year since 2003. While the country still continues to face the tremendous challenge of reducing poverty for 354 million (representing 27 percent of the world's poor) of its over one billion population, robust economic growth has already allowed millions to emerge from poverty creating a sizable middle class of 300 million people. This growth has been a dramatic driver in the nature and scale of impact on the country's environment and natural resources.

The Challenge: Rapid Growth in Extremely Diverse Natural, Economic and Social Environment

2. Given the high population density, vulnerable ecology, extreme climate and a significant share of the economy heavily dependent on the natural resource base, **environmental sustainability might well be the next greatest challenge along India's development path**, adding to the list of priority needs, such as reducing disparity, eliminating poverty and promoting social cohesion. Mirroring the country's size and diversity, environmental risks and problems are wide-ranging. India's dual features of a low income economy and a middle income economy are reflected in the environmental damage estimates. The damages are still dominated by "poverty-related" risks, such as lack of sanitation and indoor air pollution in rural areas. However, the share of "growth-related" risks manifested by the deteriorating urban environment, industrial waste and chemical pollution is increasing. As the country finds itself into the second decade of strong economic performance, making and further planning massive investments in infrastructure, urban development, and industrialization, the issues of managing the environmental impacts associated with this rapid growth are capturing public attention.

3. To deal with these impacts, India has developed a comprehensive set of environmental laws and institutions, including a very active judiciary. Despite a strong policy and institutional framework and some successes, environmental degradation has not been arrested on a large scale. The country-wise average compliance ratio for monitored industries (falling far short of all polluting sources) is only 50 percent. Furthermore, the trends in environmental quality indicators are mixed; for example, urban air quality (measured as suspended particular matter of less than 10 microns) has been improving in the largest cities, such as Delhi and Mumbai, where significant efforts have been made to control multiple pollution sources, while it is deteriorating in many other cities.

4. The immense unfinished agenda underpins the deepening dissatisfaction with the state of environmental affairs by a growing and increasingly vocal "green" constituency, resembling, in some ways, a historical pattern of 1960s in industrialized countries. A **rising public demand for better environmental quality**, often driven by the influential urban middle class and backed by the judiciary (as in the famous case of cracking on Delhi's air pollution), is being increasingly matched by voluntary environmental performance obligations from India's large-scale corporate sector and industry asserting a prominent role in the global market.

5. **This demand, however, is yet to be matched by the regulatory capacity of environmental agencies.** While the capacity of the Ministry of Environment and Forests (MoEF), the Central Pollution Control Board (CPCB) and the State Pollution Control Boards (SPCBs) has improved over time, keeping up with the challenges of rapid growth has proved difficult. Many would argue that the judiciary filled the vacuum left by the lack of regulatory oversight. India's enormous economic and social diversity needs to be better appreciated in this context. There are significant segments of population that have other more pressing priorities. Thus, political commitment to environmental improvement still varies by State and constituency, particularly when measured up against multiple competing needs. This has a bearing on the status and capacity of both the State and national environmental agencies. And besides a large-scale sector, there are numerous smaller scale industries (the backbone of India's growth and employment), which are often unable to adopt modern technologies that would be required for compliance with environmental laws. The understanding of the environmental impacts, their origins, consequences and cost-effective mitigation strategies, while evolving gradually, is still incomplete, particularly with respect to cross-sectoral and cumulative impacts. The understanding and perceptions significantly differ across stakeholder groups. All of this further complicates the formulation and delivery of an effective regulatory response that would benefit from a broad-based support.

The Study

6. The objective of this *Country Environmental Analysis* was to help strengthen the environmental policy *implementation* framework, to meet the challenges of a rapidly growing and extraordinarily diverse economy in India. In particular, the study aimed at assisting with the implementation of the new National Environment Policy (NEP 2006), which was released in draft for public consultation at the time this study was initiated. The scope of work was developed through extensive consultations with the MoEF, the main study counterpart, and multiple other stakeholders to focus on priority issues not covered by and complementary to recent or on-going work. Given that a review of the Environmental Impact Assessment (EIA) process was commissioned by the MoEF earlier and was nearing its completion at the time this analysis was about to start, this study focused on identifying and proposing ways to address major gaps in the existing institutional arrangements, as well as regulations and incentives for post-EIA *environmental compliance and performance*.

7. In view of the focus on the growth–environment nexus, the study covered three select sectors — industry, power (including three distinct sub-sectors: coal-based power generation, hydro power generation, and transmission), and highways — that are among the key drivers of growth. Together, these sectors represent a wide range of environmental impacts, sources and regulatory issues that allows drawing conclusions of broad relevance. The analytical framework used by this study was a combination of sector-wide reviews, based on secondary data of issues, policies, regulations and institutions, with several case studies of implementation experiences. Ranging across seven Indian States, the project-level case studies helped to gain a deeper understanding of barriers, as well as contributors, to better environmental compliance and performance in the real-life situation. The case studies involved primary data collection and consultations with local stakeholders. Selective reviews of international experience in environmental management were also conducted. The findings from all reviews and case studies have been integrated to leverage support for corrective actions building on a growing number of good practices in India and internationally.

8. A central feature throughout this study has been the extensive consultations and dialogue with various concerned sectors and players. Roundtable discussions, meetings, brainstorming events and workshops took place in December 2004, April 2005 (launch workshop), June 2005, August 2005, December 2005 (multi-sectoral consultation workshop on early findings) and July–August 2006 (consultation on the draft final report). A major public (non-governmental organization; NGO) consultation workshop was held in July 2006, followed by meetings with government representatives of all the sectors involved (environment, industry, power, and highways). In addition, several consultations were held by study consultants during summer 2005 with local stakeholders at the project sites selected as case studies. The draft report was also posted on the Internet for broader public review and feedback during June–July 2006.

9. A highly consultative process was particularly important because, from the onset, the main added value of this exercise was not as much in producing new knowledge or a new analytical result, as in helping to develop a *commonly shared* vision on the way forward, reconciling different perspectives by diverse stakeholders. The importance of this approach was further reinforced by a conclusion from the study that the lack of effective dialogue among opposing stakeholders is becoming a binding constraint to further progress, so much desired by the very same stakeholders.

10. The key findings and recommendations of the study are grouped under five themes: (i) facilitating national dialogue and public participation; (ii) expanding the regulatory toolkit to enable environmental compliance; (iii) strengthening the capacity of environmental agencies to meet the growing demands, (iv) aligning sectoral incentives with environmental priorities; and (v) working across sectors.

Facilitating National Dialogue and Public Participation

11. While the impetus for change and more effective action is building up and being recognized, albeit to a varying degree, at all levels and by all players, **there is a serious breakdown in public trust and constructive dialogue** with respect to addressing a very complex and non-trivial set of issues. Increasing confrontation and suspense make the much needed environmental management reforms difficult to agree upon and implement, further exacerbating environmental problems. There is an urgent need to start working towards developing **a commonly shared vision on the way forward**, involving all principal stakeholders and reconciling diverse perspectives.

12. Managing expectations from the public and decision-makers regarding the public participation process is important. Successful public participation does not just happen. One of the key recommendations is to **carefully plan and execute a long term national program for supporting public participation in environmental management** aimed at educating and building capacity of all stakeholders involved. The first step could be to develop detailed guidelines, as well as provide training, on public participation for both State-level environmental authorities and sectoral agencies (adjusted to sector's specifics). Significant attention should be given to **building civil society capacity** at the community level to help communities understand the environmental issues and linkages to sector activities, and thus effectively garner participation in public forums. Overall, the program should be designed and targeted according to the diversity of India's stakeholders (with some of non-government stakeholders being more educated than the regulator).

13. While it is very important to increase the effectiveness of the more traditional forms of public participation, such as public hearing, the program should also **promote innovative and more interactive approaches** that can increase the level of public awareness, involvement, and ownership of environmental problems and solutions. One such example, already piloted in India, is the citizen involvement in environmental monitoring and enforcement, which should be further supported.

14. Furthermore, **the passage of the Right of Information Act (RTIA) provides a valuable opportunity** for developers and regulators to improve public relations, which they cannot afford to miss or under-utilize. It is important to widely disseminate policy guidelines on the type of information the public has access to. The Information and Facilitation Counter (IFC) launched by the MoEF in December 2005 is an excellent initiative to make information easily available. This should be extended by making special efforts and arrangements to effectively reach out to the entire country, including remote locations.

15. Effective environmental enforcement requires informed consensus on environmental management objectives and policies that are based on a good understanding of **the shared roles and responsibilities of all players**, including the regulator, the regulated community (developers and polluters) and the affected community (general public). This fundamental notion of *shared responsibility* is currently challenged in India by the general perception among the public, project proponents, and development authorities alike that environmental ills are the sole responsibility of environmental agencies failing to effectively implement and enforce the laws. As India's economy continues to accelerate, the performance of the environmental regulator will come under increased scrutiny and pressure. The study shows, however, that unless an increasing public demand for better performance by the environmental regulatory agencies is matched by adequate support to these agencies, conditioned on institutional reforms to increase efficiency, transparency and accountability, it would be naive to expect substantial progress and unfair to solely blame the regulator for the lack of it.

Expanding the Regulatory Toolkit to Enable Environmental Compliance by Diverse Sources

16. The analysis revealed that **much remains to be done to strengthen the regulatory, enforcement, and incentive mechanisms at the disposal of environmental agencies**. The main focus on large point sources in applying environmental regulations does not match the scale and diversity of the India's economy, with its multiple pollution sources, dominated by small-scale industrial units or often being outside the industrial sector. Nor is it responsive to changing pressures resulting from the country's accelerated growth, such as unwieldy urbanization and regional development that are overstressing both public infrastructure and the carrying capacity of the natural environment; massive expansion in highways and transmission lines; or private investment in power generation using imported coal with different properties than those the current regulation is designed to control. At the same time, as highlighted in the NEP 2006, enforcement efforts are undermined by the lack of credible deterrents: the two key sanctions currently available to the regulator — filing a criminal case against a violating company or issuing an order to shut it down — are either too time consuming to pursue or too extreme to be routinely used.

17. In sum, **the toolkit the regulators use to facilitate compliance needs to be considerably expanded and strengthened** to adequately deal with a very diverse regulated community. This would require **new regulatory programs and approaches for different categories of priority sources, particularly targeting activities other than large point sources** that cause significant *cumulative* environmental impacts. Specifically, there is a need for regulatory programs targeting: (i) numerous small and medium enterprises (SMEs), estimated by the MoEF to account for 70 percent of the total industrial pollution load; (ii) the growing municipal sources of pollution; (iii) multiple industrial, municipal and transport sources contributing to environmental degradation in a particular area or ecosystem; and (iv) linear projects with complex direct and indirect (induced) impacts, such as the highways projects. The new regulatory programs should be designed to (i) deliver a credible threat of enforcement, using, where needed, innovative methods and mechanisms tailored to a targeted group of sources; and (ii) make a greater use of suitable economic incentives, particularly for small-scale businesses with higher abatement costs. Some actions are already being taken but a bolder and more systematic effort is needed.

18. The study recommends wider dissemination of and learning from recent successful examples in India and elsewhere of **effective packages for clusters of SMEs that combine focused enforcement effort with extensive outreach and compliance assistance** in the form of knowledge, capacity building, and financial aid, such as a matching grant or soft loan, to help with the cost of adopting a cleaner technology. The emerging lessons could be used for initiating a **national program for SME clusters that would guide the design and implementation of suitable packages at the local (municipality) level** tailored to the specific local circumstances. The program could also provide matching grants for compliance assistance, expanding the current initiative by the MoEF that supports the construction of common effluent treatment plants (CETP) for SME clusters to other pollution control and prevention measures identified as priority by the respective local program. When applicable, it would be also useful to facilitate, as part of this program, access to carbon finance (as in the case of energy efficiency/clean fuel switching measures) or other concessional global environmental financing instruments.

19. To deal with multiple sources of pollution within a particular area, it would be important to build on lessons from considerable past experience in India and internationally for **designing more effective area-based pollution management programs**, particularly for new priorities, such as urban air quality action plans or hazardous waste management. Making this approach more effective for India would likely require linking it with the decentralization process and local government agenda, strengthening the authority of municipalities and regional development authorities, and enabling them to facilitate integration of multiple sectoral strategies and stakeholders.

20. **Better recognizing the vast diversity of regulated sources in applying national discharge standards** is another important area of refining regulatory approaches towards ensuring a greater level of compliance. The process of setting source standards should better recognize significant differences in the ability to adopt pollution control and cleaner process technologies required for meeting these standards, between large and small units and between new and old facilities (particularly old public utilities, such as power plants). There is a need to strengthen and clearly define the methodology for an *economic impact assessment* of the proposed environmental standards and regulations, drawing on best international practices. This assessment would provide a scientific basis for differentiating the requirements between

different categories of sources, as well as allowing a phased implementation schedule, adjusted to different sources and locations, which is feasible for meeting the new requirements. At the same time, regulations should be backed by credible enforcement sanctions for failure to meet new standards by the established deadline as well as provide practical incentives to facilitate compliance with the new standards ahead of schedule (an approach often used by the European Union countries).

21. One of the top priorities is to strengthen the current system of punishment for environmental violations that is too difficult for routine implementation in the situation of widespread non-compliance. It would be important to **promptly evaluate, refine and expand the recently introduced bank guarantee system** in select States (an application of the environmental performance bond instrument), as a condition of renewing an environmental license (“Consent to Operate”) for violators. There is also a need for exploring other innovative schemes to strengthen enforcement deterrents, as environmental bonds are not appropriate for all circumstances, building on the NEP (2006) that calls for “a judicious mix of civil and criminal processes and sanctions” (MoEF, 2006, page 17).

22. In addition to the above priorities, **there is a double benefit to regulatory agencies from recognizing and encouraging good environmental performance and voluntary initiatives by the industry.** The Charter on Corporate Responsibility for Environmental Protection sets a good example of a collaborative process to expand upon through some regulatory incentives, such as extending the duration of CTO or/and reducing the frequency of inspections for industries that demonstrated a good record of past performance, obtained ISO 14001 certification, or introduced environmental auditing or sustainability reporting. This provides an additional (even if small) incentive for other industries to follow and to innovate further. It also allows SPCBs to focus their scarce resources on serial offenders and other priorities. There is a significant and under-realized scope for providing such support, using good practice examples of a handful of SPCBs.

23. **Public disclosure of environmental information and citizen participation in monitoring** have the power to motivate better compliance by holding the industry and government agencies accountable for their performance and decisions. It is important to continue supporting citizen-monitoring efforts that CPCB/SPCBs have initiated by promoting public-private partnerships for compliance monitoring and establishing public notification procedures for sharing relevant data.

Strengthening the Capacity of Environmental Agencies to Meet Growing Demands

24. **Matching the capacity of the regulator with the multiple and expanding regulatory mandates in a rapidly growing economy is a major challenge.** There are significant capacity constraints of State environmental agencies to meet their existing mandates, as well as the need for introducing new regulatory programs and tools and improving the effectiveness of existing ones. Furthermore, the pressures for processing consents to establish and operate (CTEs and CTOs), as well as for conducting inspection visits, are increasing for most SPCBs due to continued rapid growth, adoption of shorter timelines for approving new investments, and a larger number of units to monitor. In addition, public interest litigation (PIL) and other court cases against SPCBs are on the rise in many States, which - albeit a positive sign of civil activism - is further eroding the capacity of

SPCBs to inspect and enforce as its already limited staff resources are re-allocated to dealing with those cases. Notwithstanding that the volume and complexity of workload is growing disproportionately to the staff, skills and resources, State governments often exacerbate the situation by indiscriminate hiring freezes.

25. The study recommends that the MoEF and CPCB consider, using recent examples of several SPCBs, requesting and guiding all SPCBs to develop a **medium term capacity strengthening action plan** to meet the current and projected workload, including the requirements of the RTIA and the recent increases in court cases. These plans should first explore the possible efficiency gains through: (i) rationalizing processes (e.g. linking consent duration and inspection strategy to environmental risks and performance of a facility); (ii) upgrading technology (e.g. full computerization of application processing, greater use of continuous environmental monitoring when possible); (iii) decentralizing responsibilities to regional offices, along with staff, resources and equipment; outsourcing certain non-core functions; (iv) training to upgrade skills, etc. It would conclude with a staffing plan including a possible need for additional positions to meet the core needs, upon exhausting all options for improvements in processes and efficiency. The plan could then be used for negotiations with State governments over additional staff positions, subject to making a strong and verifiable case.

26. Furthermore, a system of oversight between the center and States needs to be strengthened to ascertain **greater accountability for the level of performance** by State environmental agencies, which varies greatly across states. The MoEF and CPCB could consider introducing a performance-based program of support to SPCBs, which would be rewarded for exceeding the agreed performance targets, in addition to the “needs-based” technical assistance to SPCBs with particularly low capacity (e.g. in new and/or poorer States). Improving efficiency and accountability of the forests departments in providing the forestry clearance and performing compensatory afforestation is another priority action area.

Aligning Sectoral Incentives with Environmental Priorities

27. In addition to the critical roles of the environmental regulator and the civil society, there is also a **fundamental need for sectoral agencies to facilitate better environmental compliance and performance** of individual projects, more sustainable development of the sector as a whole and a greater cross-sectoral coordination, particularly at the planning stage. Case studies and sector reviews show that environmental monitoring and enforcement of specific sources can do very little to improve the situation on the ground if environmental factors are not considered at the time of location decisions, spatial planning, project design, and technology selection. Sectoral agencies and local governments are typically better positioned to influence these choices than the environmental regulator.

28. **The industry sector** agencies can significantly influence environmental outcomes by: (i) integrating environmental objectives in the State Industrial Policy, already done by several, though not all, States; (ii) linking industrial promotion incentives (such as tax holidays and soft loans) to environmental risks and performance, for example conditioning incentives on securing an environmental performance bond by industries with hazardous processes; (iii) coordinating with SPCBs and municipalities for better planning and zoning that integrate environmental considerations, including the need for common environmental infrastructure; (iv) organizing programs to raise awareness of business opportunities linked to

good environmental management, using increasing examples within India; (v) promoting partnerships between larger industries and smaller suppliers, such as “green supply chain” initiatives; and (vi) facilitating environmental knowledge sharing and training by business associations, particularly in “emerging” States with massive new development investments (e.g. Chhattisgarh, Jharkhand, and Orissa).

29. In the **power sector**, there is significant synergy between the three core drivers shaping future development of the sector. These are: (i) meeting a growing demand for electricity at affordable cost; (ii) ensuring long-term security of primary energy supply through an appropriate mix of sources; and (iii) minimizing the environmental impacts — at the local, regional and global level. Nevertheless, **there are a number of areas where further alignment of sectoral policies and programs with environmental considerations is required**. These include: (i) a more focused effort to promote the uptake of energy efficiency and conservation measures on the ground; (ii) enhancing energy efficiency and environmental considerations in coal-based generation, including the construction of new plants and the Renovation & Modernization (R&M) program for old coal fired power plants; (iii) strengthening incentives for ash management and use of better quality coal; and (iv) creating a stable regulatory environment for renewable energy generation at the State level. It would be also useful to include environmental indicators of sector performance in the Ministry of Power (MoP) online database and annual reports.

30. Furthermore, the recent introduction of the Net Present Value (NPV) for diverted forest land has illustrated that environmental regulation can significantly influence the cost and tariff structure of power generation and transmission projects, and skew the market of power generation in favor of certain primary energy sources and technology choices over others. The impact of the NPV payment that has been particularly felt by new hydro power projects highlighted **the need for a comprehensive and consistent methodological framework for estimating and account for all relevant externalities**. This would help assess the full economic costs and benefits of alternative power sector technology choices at the project and system level, and devise regulatory and/or financial incentives to be provided to investors in generation that would facilitate optimal technology and/or energy source choices.

31. In the rapidly expanding **highways sector** the key recommended sector specific actions are: (i) strengthen mechanisms, at both policy and implementation level, to take better account of the indirect, induced cross-sectoral and cross-boundary impacts, based on best practices available in India and internationally; (ii) provide technical guidance on key environmental management aspects through sectoral Guidelines; (iii) integrate environmental management measures in the updated construction codes and technical specifications for highways and road projects; and (iv) develop a manual for translating provisions of the Environmental Management Plans (EMP) into contract clauses to improve the implementation of EMP and environmental performance of contractors.

32. **The environmental agenda provides additional opportunities to support the development of a modern and efficient sector**. This is particularly evident in the power sector but applies to other sectors as well. Around the world, national environmental requirements have often steered technological innovation, energy conservation, management improvements, better planning, and superior design that, in the longer term, become beneficial for sector-wise and economy-wide performance. As concerns about global

environmental issues, such as climate change or toxic chemicals, have led (and continue to lead) to the development of international concessional financing mechanisms, along with efforts related to knowledge, technical assistance and technology transfer, these instruments can and should be more effectively used by India to reinforce and advance sector development objectives and national environmental priorities. For example, India represents one of the largest potential markets for carbon-reducing investments under the Clean Development Mechanism (CDM). Following a meeting of G-8 countries in summer 2005, the *Investment Framework for Clean Energy and Development* is being developed to accelerate investments that can meet the growing energy demands in an environmentally sustainable manner. It is important for government agencies and private sector players in India to become an active and *informed* participant of this process, highlighting the need for a **country-specific strategic assessment of “low carbon” economic growth options.**

Working Across Sectors for Common Public Good

33. There are also important **common needs** highlighted by all stakeholders of environmental management. Summarized below, these could be **good entry points for working together** and building constructive partnerships.

Improving Access to Information, Knowledge and Training

34. There is a **general consensus that all institutions — representing environmental, sectoral, and civil society stakeholders — can play a key role in strengthening the knowledge base and technical capacity** that are important in minimizing the environmental impacts of development. Much of the information is already being provided by various institutions, and it is important to focus future efforts on: (i) disseminating it more evenly across the country; (ii) providing high and *comparable* quality sector-specific training across States and organizations; and (iii) developing targeted, well-designed and well-delivered programs for community learning.

Strengthening Cross-sectoral Coordination

35. The lack of effective mechanisms for inter-agency coordination is too often at the root of environmental management problems, including difficulties with compliance and enforcement, as well as failures of common environmental infrastructure. It is thus critical, for both sectoral and environmental authorities, to **evaluate, share and promote national best practice examples** of State-level policies and institutional mechanisms, as well as relevant international experience that enable early and meaningful participation of environmental agencies in the planning and design of infrastructure and industrial development projects. Examples from sector reviews include the Environment and Social Management Framework for the highways sector by the Government of Gujarat; and the efforts of the Government of Andhra Pradesh to integrate environmental considerations into industrial development planning. The Charter on Corporate Responsibility for Environmental Protection drawn up jointly by the industry and MoEF/CPCB is another good example of a collaborative action to follow.

Empowering Local Governments

36. New priorities and programs, such as urban air quality action plans, programs for SME clusters, or other area-wise pollution management programs, will require even greater cross-sectoral cooperation and integration within a particular municipality or other spatial zones. Municipal or other appropriate local governments appear to be best positioned to have the right incentives to ensure the coordination needed. It would be thus important to provide them with sufficient authority and capacity to forge such coordination. **Devolving more powers to and building capacity of local governments**, set in motion by the 73rd and 74th Constitutional amendments, would be necessary for developing and implementing environmental management programs aimed at measurable improvements of environmental quality in the areas of their jurisdiction, with the participation of all concerned sectors, as well as citizens.

The Way Forward

37. **The emerging environmental agenda is of immense proportion.** The needed institutional changes and large-scale improvements on the ground will require national commitment and consensus on a program of actions spanning over the long-term. Many of the measures would involve further examination, design, as well as consultations with the public, other government agencies, and the regulated community. It will also require that environmental agencies, sectoral institutions, and the general public patiently work together to progress towards the objectives set out in the NEP.

38. An enormous agenda is not new for India, which has on numerous occasions risen to meet such challenges. Encouragingly, many steps and initiatives setting the right direction have been recently taken by various players, including the environmental regulator. It would be important to move quickly towards reaching a broad agreement with all major stakeholders on the priority actions, starting with the identified list (Table S.1), and **develop a medium- to long-term program of implementing the agreed actions** supported by necessary resources, monitorable targets, and clear accountability mechanisms.

Table S.1: Key proposed actions and the roles of different stakeholders

Issue/Area	Recommended Actions		
	Environment Agencies	Regulated Sectors	Civil Society
Promote public participation	<p>Develop a national program, including:</p> <ul style="list-style-type: none"> • Programs for raising community knowledge and capacity • Guidelines and training to SPCBs on public consultation • Programs to involve citizens in monitoring and enforcement 	<p>Develop sectoral guidelines and training on public consultation</p> <p>Dissemination of examples when public participation improved project performance</p>	<p>Collaborate on developing effective programs for public consultation and community knowledge</p> <p>Share local knowledge with environmental agencies and sectors</p>
Improve access to information, knowledge and training	<p>Publicize the Information and Facilitation Center and create its offices in other locations</p> <p>Develop and regularly update public on-line environmental data base</p> <p>Develop guidelines to facilitate the use of the Right to Information Act</p>	<p>Develop networks of regional centers within appropriate existing institutions to provide high quality training and knowledge across the country</p> <p>Develop sectoral guidelines and/or share best practices to overcome specific knowledge gaps</p>	<p>Proactively use the Right to Information Act to obtain local environment data</p> <p>Disseminate relevant information to affected communities</p>
Set feasible standards for a diverse regulated community	<p>Review best international practice procedures for setting/differentiating source standards and develop guidelines for India</p> <p>Introduce an enhanced methodology for an economic impact assessment of new regulations</p>	<p>Provide necessary economic information, collaborate on the analysis and facilitate consultation with the regulated community</p> <p>Develop, in collaboration with MoEF/CPCB a consistent framework for integrating externalities in the regulatory regime for the power sector</p>	<p>Provide an independent review of the proposed standards</p>
Introduce new regulatory programs to address growing pollution sources	<p>Develop well-packaged regulatory programs for SMEs clusters that integrate targeted enforcement with compliance assistance</p> <p>Develop “new generation” area-based pollution management programs dealing with multiple sources that focus on ambient quality outcomes</p>	<p>Provide training and capacity building to SMEs on compliance and related business opportunities</p> <p>Promote greening supply chain and industry mentoring initiatives</p> <p>Collaborate on development an area-based program</p>	<p>Participate in development of local SME and area-based environmental programs</p> <p>Allow community monitoring of SMEs and other sources of pollution in the area</p>
Strengthen monitoring and enforcement	<p>Adopt a plan to improve effectiveness of monitoring, including greater use of CEM technology and self monitoring data</p>	<p>Promote self-monitoring</p> <p>Offer sector rewards for good environmental compliance and performance</p>	<p>Develop public and disclosure “green rating” and schemes</p> <p>Participate in citizen monitoring programs</p>

	<p>Periodically update sectoral guidelines for monitoring, add new sectors of growing impact such as highways</p> <p>Evaluate, refine and expand and strengthen the pilot bank guarantee system</p>	<p>Provide information and technical assistance on compliance</p>	<p>Collaborate in public-private partnerships to improve awareness and compliance</p>
Improve cross-sectoral coordination	<p>Empower local government to oversee local/regional environmental programs that require cross-sectoral coordination</p> <p>Expand program of developing environmental zoning atlas for industrial and urban areas</p>	<p>Share and promote best practice examples of involving environmental authorities in regional zoning and project planning/citing/design</p>	<p>Organize early involvement of civil society groups in zoning and planning activities, and oversight of local environmental programs</p>
Promote good environmental performance by sectors	<p>Develop a set of regulatory incentives to support voluntary initiatives, using existing good practices</p> <p>Collaborate on developing incentive packages for energy efficiency and clean coal</p> <p>Coordinate the development of a strategic framework for using global environmental financing instruments</p>	<p><i>Industry:</i> Integrate environmental objectives in the State Industrial Policy and link promotion incentives to environmental performance</p> <p><i>Power:</i> Provide incentives for better ash management and enhanced R&M of coal plants; include environment performance indicators in MoP database and annual reports</p> <p><i>Highways:</i> Integrate environmental management measures in codes and specifications through a system of periodic revision; develop a manual for incorporating EMPs in contract documents</p>	<p>Public green rating and disclosure programs</p> <p>Citizen monitoring and awareness raising programs</p>
Strengthen regulator capacity and oversight of its performance	<p>Develop/implement medium-term capacity strengthening action plans to meet growing mandates of SPCBs</p> <p>Review and recommend measures to improve the forestry clearance process</p> <p>Strengthen an oversight program for SPCBs, including performance-based incentives</p>	<p>Provide inputs/suggestions for improving effectiveness and efficiency of processes</p>	<p>Participate in developing capacity upgrading action plan</p> <p>Provide independent verification of regulator performance</p>