INDIA
Review of the Effectiveness of Environmental Assessments in World Bank-Assisted Projects

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INDIA

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Fiscal 1990-97

Environment Sector Management Unit
South Asia Region
The World Bank
Contents

Acronyms and abbreviations      v
Acknowledgments             vi
Executive summary    1

1. Background to this review  5
   Instituting environmental assessment  5
   Scope and limitations of the review     6
   Review methodology, structure and audience  6

2. Developing a review framework    8

3. Evaluating for quality    11
   Review procedure to evaluate the quality of environmental assessment  11
   Overall observation of project-specific EAs  12
   Identification of issues and scoping  12
   Baseline conditions  13
   Analysis of alternatives  13
   Prediction and assessment of impacts  14
   Mitigation measures  14
   Public involvement and consultation  15
   Monitoring plans/institutional aspects  17
   Environmental covenants in legal documents  17
   Environmental supervision  18
   Summary of the review of sectoral EAs  19

4. Addressing special issues  20
   Sectoral and regional environmental assessments  20
   Project screening criteria  20
   Guidelines for category-B projects  21
   Review criteria  21
   Integration of environmental assessment and social analysis  21
   Mitigation measures and environmental assessment  21
   Nontechnical summary for effective public consultation  23
   Need for coherence between EA process and EIA systems  23
   Financial intermediary lending  24
5. Conclusions and recommendations 25
   How to improve the effectiveness of EA in project design? 25
   How to improve the effectiveness of EA in project implementation? 26
   Next Steps 27

Annexes
1 Comparison of World Bank's OD 4.01 and Government of India’s EIA notification 28
2 Categories of projects requiring environmental analysis 31
3 List of World Bank–financed projects by environmental assessment category 34
4 Past studies on effectiveness of environmental assessments 36
5 Project information matrix 40

Bibliography 54

Boxes
3.1 Influence of public consultation on design of Second Madras Water Supply Project 15
3.2 Examples of specific and generic environmental and social legal covenants 17

Figure
1.1 Categorical distribution of projects supported by the World Bank in India, FY 90-97 6

Tables
2.1 Rules for assessing the EAs of category A- and B-projects 9
3.1 List of selected projects by sector 11
3.2 Summary of EA ratings for category A and B projects 12
3.3 Summary of attribute ratings assigned to all category A- and B-projects reviewed 13
3.4 Supervision ratings on compliance of environmental mitigation plans as reported in Form 590 during FY90-97 16
4.1 Checklist of review questions 22
<table>
<thead>
<tr>
<th>Acronym</th>
<th>Full Form</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAC</td>
<td>Citizens Advisory Committee</td>
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<td>CIBA</td>
<td>Central Institute of Brackish Water Aquaculture</td>
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<td>EA</td>
<td>Environmental assessment</td>
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<td>EAP</td>
<td>Environment action plan</td>
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<td>EIA</td>
<td>Environment impact assessment</td>
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<td>EMP</td>
<td>Environmental management plans</td>
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<td>FI</td>
<td>Financial intermediary</td>
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<td>GOI</td>
<td>Government of India</td>
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<td>IDA</td>
<td>International Development Association</td>
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<td>IPDP</td>
<td>Indigenous people development plan</td>
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<td>IL&amp;FS</td>
<td>Infrastructure Leasing and Financial Services Limited</td>
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<td>IPCL</td>
<td>Indian Petroleum Corporation Limited</td>
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<tr>
<td>MCGM</td>
<td>Municipal Corporation of Greater Mumbai</td>
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<td>MOEF</td>
<td>Ministry of Environment and Forests, Government of India</td>
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<td>NEERI</td>
<td>National Environmental Engineering Research Institute</td>
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<td>NGO</td>
<td>Nongovernmental organizations</td>
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<td>NTPC</td>
<td>National Thermal Power Corporation</td>
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<td>NTS</td>
<td>Nontechnical summary</td>
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<td>OED</td>
<td>Operations Evaluation Department, The World Bank</td>
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<td>ONGC</td>
<td>Oil and Natural Gas Commission</td>
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<td>R&amp;R</td>
<td>Resettlement and rehabilitation</td>
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<td>SASEN</td>
<td>South Asia Environment Unit of the World Bank</td>
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<td>TOR</td>
<td>Terms of reference</td>
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Acknowledgments

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Executive summary

The World Bank's lending portfolio in India has grown recently and is expected to reach an annual level of about US$3 billion over the next few years. The World Bank and the Government of India (GOI) are keen to ensure that social development and environmental concerns are fully reflected in this growth process. The main objectives of this document are to:

- review the effectiveness of the environmental assessment (EA) in Bank-assisted projects in India between fiscal years 1990 to 1997,
- identify areas requiring further attention, and
- make recommendations to improve the EA effectiveness.

This is a desk review of 14 projects from the India portfolio based primarily on available EA, staff appraisal, supervision, and implementation completion reports, and environmental data sheets. Discussions were held with task managers, supervision staff, and relevant Indian government officials and consultants.

Overall observations

The quality of most reviewed EA reports was found to be 'satisfactory'. Two projects, Bombay Sewage Disposal and Vadodara-Halol Road Widening, top the list having benefited from intensive supervision and professional guidance from staff of the South Asia Environment Unit (SASEN). Overall EA quality has been steadily improving in India. Projects prepared in the years 1996 and 1997 were much better than those prepared in the years 1991 and 1992. This is an encouraging trend, which could be due to gradual building of capacity in EA preparation among the project implementing agencies and local consultants as per World Bank guidelines and close Bank supervision.

The weakest areas identified for category-A projects were identification of issues and scoping, analysis of alternatives, prediction and assessment of impacts, and public involvement and consultation. For category-B projects, the analysis of alternatives and prediction and assessment of impacts were found to be weak. Finally, compliance with EAs during project implementation was found to be weak.

Sectoral EAs have been carried out in only three projects in India. These are the Water Resources Consolidation projects in the States of Haryana, Tamil Nadu, and Orissa. A detailed review of these projects could not be carried out because of the unavailability of full EA reports of Haryana and Tamil Nadu. The weak areas were found to be the same as in category-A projects. This could be because the sectoral EAs require a higher level of expertise as they have to focus more on systemic alternatives, policy analysis, linkages with other sectors, and institutional arrangements. None of these reports seem to have included process guidelines stating the sub-project eligibility or appraisal criteria, or link between the sectoral, and project specific EAs. This is an important element of a sectoral EA as it lays down the framework to implement its recommendations.

Effectiveness of EA in project preparation

Identification of issues and scoping was observed to be one of the weak areas in EA preparation. This step is important to focus the EA on priority environmental and cost-effectiveness issues. Often voluminous data of direct relevance to the project are collected in an effort to comply with lengthy requirements of the GOI Ministry of Environment and Forests (MOEF). The MOEF requires elaborate questionnaires that give
more emphasis on collection of background data and do not orient them to identify and prioritize the environmental issues arising from the project activities.

Description of baseline conditions was found to be the strongest aspect in all but one of the projects reviewed. This is because the EA consultants are most familiar with the MOEF requirements to collect exhaustive ambient environmental quality and meteorological data. However, the question that still remains is, how much of these data are useful (or actually used) and cost effective for EA?

Analysis of alternatives, despite the emphasis given in the Bank Operational Directive (OD) 4.01, was observed to be one of the weakest elements of most of the EAs. Often only an analysis of 'with project' and 'without project' scenarios was carried out. One of the reasons for not exploring different alternatives is the failure to initiate the EA at the earliest stage of project design, before the crucial aspects (location, size, or technology) are decided. As a result, EAs focus only on mitigation measures to defend the decisions already taken.

Prediction and assessment of impacts using appropriate quantitative analytical tools, such as mathematical water/air quality models or Geographical Information Systems, have been carried out in only a few projects. Air quality modeling is one of the well-established tools for prediction and decision making. However in many cases these have not been used satisfactorily for optimizing stack heights and air pollution control equipment.

Development of mitigation measures were found to be 'above satisfactory' in all EAs except one. However none of the reports have recommended mitigation measures for eliminating all major and minor impacts. In most cases the identified mitigation measures have not been costed and integrated with the project. Several of the EAs have failed to recognize the residual or induced impacts such as the treatment and secured disposal of chemical sludge from wastewater- and water-treatment plants.

Public involvement/consultation under OD 4.01 clearly states that EAs must be prepared ensuring maximum participation of and consultations with the affected peoples and nongovernmental organizations (NGO), especially after the EA category has been assigned and when the draft EA has been prepared. There are few instances where the views of affected peoples were integrated as part of the project design to mitigate any adverse environmental impacts. However, it was also observed that the public consultations or involvement rarely continue beyond the project preparation stage.

Monitoring plans and institutional aspects were included for most of the EAs covering all major mitigation measures and an institutional framework to aid implementation. For an 'excellent' rating, EAs would have to address all issues arising out of the environmental and social analysis and recommend an audit framework for post-project monitoring. Rarely do EA reports cover all these aspects.

Effectiveness of EA in project implementation

Environmental covenants in legal documents including loan, credit and grant agreements, bidding documents, and related contracts provide much of the framework to support and enforce supervision. It is therefore critical that such documents adequately reflect the project environmental requirements and specific mitigation measures recommended by the EA process. Most of the projects reviewed have legal covenants which cover the development and/or implementation of Environmental Management Plans (EMP). However the references are usually generic in nature; and in more than 50 percent of the projects reviewed there was no clear relationship between the EMP/Rehabilitation Action Plans (RAP) and the social/environmental legal covenants.

Environmental supervision was found to be inadequate in several of the projects reviewed. This review analyzed the data reported by the task managers in Form 590 for information on the status of compliance of environmental aspects and participation of environmental staff in supervision missions. In seven out of nine category-A projects, environmental specialists participated in less than 50 percent supervision missions. In case of category-B projects, environmental specialists rarely (less than 20 percent of missions) participated in supervision missions. In addition, Form 590 does not necessarily reveal the ground realities or the actual status of EMP compliance. For example, eight consecutive supervision missions of the Shrimp and Fish Culture project have been rating the project
'satisfactory' for environment even when site-specific EMPs have not been designed until now.

**Special issues**

*Sectoral and regional environmental assessments*, while limited in India, have considerable relevance to India where a large number of State-level projects are in the proposed fiscal 1998–2000 lending program. Consequently, opportunities to address environmental issues at planning, programmatic, and policy level are not employed to achieve long-term sustainable solutions.

*Project screening criteria* should not be based solely on the project type, but primarily on field data.

*Guidelines for category-B projects* should be developed and followed during the project preparation and implementation stages.

*Nontechnical summary (NTS)* is an essential tool for communicating EA findings and its absence reduces the opportunity for better communication with stakeholders. The recent amendment to the environmental impact assessment (EIA) notification of the Government of India (April 1997) also requires a public hearing to be conducted. At present OD 4.01 does not require an NTS, but does require public consultations. It will be a good contribution therefore for the Bank to formally require and provide specific guidance for a NTS as result of the EA exercise.

*Financial intermediary (FI) lending* by the Bank to promote private sector development in India is increasing. According to OD 4.01, the Bank should appraise and strengthen, where necessary, the environmental capabilities of the FI to ensure that they carry out appropriate environmental analysis of all sub-projects in a manner consistent with Bank policy. Among the projects reviewed, it is evident that two different approaches are followed. One being the establishment and strengthening of social and environmental capacity within the FI by preparing an environmental and social report that responds to both GOI and Bank requirements and regulations. The second approach being the reliance of the Bank on the existing capacity of the FI to provide the environmental and social clearances for each sub-project to be financed.

*Capacity building.* A comparison of the Bank’s OD 4.01 and MOEF EIA system (Annex 2) shows that there are differences in the requirements, approach and content. Discussions during this review with MOEF officials and the Bank staff confirm that there is a strong demand for a systematic program of educating and informing various interest groups of the requirements OD 4.01 and the EIA notification.

**Conclusions and recommendations**

The quality of EA reports in India has been steadily improving. But two major challenges are how to improve the EA effectiveness in influencing the project design, and how to improve EA compliance during project implementation. Based on the findings of this review, the following key recommendations to address these challenges are proposed for the management’s review and concurrence.

**How to improve the effectiveness of EA in project design?**

- Introduce a sectoral and regional EA approach to improve the timing of the EA process.
- Strengthen the early steps of issues identification and EA scoping to better focus EA activities.
- Reinforce environmental perspectives in the analysis of investment alternatives.
- Make the public consultation process influential in the project design and mitigation strategy.
- Prepare review criteria to ensure consistency and quality of EA reports.
- Prepare follow-up training on key issues raised by EAs.

**How to improve the effectiveness of EA in project implementation?**

- Ensure compliance of EMP through adequate environmental supervision by (a) including environmental performance indicators in legal documents; (b) preparing a separate detailed supervision note on environmental components; and (c) strengthening the field office capacity to assume more field-based environmental supervision.
- Strengthen EA capacity in the project implementing agencies to reduce the communication gaps and to improve the quality of EA reports by (a) organizing sector-specific meetings among the staff of the Bank, GOI, and project implementing agencies, similar to those
done in the highways sector, to discuss the environmental and social issues; and (b) identifying and organizing regular training programs and seminars in partnership with other donors.

**Next steps**

This review was a modest beginning to understand the effectiveness of EA in Bank-assisted projects in India. The following actions are envisaged as next steps to continue this task:

- initiate a follow-up study including field visits and post-implementation review to fully assess the effectiveness of the EA and integration of environmental and social assessments in Bank-assisted projects in India.
- develop a management information system to monitor the compliance of agreed environmental actions of all category A- and B-projects.
- expand training of Indian officials and EA practitioners in best practice lessons learned around the world on such topics as: early scoping; analysis of alternatives; increasing the decentralization of responsibilities to state and local levels; and strengthened public consultation requirements.

**Note**

1. Form 590 is the project supervision status reporting format. This report is completed by Bank task managers following project supervision missions. Environmental ratings are generally assigned by comparing actual performance to the original objectives and parameters at appraisal, according to the scales described in OD 4.01.
1. Background to this review

Instituting environmental assessment

The World Bank adopted Operational Directive (OD) 4.00 (Annex 1) in 1989 to use environmental assessment (EA) as a tool to improve the concept, design, implementation, and monitoring of all investment projects from an environmental and social perspective. The OD 4.00 (Annex 1) was subsequently amended as OD 4.01 in 1991 to expand its scope and provide more clarity in the screening and implementation process. The Government of India (GOI) notified the rules for Environmental Impact Assessment (EIA) of development projects in 1994 under its Environment Protection Act of 1986.

The main objectives of the Bank's OD 4.01 and GOI EIA notification are to prevent, minimize, mitigate, or compensate for the adverse environmental impacts of development projects. A comparison of the two is given in Annex 1. All Bank-assisted projects are screened at the identification stage for environmental impacts and assigned to one of three categories: A, B, or C. GOI in its EIA notification lists 29 development projects which require environmental clearance, depending on the order of financial investments. A comparative description of categories of projects requiring environmental analysis, as per the Bank's OD 4.01 and the GOI EIA notification, is given in Annex 2. A summary of typical environmental issues of category A- and B-projects are also included in Annex 2.

A comparison of Bank's OD 4.01 with GOI EIA notification reveal the following key areas of difference. The Bank's screening criteria include an illustrative list of projects which offers more flexibility in categorization and type of EA required. The GOI criteria are more rigid and specify 29 types of projects which require EIA with a minimum investment level of 50 crores (500 million Rupees or US$12.5 million). Such an approach excludes some types of investments with environmental impacts. Among those excluded for example may be water supply and wastewater management projects including municipal wastewater treatment and disposal, and common effluent treatment plants which are often part of Bank-supported projects. The other differences are in the analysis of alternatives and carrying out social assessments which are both strongly recommended by the Bank as part of the EA process but emphasized to a lesser degree by GOI.

Between fiscal 1990 and 1997, 83 projects were financed by the Bank in India which were subject to the EA process. A categorical distribution of these projects is shown in Figure 1.1. A list of these projects is given in Annex 3.

After seven years of experience in applying the EA process in India, the results of its practical application are mixed. In the National Thermal Power Corporation (NTPC) power generation project, a detailed environmental and social assessment for the expansion of Rihand and Vindhyachal power stations was carried out. Still, however, a request for inspection has been made by a local nongovernmental organization (NGO) claiming violation of five operational directives and policies, including OD 4.01 on environmental assessment. The Shrimp and Fish Culture project, five years after effectiveness, remains to develop site-specific Environmental Management Plans (EMP). On the other hand, there are some stand-outs, such as the State Health Systems Development project which is rated category C. It is being supervised as a category-B project because it deals with the management and disposal of medical waste. During the course of initial supervision,
Due to limited time and resources, this review did not include field visits. Detailed examination was limited to a selected sample of fourteen projects, carefully drawn from the India portfolio to represent the various types of Bank-assisted projects in India. It is recommended that this review be followed by further work including field visits and post-implementation review to fully assess the effectiveness of the EA process.

Scope and limitations of the review

This review was initiated in November 1996 to focus on the identification of the substantive environmental issues addressed by category A- and B-projects, the quality of EA (using full reports, when available, or summaries) and EMPs. It is expected that the lessons learned from this analysis of the EA process for projects under implementation would be useful when applied to the growing number of category A- and B-projects which will enter the portfolio over the next few years.

The main objectives of this review are to:

- review the EA effectiveness in Bank-assisted projects in India (fiscal 1990 to 1997);
- identify areas requiring further attention; and
- make recommendations to improve the EA effectiveness.

This is a desk review based primarily on staff appraisal, supervision, and implementation completion reports where applicable, and environmental data sheets where available. Discussions with task managers, supervision staff, and relevant Indian government officials and consultants, were held. And the extent of compliance with the procedures laid down in the OD 4.01 could not be independently verified through interviews with the borrowers, consultants, as well as project-affected groups.

This review was focused on OD 4.01 and no specific attention was given to resettlement and rehabilitation (R&R) issues which are to be the subject of a separate review over the coming months. A limited examination of social issues as delineated in OD 4.01 was carried out.

Review methodology, structure and audience

The review methodology consisted of the following four major steps:

1. review of previous studies on the effectiveness of EA by the World Bank, national, and international agencies;
2. development of a conceptual framework for reviewing the effectiveness of EA in representative Bank-assisted projects;
3. review of EA experiences of the selected projects; and
4. drawing conclusions and making recommendations.

Chapter 1 of the report introduces the Bank's OD 4.01 and GOI requirements for EIA of developmental projects, along with background discussions within the India Country Department, that led to the initiation of this review. Chapter 2 develops and analyzes the quality review framework for effectiveness of EA. Chapter 3 focuses on the quality of EA and analyzes the influence of EA on project design and implementation of the selected projects. Chapter 4 highlights special issues arising from the lessons learned from the review that need further study. Chapter 5 recommends approaches for better management of environmental issues both by the Bank as well as the borrower.

This review is intended for Bank's regional and sectoral managers and staff. It is also aimed at GOI staff responsible for project design and implementation, consultants, NGOs, and other staff involved in developing and implementing public consultation and participation strategies.
Background to this review

Notes

1. EA as defined by OD 4.01 is a flexible procedure which should vary in breadth, depth, and type of analysis depending on the project. It may be performed at one point in time or in discrete stages. EA is carried out during project preparation, before appraisal, and is closely linked to the feasibility study. EA covers project specific and other environmental impacts in the area of influence of a project. The purpose of EA is to improve decision making and to ensure that the project options under consideration are environmentally sound and sustainable. All environmental consequences should be recognized early in the project cycle and taken into account in project selection, siting, planning and design.

2. World Bank uses the term Environmental Assessment (EA); Government of India uses Environmental Impact Assessment (EIA).

3. Out of 83, three projects belong to category D. Category D has been eliminated from the environmental screening in OD 4.01. Two projects still show “category to be determined” and hence do not fall into categories A, B or C. Thus the total of A, B and C projects totals to 78 rather than 83.

4. The other operational directives claimed to be violated were on involuntary resettlement (OD 4.30), indigenous peoples (OD 4.20), economic evaluation of investment operations (OP 10.04) and project supervision (OD 13.05).

5. This review was carried out in a period of seven months with a total budget of about US$25,000.
2. Developing a review framework

The term 'review' is used in a variety of different ways in EA literature. This review assesses the EA quality and effectiveness of the 14 selected projects. In order to ensure a comprehensive and fair review, a well-defined review framework was developed by analyzing the review criteria used in some of the past studies on EA effectiveness.

Evaluating the effectiveness of the EA process in decision making and ensuring sustainable development has been the focus of a number of studies and fora globally. As part of this review, several studies carried out by the Bank and other national and international agencies were reviewed mainly for their key findings and criteria used in evaluating EA effectiveness. Main findings emerging from the analysis are given in Annex 4 along with a list of the studies reviewed.

The main focus of the Bank-initiated studies has been on the compliance with OD 4.01 on environmental assessment and OD 4.30 on involuntary resettlement; and on whether EMPs have been prepared and included in the project design. Analysis and findings emerging from these are also given in Annex 4.

The first step in developing the review framework was to identify a list of key attributes based on the expectations laid down in OD 4.01. Seven key attributes were used for reviewing the project-specific EAs:
1. identification of issues and scoping,
2. baseline conditions,
3. analysis of alternatives,
4. prediction and assessment of impacts,
5. mitigation measures,
6. public involvement and consultation, and
7. monitoring plans and institutional aspects.

For sectoral EAs, two additional attributes were included: coverage of policy, legal and administrative framework; and project description.

The second step in the review framework was to develop rules for assigning appropriate ratings to each attribute: 'inadequate,' 'satisfactory,' or 'excellent'.1 The rules developed for the evaluation of each attribute for project category A and B are given in Table 2.1. While the same attributes have been used for category A- and B-projects, a different set of rules were used for assigning the ratings. This is because in the case of category-B projects, a full EA is not required and a partial environmental analysis, limited to the particular environmental issues of the project, is sufficient.2

In order to provide an overall quality rating for each EA report, a relative scoring or numerical value was assigned to each of the ratings. A sliding scale of scores of 10, 6, and 3 was applied for ratings 'excellent,' 'satisfactory' and 'inadequate', respectively. For each project these scores were aggregated to assess the overall quality rating and could vary from 21 to 70 as a total of seven review attributes.

Notes
1. Each attribute is rated independently of one another. Thus, if an EA receives a rating of 'inadequate' for the attribute 'identification of issues', the attribute 'mitigation' can receive a 'satisfactory' rating if, at least for the issues identified, appropriate mitigations have been developed.
2. The OD 4.01 states that for category B projects "although a full EA is not required, environmental analysis is required" and "mitigations plans alone suffice."
Table 2.1 Rules for assessing the EAs of category A- and B-projects

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<th>Category-A Rules</th>
<th>Category-B Rules</th>
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<tr>
<td>a) Identification of issues and scoping</td>
<td><strong>Inadequate:</strong> Even if one major issue is not covered, although all minor issues have been covered. Even if all major issues are covered, but no scoping and prioritization has been done. <strong>Satisfactory:</strong> All major issues have been covered. Scoping and prioritization of issues has been done. <strong>Excellent:</strong> All major and minor issues covered and scoping and prioritization has been done.</td>
<td><strong>Inadequate:</strong> Even if one major issue is not covered, although all minor issues have been covered. Even if all major issues are covered, but no scoping and prioritization of issues has been done. <strong>Satisfactory:</strong> All major issues have been covered. Scoping and prioritization of issues has been done. <strong>Excellent:</strong> All major and minor issues covered and Scoping and prioritization has been done.</td>
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<td>a) Identification of issues and scoping Major issues are those which (a) have a high order of severity (which capture the intensity of the project activity and the fragility of the impacted environmental component), (b) have large spatial extent (area wide/regional impact) and (c) last for long period &amp; irreversible. Rest of the issues are termed as minor.</td>
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<td>b) Baseline conditions</td>
<td><strong>Inadequate:</strong> Existing conditions are not adequately described (i.e., baseline data is incomplete). Details not relevant to project and environmental setting have been reported. <strong>Satisfactory:</strong> Existing conditions are adequately described. <strong>Excellent:</strong> Existing conditions are adequately described as above but in addition interlinkages between environmental and social settings have been identified which assist in the prediction and assessment of impacts.</td>
<td><strong>Inadequate:</strong> Existing conditions are not adequately described (i.e., baseline data is incomplete). Details not relevant to project and environmental setting have been reported. <strong>Satisfactory:</strong> Existing conditions described adequately based on a reconnaissance survey. <strong>Excellent:</strong> Existing conditions are adequately described as above but in addition some environmental monitoring activity has been done to define the baseline conditions in detail where an issue of significance has been identified.</td>
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<td>b) Baseline conditions Baseline conditions cover existing status of all environmental components likely to be impacted.</td>
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<td>c) Analysis of alternatives</td>
<td><strong>Inadequate:</strong> No true alternatives examined. <strong>Satisfactory:</strong> Alternatives have been examined but there is no influence on the project design. <strong>Excellent:</strong> Alternatives have been examined which lead to better project identification in terms of cost-effectiveness, env compatibility and explore opportunities for environmental enhancements.</td>
<td><strong>Inadequate:</strong> No true alternatives examined. <strong>Satisfactory:</strong> Alternatives have been examined but there is no influence on the project design. <strong>Excellent:</strong> Alternatives have been examined which lead to better project identification in terms of cost-effectiveness and environmental compatibility.</td>
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<td></td>
<td>c) Analysis of alternatives Alternatives to be covered include those for proposed design, site, technology &amp; operational alternatives in terms of their potential env impacts, capital and recurrent costs, suitability under local conditions, and institutional, training and monitoring requirements.</td>
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<td>d) Prediction and assessment</td>
<td><strong>Inadequate:</strong> Predictions are done on an ad-hoc basis. Predictions limit only to assessment of present situation, but no actual predictions have been performed. Tools used (e.g., mathematical model, valuation techniques) for assessment and prediction are inappropriate. <strong>Satisfactory:</strong> Predictions have been done on quasi-quantitative basis. Tools used for prediction and assessment are appropriate. <strong>Excellent:</strong> Predictions have been done on a quasi-quantitative basis with a stress on quantitative tools as much as possible. Advanced presentation and interpretation techniques have been used (such as the Geographical Information Systems), to improve the level of assessment. Tools used for prediction and assessment are appropriate. A sensitivity analysis has been done and certainty around the predictions has been stated. Model limitations are also well stated.</td>
<td><strong>Inadequate:</strong> Predictions are not done. <strong>Satisfactory:</strong> Predictions are ad-hoc and limited only to an assessment of the present situation, but no actual predictions have been performed. <strong>Excellent:</strong> Predictions have been done on quasi-quantitative basis with a stress on quantitative tools as much as possible.</td>
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<th>Attribute</th>
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</table>
| **e) Mitigation measures**  
Identification of feasible and cost-effective measures that may reduce potentially significant adverse environmental impacts to acceptable levels, and estimation of the potential environmental impacts; capital and recurrent costs; and institutional, training and monitoring requirements of those measures | **Inadequate:** Mitigation measures have not been proposed even for a single major impact.  
**Satisfactory:** Mitigation measures have been proposed for all major impact. Rationale for the mitigation measures is given. Techno-economic feasibility including social acceptance for the proposed mitigation measures has been analyzed.  
**Excellent:** Mitigation measures have been proposed to "nullify" or eliminate all major as well as minor impacts. An institutional plan has been drawn allocating the responsibilities of implementing the mitigation measures. Mitigation measures are integrated with project implementation plan. Side-effects or negative impacts of the mitigation measures themselves have been adequately recognized and understood. Mitigation measures include preparedness (e.g. risks due to tank farms in a chemical factory) for uncertain impacts. More detailed studies are suggested for impacts not fully understood. | **Inadequate:** Mitigation measures have not been proposed even for a single major issue.  
**Satisfactory:** Mitigation measures have been proposed for all major issues. Rationale for the mitigation measures is given. Techno-economic feasibility including social acceptance for the proposed mitigation measures has been analyzed.  
**Excellent:** Mitigation measures have been proposed to "nullify" or eliminate all major as well as minor impacts. |
| **f) Public involvement/consultation**  
The section on Environmental Analysis in project design is frozen. OD 4.01 does not make a specific request for Public Consultation/Involvement for category-B projects | **Inadequate:** Totally missing or done after the project design is frozen.  
**Satisfactory:** Done but has not been carried out systematically. The outcomes of the consultation however find some place in the project design and/or compensation strategy.  
**Excellent:** Done with rigor and the right spirit, upfront, influencing project concept, alternatives, assessment of impacts, mitigation strategy etc., throughout the Project Cycle, leading to an acceptable project design. | **Satisfactory:** Done but has not been carried out systematically. The outcomes of the consultation however find some place in the project design and/or compensation strategy.  
**Excellent:** Done with rigor and the right spirit, upfront, influencing project concept, alternatives, assessment of impacts, mitigation strategy etc., leading to an acceptable project design. |
| **g) Monitoring plan and institutional aspects**  
General guidelines for long-term sector-wide environmental monitoring to ensure adequate implementation of investments. Should use findings of the baseline data section as a basis to measure progress in mid-term review and final evaluation. | **Inadequate:** Monitoring plan is poorly formulated or is not suggested. Institutional aspects are not looked into.  
**Satisfactory:** Monitoring plan is suggested addressing all the major issues. Institutional aspects have been looked into. Costs have been estimated and accounted.  
**Excellent:** Monitoring plan is suggested addressing all the major issues, including those arising out of SA addresses monitoring needs for post project monitoring/audit framework; Institutional framework shows public involvement. Costs have been estimated and accounted. | **Inadequate:** Monitoring plan is poorly formulated or is not suggested. Institutional framework is not developed.  
**Satisfactory:** Monitoring plan is suggested addressing all the major issues. Institutional framework has been developed.  
**Excellent:** Monitoring plan is suggested addressing all the major issues, including those arising out of SA addresses monitoring needs for post project monitoring. |
3. Evaluating for quality

For this EA review, a representative sample of 14 projects were selected for detailed analysis. The following criteria were applied to select these 14 projects from a list of 83 projects (of which 16 are category-A and 28 are category-B projects) financed by the Bank between July 1990 and June 1997 in India:

- a mix of category A- and B-projects with an emphasis on category-A projects;
- coverage of key sectors such as infrastructure, rural development (water resources), energy, industry/private sector development, and health;
- projects that involve sectoral and project specific EA; and
- projects that use financial intermediaries.

The sectoral distribution of the 14 projects is shown in Table 3.1. A brief project description along with its objectives, major components, key environmental and social impacts, key EMP and legal covenants is given in Annex 5.

Review procedure to evaluate the quality of environmental assessment

The review framework outlined in Chapter 2 was employed to evaluate the quality of EA reports. For objectivity and consistency, EA reports were independently reviewed by five professionals who are familiar with the requirements of OD 4.01. This was followed by a joint review to reconcile differences in the judgments. This process also helped in refining the review criteria, especially the rules for evaluation. Each of the reviewers independently followed a sequential procedure:

<table>
<thead>
<tr>
<th>Projects</th>
<th>Category</th>
<th>Sector</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Bombay Sewage Disposal Project</td>
<td>A</td>
<td>Infrastructure</td>
</tr>
<tr>
<td>2. Private Infrastructure &amp; Finance (IL&amp;FS) Project</td>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td>3. Second Madras Water Supply Project</td>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td>4. Haryana Water Resources Consolidation Project</td>
<td>A</td>
<td>Rural Development</td>
</tr>
<tr>
<td>5. Orissa Water Resources Consolidation Project</td>
<td>A</td>
<td>(Water Resources)</td>
</tr>
<tr>
<td>6. Tamil Nadu Water Resources Consolidation Project</td>
<td>A</td>
<td>(Water Resources)</td>
</tr>
<tr>
<td>7. Assam Rural Infrastructure and Agricultural Services Project</td>
<td>B</td>
<td>B</td>
</tr>
<tr>
<td>8. Bihar Plateau Development</td>
<td>B</td>
<td>B</td>
</tr>
<tr>
<td>9. Shrimp and Fish Culture Project Project</td>
<td>B</td>
<td>B</td>
</tr>
<tr>
<td>10. Gas Flaring Reduction Project</td>
<td>A</td>
<td>Energy</td>
</tr>
<tr>
<td>11. NTPC Power Generation Project (Rihand II and Vindhyachal II)</td>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td>12. Industrial Pollution Prevention Project</td>
<td>B</td>
<td>Industry</td>
</tr>
<tr>
<td>13. Second Petrochemicals Development Project</td>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td>14. State Health Systems Development Project</td>
<td>C</td>
<td>Health</td>
</tr>
</tbody>
</table>

a. Due to unavailability of full EA reports, only the EA summary and SARs of these projects were reviewed. Therefore, detailed review and comparative evaluation of these three projects could not be made.

b. In view of the adverse environmental impacts that may arise as a result of medical waste disposal, this project, although category C, is being supervised as category B and future projects of similar nature will also be categorized as B.

- The EA report together with other related documents such as staff appraisal reports and supervision mission reports were evaluated for each attribute and assigned a rating of either 'inadequate', 'satisfactory', or 'excellent'.
- When the above review and evaluation sheets were complete, the reviewers met to compare findings. When differences in the evaluation occurred, the reviewers jointly re-examined and reconciled their findings.

Overall observation of project-specific EAs

An overall project score of the EA reports reviewed is presented in Table 3.2. These overall scores are computed as the sum of individual ratings and scores assigned to each attribute by applying the rules explained in Chapter 2.1

The quality of most of the EA reports reviewed is found to be 'satisfactory' with an overall quality rating of 42 or above, calculated by multiplication of 7 (number of attributes) by 6 (score for rating as satisfactory). Two projects, Bombay Sewage Disposal and Vadodara-Halol Road Widening, a subproject of the Private Infrastructure Finance Project, top the list. These two projects had the benefit of intensive supervision and professional guidance from staff members of the Asia Technical Environment and Natural Resources Division (ASTEN), now reorganized as South Asia Environment Sector Management Unit (SASEN).

It clearly emerges from Table 3.2 that the overall EA quality has been steadily improving in India during the past six years. The projects that were prepared from 1996 to 1997 were the best compared to the unsatisfactory ones prepared in 1991 to 1992. This is an encouraging trend which could be due to two main reasons. One is the gradual building of capacity among borrowers and local consultants in EA preparation as per the Bank guidelines. And other reasons are improved skill of and closer supervision by Bank staff.

A summary of attribute ratings assigned to all category A- and B-projects reviewed is given in Table 3.3. This table highlights the strengths and weaknesses of the projects reviewed. Description of baseline conditions and development of mitigation measures emerged as the strong areas of EAs reviewed.

The weakest areas identified for category-A projects were identification of issues and scoping, analysis of alternatives, prediction and assessment of impacts, and public involvement and consultation. Limited to the EA reports reviewed, the analysis of alternatives and prediction and assessment of impacts were found to be weak in category-B projects.

Identification of issues and scoping

Key observations on the Bank's experience in India with respect to each attribute and a few other key issues related to effective implementation of EAs

<table>
<thead>
<tr>
<th>Table 3.2 Summary of EA ratings for category A- and B-projects</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Project</strong></td>
</tr>
<tr>
<td>---------------------------------------</td>
</tr>
<tr>
<td><strong>Category-A projects</strong></td>
</tr>
<tr>
<td>Private Infrastructure Finance (IL&amp;FS) Project</td>
</tr>
<tr>
<td>Bombay Sewage Disposal</td>
</tr>
<tr>
<td>Manne Outfalls</td>
</tr>
<tr>
<td>Aerated Lagoons</td>
</tr>
<tr>
<td>Second Madras Water Supply</td>
</tr>
<tr>
<td>NTPC Power Generation</td>
</tr>
<tr>
<td>(Rihand &amp; Vindhyachal)</td>
</tr>
<tr>
<td>Second Petrochemicals Dev. Vadodara</td>
</tr>
<tr>
<td>Nagothane</td>
</tr>
<tr>
<td><strong>Category-B projects</strong></td>
</tr>
<tr>
<td>Assam Rural Infrastructure and Agricultural Services</td>
</tr>
<tr>
<td>Bihar Plateau Development</td>
</tr>
<tr>
<td>Shrimp and Fish Culture</td>
</tr>
</tbody>
</table>
Table 3.3 Summary of attribute ratings assigned to all category A- and B-projects reviewed

<table>
<thead>
<tr>
<th>Attributes</th>
<th>Category-A projects</th>
<th>Category-B projects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identification of issues and scoping</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Baseline conditions</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Analysis of alternatives</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Prediction and assessment of impacts</td>
<td>3</td>
<td>None</td>
</tr>
<tr>
<td>Mitigation measures</td>
<td>1</td>
<td>None</td>
</tr>
<tr>
<td>Public involvement and consultation</td>
<td>2</td>
<td>None</td>
</tr>
<tr>
<td>Monitoring plans/institutional aspects</td>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>

should be noted. Rarely are issues prioritized to lend a focus as well as cost-effectiveness to the EA study. Often voluminous data collected are not directly relevant to the project. This may be because many EA consultants in India are familiar with complying with the Ministry of Environment and Forests (MOEF) complex questionnaires.

These required questionnaires give more emphasis on collecting a wide array of background data. This requirement is not oriented to identifying and prioritizing the environmental issues arising from the project activities. For example, the Second Petrochemical Development (Nagothane) Project simply followed the formats laid down by MOEF, collected voluminous data but failed to recognize the likely impacts due to laying of long-distance pipelines carrying hazardous chemicals. In another case the Second Madras Water Supply Project failed to recognize the impacts due to disposal of more than 3.0 million liters per day of chemical (alum) sludge from the proposed water treatment plant.

There were also some exceptions. The Bombay Sewage Disposal Project is a good example where the issues identified were prioritized. Additional detailed field investigations such as (a) collection of oceanographic data and calibration of mathematical models covering expanded area of coastal waters; and (b) determination of the final configuration of the marine outfall systems have been proposed to aid further understanding of issues and better implementation of mitigation plans.

Baseline conditions

Baseline conditions were found to be the strongest aspects in all but one of the category A- and B-projects reviewed. (The only exception was the EA report for Shrimp and Fish Culture Project which did not contain adequate baseline data on the proposed fisheries components in the States of Bihar and Uttar Pradesh.) This is not surprising: the consultants are most familiar with the MOEF requirements to collect exhaustive ambient environmental quality and meteorological data. Most EA reports had collected large amounts of data on existing environmental and social settings. However the question that still remains is how much data collected are useful for EA and is it cost effective?

Analysis of alternatives

The review has shown that analysis of alternatives is one of the weakest EA elements. Despite the emphasis given to analysis of alternatives in OD 4.01, rarely did any EA identify and analyze systemic alternatives and a few had analyzed technical alternatives. These are
Prediction and assessment of impacts

Prediction and assessment of impacts has been rated 'less than satisfactory' in 3 out of 7 category-A projects reviewed. Only one category-B project was found to be 'less than satisfactory' because limited environmental analysis or mitigation plans alone suffice. Most of them have not used the appropriate quantitative analytical tools such as the mathematical water/air quality models or Geographical Information Systems. A good example of a comprehensive assessment of impacts is that of the Bombay Sewage Disposal Project: The EA extensively used mathematical modeling for predicting water quality (shoreline bacterial concentration) impacts and for choosing the length of marine outfall. It also clearly stated the limitations of the model used and the unavailability of adequate field data.

Air quality modeling is one of the well-established tools for predictions and decision making. However, in many cases these have not been used satisfactorily. For example, the Second Petrochemicals Project did not make quantitative predictions on sulfur oxides (SOX) and nitrogen oxides (NOX) and have not made use of the extensive meteorological data collected. Similarly the NTPC Project used the model only for predicting ambient air quality and not for optimizing stack heights and air pollution control equipment.

Mitigation measures

Mitigation measures were found to be 'above satisfactory' in all EA projects reviewed except one case. None of the reports received an 'excellent' rating because mitigation measures for eliminating all major and minor impacts have not been recommended. Also in most cases the identified mitigation measures have not been costed and integrated with the project.

Several EAs have failed to recognize the residual or induced impacts and the side effects of the mitigation measures themselves. For example, the treatment and secured disposal of chemical sludge from wastewater- and water-treatment plants seems to be an issue often neglected by many projects. The Second Petrochemicals, the Second Madras Water...
Supply, and the Industrial Pollution Control are some of the projects which have failed to address this issue satisfactorily.

**Public Involvement and Consultation**

Operational Directive 4.01 clearly states that EA must be prepared ensuring maximum participation and consultations of the affected peoples and NGOs, especially after the EA category has been assigned and when the draft EA has been prepared. Despite this requirement, the detailed analysis of the project specific EA reports shows that only 50 percent of the projects were rated 'satisfactory' or higher for 'public involvement and consultation'. The outcomes of the consultations which were undertaken did find some place in the project design and/or mitigation strategy.\(^3\)

This review shows that there are a few examples where the views of affected peoples were integrated as part of the project design to mitigate any adverse environmental impacts. The Second Madras Water Supply project (Box 3.1) is a good example where systematic public consultation resulted in framing of rules to protect the irrigation rights of the farmers in drought periods.

This review also points out that public consultations and involvement rarely continue beyond the project preparation stage. Nonetheless there is a good example where such consultations were held regularly during the implementation stage as well. In the Bombay Sewage Disposal Project, a Citizens Advisory Committee (CAC) was formed during the preparation stage (April 1994) to assist and advise the Municipal Corporation of Greater Mumbai (MCGM) in implementing the agreed environmental mitigation and monitoring plan. It was comprised of two representatives of a fisher-folk cooperative, two environmentalists, two municipal councilors, and one representative each from residents associations. The CAC has been meeting regularly since 1996 at intervals of three to four months and the project management unit maintains a record of the CAC discussions and of the follow up actions taken. Bulletins in Marathi (local language) and English were made accessible to the public, informing them about the proposed works and their likely impacts and MCGM efforts to mitigate these impacts.

A clearly defined strategy for public consultation was completed in only 20 percent of the projects under
Table 3.4 Supervision ratings on compliance of environmental mitigation plans as reported in Form 590 during FY90-97

<table>
<thead>
<tr>
<th>Project Category</th>
<th>Form 590s reviewed</th>
<th>Form 590s &quot;not rated&quot;</th>
<th>Form 590s &quot;satisfactory&quot; (1, 2, 3, HS)</th>
<th>Form 590s &quot;unsatisfactory&quot; (0, 4, U, HU)</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bombay Sewage Disposal Project / A</td>
<td>4</td>
<td>0</td>
<td>4</td>
<td>0</td>
<td>4 total missions (0 without env. specialist; 4 with env. specialist)</td>
</tr>
<tr>
<td>Gas Flaring Reduction / A</td>
<td>3</td>
<td>0</td>
<td>3</td>
<td>0</td>
<td>9 total missions (3 without env. specialist; 0 with env. specialist). Form 590s not available = 6</td>
</tr>
<tr>
<td>NTPC Power Generation / A</td>
<td>6</td>
<td>0</td>
<td>6</td>
<td>0</td>
<td>10 total missions (4 without env. specialist; 6 with env. specialist) 4Form 590s not available = 4</td>
</tr>
<tr>
<td>Private Infrastructure Finance (IL&amp;FS) / A</td>
<td>Not available</td>
<td>Not available</td>
<td>Not available</td>
<td>Not available</td>
<td>1 total mission (0 without env. specialist; 0 with env. specialist) Form 590s not available = 1</td>
</tr>
<tr>
<td>Second Madras Water Supply / A</td>
<td>4</td>
<td>2</td>
<td>2</td>
<td>0</td>
<td>4 total missions (2 without env. specialist; 2 with env. specialist)</td>
</tr>
<tr>
<td>Second Petrochemicals Development / A</td>
<td>3</td>
<td>0</td>
<td>3</td>
<td>0</td>
<td>Total number missions not available (2 without env. specialist; 1 with env specialist) Records of only 3 missions at NDO.</td>
</tr>
<tr>
<td>Haryana Water Resources Consolidation / A</td>
<td>7</td>
<td>7</td>
<td>0</td>
<td>0</td>
<td>7 total missions (7 without env. specialist; 0 with env. specialist) Form 590s not available = 0</td>
</tr>
<tr>
<td>Orissa Water Resources Consolidation / A</td>
<td>4</td>
<td>0</td>
<td>4</td>
<td>0</td>
<td>4 total missions (3 without env. specialist; 1 with env. specialist) Form 590s not available = 0</td>
</tr>
<tr>
<td>Tamil Nadu Water Resources Cons. / A</td>
<td>4</td>
<td>0</td>
<td>4</td>
<td>0</td>
<td>4 total missions (3 without env. specialist; 1 with env. specialist)</td>
</tr>
<tr>
<td>Industrial Pollution Prevention / B</td>
<td>4</td>
<td>0</td>
<td>4</td>
<td>0</td>
<td>5 total missions (0 without env. specialist; 5 with env. specialist) Form 590s not available = 1 (Mid-term review has not yet taken place)</td>
</tr>
<tr>
<td>Assam Rural Infrastructure and Agricultural Services / B</td>
<td>3</td>
<td>1</td>
<td>2</td>
<td>0</td>
<td>5 total missions (3 without env. specialist; 1 with env. specialist) Form 590s not available = 2 (Mid-term review has not yet taken place)</td>
</tr>
<tr>
<td>Bihar Plateau Development / B</td>
<td>8</td>
<td>1</td>
<td>7</td>
<td>0</td>
<td>9 total missions (7 without env. specialist; 1 with env. specialist) Form 590s not available = 1</td>
</tr>
<tr>
<td>Shrimp and Fish Culture / B</td>
<td>10</td>
<td>1</td>
<td>8</td>
<td>1</td>
<td>10 total missions (9 without env. specialist, 1 with env. specialist)</td>
</tr>
<tr>
<td>State Health Systems Development II / C</td>
<td>1</td>
<td>Not applicable</td>
<td>Not applicable</td>
<td>Not applicable</td>
<td>1 total mission (0 without env. specialist, 1 with env. specialist) (Mission included a medical waste management specialist/bio-medical engineer)</td>
</tr>
</tbody>
</table>

a Each project was reviewed from its respective date of effectiveness to June 1997
b Rating format prior to FY97: (1) no significant problems; (2) moderate problems; (3) major problems, appropriate actions being taken to address them, and (4) major problems, not being addressed
c Rating format from FY97: (HS) highly satisfactory, (S) satisfactory, (U) unsatisfactory, (HU) highly unsatisfactory, (NR) not rated
review. Only two projects, Vadodara-Halol Road Widening and Assam Rural Infrastructure and Agricultural Services, were rated 'excellent' for public consultations. In the case of the Assam project, extensive discussions on project design were held with local NGOs and women's groups which also participated in site-specific project design, implementation, and monitoring. In the case of Vadodara-Halol Road Widening, the public involvement and consultation were carried out from the stage of site selection and analysis of alternatives for various proposed alignments of the highway.

Monitoring plans/institutional aspects

Most EAs reviewed had prepared outline monitoring plans covering all major mitigation measures and an institutional framework to aid implementation. For an 'excellent' rating, EAs would have to address all issues arising out of the environmental and social analysis and recommend an audit framework for post-project monitoring. Rarely do the EA reports cover all these aspects. For example, despite the preparation of a monitoring plan addressing all social and environmental issues, the Vadodara-Halol Road Widening project has not addressed the audit/post-project monitoring needs. On the other hand, the CAC formed under the Bombay Sewage Disposal Project did assist and advise the MCGM in implementing the agreed environmental mitigation and monitoring plan. Also, the project has developed a comprehensive management information system to monitor the compliance of agreed EMPs.

Environmental covenants in legal documents

Legal documents including loan, credit and grant agreements, bidding documents and related contracts provide much of the framework to support and enforce supervision. It is therefore critical that such documents adequately reflect the project environmental requirements and specific mitigation measures recommended by the EA process (Environmental Assessment Sourcebook Update on Environmental Performance Monitoring and Supervision, June 1996.)

Box 3.2 Examples of specific and generic environmental and social legal covenants

Specific legal covenants, examples where there is a direct relation with the environmental or social component of the project.
- Bombay Sewage Disposal project has dated covenant which states “India to establish revised water quality standards applicable to wastewater discharge to marine coastal waters by June 30, 1997.” For implementing the slum sanitation scheme component, it states “MCGM to apply the policy guidelines for the slum sanitation schemes agreed with the Bank.”
- In the case of Second Madras Water Supply, “Institute dam safety inspection arrangements for Veeranam tank.”
- Gas Flaring Reduction Project specifies the environmental covenant with respect to its environmental component requirement, “Oil and Natural Gas Commission (ONGC) to obtain environmental clearance for all components of the proposed project,” and “ONGC to carry out a safety engineering study of existing platforms linked to facilities that will be constructed under the project and safety audit for its entire offshore operations.”

Generic legal covenants, examples where the covenant encompasses the environment mitigation plans in general.
- National Thermal Power Corporation (NTPC) project's legal document states that “NTPC to implement the environmental action plan dated May 10, 1993, as agreed with the Bank.”
- Fish and Shrimp Culture project's legal agreement mentions “each State shall carry out such mitigatory actions satisfactory to the Association as required for preventing, reducing or eliminating the potential negative effects of the project on the environment.”
- Orissa Water Resources Consolidation Project - “carry out R&R in accordance with the R&R plan and in a manner and timeframe acceptable to IDA.”
- Bihar Plateau Development Project “make arrangements satisfactory to Association for resettlement and rehabilitation of displaced persons.”

Source: Drawn from form 590 sections on compliance of legal covenants.
A summary of key project activities, their environmental and social impacts, key EMPs, and relevant legal covenants along with their compliance status as of June 1997 is given in Annex 5. Several main observations emerge:

1. Most of the projects have legal covenants which cover the development and/or implementation of EMPs. However, the majority of covenants do not necessarily contain specific environmental or social actions to be met on a timely basis. The references are usually general in nature. Box 3.2 gives examples of general environmental language used in a legal document.
2. In less than 50 percent of the projects, a clear relationship exists between the EMP/Rehabilitation Action Plans (RAPs) and the social/environmental legal covenants.
3. All three water resources consolidation projects, which are classified as category A, do not have specific environmental covenants although some aspects of EMPs are covered under covenants related to the “management aspects of the project.” On the contrary, social impact mitigation measures are well reflected in the legal covenants.
4. There are no specific environmental or social covenants for the Assam Rural Infrastructure and Agricultural Services project, but aspects of the EMP are covered under the covenant related to ‘implementation’.

In some projects, the legal document simply makes a reference to environmental mitigation and management plans described in the staff appraisal report. Some examples are given in Box 3.2. While such a step helps in covering all identified mitigation measures, the effectiveness of this approach depends on the quality and clarity of the measures described in the staff appraisal report and the commitment of the borrowers, especially since the staff appraisal report lacks legal status.

### Environmental supervision

Supervising the environmental aspects of a project includes monitoring the compliance of environmental commitments and the implementation status of mitigatory measures. Despite the preparation of good quality EA reports, the project supervision often does not give adequate focus on environmental issues and supervision reports do not include enough details on progress in implementing EA recommendations. The Environmental Assessment Sourcebook Update on Environmental Performance Monitoring and Supervision (June 1996) states that category-A projects require annual participation of an environmental and/or social sciences specialist (depending on the importance of environmental or social issues) in project supervision. Category-B projects require participation in mid-term reviews as a minimum requirement.

This section of the review analyzes the information on environmental supervision, as reported by the task managers in Form 590. The available information/data was analyzed for participation of environmental staff during supervision missions, and the level of compliance of environmental aspects as suggested by the specified environmental rating criteria. Table 3.4 summarizes the information collected from Form 590 of various supervision missions. Some key observations emerge from the review:

- Inadequate environmental supervision to monitor progress in agreed-upon EMP implementation has been one of the weakest aspects. Recent studies by the Environment Department and the Operations Evaluation Department (OED) also reached similar conclusions. In the category-B Shrimp and Fish Culture project, despite good environmental analysis with adequate mitigation strategies in the initial stages, lack of local ownership of the EA process and weak supervision by the Bank resulted in unsatisfactory environmental outcome. Only one of the 10 missions included an environmental specialist.
- In seven out of nine category-A projects, environmental specialists participated in less than 50 percent supervision missions. Therefore, ratings seldom get assigned. Sometimes, the minimum requirement of annual participation by an environmental specialist in project supervision was not followed. In the Haryana Water Resources Consolidation project, there was no participation of an environmental specialist during any supervision mission.
- Participation of environmental specialists in supervision missions is rare in category-B projects (less than
20 percent), except the Industrial Pollution Prevention project wherein environmental specialists were present for regular project supervision as well. In the Bihar Plateau Development project even the minimum requirement of participation in the mid-term review (Feb. 5-10, 1996) was not carried out.

Form 590s do not reveal the ground realities or the actual status of EMP compliance. Eight consecutive supervision missions of the Shrimp and Fish Culture project have been rating the project 'satisfactory' for environment even when site specific EMPs had not been designed till later (June 1997).

Summary of the review of sectoral EAs

Sectoral EAs were carried out in only three projects in India and all were selected for this review. These are the water resources consolidation projects in the states of Haryana, Tamil Nadu, and Orissa. A detailed review of these projects could not be carried out because of the unavailability of full EA reports for Haryana and Tamil Nadu. However based on the staff appraisal reports of these two projects and a detailed review of the EA report for Orissa, the following generic conclusions are drawn:

- The weak areas in category-A projects were found to be analysis of alternatives, prediction and assessment of impacts, and public involvement and consultation. This is not surprising because the sectoral EAs require a higher level of expertise to focus more on systematic alternatives, policy analysis, linkages with other sectors, and institutional arrangements.
- Other attributes like project description, baseline conditions, mitigation plans, development of environmental management and training plans have been addressed at a satisfactory level.
- No reviewed reports seem to have included process guidelines stating the sub-project eligibility or appraisal criteria, link between the sectoral and project-specific EAs. Such details were found in the sectoral EA under preparation for the proposed Hazardous Waste Management project. This important element lays down the framework to implement sectoral EA recommendations.
- The environmental supervision of these projects appears to be weak. These projects require closer supervision from which to learn how to improve the effectiveness of sectoral EAs.

Notes

1. As explained in note a of Table 3.1, not all projects in the sample were reviewed in a sufficiently detailed manner as to allow comparisons.
2. As per OD 4.01, assessment of investment alternatives from an environmental perspective should form an essential part of the EA process. This includes the systematic comparison of the proposed investment design, site, technology and other operational alternatives in terms of their potential environmental impacts, capital and recurrent costs, and institutional, training, and monitoring requirements. Para 2 of Annex B in OD 4.01 states that the basis for selection of the alternative proposed for the project design should also be stated.
3. The views of affected groups and local NGOs should be fully taken into account in project design and implementation, and in particular in the preparation of EAs. This process is important in terms of both the nature and extent of any social or environmental impact and the acceptability of proposed mitigatory measures, particularly to affected groups. Consultations do not reduce the decision authority of the borrower, but are a valuable way to improve decision making, to obtain feedback on the EA process and to increase community cooperation in implementing the EA recommendations. Such consultations should occur at least at the following two stages: (a) shortly after the EA category has been assigned and, (b) once a draft EA has been prepared.
4. Form 590 is the project supervision status reporting format. This report is completed by Bank task managers following project supervision missions. Environmental ratings are generally assigned by comparing actual performance to the original objectives and parameters at appraisal, according to the scales described in OD 4.01.
4. Addressing special issues

This review has so far highlighted several important issues pertaining to the analysis of project-specific and sectoral EAs. This chapter discusses some of the special issues that need to be addressed for improving the effectiveness of the EA process in India.

Sectoral and regional environmental assessments

Sectoral and regional EAs have considerable relevance to India where a large number of State-level projects such as State health systems, municipal services, and road and highway projects are in the proposed fiscal 1998-2000 lending program. For example, the proposed Hazardous Waste Management project is already using the sectoral EA approach. While the EA system in India is currently maturing with respect to project-specific EAs, the experience is limited in recognizing and coordinating regional and sectoral EA. Consequently, opportunities to address environmental issues at planning, programmatic, and policy level are not used to strike long-term sustainable solutions. Therefore strengthening this approach would benefit implementation of projects with sectoral/regional impacts.

The World Bank has much experience in carrying out project-specific EA. This has resulted in the development of the Environmental Assessment Sourcebooks (Volumes I, II and III) which provide valuable guidance on project-specific EAs. However, although OD 4.01 refers to regional and sectoral EAs, experience in carrying out these types of assessments have been comparatively limited. This slow uptake of sectoral EA can be expedited in relevant projects by linking analysis of alternatives with tried-and-true economic least-cost sequencing while integrating social and environmental criteria to conventional economic criteria. State sectoral master plans and five-year budget exercises can be powerful sites to introduce sectoral EAs.

For the first time in India a series of Water Resources Consolidation Projects (WRCP) currently under implementation in Haryana, Tamil Nadu, and Orissa are using the sectoral EA approach. These projects are programmatic in nature with the main environmental issues concerning monitoring and management of existing operations across the sector as a whole, rather than impacts from new construction.

The first phase focuses heavily on the institutional and legal framework for the entire water sector in each state. The second phase, based on the recommendations of the first phase, would include activities like long-term EA training and preparation of case studies and monitoring plans for the irrigation sector. It will be extremely useful to monitor the effectiveness of this approach compared to the project-specific EA approach.

The regional EA approach has not been used in any of the projects in India. The advantage of using regional EA as a tool to develop investment strategies, programs, and projects that are environmentally sustainable for a region as a whole has not been fully understood or exploited. The Assam Rural Infrastructure and Agricultural Services project and the Shrimp and Fish Culture project (both category-B projects covering most parts of the State) are good examples where the regional EAs could have influenced the respective State governments in making environmentally sustainable investment decisions, much beyond the scope of the Bank-assisted project.

Project screening criteria

The Bank's classification of projects by categories A, B and C depends on the significance of the environmen-
Addressing special issues

The project screening criteria plays an important role in assigning the right type of category. The review suggests that deciding the level of EA to be undertaken based solely on the project type may not be the best way of screening. Several other important variables should be considered including 'project size,' 'location' and 'project type'. Category-B projects may have to be elevated to category A because of the sensitivity of location. The Shrimp and Fish Culture project is a good example where an analysis of adverse environmental impacts due to large-scale shrimp farming in coastal areas might have changed from category B to category A. Therefore it is important that the project categorization is based primarily on field data, and less on project type. Similar findings were reported in the second review by the Environment Department of the World Bank.

Guidelines for category-B projects

Operational Directive 4.01 outlines a suggested table of contents for the detailed EA report for category-A projects. However, no such guidance is provided for category-B projects and the EAs are limited to adequate environmental analysis and development of the mitigation plans. Consequently, there are varying levels of details in the EA reports prepared for category-B projects and review of these reports is rather difficult. In order to ensure the quality and improve the effectiveness of EA in category-B projects, it will be useful to develop detailed guidelines to be followed during the project preparation and implementation stages.

Review criteria

The review team used a set of questions given in Table 4.1 as a basis to develop the review framework described in Chapter 2. These questions reflect the requirements of OD 4.01 and identifies the key tasks and their expected outcome at each milestone of the project cycle. Further improvement of these questions and the review framework developed in Chapter 2 will be useful in disseminating the requirements of OD 4.01 among consultants and borrowers. This could become an attachment to the consultant's terms of reference (TOR) on EA.

Integration of environmental assessment and social analysis

Several projects reviewed have carried out satisfactory, independent environmental and social assessments but failed to adequately integrate or link them. The type and level of social analysis which must be undertaken varies with each project. In most cases it is not expected to be a complete sociological study nor a social cost-benefit analysis of the project. Of the many social impacts that might occur, the EA is concerned primarily with those relating to environmental resources and the informed participation of affected groups. For the purpose of EA, social analysis focus on how various groups of people affected by a project allocate, regulate, and defend access to the environmental resources upon which they depend for their livelihood. Such an integration seems to have been well achieved in case of the Second Madras Water Supply project and Bihar Plateau Development project EA reports.

Mitigation measures and environmental assessment

During the EA, mitigation measures emerge from the recommendations delineated in the EMP. It is also possible that the mitigation measures get identified as stand-alone projects. Examples are the Bombay Sewage Disposal Project at a local scale and the Industrial Pollution Control Project at the national scale.

Generally, mitigation measures are expected to reduce or eliminate the critical negative impacts likely to be caused by the various activities as under the development project. However there could be situations when mitigation projects themselves have a potential to lead to other significant environmental and social impacts. Examples are the problem of treatment and disposal of sludge arising from an effluent treatment plant or the intrusion to the aviation airspace caused by a tall industrial stack or the interference...
## Table 4.1 Checklist of review questions

<table>
<thead>
<tr>
<th>Task Related Questions</th>
<th>Outcome Related Questions</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Milestone: IDENTIFICATION</strong>&lt;br&gt;Is screening done?</td>
<td>Are screening criteria adequate and clear?</td>
</tr>
<tr>
<td>Is scoping done?</td>
<td>Are the outcomes of screening commensurate with the national guidelines?</td>
</tr>
<tr>
<td>Is consultation with affected groups done?</td>
<td>Are all critical environmental issues identified?</td>
</tr>
<tr>
<td><strong>Milestone: PREPARATION AND DESIGN</strong></td>
<td>Has the outcome of the scoping been used in defining further studies?</td>
</tr>
<tr>
<td>Have baseline studies been conducted?</td>
<td>Do the baseline studies cover information on the impacted environmental components?</td>
</tr>
<tr>
<td>Have alternatives been examined?</td>
<td>Are the concerns of the affected groups reflected in the identification of the alternatives?</td>
</tr>
<tr>
<td>Have all significant issues been assessed?</td>
<td>Is the methodology used for assessment acceptable?</td>
</tr>
<tr>
<td>Have mitigation measures been identified for mitigation of significant issues?</td>
<td>Are all relevant national guidelines/rules satisfied?</td>
</tr>
<tr>
<td>Have the Residual risks been identified?</td>
<td>Are the mitigation measures proposed adequate?</td>
</tr>
<tr>
<td>Has an EA report been prepared as per the guidelines?</td>
<td>Are the residual impacts acceptable?</td>
</tr>
<tr>
<td>Has the public involvement/consultation been done during the preparation of the EA report?</td>
<td>Is a risk management plan prepared as a part of the EMP?</td>
</tr>
<tr>
<td>Does the EA address the monitoring requirements during implementation?</td>
<td>Is the quality of the EA report produced acceptable?</td>
</tr>
<tr>
<td>Does the EA address the post-project monitoring requirements?</td>
<td>Is there a linkage between environmental and social assessment?</td>
</tr>
<tr>
<td>Are the mitigation measures integrated with the project elements, planning and budgets?</td>
<td>Have the concerns of affected groups been addressed in the proposed mitigation measures?</td>
</tr>
<tr>
<td>Is the project selected, out of the alternatives identified, based on an economic analysis covering environmental costs and benefits?</td>
<td><strong>Milestone: APPRAISAL</strong>&lt;br&gt;Has the review of the EA procedures and findings been done?</td>
</tr>
<tr>
<td>Are the mitigation measures proposed adequate?</td>
<td>Is the review of the institutional arrangements satisfactory?</td>
</tr>
<tr>
<td>Is the project selected, out of the alternatives identified, based on an economic analysis covering environmental costs and benefits?</td>
<td>Are the indicators measurable and meaningful?</td>
</tr>
<tr>
<td><strong>Milestone: NEGOTIATIONS AND LOAN APPROVAL</strong></td>
<td><strong>Milestone: IMPLEMENTATION AND SUPERVISION</strong>&lt;br&gt;Has there been consultation / stakeholder involvement?</td>
</tr>
<tr>
<td>Have environmental covenants been included in the agreements?</td>
<td>Does the implementation plan integrate concerns arising from public consultation into the proposed time frame?</td>
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<tr>
<td>Is the formulation of the environmental covenants satisfactory?</td>
<td>Does the implementation plan identify training areas?</td>
</tr>
<tr>
<td><strong>Milestone: IMPLEMENTATION AND SUPERVISION</strong></td>
<td><strong>Milestone: COMPLETION</strong>&lt;br&gt;Has the project completion report been prepared?</td>
</tr>
<tr>
<td>Has assessment of existing human resources been done?</td>
<td>Have corrective actions been taken if result of environmental performance indicators is unsatisfactory?</td>
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<tr>
<td>Have provisions been made for additional staffing and staff training?</td>
<td><strong>Milestone: COMPLETION</strong>&lt;br&gt;Has the post project monitoring been done adequately?</td>
</tr>
<tr>
<td>Have the environmental performance indicators been used for supervision and assessment?</td>
<td>Has the methodology used for the auditing of the project EA been satisfactory?</td>
</tr>
<tr>
<td><strong>Milestone: COMPLETION</strong>&lt;br&gt;Has the project completion report been prepared?</td>
<td>Have the results of the project EA audit been used to improve the EA process?</td>
</tr>
<tr>
<td>Has post project monitoring been done?</td>
<td><strong>Milestone: COMPLETION</strong>&lt;br&gt;Has the project completion report been prepared?</td>
</tr>
<tr>
<td>Has a project EA audit been done?</td>
<td><strong>Milestone: COMPLETION</strong>&lt;br&gt;Has the project completion report been prepared?</td>
</tr>
</tbody>
</table>
caused to the local fishermen by a marine outfall. It is necessary therefore that the mitigation measures are also examined as projects and an EA is performed. The EA should ensure that the impacts arising from the mitigation projects are identified, predicted and assessed to find out the most acceptable design.

The Bombay Sewage Disposal Project is an excellent example in favor of this concept where EA led to redesign of the mitigation measures by an exhaustive analysis of alternatives. After establishing that the proposed mitigation project (aerated lagoons at Malad and Verso) was ineffective in delivering the desired environmental improvement on receiving ecosystem, the EA undertook a systematic step-by-step analysis of alternatives so that the project meets the minimum environmental objectives. A series of alternatives were examined, all of which were technically feasible; technology was proven, land was available, and discharge standards were expected to be met.

Finally, the alternative which ensured a minimum desired level of dissolved oxygen in the receiving waters was identified. This consisted of a diversion of bulk of the wastewater away from Malad Creek with only limited discharge of secondary treated sewage into the creek via a marine outfall. This alternative was radically different from the original mitigation project with a potential for substantial environmental improvement. As a result, the Malad aerated lagoons were scrapped. Verso lagoons were scaled down and retained as technology demonstration schemes.

During the environmental screening process, the Bombay Sewage Disposal Project was marked category A, whereas the Industrial Pollution Control project was given category C and did not undergo a similar EA process. Consequently, the designs of Common Effluent Treatment Plants (CETP, a component in the Industrial Pollution Control Project) were not comprehensive enough to address the management of sludges arising from the treatment plants. Similarly, the eligibility criteria for granting the loans for individual industries did not put enough stress on the preventative and multiple media aspects of waste management. It is therefore clear that even projects formulated as a package of mitigation measures (such as Industrial Pollution Control Project) should be subjected to an EA to derive maximum benefits. An EA in this case could have insisted that CETPs be accompanied by comprehensive sludge management schemes. Eligibility criteria for individual industry loans could have stressed waste minimization at source as well as a need to address multimedia manifestation of pollutants.

Thus EA has a considerable role to play in structuring even mitigation projects so as to ensure that they are environmentally sound as well as cost effective.

Nontechincal summary for effective public consultation

A nontechnical summary (NTS) is an essential tool for communicating the EA findings to the project stakeholders. Generally prepared in English, Hindi, as well as the local language, NTS provides a basis for public understanding of the project-related environmental and social issues, and the proposed EMP. Public discussions on the NTS can provide clues for developing alternatives as well as assist in determining acceptance of the project and the proposed EMP. This exercise is very crucial while addressing category-A projects, for developing regional projects or while preparing sectoral EAs. The absence of NTS reduces the opportunity for better communication with stakeholders and thereby reduce the effectiveness of the EA process.

Currently, OD 4.01 does not require a NTS, but it does require public consultations. Also, the amendments to the EIA notification of the GOI (April 1997) requires a public hearing to be conducted. Guidelines for conducting a Public Hearing are being developed to this effect. This review shows that NTS is not produced as a part of EA reports. It is essential therefore for the Bank to formally require a NTS as a result of the EA exercise and provide specific guidance in producing the same.

Need for coherence between EA process and EIA systems

A comparison of the Bank's OD 4.01 and the GOI MOEF EIA system (Annex 1) shows that there are differences in the requirements, approach, and content. The EA for the Second Petrochemicals project was writ-
ten in the style of MOEF requirements but failed to meet the requirements of OD 4.01. Discussions during this review between MOEF officials and Bank staff confirm that there is a strong demand for a systematic program of educating and informing various interest groups of the requirements of OD 4.01 and the EIA notification. Such an exposure when conducted would lead to:
- a clearer understanding of the requirements which would in turn reduce delays as well as improve the quality of analysis; and
- minimize overlaps and/or identify needed expansions and strengthening for striking a coherence.

Financial intermediary lending

Bank lending through financial intermediary (FI) to promote private sector development in India is increasing. Under OD 4.01 the Bank should appraise and strengthen where necessary the environmental capabilities of financial intermediary lending to ensure that they carry out appropriate environmental analysis of all sub-projects in a manner consistent with Bank policy. Among the projects reviewed it is evident that two different courses of action or approaches have been taken.

The establishment and strengthening of social and environmental screening and review capacity within the financial intermediary appears to be one approach that was well achieved in the IL&FS project via the following key steps:
- development and adoption of an in-house policy on social and environmental assessment giving IL&FS an Environmental and Social Report which spells out the policies and guidelines governing the environmental and social clearance for sub-loans; and
- creation of an Environmental and Social Development Unit managed by a team of professionals.

The above approach seems to be working well as the quality of EA report for a sub-project financed by IL&FS (Vadodara-Halol Road Widening project) has emerged as one of the best EA reports covered in this review.

A second approach followed by the Bank is to rely on the existing FI capacity to provide the environmental and social clearances for each sub-project to be financed. This approach does not include a separate or specific institutional capacity building component as in the IL&FS project. This is the case with the on-going Industrial Pollution Control and Industrial Pollution Prevention Projects. The financial intermediaries are the Industrial Development Bank of India and Industrial Credit and Investment Corporation of India. In the absence of strict EA guidelines and limited capacity within these financial intermediaries to analyze the environmental issues and carry out environmental supervision, some of the sub-projects approved to date have potential adverse impacts. In particular some of the common industrial effluent treatment plants and individual on-site industrial-effluent, hazardous-waste treatment facilities supported under these projects deserve more detailed environmental assessments/appraisal than the current practice.

Notes
1. Stated in the Environment Assessment Sourcebook Update, Dec. 1996, the purpose of regional EA is to improve investment decisions by bringing environmental opportunities and constraints into development planning at the regional level. It assesses environmental issues and impacts in a distinctly spatial setting. Sectoral EAs avoid the inherent limitations of project specific EAs in addressing issues related to policy and planning and the legal and institutional framework. It offers better opportunities not only for analyzing existing policies, institutions and development plans in terms of environmental issues, but also for supporting environmentally sound sector wide investment strategies.
2. In projects with major social components, which require consultations pursuant to other Bank Operational Directives i.e., OD 4.30, Involuntary Resettlement and OD 4.20 Indigenous Peoples, the consultations on social issues and on Environmental Assessment should be linked. (OD 4.01, October 1991 and Environmental Assessment Sourcebook, Volume 1, 1991)
3. The Environment and Social Report responds to both GOI and Bank's requirements and regulations. Organized in 3 volumes, the Report (a) outlines the company’s environmental and social goals; (b) provides the contextual setting for the environmental and social assessment process; (c) identifies the major issues in the priority sectors; (d) details the environmental and social assessments process that IL&FS will follow when appraising sub-projects; (e) outlines methods to moderate risks and liabilities due to environmental and social factors; (f) specifies the organizational arrangements in IL&FS to manage the environmental and social assessment process; and (g) spells out the staff development plan.
This chapter offers recommendations based on the lessons emerging from the detailed review of 14 projects to improve the effectiveness of the EA in the Bank-assisted projects in India and identifies areas requiring further attention.

The quality of EA reports in India has been steadily improving. However, the World Bank’s experience with regard to the effectiveness of the EA process in influencing the project design and implementation is not fully satisfactory. This is an area of concern particularly in view of the fact that the Bank’s lending portfolio in India is expected to grow at a faster pace and reach a level of US$3-4 billion over the next few years. Both the Bank and GOI are keen to ensure that social development and environmental concerns are fully reflected in the growth process.

**How to improve the effectiveness of EA in project design?**

In order to make the EA process proactive and ensure quality assessments, it is recommended that priority actions be taken to improve: (a) the timing of the EA process, (b) the analysis of alternatives, (c) the public consultation process, and (d) the EA review criteria. These observations also reflect the conclusions of other Bank-wide studies carried out by OED and the Environment Department.

*a) Improve the timing of the EA process by introducing sectoral and regional EA approach*

EA process is known to have greatly influenced the project design when it is carried out early in the project cycle. But this is not always easy because of various reasons such as the emphasis on comprehensiveness, the need for collecting field data for at least a twelve-month period to capture the seasonal variations, and more importantly the stress on quick project preparation. These hurdles could be overcome to a large extent by carrying out broader sectoral and regional EAs very early in the project cycle. To quote from the OED study (1996) on effectiveness of EA: “More frequent recourse to sectoral and regional EAs would lead to improvement in timeliness, better screening, more careful consideration of alternatives and would eliminate the need for repeated gathering of same data for project specific environmental assessments.” This will also help in improving the scoping and prioritization of environmental issues while carrying out project-specific EAs, as these were not satisfactory in a majority of EAs reviewed.

**Recommendation.** Looking at these benefits and considering India’s proposed lending program for fiscal 1998-2000, the sectoral and regional approach should be used for the projects in the sectors such as State and National highways, municipal services, and State health systems.

*b) Improve the analysis of investment alternatives from an environmental perspective*

Advantages of a serious economic analysis of environmental costs and benefits of various investment alternatives presented during the project preparation stage are well known. Despite the emphasis given in OD 4.01 and in Indian regulations, analysis of alternatives was observed to be one of the weakest aspects of the EA process.

**Recommendation.** In order to identify and analyze various investment alternatives from an environmental perspective, the EA process should be initiated at an early stage of the project preparation, a separate section on analysis of alternatives should be introduced in the TOR for the EA assignment, and the sectoral and regional EA approaches should be applied wherever possible. Also, there is a need for the MOEF to prepare separate application forms for various categories of projects.
c) Improve the public consultation process to influence the project design and mitigation strategy

Operational Directive 4.01 clearly states that EA must be prepared ensuring maximum participation and consultations of the affected peoples and NGOs, especially after the EA category has been assigned and when the draft EA has been prepared. Only 50 percent of the projects reviewed had carried out ‘satisfactory’ public involvement/consultation process. Common shortcomings were found to be poor documentation of the consultative process and its outcome, limited influence on project design and development of mitigation strategies, and consultation during and after implementation.

Recommendation. To improve this situation, prepare specific guidelines on public consultation during various stages of project preparation and implementation, including on NTS preparation; and prepare a generic TOR on public participation and consultation to be part of the main EA TOR. A fairly comprehensive, generic TOR prepared for the proposed Hazardous Waste Management project is a good beginning in this direction.

d) Prepare a review criteria to ensure consistency and quality EA reports.

A quality control and review mechanism and some mandatory environmental mitigation plans with a focus on integration of environment and social assessment would greatly benefit both the Bank and the borrowers. Some donor agencies like Asian Development Bank and Finnish International Development Agency have developed a quality review criteria along with standardization across sectors to promote consistency, accuracy and better quality EAs.

Recommendation. Fine tune the criteria used in this review and develop a standard review criteria which could be shared with the project implementing agencies and EA consultants.

How to improve the effectiveness of EA in project implementation?

Inadequate environmental supervision to monitor the compliance of agreed environmental management/mitigation plans has been one of the weakest aspects observed in this review. The main reasons include rare participation of environmental specialists in supervision missions, inadequate reflection of specific mitigation measures in the legal documents, and lack of seriousness as in some cases when EA is only considered only a project preparation activity. In some extreme cases, EAs were not available in the project files. The real challenge is to create proper incentives and disincentives (for the staff to comply with the provisions of ODs) for enhancing the effectiveness of EA process.

a) Improve compliance of EMPs through adequate environmental supervision

Often, the supervision reports lack details on environmental issues and Form 590s do not reveal the ground realities or the actual status of compliance of the environmental management or mitigation plans.

Recommendation. In order to enhance the adequacy of environmental supervision, include environmental performance indicators, prepare a separate detailed environmental supervision note as prepared for other components of the project, and strengthen the capacity in the Field Office to have more field-based environmental supervision.

b) Strengthen EA capacity in the project implementing agencies

A comparison between the Bank’s OD 4.01 and the GOI EIA notification shows that there are differences in the requirements, approach, and contents. A strong need exists to understand these differences and build capacity in specific areas identified as the weak areas in this review. Such an initiative would not only improve the quality but also reduce the delay in EA preparation. These areas include scoping, analysis of alternatives, public consultation, integration of environmental and social concerns and preparation of sectoral and regional EAs.

Recommendation. In this context, organize sector-specific meetings among staff of the Bank, GOI, and project implementing agencies, similarly planned for the highways sector, to discuss the environmental and social issues; identify and organize regular training programs and seminars in partnership with other donors; get environmental units from sectoral imple-
menting ministries together annually to share common problems as a form of capacity strengthening.

Next Steps

This review was a modest beginning to understand the effectiveness of EA in the Bank-assisted projects in India. The following actions are envisaged as the next steps to continue this task:

- initiate a follow-up study including field visits and post-implementation review to fully assess the effectiveness of the EA in the Bank-assisted projects in India; and
- develop a management information system to monitor the compliance of agreed environmental actions of all category A- and B-projects.

Note

1 Asian Development Bank, through a Technical Assistance Project, is assisting the GOI in improving its capacity in the EIA area.
Annex 1  Comparison of World Bank's OD 4.01 and Government of India's EIA notification

<table>
<thead>
<tr>
<th>Criteria</th>
<th>World Bank (OD 4.01)</th>
<th>MOEF (Handbook of Environmental Procedures and Guidelines)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year of</td>
<td>1991</td>
<td>Until January 1994, environmental clearance was an administrative requirement. After January implementation 1994 EIA has been made statutory for 29 specific project categories through enactment of EIA notification in May 1994.</td>
</tr>
<tr>
<td>Target</td>
<td>• Staff of the Bank</td>
<td>• MOEF, Pollution Control Boards, State Department of Environment</td>
</tr>
<tr>
<td></td>
<td>• Borrowers (=&gt; consultants)</td>
<td>• Project Proponent (=&gt; consultants)</td>
</tr>
<tr>
<td>Purpose</td>
<td>• To improve decision making.</td>
<td>• To ensure optimal utilization of finite natural resources, through use of better technology and management packages.</td>
</tr>
<tr>
<td></td>
<td>• To ensure the project options under consideration are environmentally sound and sustainable (guidance of sustainability is provided as OD 4.00 environmental policies).</td>
<td>• To incorporate suitable remedial measures in the project formulation</td>
</tr>
<tr>
<td>Types of EA</td>
<td>• Project specific</td>
<td>Project specific</td>
</tr>
<tr>
<td></td>
<td>• Regional</td>
<td>Need for Regional EAs being recognized by MOEF For example area development projects are now subjected to EIA.</td>
</tr>
<tr>
<td></td>
<td>• Sectoral</td>
<td></td>
</tr>
<tr>
<td>Screening criteria</td>
<td>• Categorization is based on the judgment of task manager with the concurrence of Regional Environment Division.</td>
<td>• Rapid EIA or full EIA depending upon the decision of Impact Assessment Agency (IAA). The project proponent may submit the rapid EIA report, followed by detailed if asked for by IAA.</td>
</tr>
<tr>
<td></td>
<td>• Category A (full EA required)</td>
<td>• EIA clearance from MOEF required if the project falls under the list of 29 projects listed in schedule I of EIA notification 1994. The following categories also require environmental clearance:</td>
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<tr>
<td></td>
<td>• Category B (preparation of mitigation plan)</td>
<td>• All industrial activities with investments of Rs 50 crores and above</td>
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<tr>
<td></td>
<td>• Category C (EA not required)</td>
<td>• More polluting industries such as pesticides, distilleries, pharmaceuticals, raw skin and hides, dyes, foundries and electroplating, if the investments are more than 1 crore.</td>
</tr>
<tr>
<td>Identification of potential issues</td>
<td>Issues to be addressed in the EA are provided in Bank's policies and guidelines for the following areas</td>
<td>Separate guidelines are available for the following projects which indicate specific issues to be addressed in the EA:</td>
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<tr>
<td></td>
<td>• agrochemical</td>
<td>• river valley</td>
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<td>• biological diversity</td>
<td>• thermal power plants</td>
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<tr>
<td></td>
<td></td>
<td>• mining</td>
</tr>
<tr>
<td>Criteria</td>
<td>World Bank (OD 4.01)</td>
<td>MOEF (Handbook of Environmental Procedures and Guidelines)</td>
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<td></td>
<td>• coastal and marine resources management</td>
<td>• rail, roads and highways</td>
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<td></td>
<td>• cultural properties</td>
<td>• ports and harbors</td>
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<td>• dams and reservoirs</td>
<td>• new townships</td>
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<td>• hazardous and toxic materials</td>
<td>• hazardous waste storage, treatment and disposal facilities</td>
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<td>• indigenous peoples</td>
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<td></td>
<td>• induced development and other socio-cultural aspects</td>
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<td>• industrial hazards</td>
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<td>• international treaties and agreements on environment and natural resources</td>
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<td>• involuntary resettlement</td>
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<td>• natural hazards</td>
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<td>• occupational health and safety</td>
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<td></td>
<td>• ports and harbors</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• tropical forests</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• watersheds</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• wetlands</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• wild lands</td>
<td></td>
</tr>
</tbody>
</table>

| EA report                                                              | TOR and table of contents—well defined. No requirement of the questionnaire.         | TOR and table of contents—not defined. Whereas, a questionnaire is specified which is mandatory with the EA report. |

| Analysis of alternatives                                               | Strongly recommended                                                                  | Consideration of alternatives is mandated. Also, for industrial projects, analysis of alternative technological processes is required |

| Geographical scope of the EA study                                     | No generalized definition. Case specific scoping is done by the environmental specialist (Regional Environment Division). | • 20 kilometers radius for the industrial projects • 10 kilometers radius for other projects |

| Social assessment                                                      | Social assessment is mandatory including rehabilitation action plan (RAP) and indigenous people development plan (IPDP). | Land acquisition act is applicable where relevant A comprehensive rehabilitation plan is required if more than 1,000 people are likely to be displaced |

| Public and NGO involvement                                            | Public participation and involvement of NGO is a strong element, which may even lead to change in the project design. | Public hearing is a must for any of the 29 project listed in the schedule 1 of the EIA notification. Guidelines have been recently developed for public hearing. It is not a participatory process influencing the project design. Real benefits of EA are not thus accrued. Public participation and involvement of NGO is not mandatory in deciding on the project elements |

| Risk management                                                       | Mandatory under mitigation plan                                                      | On-site and off-site risk management plan is an essential part of EIA report                                |

| EMP and monitoring plan                                               | Detailed guidelines are available for • institutional arrangements • implementation schedule • monitoring and reporting procedure • integration of environmental and social cost | No detailed guidelines provided. However, EMP and monitoring plan is essential. |

| Review process for EA                                                 | Process is described but criteria are not defined                                    | Process is described but criteria are not defined                                                    |

(Table continues on next page)
<table>
<thead>
<tr>
<th>Criteria</th>
<th>World Bank (OD 4.01)</th>
<th>MOEF (Handbook of Environmental Procedures and Guidelines)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Post project monitoring</td>
<td>Project is monitored only until project completion</td>
<td>Half yearly compliance report is mandatory.</td>
</tr>
<tr>
<td>Duration of EA report preparation and review process</td>
<td>6 to 18 months</td>
<td>Rapid assessment - 3 months (minimum)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Detailed assessment - 12 months (minimum)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Review of the report - 3 months</td>
</tr>
</tbody>
</table>
Annex 2 Categories of projects requiring environmental analysis

The World Bank OD 4.01 (1991)

All Bank-assisted projects are screened at the identification stage for environmental impacts and assigned to one of three categories: A, B, or C. Bank and international experience shows that projects in certain sectors or of certain types are normally best classified as illustrated below and they are by no means exhaustive:

Category-A classification

A project is classified as category A if it is likely to have significant adverse impacts that may be sensitive, irreversible, diverse, comprehensive, broad or precedent setting and require full EA. These impacts generally result from a major component of the project and affect the area as a whole or an entire sector. An illustrative list of category-A projects includes:

- dams and reservoirs,
- forestry production projects,
- industrial plants (large scale) and industrial estates,
- irrigation, drainage and flood control (large scale),
- land clearance and leveling,
- mineral development (including oil and gas),
- port and harbor development,
- reclamion and new land development,
- resettlement and all projects with potentially major impacts on people,
- river basin development,
- thermal and hydropower development, and
- manufacture, transportation, and use of pesticides or other hazardous and/or toxic materials.

Typical environmental issues of category-A projects

- Water impoundment, flooding, and alterations of water flows.
- Change in surface and groundwater quality
- Groundwater overpumping, water logging, salinization, reduction of downstream flows.
- Disruption in riverine fisheries from stream flow alterations.
- Leaching of soil nutrients, soil erosion.
- Forest clearing, loss of wild lands and wild life habitats.
- Dislocation of people in affected zones.
- Air and water pollution and increase in noise due to heavy construction i.e., dams, thermal and hydropower plants or highways and roads.
- Increase in air emissions and solid residues from industrial units and occupational health hazards due to fugitive emissions.
- Sea-bed disturbances due to laying of oil and gas pipelines and disturbances of cultural resources, benthic communities, coral reefs, wetlands etc.
- Hazards from gas pipeline leakage or rupture and contamination of groundwater aquifers.
- Chemical contamination from wastes and accidental oil spills.

Category-B classification

A project is classified as category B if its potential environmental impacts are site specific in nature and do not significantly affect human populations or alter environmentally important areas, such as mangroves, wetlands, and other major natural habitats. Few if any of the impacts are irreversible and mitigatory measures can easily be designed. A partial environmental analysis is required,
curtailed to the particular environmental issues of the project. A typical list of category-B projects includes:

- agro-industries (small scale)
- electrical transmission
- aquaculture and mariculture
- irrigation and drainage (small scale)
- renewable energy
- rural electrification
- tourism
- rural water supply and sanitation
- watershed projects (management of resettlement)
- resettlement maintenance, and upgrading projects (small scale).

**Category-C classification**

A project is categorized as category C if it is unlikely to have adverse environmental impacts, or its impacts are likely to be negligible, insignificant, or minimal and EA is not required. Typically these projects fall under:

- education
- family planning
- health
- nutrition
- institutional development
- technical assistance
- most human resource projects.

**GOI notification on environmental impact assessment of development projects**

Any new project or the expansion or modernization of any industry or project listed below are required to obtain environmental clearance from MOEP. Besides this, site specific projects such as mining, pit-head thermal power stations, hydro-power, major irrigation projects, ports and harbors will also have to obtain separate site clearance from the GOI or the State governments as the case may be.

The 29 projects covered by this 1994 notification follow:

1. Nuclear power and related projects such as heavy water plants, nuclear fuel complex, rare earths;
2. River valley projects including hydel power, major irrigation and their combination including flood control;
3. Ports, harbors, airports (except minor ports and harbors);
4. Petroleum refineries including crude and product pipelines;
5. Chemical fertilizers (nitrogenous and phosphatic other than single superphosphate);
6. Pesticides (technical);
7. Petrochemical complexes (both olefinic and aromatic) and petro-chemical intermediates such as department management team, Caprolactam, LAB etc. and production of basic plastics such as LDPE, HDPE, PP, PVC;
8. Bulk drugs and pharmaceuticals;
9. Exploration for oil and gas and their production, transportation and storage;
10. Synthetic rubber;
11. Asbestos and asbestos products;
12. Hydrocyanic acid and its derivatives;
13. Primary metallurgical industries (such as production of Iron and Steel, Aluminium, Copper, Zinc, Lead and Ferro Alloys) and (b) Electric arc furnaces (Mini Steel Plants);
14. Chlor-alkali industry;

<table>
<thead>
<tr>
<th>Summary of typical environmental issues of category-B projects</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Agro-industries lead to air pollution, solid waste problems, water pollution due to discharge of liquid effluents.</td>
</tr>
<tr>
<td>• Eutrophication of lagoons and lakes and endangerment of mangroves in the vicinity of fisheries and aquaculture projects.</td>
</tr>
<tr>
<td>• Loss of forest cover</td>
</tr>
<tr>
<td>• Submergence of farm land, soil erosion in watershed and siltation in dams due to small scale irrigation and mini-hydel schemes.</td>
</tr>
<tr>
<td>• Marginal loss of farm land; water logging due to inappropriate road design.</td>
</tr>
<tr>
<td>• Loss of land use and population relocation due to placement of towers and sub-stations in electrical transmission projects</td>
</tr>
</tbody>
</table>
15. Integrated paint complex including manufacture of resins and basic raw materials required in the manufacture of paints;
16. Viscose staple fiber and filament yarn;
17. Storage batteries integrated with manufacture of oxides of lead and lead antimony alloy;
18. All tourism projects between 200 meters to 500 meters of high tide line or at locations with an elevation of more than 1,000 meters with investment of more than Rs. 5 crores;
19. Thermal power plants;
20. Mining projects (major minerals) with leases more than 5 hectares;
21. Highway projects except those projects relating to improvement work including widening and strengthening of roads with marginal land acquisition along the existing alignments provided it does not pass through ecologically sensitive areas such as national parks, sanctuaries, tiger reserves, reserve forests;
22. Tarred roads in Himalayas and/or forest areas;
23. Distilleries;
24. Raw skins and hides;
25. Pulp, paper and newsprint;
26. Dyes;
27. Cement;
28. Foundries (individual); and
29. Electroplating
Annex 3 List of World Bank–financed projects by environmental assessment category

<table>
<thead>
<tr>
<th>Number</th>
<th>Project</th>
<th>Category</th>
<th>Sector</th>
<th>Fiscal Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Infrastructure Finance (IL&amp;FS)</td>
<td>A</td>
<td>Infrastructure</td>
<td>96</td>
</tr>
<tr>
<td>2.</td>
<td>Orissa Water Resources Consolidation</td>
<td>A</td>
<td>Rural Dev (Water Resources)</td>
<td>96</td>
</tr>
<tr>
<td>3.</td>
<td>Bombay Sewage Disposal</td>
<td>A</td>
<td>Infrastructure</td>
<td>96</td>
</tr>
<tr>
<td>4.</td>
<td>Tamil Nadu Water Resources Consolidation</td>
<td>A</td>
<td>Rural Dev (Water Resources)</td>
<td>96</td>
</tr>
<tr>
<td>5.</td>
<td>Madras Water Supply II</td>
<td>A</td>
<td>Infrastructure</td>
<td>96</td>
</tr>
<tr>
<td>6.</td>
<td>Haryana Water Resources Consolidation</td>
<td>A</td>
<td>Rural Development</td>
<td>94</td>
</tr>
<tr>
<td>7.</td>
<td>NTPC Power Generation I</td>
<td>A</td>
<td>Energy</td>
<td>94</td>
</tr>
<tr>
<td>8.</td>
<td>Private Power Development</td>
<td>A</td>
<td>Energy</td>
<td>94</td>
</tr>
<tr>
<td>9.</td>
<td>Renewable Resources</td>
<td>A</td>
<td>Energy</td>
<td>93</td>
</tr>
<tr>
<td>10.</td>
<td>Rajasthan Agricultural Development</td>
<td>A</td>
<td>Rural Development</td>
<td>93</td>
</tr>
<tr>
<td>11.</td>
<td>Maharashtra Power II</td>
<td>A</td>
<td>Energy</td>
<td>93</td>
</tr>
<tr>
<td>13.</td>
<td>Private Power Utilities</td>
<td>A</td>
<td>Energy</td>
<td>92</td>
</tr>
<tr>
<td>14.</td>
<td>Second Petrochemicals</td>
<td>A</td>
<td>Industry</td>
<td>91</td>
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<tr>
<td>15.</td>
<td>Private Power Utilities (II)</td>
<td>A</td>
<td>Energy</td>
<td>91</td>
</tr>
<tr>
<td>16.</td>
<td>Cement Industry Restructuring</td>
<td>A</td>
<td>Industry</td>
<td>90</td>
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<tr>
<td>17.</td>
<td>Industrial Pollution Prevention</td>
<td>B</td>
<td>Industry</td>
<td>97</td>
</tr>
<tr>
<td>18.</td>
<td>Andhra Pradesh Irrigation III</td>
<td>B</td>
<td>Rural Development</td>
<td>97</td>
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<tr>
<td>19.</td>
<td>Andhra Pradesh Emergency Cyclone</td>
<td>B</td>
<td>Infrastructure</td>
<td>97</td>
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<tr>
<td>20.</td>
<td>Ecodevelopment</td>
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<td>Rural Development</td>
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<td>21.</td>
<td>Uttar Pradesh Rural Water</td>
<td>B</td>
<td>Rural Development</td>
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</tr>
<tr>
<td>22.</td>
<td>Orissa Power Sector</td>
<td>B</td>
<td>Energy</td>
<td>96</td>
</tr>
<tr>
<td>23.</td>
<td>Assam Rural Infrastructure</td>
<td>B</td>
<td>Rural Development</td>
<td>95</td>
</tr>
<tr>
<td>24.</td>
<td>Madhya Pradesh Forestry</td>
<td>B</td>
<td>Rural Development</td>
<td>95</td>
</tr>
<tr>
<td>25.</td>
<td>Financial Sector Development</td>
<td>B</td>
<td>Finance</td>
<td>95</td>
</tr>
<tr>
<td>26.</td>
<td>Container Transport</td>
<td>B</td>
<td>Infrastructure</td>
<td>95</td>
</tr>
<tr>
<td>27.</td>
<td>Andhra Pradesh Forestry</td>
<td>B</td>
<td>Rural Development</td>
<td>94</td>
</tr>
<tr>
<td>28.</td>
<td>Uttar Pradesh Sodic Land Reclamation</td>
<td>B</td>
<td>Rural Development</td>
<td>94</td>
</tr>
<tr>
<td>29.</td>
<td>Karnataka Water Supply &amp; Environmental Sanitation</td>
<td>B</td>
<td>Infrastructure</td>
<td>93</td>
</tr>
<tr>
<td>30.</td>
<td>PGC Power system</td>
<td>B</td>
<td>Energy</td>
<td>93</td>
</tr>
<tr>
<td>31.</td>
<td>Jharia Mine fire Control</td>
<td>B</td>
<td>Energy</td>
<td>93</td>
</tr>
<tr>
<td>32.</td>
<td>Bihar Plateau Development</td>
<td>B</td>
<td>Rural Development</td>
<td>93</td>
</tr>
<tr>
<td>33.</td>
<td>Rubber</td>
<td>B</td>
<td>Rural Development</td>
<td>93</td>
</tr>
<tr>
<td>34.</td>
<td>National Highways II</td>
<td>B</td>
<td>Infrastructure</td>
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</tr>
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<td>35.</td>
<td>West Bengal Forestry</td>
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<td>Rural Development</td>
<td>92</td>
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<td>36.</td>
<td>Power Utilities Efficiency Improvement</td>
<td>B</td>
<td>Energy</td>
<td>92</td>
</tr>
<tr>
<td>37.</td>
<td>Maharashtra Forestry</td>
<td>B</td>
<td>Rural Development</td>
<td>92</td>
</tr>
<tr>
<td>38.</td>
<td>Shrimp and Fish Culture</td>
<td>B</td>
<td>Rural Development</td>
<td>92</td>
</tr>
<tr>
<td>39.</td>
<td>Oil and Gas Sector Development</td>
<td>B</td>
<td>Energy</td>
<td>92</td>
</tr>
<tr>
<td>40.</td>
<td>Dam Safety</td>
<td>B</td>
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<td>41.</td>
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<td>Sector</td>
<td>Fiscal Year</td>
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<tr>
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<td>42.</td>
<td>Agriculture Development I (TN)</td>
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<td>43.</td>
<td>Northern Region Transmission</td>
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<tr>
<td>45.</td>
<td>Reproductive Health I</td>
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<td>97</td>
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<td>46.</td>
<td>Rural Women's Development</td>
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<td>97</td>
</tr>
<tr>
<td>47.</td>
<td>Tuberculosis Control</td>
<td>C</td>
<td>Health</td>
<td>97</td>
</tr>
<tr>
<td>48.</td>
<td>Environmental Capacity Building TA</td>
<td>C</td>
<td>Environment</td>
<td>97</td>
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<tr>
<td>49.</td>
<td>State Road Infrastructure Technical Assistance</td>
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<td>Infrastructure</td>
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<tr>
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<td>District Primary Education II</td>
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<td>Coal Sector Environmental &amp; Social Mitigation</td>
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<tr>
<td>53.</td>
<td>Hydrology Project</td>
<td>C</td>
<td>Rural Development</td>
<td>96</td>
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<td>95</td>
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<td>Andhra Pradesh First Referral Health System</td>
<td>C</td>
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<td>56.</td>
<td>District Primary Education II</td>
<td>C</td>
<td>Education</td>
<td>95</td>
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<tr>
<td>57.</td>
<td>Population IX</td>
<td>C</td>
<td>Health</td>
<td>95</td>
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<td>58.</td>
<td>Blindness Control</td>
<td>C</td>
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<td>59.</td>
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<td>60.</td>
<td>Forestry Research Education</td>
<td>C</td>
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<td>61.</td>
<td>National Leprosy Elimination</td>
<td>C</td>
<td>Health</td>
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<td>External Sector Adjustment</td>
<td>C</td>
<td>Finance</td>
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<td>63.</td>
<td>Uttar Pradesh Basic Education</td>
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<td>64.</td>
<td>Integrated Child Development Services II (Bihar &amp; Madhya Pradesh)</td>
<td>C</td>
<td>Health</td>
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</tr>
<tr>
<td>65.</td>
<td>Social Safety Net</td>
<td>C</td>
<td>Health</td>
<td>93</td>
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<tr>
<td>66.</td>
<td>Population VIII</td>
<td>C</td>
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<tr>
<td>67.</td>
<td>AIDS Prevention and Control</td>
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<td>Health I (MCH)</td>
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<td>Andhra Pradesh Emergency Cyclone</td>
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<td>Integrated Child Development Services I (Orissa &amp; Andhra Pradesh)</td>
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<td>73.</td>
<td>Second Tamil Nadu Nutrition</td>
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<td>74.</td>
<td>Population Training (VII)</td>
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<td>75.</td>
<td>Technician Education I</td>
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<td>Technology Development</td>
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<td>77.</td>
<td>Family Welfare Training</td>
<td>C</td>
<td>Health</td>
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<td>78.</td>
<td>Electronics</td>
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<td>Industry</td>
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<td>Industrial Pollution Control</td>
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<td>Watershed Plains</td>
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<td>Rural Development</td>
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<td>81.</td>
<td>Watershed Hills</td>
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<td>82.</td>
<td>Hyderabad Water Supply</td>
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<tr>
<td>83.</td>
<td>Punjab Irrigation &amp; Drainage</td>
<td>TBD</td>
<td>Water Resources</td>
<td>90</td>
</tr>
</tbody>
</table>
Annex 4  Past studies on effectiveness of environmental assessments

Considerable experience has been gathered worldwide in the application of the EA process both at the project and policy planning levels. The EA process is considered effective if it has a positive influence on the decision-making process. These positive effects may be in the form of: (a) the project being conducted in a more environmentally sustainable manner than originally proposed; (b) timely recognition of unacceptable adverse environmental and social impacts leading to modification of the project (e.g., alterations in design, site, route, alignment, choice of raw materials, technology etc.); or (c) in an extreme situation, cancellation or postponement of an activity. In addition, a number of indirect effects such as improvement in legislation, streamlining procedures, increase in environmental awareness, also emerge as benefits of EA. Some experiences in the form of review studies on effectiveness of EA from various sources are briefly described below.

Key findings

The key findings of these studies have been summarized into 'general' and 'specific' to milestones in the project cycle. The general findings include the following:

(a) All of the studies cited above recommend the need for early timing of EA in the project cycle to make the process more effective. In addition, the need for well defined review criteria and improvement of the report quality are the other two major recommendations.

(b) A questionnaire based study made by Canadian Environmental Assessment Agency and International Agency for Impact Assessment reported that in 40 percent of the responses reviewed (out of 324), EA contributed to better decision making. In 38 percent of the cases, it was reported that the EA prevented environmental damage and social losses beyond what would be achieved without assessment.

(c) According to both the European Commission studies, public participation and consultation influenced modifications at the pre and post submission phase of the EA process. Study on Resettlement and Rehabilitation in India (World Bank, 1994) noted an improvement in quality of project performance since 1990 (after OD 4.3) due to better interaction between Bank and Borrower.

(d) Despite the above, there are increased concerns about the cost-effectiveness of the EA process including the financial, time and administrative burdens. For example, the World Bank’s experience in Indonesia has shown a lack of coordination between the Bank and the national EIA implementing agency, BAPEDAL. (World Bank, 1995)
(e) The Canberra, 1994 and the East and South Asia EA, World Bank, 1995 studies found that there is a lack of an effective public consultation strategy during the entire project cycle, including, public hearing and disclosure. G. J. Alearts (World Bank, 1994) stresses a need for technical guidance in the form of checklists for task managers for screening, scoping and supervision, based on the observations on the limited projects in water and wastewater sectors.

Key findings “specific to milestones in the project cycle” include the following:

(a) Identification
- Screening is based more on desk review than on lessons learnt from field experiences (Alearts, 1994).
- Scoping has been generally found to be deficient (Delphi, 1994; IAIA, 1994; European Commission’s Review).
- Institutional deficiencies have been noticed in understanding differences between the Sectoral Environmental Assessment and Project Environmental Assessment methods (Delphi, 1994).

(b) Preparation and design
- In general, the EA methodologies employed are not comprehensive and/or appropriate. The steps of prediction and assessment of impacts do not use quantitative framework. (Delphi, 1994, United Nations Development Programme-MOEF, 1995).
- Lack of data or lack of access to data has been reported as one of the reasons for poor quality of EA. (Delphi, 1994, European Commission’s Review, United Nations Development Programme- MOEF, 1995).
- There is an absence of integration of social issues in the Environmental Assessment process, including indigenous people’s involvement etc. (Canberra, 1994).

(c) Appraisal, negotiations and loan approval
The second Environmental Assessment Review of the Bank notes that:
- The mitigation and monitoring plans of EAs do not include key environmental performance and impact indicators.
- Relevant documents such as staff appraisal reports and legal documents do not reflect sufficiently the EA findings.
- Loan covenants are general in nature and do not address project specific issues.

(d) Implementation and supervision
- The OED study (June 1996) notes that mitigation plans are not integrated with the Project resulting in weak implementation and supervision.
- The Second Environment Assessment Review (World Bank, July 1992-1995) found that there is an ambiguity in definition and allocation of responsibilities and resources of Environmental Units during supervision.
- Level of involvement of local technical experts and NGOs is found to be inadequate during supervision.
- Careful monitoring needed of the environmental capacity in the Bank to supervise projects subject to EA. Institutionally, options for carrying out cost-effective environmental supervision are inadequately considered.
- According to European Commission’s Review, there is in general an insufficient use of EAs, and the consultations based upon them in authorizing new projects. Thus, the lessons learnt from EA are rarely put into policies and strategies. (European Commission’s Review, 1993)

Analyzing the EA review criteria used

There is no one set of universally accepted EA review criteria and each set uses a different framework. A brief summary of some of the reported EA review criteria (see References) is discussed below.

The World Bank’s Second Environment Assessment Review (1996) makes an overall and direct assessment of the EA report and uses different framework for category A- and B-projects. The review uses five attributes i.e., impact assessment; alternatives; public consultation; mitigation plan; monitoring plan; and management plan, and four ratings for category-A projects. For category-B projects, five gross ratings are applied to the entire report. These ratings are described below.

Elkin and Smith study (1988) uses 37 criteria, in the form of a checklist. These criteria are grouped under nine categories i.e., Administration, Effective Communication, Identifying Key Concerns, Looking at Alternatives, Collecting Information, Describing Baseline Conditions, Predicting Impacts, Managing and Mitigating Impacts, and Follow up Surveillance and Monitoring. No aggregation is done over the criteria to

### Category-A ratings for EA work

**Excellent:** Work exceeds that required by OD 4.01 and is comparable to the best international work, even in the most advanced countries;

**Good:** Work fully meets the EA requirements of OD 4.01;

**Adequate:** Work barely meets the EA requirements of OD 4.01

**Inadequate:** Work does not meet the minimum EA requirements of the OD 4.01

### Category-B ratings for EA work

**Full:** Analysis close to the level of category-A report.

**Moderate:** Moderate level of environmental analysis, e.g., mitigation plan or management plan, often in the form an annex to the staff appraisal report.

**Reference:** Refers to studies associated with other projects or to existing or planned guidelines, standards, procedures, regulations, manuals etc.

**Minimum:** Minimum mention of environment;

**Zero:** Nothing on environment

Rate the EA report as a whole. This review system was adapted in the First Environment Assessment Review of the World Bank by developing nine questions based on the categories described above. Fifty-three projects from eight countries were reviewed based on this criteria.

N. Lee and Colley study (1992) uses 52 attributes and 7 types of ratings, for communicating quality of the EA with non-specialists. These attributes are organized over sixteen sub-categories which are in turn grouped under four categories as described below. Aggregation is done over all the criteria to report overall quality of the EA, the methodology of which is however subjective. This review framework was used by the European Commission to evaluate performance of the EA process within eight member states of the EU by reviewing a total of 112 EA reports.

Key observations emerging from the analysis of the review framework used in the above studies are:

- The review criteria developed by Elkin and Smith (1988) does not have a system of ratings. Hence, it is subjective in judging effectiveness and in making specific recommendations;

### Categories and sub-categories

1. **The description of the development, the local environment and the baseline conditions**
   - Description of the development, Site description
   - Wastes
   - Environment Description
   - Baseline conditions

2. **Identification and evaluation of key impacts**
   - Definition of impacts
   - Identification of Impacts
   - Scoping
   - Prediction of Impact Magnitude
   - Assessment of Impact Significance

3. **Alternatives and mitigation of impacts**
   - Alternatives
   - Scope of effectiveness of mitigation measures
   - Commitment to mitigation

4. **Communication of results**
   - Layout
   - Presentation
   - Emphasis
   - Non-technical summary

### Ratings (applied to all fifty-three attributes)

A. Generally well performed, no important tasks left incomplete

B. Generally satisfactory and complete, only minor omissions and inadequacies

C. Can be considered just satisfactory despite omissions and/or inadequacies

D. Parts are well attempted but must as a whole be considered just unsatisfactory because of omissions and/or inadequacies

E. Not satisfactory, significant omissions or inadequacies

F. Very unsatisfactory, important tasks poorly done or not attempted

NA. The review topic is not applicable or relevant in the context of EA
• The review criteria developed by Lee and Colley (1992) does not follow the milestones of the project cycle; and
• The review criteria used by the World Bank (1996) is 'generalized' and lacks structure and objectivity.

Note
Annex 5 Project information matrix

1. BOMBAY SEWAGE DISPOSAL PROJECT

Background
Category A, Project Specific Environmental Assessment; IDA credit: US$25 0 million; IBRD loan: US$167 0 million

Components:
A. Physical works: (i) construction of two, 3 km submarine tunnel outfall sewers of 3.5m diameter each to convey partially treated sewage effluent to the Arabian Sea; (ii) construction of a pumping station; (iii) construction of two aerated sewage treatment lagoons; (iv) construction of an influent tunnel; (v) rehabilitation of the existing tunnel; (vi) structural improvements of five existing sewage pumping stations; (vii) conveyance systems improvements; (viii) provision of slum sanitation
B. Technical assistance for project support and studies on water quality management.
C. Studies and detailed engineering for the second stage of the project

Environmental impacts/issues as a result of major project activities:
• Construction of outfalls: Vibrations due to blasting, rise in ambient noise levels, impairment of air quality near the sites, and locally impaired water quality due to the trenching at the diffuser section.
• Construction of lagoons: Major impact is the loss of about 40 hectares of mangrove cover amounting to 5% of total area of mangrove forest.
• Operation of outfalls: improvement in coastal water quality by moving waste water discharge points 3 km offshore and eliminating Dissolved Oxygen (DO) depletion along with reduction in nutrient loading.
• Operation of the Lagoons: single cell lagoons as planned will arrest further deterioration in creek water quality.
An EA was undertaken by National Environmental Engineering Research Institute (NEERI) beginning in September 1991.

Social issues.
• No R&R requirements for the sewerage works.
• Municipal Corporation of Greater Mumbai’s (MCGM) response to public concern initiated a program to improve sanitary conditions.
• MCGM proposed to do so in those 164 slums which presently occupy municipally-owned lands in order to avoid awaiting resolution of the legal issues arising from public investments on privately owned lands, or the costs and delays to be expected from efforts towards their municipal acquisition.

Key EMPs:
Construction/operation of outfalls
• Construction sites and access roads to be watered twice daily
• Noise monitoring
• Regular supervision of blasting and drilling operations
• Monitoring air quality twice a week.
• Monitoring at beaches for bacterial and chemical parameters twice/week.

Construction/operation of lagoons
• Mangrove replantation of equivalent area
• Weekly monitoring of lagoon effluent for BOD, SS etc.
• Monthly monitoring of lagoon effluent for metal concentrations.
• Seasonal creek monitoring.

Environmental covenants and compliance as of June 1997:
• “India to establish revised water quality standards applicable to wastewater discharge to marine coastal waters.” Compliance is “not yet due”, studies completed. GOI consultations are scheduled for July 3/4. Revision expected by 30-Sep-97
• “MCGM to implement the agreed Environmental Impact Mitigation and Monitoring Plan” In “compliance”, (Oct. 1996, Supervision mission)

Social covenants and compliance as of June 1997:
• “MCGM to apply the policy guidelines for the slum sanitation schemes agreed with the Bank.” In “compliance,” (Oct. 1996, Supervision mission)
• “MCGM to certify to the Bank that the Slum Sanitation policy guidelines have been complied with in all respects for each such scheme.” In “compliance”, (Oct 1996, Supervision mission)

Note: Social covenants include “Involuntary Resettlement”, and “Indigenous People.”
## 2. PRIVATE INFRASTRUCTURE FINANCE (INFRASTRUCTURE LEASING & FINANCIAL SERVICES (IL&FS)) PROJECT

**Background:**
Category A; Project Specific Environmental Assessment; IDA credit: US$5 million equiv; IBRD loan US$200 million; Sub-project: Rs.1,500 million; Effective Nov 22, 1996; Sector Infrastructure

**Components:**
- Assist IL&FS to finance sub-projects such as major bridges, urban bypasses, port facilities, water supply/effluent treatment schemes and integrated area development on a Build-Operate-Transfer basis.
- **A. Investment** in the form of line of credit to IL&FS to provide long term finance for construction/operation of commercial infrastructure projects in IL&FS pipeline
- **B. Sub-project preparation** component for specialized consultancy purposes.
- **C. Technical assistance** for (i) IL&FS staff development; (ii) specific studies by IL&FS to facilitate the evaluation & implementation of commercial infrastructure projects

This Review focuses on the Gujarat Roads Project, which comprises of widening and strengthening of existing two lane state highway, will be effective from fourth quarter 1997-98.

The Project assists IL&FS in financing infrastructure sub-projects. IL&FS adopted a policy framework for integrating environmental and social issues (the Environment and Social Report approach) Hence, the reporting format is different and not analyzed in this manner. This Review has focused on one sub-project i.e. Gujarat Roads, Widening and Strengthening of Vadodara-Halol Road.
3. SECOND MADRAS WATER SUPPLY PROJECT

Background:
Category A; Project Specific Environmental Assessment; IBRD loan US$275.8 million, Effective: Feb 14, 1996;
Closing: June 30, 2002, Sector: Infrastructure

Components:
A. Physical works: (i) source works at the existing Veeranam irrigation tank to the south of Madras;
   (ii) 235 km, transmission pipeline from Veeranam to Madras, with associated treatment and pumping facilities supplying 180 million liters of water per day; (iii) continuation of distribution improvements from the First Madras Water Supply project; (iv) water conservation program i.e., leak detection, repairs and tariff increases to encourage efficiency of water use
B. Technical assistance in the form of project preparation and implementation support.
C. Resettlement and rehabilitation of displaced persons along Veeranam pipeline right of way

Environmental impacts/ issues as a result of major project activities:
- Source improvement works: impact on ecology of Veeranam lake and surroundings
- Improved Veeranam feeder system: impact on surface water quality
- Laying of transmission main, construction of water treatment plant and pumping stations: impact on terrestrial flora and fauna, air quality / noise levels.
- The EA was undertaken by NEERI, completed in October, 1994, and submitted to the Bank in February 1995.

Social issues:
- The number of project-affected persons is 168, including encroachers a total of 1,429, of which 521 will require only resettlement, 864 only rehab. and 44 will require both
- Most displacement will be along the pipeline right-of-way, already in Tamil Nadu Water Supply and Drainage Board (TWAD) ownership.

Key EMPs:
Pre-construction phase.
- The pipeline ROW selected from three alternatives to minimize land acquisition, R&R, etc.
Construction phase:
- Minimum damage to existing structures flora, fauna / other infrastructure.
- Replantation on areas/periiphery of construction.
- Ensure unobstructed natural drainage.
- Minimize social disruption.
- Air quality and noise monitoring
Operational phase:
- Regular source and treated water quality monitoring once a month.

Environment covenants and compliance as of June 1997:
- "Carry out provisions of Environmental Mitigation and Monitoring Plan".
- "Institute dam safety inspection arrangements for Veeranam tank".

Social covenants and compliance as of June 1997:
- "TWAD to undertake R&R, implement the RAP and provide prompt compensation and assistance to displaced persons / families".
- The latter two covenants will be made redundant by decision to drop the Veeranam pipeline by GOTN. (Oct. 1996, supervision. mission)
4. HARYANA WATER RESOURCES CONSOLIDATION PROJECT

Background:
Category A; Sectoral Environmental Assessment; IDA credit. US$258.0 million, Effective: June 24, 1994,
Closing: Dec. 31, 2000; Sector: Water Resources

Components:
A. Physical Works: (i) rehabilitation and modernization of the existing canal, drainage systems, and watercourses, replacement of the Hathnikund Barrage, and construction/extension of minor canals; (iii) upgradation of operation and maintenance of the water distribution and drainage system;
B. Institutional strengthening to support administration, data collection, planning, design, research, training, beneficiary participation and formation of Water User Associations.
(These investments are financed under the areas of the Bhakra Canal and Western Yamuna Canal System of the State)

Environmental impacts / issues as a result of major project activities:
- Rehabilitation of irrigation facilities: conservation and increased water use efficiency
- Canal/Water course lining: water conservation, better distribution, public health benefit due to better supply
- Drainage Programme: flood control benefits, reduction of water logging and soil salinity
- Research/training, benefit water resource management, data collection etc.
- Hathnikund Barrage economic benefits, minimal disruption of aquatic resources
- A Category A—Sectoral EA completed for the project in August 1993 (before appraisal)

Social issues:
- There are no R&R issues involving movement of families or communities Land acquisition would be limited to narrow strips for realigned canals
- Benefits to people provided through increased and assured water supplies for irrigation, agriculture, domestic and livestock related uses

Key EMPs.
- Notification of works to users/public relations Programme on water conservation
- Replanting as appropriate.
- Monitoring of water quality impacts
- Notification at command area level.
- Notification to downstream user groups

- No environmental covenants
- "Carry out a socio economic baseline survey related to water resources use, management and service and furnish findings to IDA" (Partially completed)
- Select tubewells for rehabilitation as per agreed criteria. (Not yet due)
- Select water courses for rehabilitation only after formation of Water Users Association (WUA) of the beneficiaries". (Not yet due)

- "Implement a satisfactory land acquisition program" This has been complied with. (Mar 1997, supervision. mission)
5. ORISSA WATER RESOURCES CONSOLIDATION PROJECT

Background.
Category A; Sectoral Environmental Assessment; IDA credit: US$290.9 million; IBRD loan: Effective: Jan. 30, 1996;
Closing: Sept. 30, 2002, Sector Water Resources

Components:
A. Physical works. (i) scheme completions, for ongoing projects for increased availability / reliability of water; (ii) systems improvement and farmer turnover, to improve productivity through rehabilitation / modernization of selected existing irrigation schemes, linked with increased farmer participation;
B. Institutional strengthening. (i) capacity building to introduce multi-sectoral water planning, allocation and incorporation of environmental management in all aspects of water use;
(ii) strengthening Orissa’s Department of Water Resources in technical and managerial areas;
C. Technical assistance: (i) research and agricultural intensification to foster research and technology transfer in the water sector and improved agricultural practices;
D. Resettlement and rehabilitation for project affected persons and Indigenous peoples development plan

Environmental impacts/issues as a result of major project activities:
• SIFT Projects i.e. rehabilitation, of irrigation systems, better O&M: relieve 240,000 hectares of irrigated command area, increase in crop yields
• Improved water management: reduce water logging, soil salinity, malaria and water borne diseases.
• Scheme completions i.e. Naraj Barrage, Rengali and Mahanadi-Chitrotpala irrigation: ensure flood control, silt reduction, stabilize irrigation systems, marginal loss of forest land
• River basin multi-sectoral planning: optimum use of water resources, integrate flood control and drought management.
• A Sectoral EA prepared in October 1993 initially by Snowy Mountains Engineering Corporation, (SMEC). The report was revised after a review of the issues related to the implementation of the OWRCP Program, in June 1994.

Social issues:
• Resettlement and rehabilitation is required on seven scheme completion sites.
• About 1,799 hectares of private lands, 1,680 hectares of government lands (primarily unused wastelands) and about 1,636 hectares of forest lands need to be acquired.
• About 76% of the land acquired would be due to canal/ drainage construction and 24% due to submergence / reservoirs.
• About 2,596 persons would be displaced and about 31,207 persons would be affected.
• “Orissa State resettlement and rehabilitation Policy” was issued in 1994.
• An IPDP has been prepared for six project sites. The total tribal population to benefit from the IPDP Component is close to 57,000 persons.

Key EMPs
Environment Action Plan Prioritizes: (There is no detailed EMP)
• Formation of EA cells, training of EA Staff in DOWR.
• State Water Policy emphasizes the implementation of an Environmental Management Plan. This incorporates rehabilitation measures, afforestation, impacts on estuarine/coastal fisheries, salt intrusion, mitigate waterlogging effects.
• Institutional strengthening i.e. creation of the Water Resources Board to decide about water allocation among water users
• Measurement/monitoring—all aspects of surface water hydrology/water quality.
• Catchment management—watershed mgmt to form part of environment management. To control sediment inflow into reservoirs.

Environment covenants and compliance as of June 1997:
• No environmental covenants.
Social covenants and compliance as of June 1997:
• “Carry out resettlement and rehabilitation in accordance with the resettlement and rehabilitation plan and in a manner and time frame acceptable to IDA”.
• “Carry out IPDP activities in a manner and time frame acceptable to the Association”.
• For both the above covenants, compliance status shows “work in progress and to be continued” (Oct. 1996, supervision. mission)
6. TAMIL NADU WATER RESOURCES CONSOLIDATION PROJECT

Background:
Category A; Sectoral Environmental Assessment; IDA credit: US$282.9 million; Effective: Dec. 14, 1995;
Closing: Mar 31, 2002; Sector: Water Resources

Components
A. Physical Works: (i) rehabilitation and modernization of the existing irrigation systems linked with farmers' participation; (ii) scheme completion to complete viable investment on existing schemes for increased availability and reliability of water.
B. Institutional strengthening: (i) capacity building to incorporate environmental management in water planning, investment and management; (ii) strengthen Tamil Nadu's Water Resources Organization.
C. Technical Assistance to enhance research in the water sector.
D. Land acquisition and economic rehabilitation for project affected persons.

Environmental impacts/ issues as a result of major project activities:
- Rehabilitation, modernization and scheme completion: mitigate against waterlogging, salinization, depletion of groundwater levels and disease risks caused by sources of stagnant water.
- Category A Sectoral EA was conducted by Public Works Department/WRO and HR Wallingford consultants (before appraisal).

Social issues:
- Acquisition of 570 hectares of farmed land involving about 1,460 project-affected persons, i.e., no village residential sites are being relocated.
- Needs for project-affected persons catered for, based on socio-economic surveys and Land Acquisition and Economic RAP, undertaken by consultants and WRO with project-affected person participation for each of the scheme completion sites where LAER is involved.

Key EMPs:
Environment Action Plan Prioritizes: (There is no detailed EMP).
- Set up Environment cells for state water planning, allocation and EA.
- Unit to regulate groundwater usage.
- Consolidation of water data collection.
- Establish code of practice incorporating environmental safeguards.
- Studies in groundwater use, soil conservation, catchment interlinkages, pesticide impacts, sedimentation, waste water reuse, pollution and health hazards.

Environment covenants and compliance as of June 1997:
- No environmental covenants.

Social covenants and compliance as of June 1997:
- "Carry out the land acquisition and economic rehabilitation of the project as given under Sch 2, Part E of Development Credit Agreement (DCA) in accordance with a plan agreed with IDA" This is being complied with. (October 1996, supervision mission)
7. ASSAM RURAL INFRASTRUCTURE AND AGRICULTURAL SERVICES PROJECT

Background:
Category B; Project Specific Environmental Assessment, IDA credit: US$126.0 million; Effective Aug. 31, 1995; Closing: Dec 31, 2003; Sector Rural Development

Components:
A. Income generation: (i) fisheries development including fish production, support services and monitoring and evaluation, (ii) horticulture development including strengthening 23 progeny orchards, training and demonstrations; (iii) livestock development.
B. Institutional development: (i) technology generation; (ii) education and training; (iii) extension services to include women farmers etc; (iv) seed multiplication; (v) land administration.
C. Infrastructure development: (i) small scale irrigation; (ii) rural roads improvements;
D. Technical assistance to include a number of studies necessary for improving the use of natural resources and the marketing of perishable horticulture products.

Environmental impacts / issues as a result of major project activities:
- Rice-based farming systems. No new land will be cultivated. Consumption of artificial fertilizers is not expected to increase.
- Horticulture: directed towards domestic cultivation of pineapple, banana, etc. promotion of integrated pest mgmt and natural fertilizers.
- Livestock: possible conversion of small areas of waste land / other land to fodder production. Pressure from grazing will be reduced as more animals will be stall fed.
  Fisheries: loss of existing habitat (less than 2% of total water area), possible loss in biodiversity and change in water quality through overloading with organic matter. Rehabilitation of existing fishing places rather than the creation of new ones is proposed.
- Minor irrigation. withdrawal of more water for irrigation would not deplete groundwater as recharge exceeds the rate of withdrawal.
- Rural roads (rehabilitation of existing roads). no significant loss of agricultural land.

Social issues:
- The social focus is on benefits to women as in Assam they play a key role in agriculture.
- Improvements in the infrastructure (rural roads), and the production of livestock, fish fruits and vegetables would contribute to women welfare.
- Women would also benefit from increased incomes from milk and fish production
- In general, women laborers would benefit from significantly enhanced employment opportunities

Key EMPs:
- Livestock. research to determine the extent of the problem, find solutions involving the community in their own health management, housing small livestock in poultry, ducks away from human habitations and recycle the manure they produce; in tea growing areas grass for animals should not be cut from areas sprayed with pesticides.
- Fisheries: ensure that breeding areas for wild fish are not lost; leave some vegetation untouched in the water body; env. issues for each rehab. site to be discussed with community members, provide analysis kits for water and soil to farmers to enable them to monitor / control the water quality of their ponds, Pollution Control Board to assist the Dept. of Fisheries in monitoring.
- Rural roads. existing, instead of new quarries to be used to avoid additional dust, noise etc; boulders needed to be extracted from river beds should be done so from shallow depths only, to avoid erosion of the river bed

- No environmental or social covenants, but certain issues covered by “Implementation” covenants.
- “Prepare a road maintenance policy, financing arrangements and an implementation plan satisfactory to the Association as a condition of disbursement of credit proceeds for rural road repair and maintenance”. Status—Committee is being established and consultant to be recruited. (Mar. 1997, supervision. mission)
- “Carry out land acquisition and resettlement and rehabilitation of any people affected under the project in accordance with arrangements and procedures agreed with the Association”. No land acquisition is needed to date (Mar. 1997, supervision. mission).
8. BIHAR PLATEAU DEVELOPMENT PROJECT

Background:
Category B; Project Specific EA (Environmental Reconnaissance); IDA credit. US$117.0 million;
Effective: Mar 16, 1993; Closing - June 30, 1998, Sector Rural Development

Components:
A. Institutional development: (i) agricultural research and technology transfer to aid agricultural development; (ii) support on-farm trials / demonstrations and training; (iii) strengthen the Minor Irrigation Department (MID).
B. Infrastructure development: (i) irrigation facilities development and rehabilitation including better operation and maintenance schemes; (ii) rural roads upgradation; (iii) drinking water schemes development and upgradation
C. Technical assistance to support MID in preparation / supervision work and staff training

Environmental impacts / issues as a result of major project activities.
- Small scale irrigation and mini-hydel schemes: submergence of farm land (less than 20 hectares), soil erosion in watershed and siltation in dams, waterlogging. Socio-env. impacts - health hazards, conflicts on water rights. Downstream impacts- change in water supply and quality.
- Drinking water supply (approx 5,000 hand pumps) lack of adequate drainage in the vicinity of wells
- Agricultural development: no serious impact except soil erosion and land alienation
- Rural Roads: marginal loss of farm land; waterlogging due to inappropriate road design
- Environmental Reconnaissance Report (prepared by Mariom Ward & Abdul Salam, Ranchi, Bihar, 1991)

Social Issues:
- Benefit about 3.7 million people by increasing their annual average net income from farming alone by 70%.
- With irrigation and watershed treatment, the cropping intensity would improve by about 30%
- Infrastructural improvements would benefit women.
- No new activities introduced in the tribal project area, except ensured representation of tribals in all resource management committees.

Key EMPs:
- Small scale irrigation schemes: conservation practices to avoid soil erosion, people participation in site choice and final design; integrated water resource use strategy to avoid social conflicts; mechanisms for appropriate distribution of benefits among watershed users; environmental Training.
- Drinking water supply: improved design with proper drainage into soak pit to be used to grow trees etc
- Agricultural development: continue to emphasize cereal and pulse production to improve nutrition level of people, irrigation development to be tailored to agricultural technology; soil erosion and moisture retention control by adopting the watershed development approach; NGO help in solving land alienation problems.
- Rural Roads: prioritization based on new road access to minimize land acquisition, appropriate design standards to avoid water-logging etc.

Environment covenants and compliance as of June 1997:
- No environmental covenants.

Social covenants and compliance as of June 1997:
- "Make arrangements satisfactory to Association for resettlement and rehabilitation of displaced persons". (Compliance is "not yet due", April/ May 1997, supervision. mission)

Other covenants of relevance:
Management aspects of the project or of its executing agency:
- "Transfer O&M responsibilities of drinking water facilities to village Panchayats" (Not complied with, out of 6,800 tubewells, not one has been transferred to user groups, due to lack of maintenance capability at field level. April/ May 1997, supervision. mission)
- "Transfer ownership and responsibility of O&M of irrigation schemes to Panchayat and WUC". (Not complied with, April/ May 1997, supervision. mission)
- "Implement criteria satisfactory to Association for selection of roads". (Complied with partially, some roads do not meet Bank specified criteria)
9. SHRIMP AND FISH CULTURE (B)

Background:
Category B; Project Specific Environmental Assessment; IDA credit- US$85.0 million, Effective- May 28, 1992;
Closing, June 30, 1999; Sector: Rural Development

Components:
A Institutional and infrastructure development:
(i) Brackish water shrimp component located in the states of West Bengal, Orissa, and Andhra Pradesh, representing about 80% of the project cost. Its benefits would be significant both in terms of foreign exchange earnings and income to the beneficiaries;
(ii) Inland fisheries component located in West Bengal, Orissa, Andhra Pradesh, Bihar and Uttar Pradesh representing about 8% of project cost, requires very little infrastructural cost, with the majority of investments associated with the stocking of water bodies and the provision of support equipment and services,
B Technical Assistance: project management including environmental management and training representing about 12% of project cost, with a greater emphasis on the shrimp component.

Environmental impacts/issues as a result of major project activities:
• Meendwip Island site in W Bengal endangers the mangrove vegetation in the vicinity.
• Pond and infrastructure development: loss of forest cover. The location of the site is near the Indian Oil Company refinery discharging hydrocarbon residues into the estuary, dredging would disturb sediments on the river bottoms which may contain pollutants.
• Interu site in Andhra Pradesh (300 hectares site to be developed into a prawn farm), would lead to the eutrophication of the lagoon, eventually resulting in poor pond water quality.
• Inland fisheries component is not expected to have a significant environmental impact. The main area of possible negative impact relates to the eutrophication of ox-bow lakes.

Environmental Assessment Report was prepared by Tropical Research & Development, Inc., USA and a team of local experts in 1991.

Social issues:
• Provision for joint ownership of husband and wife, under the shrimp component, enabling sharing of moneys earned.
• Training programs to include women from the earliest stage.
• While the physical division of labor would continue, with women forming at least 30% of cooperative membership, they would be economically better off.
Women would also be eligible to participate as small entrepreneurs to receive credit to set up rearing ponds and manage pens and cages owned by the cooperatives

Key EMPs:
Meendwip island site.
• Afforestation/regeneration of equivalent area of mangrove
• Assay for heavy metals in shrimp tissue semi-annually.
Biderpur site:
• Construction of sluice gates to allow drainage of agricultural water through the shrimp farm dikes.
Interu site:
• Study by Central Institute for Coastal Engineering and Fisheries of the lagoon hydrology at Interu.
Awareness programs.
• Environmental monitoring programs of the three states in shrimp component
Training in conservation techniques for prawn seed collectors to reduce mortality of the catch

Environment covenants and compliance as of June 1997:
Environmental:
• “Each state shall carry out such mitigatory actions satisfactory to the Association as required for preventing, reducing or eliminating the potential negative effects of the project on the environment”. Not complied, no environmental monitoring plan in operation due to delays in contracting for this work. (Dec. 1996, supervision mission).

Social covenants and compliance as of June 1997:
• No social covenants.
10. GAS FLARING REDUCTION (A)

Background:
Category A, Project Specific Environmental Assessment; IDA credit US$350 million; Effective July 12, 1991; Closing: June 30, 1997, Sector: Energy

Components
A. Physical works: (i) Erection of two process platforms; (ii) construction of three submarine pipelines; (iii) expansion of the existing gas terminal at Hazira to process additional gas supplies, nearly doubling the current capacity of the terminal
B. Technical assistance: (i) provide support for a reservoir study of the Bombay High Oilfield aiming to optimize oil and gas production and reduce the chances for the recurrence of excessive gas flaring; (ii) implementation of a package of measures to reduce environmental risks and enhance the safety of offshore operations

Environmental impacts / issues as a result of major project activities.
- Overall positive environmental impact. Improve the facilities that currently exist, such as worker safety and emissions from flared gas.
- Construction of process platforms: very limited disturbances of the sea floor during location sampling and platform siting. Possible env risks from generated liquid effluents like sewage and deck drainage during operations
- Construction of gas pipelines: very limited disturbances of the sea floor. Localized occupational health issue due to exhausts from the large power drivers and combustion of gas flaring.
- An Environmental Assessment (EA) was prepared in 1990 by the NEERI in Nagpur, India, and sponsored by the Borrower, the ONGC

Social issues:
- Beneficial socio-economic impacts. the utilization (instead of waste) of an important energy source and the increase in employment
- Setting up a new oil processing terminal at Usar vis-a-vis designing a pipeline system to the existing terminal at Hazira, the former was rejected since it had environmental as well as land acquisition / social implications which would result in delays in the project implementation.

Key EMPs:
Mitigation measures are incorporated in the Env. Component of the project
- Safety engineering study for the existing platforms to be linked to the facilities to be constructed.
- Staff training in safety and environmental engineering.
- Strengthening current arrangements for rescue of persons at sea.
- Expansion of ONGC current capacity to combat oil spills
- Enhance ONGC capability to monitor the environment impact of its operations especially on marine ecosystems
- Implement the environmental monitoring program of all ONGC operations
- Strengthen ONGC to deal with risk fires through the design of flares and risk assessment studies.

Environmental covenants and compliance as of June 1997:
- "ONGC to obtain environmental clearance for all components of the proposed project". Complied, (Feb. 1997, supervision mission)
- Relevant covenant under class - "Monitoring, review and reporting"
  "ONGC to carry out a safety engineering study of existing platforms linked to facilities that will be constructed under the project and safety audit for its entire offshore operations". Complied, safety engineering study completed in October 1991; safety audit completed in Dec. 1993; recommendations reviewed by the Bank and is being implemented by ONGC. (Feb. 1997, supervision mission)

Social covenants and compliance as of June 1997:
- No social covenant
11. NTPC POWER GENERATION (A)

Background:
Category A, Project Specific Environmental Assessment; IBRD loan- US$400 million, Effective- Jun. 6, 1994;
Closing - Sept 30, 1997; Sector: Energy

Components
A. Physical works: (i) generation capacity additions for Stage II expansions of the Rihand and Vindhyachal thermal power plants.
B. Institutional strengthening: (i) support NTPC to undertake joint venture operations; (ii) strengthen its environmental and resettlement and rehabilitation management capability.
C. Technical assistance (i) environmental strengthening and resettlement and rehabilitation component which includes upgrading environmental performance of NTPC power stations; (ii) implementation of an Environment Action Plan which includes environmental upgrading of projects, training and technical assistance.

Environmental impacts / issues as a result of major project activities:
Rihand II & Vindhyachal II
• Construction phase: increase in suspended solids in water, dust and NOx concentration in air; soil erosion.
• Operation phase: coliform in open wells, toxic metal contamination in groundwater, suspended solids from plant effluent; hot water discharge into lake; acidic/alkaline effluent; nitrogen oxides (NOx), sulfur dioxide (SO2), particulate matter in ambient air.
• Full EAs were carried out for Rihand II and Vindhyachal II, by NTPC in April 1993.

Social issues:
• Resettlement and rehabilitation of persons displaced by the construction of new power stations. Remedial programs which mitigate the effects of deficiencies in R&R from earlier NTPC projects.
Rihand II:
• Total land acquired is 720 acres, out of which 223 acres is forest land. 2 villages have been affected with a total of 121 Homestead oustees, of which 18 still remain to be settled. Out of a total of 191 project-affected persons, 38 still remain to be rehabilitated.
Vindhyachal II:
• Total land acquired is 1,165 acres. No forest land was acquired. 4 villages have been affected with a total of 384 Homestead oustees, of which 207 still remain to be settled. Out of a total of 824 project-affected persons, 247 still remain to be rehabilitated.

Key EMPs:
Construction phase:
• Temporary sedimentation tank.
• Sprinkling of water in construction
• Revegetation after construction
Operation phase:
• Promotion of hand pumps in resettlement colonies.
• Cooling towers to cool the effluent.
• Neutralization pit to be provided.
• Effluents treated in sedimentation tank
• EMPs to limit emissions of suspended particulate matter to 100mg/m\(^3\) (Bank standard)
• Water blanket over entire ash pond.
• Tall stacks (275 meters high) for wider dispersal of SO\(_2\) and NO\(_x\).

Environmental covenants and compliance as of June 1997:
• "NTPC to implement the Environment Action Plan dated May 10, 1993, as agreed with the Bank". Complied partially (March 1997, supervision mission).

Social covenants and compliance as of June 1997:
• NTPC to implement the Rehabilitation Action Plan in respect of each of the projects to be financed as agreed with the Bank". Complied partially (March 1997, supervision mission).
• "NTPC shall (i) carry out socio-economic survey not later than Dec. 31, 1994 to ascertain the present socio-economic status of persons affected by the on-going projects of NTPC, (ii) based upon such surveys, draw up wherever necessary remedial action programs in consultation with the Bank, (iii) implement such action programs". Complied by Dec. 31, 1994 (March 1997, supervision mission).
12. INDUSTRIAL POLLUTION PREVENTION PROJECT

Background:
Category B, No Environmental Assessment, IDA credit. US$330 million, Effective: Mar. 1, 1995,
Closing: Mar. 31, 2001, Sector Industry

Components:
A. Institutional strengthening of the State Pollution Control Boards in Rajasthan, Madhya Pradesh, Karnataka and Andhra Pradesh.
B. Technical Assistance (i) establishment of a “clean technology institutional network” to promote transfer of technologies with environmental benefits for industry; (ii) services for identification of waste minimization and abatement methods for small scale industry; (iii) pre-investment studies for Common Effluent Treatment Plants, Industrial Waste Water Recycling Plants and other waste minimization facilities; (iv) finance for other training and consulting services planned by the Ministry of Environment and Forest, including training for the preparation of environmental statements by industries.

Environmental impacts/issues as a result of major project activities.
- Overall beneficial environmental impacts.
- Amelioration and prevention of environmental issues in the industrial sector.
- Involves the introduction of cleaner technologies, which are associated with: (i) waste minimization; (ii) higher productivities and yields that in turn reflect in reduced volumes of by-products; and (iii) improved energy efficiencies that are expected to lead to a reduction in the emissions of pollutants.

Social issues:
- For installation of most individual waste water treatment units, no land acquisition will be involved
- The appraisal mission will confirm that the procedures to be followed in case of any land acquisition are consistent with Bank requirements, including the provision for public hearings prior to sanctioning of credits which may raise legitimate public concern.
- There are no other social issues anticipated.

Key EMPs:
No EMP, as the project finances sub-projects through financial intermediaries

Environment/social covenants and compliance as of June 1997
- No environmental or social covenants.
- Relevant covenant under class - “Implementation”
- “Institutional strengthening plan for State Pollution Control Board.” Covenant complied with (Feb 1997, supervision mission)
13. SECOND PETROCHEMICALS DEVELOPMENT PROJECT

Background:
Category A; Project Specific EAs for Nagothane and Vadodara; IBRD loan: US$245 million; Effective. Dec.18, 1990
Closing: Sept 30, 1997, Sector Industry

Components:
A. Physical works: (i) expansion of the Maharashtra Gas Cracker Complex from 300,000 to 400,000 tons per year; (ii) setting up the second phase, 12,500 tpy wire / cable polyethylene compounding unit in Nagothane; (iii) establishment of a new 7,500 tons per year engineering polymers processing facility; (iv) setting up of a new 60,000 tons per year polypropylene plant; (v) revamping and expansion of IPCl's butadiene extraction and poly-butadiene rubber manufacturing complex in Vadodara to 50,000 tons per year; (vi) implementation of modernization schemes at the Nagothane and Vadodara complexes,
B. Technical Assistance: (i) training and analytical equipment for Central Institute of Plastic Engineering and Technology, (ii) market development for planning preproduction imports of polymers.

Environmental impacts/issues as a result of major project activities.
• Vadodara: expansion of the three units and the implementation of the engineering polymers plant will result in an increase in the level of wastewater discharges, emission of airborne pollutants and generation of solid residues.
• Nagothane: increase in production & cracking capacity will lead to increased emissions of airborne pollutants and waste water discharge, increase in transportation and the addition of the third line in the HDPE/LLDPE plants leads to marginal increases of fugitive emissions and volatile organic chemicals.

Social issues.
• Vadodara: no land acquisition as the three expansion projects will be located within the existing complex.
• Nagothane: about 3 villages affected major occupation being semi-agricultural activities. Total population is 2,153. These people have been rehabilitated on the South side of the complex as per the guidelines laid by the government.

Key EMPs:
Vadodara
• Hazardous emissions warning system
• Laboratory testing for effluent characteristics.
Nagothane:
• Measures to prevent leakage, minimize waste production, recirculation of waste and separation of pollutant streams.
• Monitoring of air and water quality
• Tree plantation

Environment/social covenants and compliance as of June 1997:
"IPCL carry out safety audit of Nagothane and Baroda complexes". (Covenant type—Maintenance & operation, Compliance status is OK, as per mid term review supervision mission.)
14. STATE HEALTH SYSTEMS DEVELOPMENT II PROJECT

Background

Components:
Implementation of project is in Karnataka, Punjab and West Bengal
A. Institutional strengthening: (i) develop a surveillance capacity for major communicable diseases, (ii) improve service quality, access and effectiveness at the first referral level i.e., upgrade community/subdivisional and district hospitals, upgrade clinical and support services; (iii) improve access to primary health care in remote and underdeveloped areas i.e., upgrade primary health centers in the Sunderban area of West Bengal and increase access to primary care services among the scheduled caste/scheduled tribe population in Karnataka

Environmental impacts/issues as a result of major project activities
- Medical waste disposal and management has been addressed, by improving which risk of affecting human health or the environment would be minimized.
- Inappropriate management could cause transmission of HIV/AIDS, Hepatitis B/C virus, through injuries caused by syringe needles or sharp instruments infected by contaminated human blood.
- Hospital water sewage could also transmit some diseases such as cholera to the surrounding neighborhoods

Social issues
- Risks to scavengers and handlers of medical waste.
- Benefits in the form of improved hospital services in Karnataka, West Bengal and Punjab and the scheduled tribe population of West Bengal.

Key EMPs:
EA/EMP not required for Category-C projects. However medical waste management has been addressed in:
- First phase (Short term): reduction in hazards by segregating clinical waste, on-site storage to remove scavenging
- Second phase (medium term): fuller segregation and on-site treatment like needle crushers
- Third phase (long term): development of management systems from cradle to grave, implementation of clinical waste management plans and training.
- The proposal to procure incinerators has been put on hold until all options are clear as per phase Ill of the plan.

Environment/social covenants and compliance as of June 1997:
No environmental or social covenants or any other that address the management and disposal of medical waste.


