



Environmental Performance Monitoring and Supervision

One of the purposes of Environmental Assessment (EA) is to minimize potentially adverse impacts and enhance the overall quality of the project. The effectiveness of an EA in meeting these objectives is determined during project implementation through performance monitoring by the borrower and Bank supervision. Environmental performance monitoring should be directed towards measuring and evaluating changes brought about by projects and assessing the effectiveness of proposed mitigation measures. Bank environmental supervision activities ensure diligence of Borrowers in implementing mitigation measures. A recent review of the Bank's experience with EA concluded that arrangements for monitoring and supervision could be made more effective.

The 1992 Wapenhans Task Force Report "Effective Implementation: Key to Development Impact" emphasized the importance of managing the quality of projects under implementation. This resulted in a Bank-wide effort to develop practical performance monitoring indicators. The Environment Department recently issued a note on Environmental Performance Indicators (EPIs) which complements this Update. While the EPI note presents examples of measurable indicators to monitor the environmental impact of projects, this Update discusses the process of implementing effective environmental performance monitoring and supervision of Bank projects.

Definitions and objectives

Environmental performance monitoring may be defined as technical and institutional activities that are implemented by a Borrower to measure and evaluate environmental (including health and socio-economic) changes induced by a project. The overall objective of performance monitoring is to identify predicted and unanticipated changes to the physical, biological and social environment brought about by the project. This requires baseline information on pre-development environmental and social conditions, against which development and post-development impacts and mitigation measures can be measured and compared. Deviations from the baseline beyond predetermined limits should trigger corrective actions. In this respect monitoring is a dynamic activity as opposed to passive collection of data.

During the construction phase, for example, monitoring may involve checking the performance of contractors or government institutions against commitments expressed in formal documents, such as

contract specifications or loan agreements. During the post-construction phase, it may involve measuring physical, biological or social parameters against required limits (e.g. measuring air and water discharges against Borrower country or World Bank guidelines). As the degree of uncertainty in impact prediction or effectiveness of mitigation measures increases, monitoring becomes more critical.

Performance monitoring is therefore concerned with the immediate outcome and longer term impact of development projects (whether positive or negative). The EPI note provides examples of measurable indicators drawn from different environmental sectors. Supervision, in contrast, relates to the implementation process. A well-designed and executed monitoring program ensures that information is provided in the correct form and at the right time to trigger the appropriate supervisory response.

Environmental supervision may be defined as any Bank activity directed towards ensuring that Borrowers implement projects responsibly, regarding

Box 1. Environmental Management Plan

Environmental Management Plans (EMPs) outline the measures to be taken during project implementation and operation to control adverse environmental impacts and the actions needed to implement these measures. Such plans are essential elements of Category A projects; for many Category B projects, mitigation plans alone suffice. A mitigation or management plan should include the following items:

- Identification and summary of all anticipated adverse environmental impacts;
- Description of each mitigation measure, including the type of impact to which it relates and the conditions under which it is required (for example, continuously or in the event of contingencies), together with designs, equipment descriptions, and operating procedures, as appropriate;
- Description of the elements of the monitoring program (as outlined in the main text);
- Institutional arrangements (responsibilities for mitigation and monitoring), which may include recommendations for strengthening existing institutional capacity;
- Implementation schedule for measures that must be carried out as part of the project, showing links with overall project implementation plans;
- Monitoring and reporting procedures that are designed to ensure early detection of conditions that necessitate corrective actions, and provide information on the progress and results of mitigation and institutional strengthening measures; and
- Cost estimates and sources of funds for both the initial investment and recurring expenses for implementing the EMP, integrated into the total project costs.

agreed environmental safeguards and the need to address unanticipated environmental problems. This typically involves visiting project sites and meeting with Borrower representatives, and reviewing environmental monitoring reports and correspondence with the Borrower. It may also involve a sectoral or regional implementation review covering several projects. Where environmental or socio-economic problems arise during project implementation, the Bank works with the Borrower to resolve them. This may require corrective actions by the Borrower, such as modifying the design of the project or mitigation program.

Project preparation and appraisal considerations

Opportunities for preventing, minimizing, mitigating or compensating for adverse impacts can only be realized if they are integrated into overall project implementation. This is supported by clearly defining

the environmental requirements (of which performance monitoring is but one element) within an Environmental Management Plan (EMP) (see box 1). EMPs should demonstrate that proposed monitoring activities will encompass all major impacts and will be integrated into project supervision. The Task Manager should ensure that the Borrower drafts Terms of Reference (TORs) for the EA which adequately reflect the importance of preparing a comprehensive EMP.

Developing a performance monitoring program

An effective environmental performance monitoring program should consist of the following elements:

- Monitoring objectives;
- description of performance indicators which provide linkages to impacts and mitigation measures identified in the EA;
- description of parameters to be measured, methods to be employed, sampling locations, frequency of measurements, detection limits (where appropriate) and definition of thresholds that will signal the need for remedial actions;
- institutional responsibilities, timing and timescales for monitoring;
- reporting arrangements (to the regulatory authorities and the Bank); and
- costs and financing provisions.

Monitoring objectives must clearly spell out the questions to be answered by measurement activities. By way of illustration, suppose particulate emissions from a proposed project are a concern. If the monitoring objectives are simply to determine whether these emissions will cause a public nuisance, citizen complaints would be a suitable indicator. If the objectives are to ensure that respiratory risks attributed to particulate matter are reduced, an ambient monitoring program for particulate materials with a diameter of less than 10 microns (PM 10) would be appropriate. However, if the objective is to control the health risks from toxic constituents, a more extensive monitoring program focusing on the fate, transport and health effects of these constituents might be necessary. Once the monitoring objectives have been established, both the immediate outcome of the project (for example, reduced particulate emissions from the smoke stack) and the longer term environmental impact (ambient concentrations of particulates) should be monitored. An example of the use of measurable indicators in the Lithuania Siauliai Environment Project is provided in Annex 2 of the EPI note.

The monitoring program provided in the EMP should clearly show the linkages between specific impacts identified in the EA and indicators to be measured. These linkages should be demonstrated in

a way that can be readily understood by decision-makers. It is not essential to have complete details of monitoring in the EA Report. In some cases further collection of baseline data may be necessary. Nevertheless, the EMP should describe the process through which final monitoring arrangements will be agreed. Associated costs, funding and institutional needs (training, legislative or regulatory) required to complete the plan should be identified. The costs (including personnel, sampling and analytical charges) are integral to the project, and therefore will need to be factored into loan negotiations.

Verification of mitigation measures prior to final approval of the EMP is important. A formal environmental sign-off should cover both detailed mitigation and monitoring proposals (as well as associated management and training) prior to loan negotiations. It is necessary to ensure that appropriate skills are available to design and verify the mitigation measures agreed during project appraisal. Similarly, commitments to environmental protection during construction need to be checked against bid specifications and tenders.

Preparing a supervision plan

In preparing a supervision plan for a project (as required by OD 13.05 on Project Supervision) the Task Manager should consider :

- the magnitude and significance of the project's potential environmental impacts;
- uncertainties associated with the predicted environmental effects;
- past experience of similar projects within the sector, region or with the same implementing agency;
- institutional complexities and capacities of the various agencies that may be involved in project monitoring and management; and
- availability of specialist skills within the Bank, implementing agency, Non-governmental organizations (NGOs) or consultants.

Projects with potentially large, significant and uncertain environmental impacts will normally require more intensive supervision. This is especially valid where past experience shows an unwillingness or inability of the implementing agency to monitor or undertake corrective actions effectively (see box 2).

Supervision is based in part on project conditionality. Project legal documentation (which encompasses the loan, credit or grant agreements *per se*, subsidiary 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

Box 2. Benefits of intense supervision

The Category A Yacyreta II Hydro-electric project on the Rio Parana between Argentina and Paraguay has been closely supervised due to the scale and sensitivity of its potential social and environmental impacts. A Bank team was assembled to supervise the project and provide technical assistance to the Borrower on environmental aspects.

While supervision on this scale is atypical, the Yacyreta experience demonstrates the benefits of intense supervision for complex and sensitive projects. Critical elements of the Resettlement and Environmental Management Plan (REMP) include water quality monitoring, establishment of compensatory protected areas and wildlife rescue, archaeological salvage, and housing and economic rehabilitation for resettled families. By providing technical assistance and emphasizing the importance of the REMP, the Bank helped ensure compliance with REMP requirements prior to reservoir filling.

A Bank mid-term review recommended institutional improvements prior to the second phase of reservoir construction and filling. It also highlighted the importance of intensive supervision in ensuring compliance with the REMP. Reliance on intensive Bank supervisory presence may be essential where institutional capacity or political commitment to managing environmental and social aspects is insufficient or questionable.

environmental requirements and implementation mechanisms (see box 3). It is good practice to ensure that addressing major environmental components be linked to disbursement conditions.

Two vital links with the measures contained in the EMP are the Project Implementation Plan (PIP) (see Bank Procedure 10.00) and the environmental covenants agreed to by the Borrower as a condition for receiving the loan. The Task Manager and Borrower should agree on the most important environmental performance (and other) indicators specified in the PIP. These help to reinforce project supervision. To reinforce the legal documentation it is recommended that a summary schedule of performance monitoring be included as an annex to the environmental covenants. The annex should be as precise as possible.

For Category A projects, the Task Manager should ensure annual participation of an environmental and/or social sciences specialist (depending on the importance of environmental or social issues) in project supervision. For category B projects,

Box 3. Translating EA recommendations into project documentation

EA requirements are not always well-reflected in Staff Appraisal Reports (SARs) and other project documents. Implementation schedules and budgets for mitigation and monitoring measures are often ill-defined. The Second Ertan Hydroelectric Project in China provides an excellent example of effective incorporation of EA-derived mitigation and monitoring measures into the SAR, in the form of a detailed chronological schedule.

The environmental mitigation and monitoring plan summary defines the agencies and individuals responsible for the programs. It includes details on coordination of sub-components, agencies contracted for programs, agency representatives, the supervisory agency and the supervisor.

The summary plan also outlines the timing of program sub-components, the location of studies to be carried out, the data collection methods and type of data analysis. In addition, budgetary provisions for the seven year monitoring period are outlined. The detailed environmental measures defined in this SAR institutionalize the project's environmental aspects within the design and implementation plans, thereby providing a sound basis for monitoring and supervision.

One aspect rarely addressed in detail in project SARs is inclusion of environmental requirements in bidding and construction contracts. During project preparation, environmental and social provisions should be reflected in bidding documents for major project components. These might include restrictions on location or restoration of borrow areas and construction camps. Where construction camps are essential, issues to be addressed should include recruitment of local labor, controlled access to natural resources (such as fuelwood), healthcare provisions, and treatment or disposal of solid and effluent wastes (primarily domestic sewage).

participation in mid-term reviews should be the minimum requirement.

Implementation considerations

During project implementation, the Borrower is responsible for undertaking performance monitoring in accordance with the EMP, and for reporting the results to the Bank's Task Manager. In addition, there may be a requirement to report monitoring results to national or local regulatory authorities. Where results violate pre-agreed limits the implementing agency has the responsibility to take corrective action to achieve the project's environmental requirements.

Box 4. Evaluating implementation of a monitoring plan

The Guangdong and Henan Provincial Highway projects in China included construction of four lane highways in Guangdong, a two lane expressway in Henan and improvement programs for a few thousand kilometers of existing roads. Monitoring requirements for the new highway components were specified in the EMPs of the project EAs and fully reflected in the implementation and budgetary arrangements specified in the Staff Appraisal Reports (SARs). Submission of EMPs for road improvement sub-projects were a condition of disbursement. The Bank also required that each local project supervision team had at least one environmental specialist.

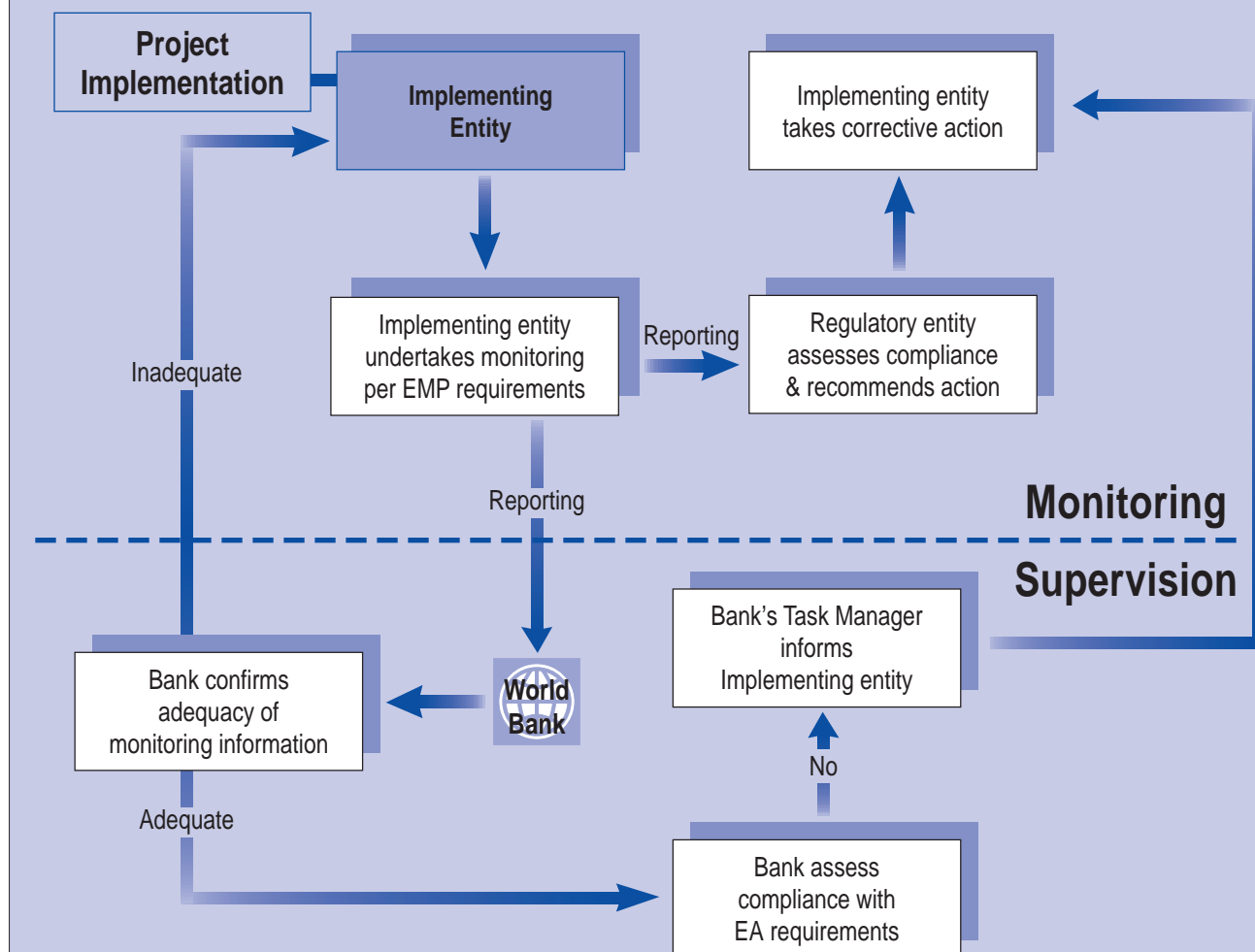
A 1993 supervision mission found implementation of monitoring measures to be variable, often lagging behind committed timescales. Dust and noise monitoring of the expressway projects and the training component required strengthening. Inter-project communication between monitoring staff was also inadequate, and some agreed monitoring programs had not been initiated. In addition, staffing of the environmental unit with implementation responsibility was insufficient. However, following the signing of contracts with local environmental institutes to undertake monitoring, significant progress was made with implementing agreed monitoring measures. Fully equipped monitoring stations are due to be operational before the expressways are opened to traffic.

The inclusion of environmental monitoring requirements within the EMP and project legal documentation provided a sound basis for measuring progress with implementation during supervision and for Borrower compliance with monitoring commitments.

Any monitoring program requires allocation of responsibilities. The task of assigning roles can be aided by the use of the matrices developed to show linkages between impacts and monitoring. This can help establish the appropriate level of expertise for particular tasks, and in assigning functions to different organizations. For example, inspection of construction might be assigned to a consultant engineers staff, while monitoring might be performed by staff from the implementing agency. Cross-checking can be facilitated by comparison of results from different monitoring sources, including local communities. For example, the effectiveness of bans on timber extraction by contractors can be verified using aerial photography supplemented by field observations.

The recipients, structure and intended usage of monitoring reports should be clearly identified. It is

Figure 1: Monitoring and supervision during project implementation



imperative that the reporting structure ensures that non-compliance is rapidly brought to the attention of the appropriate decision makers, to facilitate timely corrective actions. In addition, the structure, content and timing of reporting to the Bank should be designed to facilitate supervision and provide background for Bank missions. The Task Manager should carefully consider arrangements for tracking receipt (and subsequent dissemination) of monitoring reports. The importance of missions in project supervision is highlighted in box 4.

The Task Manager, who has the pivotal role in project supervision, confirms that progress reports submitted by the Borrower include the requisite performance monitoring information. It is advisable that the Bank's Regional Environment Divisions (REDs) review these reports and help Task Managers to assess compliance with EA requirements. If unsat-

isfactory, the RED should agree on an appropriate course of action with the Bank's Country Department staff. The Country Department notifies the Borrower of this action and any necessary follow up and consults with the RED on significant environmental changes during implementation. The likely interfaces between the Borrower, implementing agency and Bank staff during project implementation are outlined in figure 1.

Adherence to the monitoring and supervision schedule should ensure that the necessary mitigation measures are completed in a timely and satisfactory manner. It should also assist personnel involved in monitoring and supervision (particularly where responsibilities change), by providing a succinct summary of the agreed environmental requirements. To reinforce effective meshing of environmental and other project requirements, financial disincen-

Box 5. Towards improved monitoring and supervision strategies in Sri Lanka

Under the National Environmental Act, the Government of Sri Lanka requires EAs for major projects. The Act and its implementing regulations define explicit monitoring and supervision requirements as part of the project planning and implementation cycle. However, as in many other countries, in Sri Lanka monitoring is often the weakest link in the project implementation cycle.

The Central Environmental Authority (CEA) and the United States Agency for International Development convened an intensive workshop in 1995 to identify and address critical issues impeding environmental monitoring and supervision programs. Attendees included representatives from government agencies, universities, research institutions and NGOs.

Consensus was reached on a number of important issues including improving:

- Regulatory programs and policies by clearly defining monitoring and supervisory responsibilities, development of sectoral guidelines and establishing time frames for legal action in response to non-compliances;
- capacity of agencies with monitoring responsibilities through provision of additional resources, staff and specific budgetary allocations;
- proficiency of laboratories and environmental professionals by establishing certification procedures; and
- inter-agency coordination of monitoring activities by developing legal provisions under memoranda of understanding; establishing a central database within the CEA to improve the quality of and accessibility to baseline data, and maintaining an up-to-date register of data sources.

tives can be utilized. Refusal to disburse funds unless work is done in compliance with environmental requirements is a standard construction contract condition that could also be elevated to the loan agreement level.

In addition to assessing predicted impacts, monitoring may also reveal unanticipated impacts. Effective supervision ensures that corrective action is taken commensurate with the scale of such impacts. This can significantly influence project costs, which underlines the importance of accurate and timely reporting. This redesign or mobilization of contingency funds may be required.

Project status reports (Form 590)

In recognition of the need for more realistic and transparent performance assessments of projects, the Bank's Operations Policy Department (OPR) has recently revised the project status reporting format (form 590). This report is completed by Bank Task Managers following project supervision missions. The change in reporting arrangements should be fully operational by the end of FY97. Two important changes include identifying key performance indicators linked to development objectives (which may include environmental objectives), and ratings of implementation progress. Guidance on specific rating criteria which apply to the performance of environmental, and resettlement components has recently been issued by OPR. The implementation progress rating criteria for the environmental components (often specified in the EMP) are as follows:

<i>Highly satisfactory (HS)</i>	Environmental components are being implemented in a timely and satisfactory manner.
<i>Satisfactory (S)</i>	Implementation of the critical aspects of the environmental components is proceeding in a timely and satisfactory manner. There are some problems with certain other aspects, but these are not undermining the progress of implementing the components and are being addressed by the borrower/ implementing agency.
<i>Unsatisfactory (U)</i>	There are major problems in implementing some or all of the environmental components of the project, including aspects critical to the success of the components and the project as a whole. However, appropriate measures are being taken by the borrower/ implementing agency to address the problems.
<i>Highly Unsatisfactory (HU)</i>	As in "U", but problems are not being <i>satisfactory (HU)</i> addressed appropriately.

Institutional issues

Many IBRD projects require the strengthening of environmental management capacity within agencies responsible for overseeing the implementa-

tion of mitigation measures and monitoring. This should result in a better understanding of performance monitoring and better implementation of future projects (see box 5). Monitoring may be shared between an implementing entity and an environmental regulatory entity, to help develop management capacity.

It is important that some funding for monitoring be allocated to the relevant agencies, otherwise the necessary environmental actions may not be effectively implemented. Opportunities should also be sought to develop links with national monitoring networks and to ensure appropriate roles for environment management institutions.

Public consultation and involvement

Public involvement is crucial to a sound decision-making process. The EMP should therefore clearly describe and justify the proposed performance monitoring approach. Local residents will often be in the best position to observe and report environmental and social impacts. A first step is to involve them in establishing baseline conditions before a project proceeds, typically through the use of local NGOs or universities with the requisite skills. In addition, there should be one clearly identified primary point of on-site office contact with the public on compliance issues and complaints. This office should keep complete records and provide input to resolution of issues. There should also be provision for appeals by interested parties. Many countries, especially in Latin America, are establishing positions of environmental ombudsman, to hear public concerns and bring them to the attention of the authorities.

Consultation with affected people and NGOs (as specified within OD 14.70 on Involvement of NGOs in Bank Supported Activities) should be an integral part of the EMP for all Category A and are advisable for many Category B projects. In some instances NGOs have been invited to be part of the monitoring process. Bank supervision should ensure that local concerns are adequately addressed during implementation. Disclosure of information is an important element of the consultation process. Information on progress with mitigation implementation and monitoring activities should be shared with the public.

Panel of experts

In some instances, there may be disagreement as to the significance of the impacts of a project or the effectiveness of mitigation measures. The option of an independent panel of experts is provided for under Bank EA procedures and the involvement of such a group in the design and implementation of a monitoring program can be useful.

Box 6: Involvement of Panel of Experts

The Ghazi-Barotha Hydropower project in Pakistan is designed to meet the acute power shortage in Pakistan. The main project elements include a barrage located on the Indus River, a power channel (designed to convey water from the barrage to the power complex) and a power complex. The SAR for the project includes detailed TORs for an independent environmental and resettlement panel (ERP) for the implementation phase of the project. A separate ERP was actively involved in project preparation.

During implementation the ERP (which will comprise an environmental specialist, an agricultural specialist and a social scientist) will work closely with the agencies involved in project implementation. The chairman of the ERP will have responsibility to appoint short-term specialists if necessary. The ERP will be required to undertake semiannual onsite reviews of the following:

- implementation of the environmental mitigation, monitoring, and resettlement plans;
- activities of the Project Information Center;
- actions or studies which should be undertaken to support the project's environmental, resettlement and public information objectives;
- TORs for environmental and resettlement activities at the request of the implementing agency; and
- appropriate advice or guidance required to address unanticipated impacts during project implementation.

The findings of each review will be reported and detailed briefings will be given to the implementing agency and other concerned parties.

The principal advantage is that an arms-length institutional arrangement can provide a forum for discussion of technical issues and recommendations on future actions, without the appearance of a vested interest that Borrowers or the Bank may incur (see box 6). To maintain its independence it is important to establish clear procedures for disclosure of the Panel's deliberations.

Sectoral and regional EAs

The use of sectoral EAs (SEAs) and regional EAs (REAs) is increasing within the Bank, which offers certain advantages for monitoring and supervision, compared with a project-specific approach (see *Update no. 4: Sectoral EA* and forthcoming *Update no. 15 on Regional EA*). They provide a framework for assessing institutional needs and project-specific proposals.

They can also help to rationalize monitoring and supervision efforts where similar projects are funded from different sources. REAs are compatible with development of monitoring protocols that are contiguous with the boundaries of natural or man-made systems such as watersheds or large metropolitan areas, and can also facilitate inter-agency coordination. This approach can result in the systematic strengthening of overall environmental management capability in a region.

Conclusions

It is essential that monitoring and supervision be guided by clear objectives. Specific requirements should be linked to impacts identified during the EA process.

The incorporation of detailed monitoring and supervision arrangements into project legal documents is essential to ensure effective implementation. Where supervision identifies inadequacies in the approach to monitoring, project legal documents should provide a sound basis for agreeing to and implementing remedial actions.

Institutional capacity to implement or oversee monitoring should be evaluated, and reinforced as appropriate. The associated costs should be an integral part of the project costs.

It is important to maintain effective public involvement throughout project implementation. This should include provision of a forum for submitting and resolving complaints, access to monitoring information, and involvement in monitoring to the extent feasible.

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This *Update* was prepared by Aidan Davy and Phil Paradine, an independent consultant. Extensive review and comments have been provided by John Dixon, Arundhati Kunte (ENVPE) and John Butler of IRG consultants. Based on Bank policy and procedures on Environmental Assessment (EA) (Operational Directive 4.01), the *EA SOURCEBOOK UPDATE* provides up-to-date guidance for conducting EAs of proposed projects. This publication should be used as a supplement to the *Environmental Assessment Sourcebook*. Please address comments and inquiries to Olav Kjørven and Aidan Davy, Managing Editors, EA Sourcebook Update, ENVLW, The World Bank, 1818 H St. NW, Washington, D.C., 20433, Room No. S-5139, (202) 473- 1297. The Bank is thankful for the Government of Norway for financing the production of the *EA Sourcebook Update*.