

Environmental Assessment Sourcebook

Volume I

Policies, Procedures, and Cross-Sectoral Issues

Environment Department



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Environmental Assessment Sourcebook

Volume I Policies, Procedures, and Cross-Sectoral Issues

Environment Department

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FOREWORD

The Sourcebook is designed to assist all those involved in environmental assessment (EA). They include the environmental assessors themselves, project designers and World Bank task managers (TMs). This focus supports an important premise of EA, that sustainable development is achieved most efficiently when negative environmental impacts are identified and addressed at the earliest possible planning stage. The Sourcebook provides practical guidance for designing just such sustainable Bank-assisted projects.

Environmental assessment teams conducting EAs for borrowing governments need to know Bank policy regarding the project under consideration and which aspects of a project are of particular concern to the Bank. This Sourcebook provides specific information and common ground for discussion among those involved: EA professionals, the Bank and borrowing governments.

Project designers need to know applicable Bank requirements and the environmental implications of their design choices. In addition, they need to understand the objectives of an EA team. The Sourcebook provides not only project-specific considerations, but establishes common ground for general discussion, such as that regarding country strategy.

TMs are responsible for ensuring that borrowers fulfill Bank requirements for environmental review, including EAs where indicated. The Sourcebook provides assistance for these advisory tasks, through discussions of fundamental environmental considerations (with emphasis on those with relatively more impact); summaries of relevant Bank policies; and analyses of other topics that affect project implementation (e.g., financial intermediary lending, community involvement, economic evaluation).

Additional audiences likely to be interested in the Sourcebook are other economic development and finance agencies, EA teams for non-Bank projects, environmentalists, academics and NGOs.

The Sourcebook focuses on those operations with major potential for negative environmental impact, such as new infrastructure, dams and highways. Projects with relatively less negative potential, such as maintenance and rehabilitation, are not examined in detail at this stage; they merit a companion volume.

Bank policies and procedures, guidelines, precedents and "best practice" regarding the environment have been scattered throughout the institution and its publications – or have resided only in the heads of Bank staff. This Sourcebook now collects this corporate knowledge into a single source. It is planned to be an easy-to-use reference manual, hence the overlaps and repetition. Its format is designed to facilitate the frequent updating necessary in a rapidly changing field such as the environment. The Table of Contents is the most efficient entry point from which to locate sections relevant for an individual user. Comments are invited at any stage from users on ways the Sourcebook can better meet their needs.

HOW TO USE THE SOURCEBOOK

The Sourcebook is designed to facilitate the environmental assessment process. It is intended to be used by all involved in EA, primarily the EA practitioner, but also groups managing them, project designers, task managers and environmentalists in general. While much of the document refers mainly to project loans, policy-based and adjustment lending may be addressed subsequently. The Sourcebook is a reference manual which contains the information needed to manage the process of environmental assessment according to the requirements of the World Bank's Operational Directive on EA (OD 4.00 Annex A, October 1989). It is a long document because of the wide range of subjects addressed. However, no one user will need all of the information in the book. Its contents have therefore been organized to be individually as easily accessible as possible, and there is a logical way in which a user can find the items that are pertinent to any particular lending operation. The Sourcebook focuses on operations with more potential for negative environmental impacts, such as major new infrastructure, rather than on operations with less potential impact, such as rehabilitation and maintenance, important though these investments undoubtedly are.

The Table of Contents is the most important section of the Sourcebook. It will assist the user of this reference manual who may be concerned about a specific operation (see the irrigation example below).

Chapter 1 is recommended reading for anyone responsible for a Bank-supported project with potentially significant environmental impacts. It summarizes Bank EA requirements and outlines the Bank's environmental review process, from screening at the time of project identification, right through to post-completion evaluation. A number of "boxes" illustrate different applications of EA in development activities. OD 4.00, Annex A is appended to Chapter 1, along with a list of other Bank operational policy and procedural documents relevant to EA. Annex 1-3 offers a standard format for Terms of Reference (TOR) for an EA that TMs may want to tailor to their specific needs.

Chapters 2 and 3 are "issues" chapters. They provide information and guidance on a number of topics, some of which are likely to arise in any EA. The issues in Chapter 2 are primarily ecological, while those in Chapter 3 are social and cultural. The chapters can, of course, be read in their entirety, but there are two other ways to use them. Their subtopics are shown in the Table of Contents, allowing the user to find them individually. They are also cited where applicable in the discussions of EA guidelines for specific project types, so that they can be referred to in the course of preparing to conduct a particular EA.

Chapters 4, 5, and 6 are "methods" chapters: economics, institutions, and financial intermediary lending. They are not intended to substitute for the knowledge and skills of experts carrying out the actual EA. Chapter 4 gives Sourcebook users an idea of what can be accomplished in the way of economic evaluation of environmental costs and benefits as part of an EA. Chapter 5 addresses institutional strengthening. It stresses the need to develop local capability in EA, identifies some of the broader needs for building country environmental management capacity that an EA may disclose, and considers what may be realistically expected in either area from a single loan or credit. Chapter 6 discusses the particular problems associated with EAs of sector and financial intermediary lending.

The extent to which these chapters are important to an individual user depends on the type of project and the nature of environmental management in the borrowing country.

Chapter 7, community involvement and the role of nongovernmental organizations in EA, explores the implications of OD 4.00, Annex A requirements in this area and offers guidance on how to meet them. Because community involvement is a new concept not only to some Bank staff but also to officials in borrowing countries, the chapter is recommended reading for all environmental assessors as well as task managers.

Chapters 8, 9 and 10 contain sectoral guidelines for EAs. The chapters begin with general considerations pertaining to EA in the sector(s) covered and with discussions of particularly relevant topics (e.g., "Integrated Pest Management and Use of Agrochemicals" in Chapter 8, which concerns the agricultural sector, or plant siting in Chapter 10, on industrial and energy sector projects). The topics are shown in the Table of Contents and cross-referenced throughout the Sourcebook. The balance of each chapter covers specific types of projects, chosen primarily because they have potentially significant environmental impacts. For each type, the project is briefly described (intended only to indicate the features of the project which have environmental significance), potential impacts are summarized, and special issues are noted that should be considered in an EA. Possible alternatives to the project are outlined, and discussions of management and training needs and monitoring requirements are added. Each review concludes with a table of potential impacts and the measures which can be used to mitigate them. Sample Terms of Reference for the various project types are collected in one section in each chapter.

In the case of a loan for an irrigation project to reclaim arid land, the user would at a minimum consult the following Sourcebook sections:

- Chapter 1: "The Environmental Review Process" (if not already acquainted with Bank EAs)
- Chapter 8: "Irrigation and Drainage" (for the project-specific guidelines and sample TORs)
- Chapter 2: "Arid and Semi-Arid Lands" and "Land and Water Resource Management"
(for a review of ecological issues)
- Chapter 7: "Community Involvement and the Role of NGOs in Environmental Review"
(if not already familiar with the topic in Bank EAs)

The need for other information will become apparent; for example, tribal peoples, international waterways, new land settlement, resettlement, or institutional strengthening may emerge as important concerns in the project, and the appropriate Sourcebook sections can be consulted.

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The Sourcebook staff is indebted to Bank colleagues and consultants who contributed to the first edition of The Environmental Assessment Sourcebook. We wish to express our gratitude to the members of the Environmental Assessment Steering Committee for overseeing this project from beginning to end. We thank our colleagues in the international community as well as colleagues in government and environmental agencies for their comments on various sections of the Sourcebook, and for sharing their own materials.

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CHAPTER 1

THE ENVIRONMENTAL REVIEW PROCESS

1. The purposes of the Bank's policy and procedures for environmental assessment (EA) are to ensure that development options under consideration are environmentally sound and sustainable and that any environmental consequences are recognized early and taken into account in project design. The precise operational meaning of "sustainable" is still being clarified, but some guidelines are suggested in Annex 1-5. As concern has grown worldwide about environmental degradation and the threat it poses to human well-being and economic development, many industrial and developing nations, as well as donor agencies, have incorporated EA procedures into their decision-making. Bank EAs emphasize identifying environmental issues early in the project cycle; designing environmental improvements into projects; and avoiding, mitigating, or compensating for adverse impacts. By following the recommended EA procedures, designers, implementing agencies, borrowers, and the Bank are able to address environmental issues immediately, thereby reducing subsequent requirements for project conditionalities and avoiding costs and delays in implementation due to unanticipated problems.

2. The Bank's EA policy is set out in Operational Directive 4.00, Annex A (October 1989). The full text of the Environmental Assessment Operational Directive (EA OD) is provided in Annex 1-1. EA begins with screening, in which the Bank task manager (TM), in collaboration with the Regional Environment Division (RED), evaluates the project or project components according to the magnitude and sensitivity of the environmental issues raised. Screening determines the type of environmental analysis to be conducted for the project, ranging from no further analysis to a full EA. EA or other analyses are the responsibility of the borrower, but Bank staff are available to assist wherever requested, such as in determining the scope of work and developing terms of reference (TORs).

ENVIRONMENTAL REVIEW, POLICIES, AND PRINCIPLES

3. Throughout the remainder of this Sourcebook, the term "environmental review" refers to the process just described, from screening at identification through evaluation after the last disbursement, or after implementation is complete. Environmental review may entail preparation of a full EA, a more limited environmental analysis, or no further analysis at all, depending on the results of screening.

4. The terms "environmental assessment" or "EA" identify the more intensive examination which is required for lending operations that have diverse and significant environmental impacts. Formal EAs should cover the topics listed in Annex A-1 to the EA OD, including project description, baseline data, environmental impacts, analysis of alternatives, mitigation plan, environmental management and training requirements, monitoring plan, interagency coordination, and consultation with affected communities and local nongovernmental organizations (NGOs).

5. Environmental review is required for all Bank loans and credits except sectoral adjustment loans and structural adjustment loans. Sector investment projects and the investment component of hybrid loans and credits are subject to the environmental review requirement. "Bank" in this instance refers to IBRD and IDA; IFC has developed similar environmental review procedures appropriate to the nature of its investment operations.

6. EA is a flexible process, designed to suit the entire range of Bank projects and the different circumstances of its borrowing countries. There is no fixed inventory of issues to be examined in any

particular EA; instead, the Bank's procedure relies on screening, environmental reconnaissance, and discussions between Bank and borrower to identify the critical issues and to establish the scope of the EA. The EA OD also calls for interagency coordination and consultation with affected groups and local (NGOs) at an early stage to ensure that all significant environmental issues are covered.

7. "Environment" is broadly defined by the Bank as "the natural and social conditions surrounding all...mankind, and including future generations" (as amplified in Operational Manual Statement [OMS] 2.36, para 3). The EA OD reflects this scope in setting procedure for evaluating impacts on health, cultural property, and indigenous peoples as well as on the natural environment. Sociocultural effects of projects, such as new land settlement, involuntary resettlement and induced development, are also to be included in the environmental review.

8. The Bank directive integrates EA or other environmental analysis into project preparation, including project selection, siting, and design decisions. In most cases, an EA should form part of the overall feasibility study. This facilitates incorporation of the findings into selection of sites and technology, designs and implementation plans. For projects which would have major environmental impacts, the Bank recommends that the borrower retain independent experts not affiliated with the project preparation or feasibility study team to conduct the EA. However, specialists responsible for the EA as a separate task should work closely with the feasibility and design team.

9. EAs provide numerous opportunities for coordinating environmental work in the country, and should be linked to other environmental strategies, action plans, and free-standing projects. EA provides a formal mechanism for interagency coordination and for addressing the concerns of affected groups and local NGOs. EA can help strengthen environmental management capability in the country, and Bank staff should take advantage of opportunities to use it for that purpose.

ENVIRONMENTAL REVIEW AND THE PROJECT CYCLE

Overall Relationship to the Project Cycle

10. The Bank's environmental review is intimately linked to the project cycle. As Figure 1.1 shows, environmental review begins with screening at the time of project identification. Scoping and preparation of the EA occur in tandem with or as integral parts of the pre-feasibility and feasibility studies. The final EA is sent to the Bank by the Borrower prior to appraisal. If the EA is satisfactory to both borrower and the Bank, it forms the basis for the RED's decision on environmental clearance and the environmental conditions to be negotiated with the borrower, some or all of which are incorporated into the loan agreement. The EA may be adequate for the purposes of appraisal, but the Bank review may reveal needs for additional analyses before clearance can be given and negotiations undertaken.) Supervision includes monitoring the project's environmental performance and compliance with relevant conditions agreed on between the Bank and the borrower. After implementation is complete, the Project Completion Report (PCR) includes evaluation of both the impacts that actually occurred and the effectiveness of mitigation measures. The Operations Evaluation Department (OED) again audits selected projects possibly some years after the PCR.

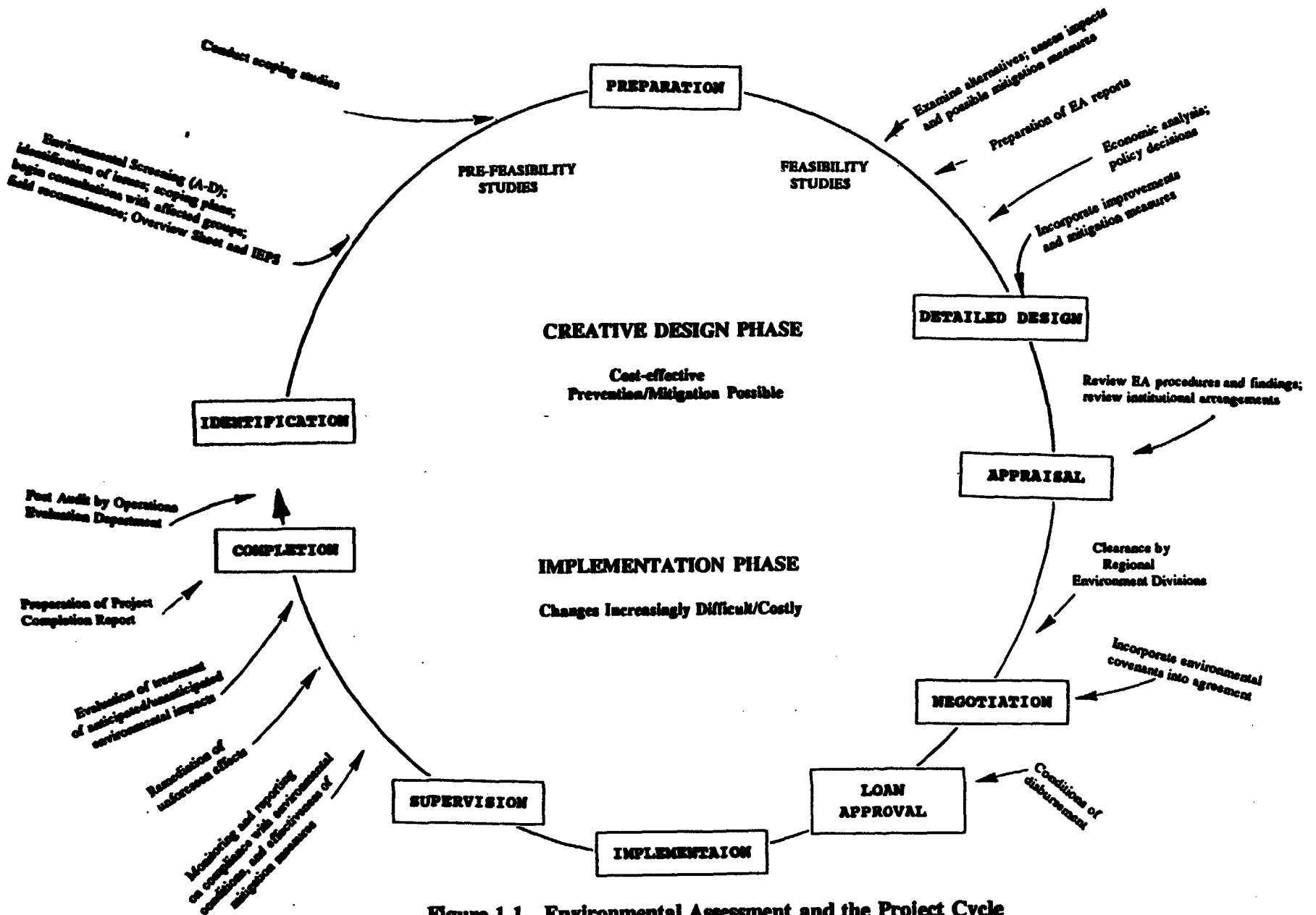


Figure 1.1. Environmental Assessment and the Project Cycle

Screening

11. Environmental screening is the responsibility of the TM, with advice and assistance from the RED. An essential part of screening is to identify which aspects of a project are not environmentally significant and which therefore can prudently be dropped from further consideration. Its purposes are to ensure that the appropriate amount of attention is devoted to the environmental aspects of the proposed project from the very outset of the project cycle, to identify as much as possible the key environmental issues, and to determine the type of environmental analysis which is needed so that those issues (and others which may arise) can be addressed effectively in project planning, design, and appraisal.

12. Screening is carried out at the time of identification. Projects are assigned to one of four categories on the basis of the nature, magnitude and sensitivity of the environmental issues, and so designated in the Initial Executive Project Summary (IEPS).

Category A: EA is normally required, as the project may have diverse and significant environmental impacts.

Category B: More limited environmental analysis is appropriate, as the project may have specific environmental impacts.

Category C: Environmental analysis is normally unnecessary, as the project is unlikely to have significant environmental impacts.

Category D: Environmental projects for which separate EAs are not required, as environment is a major focus of project preparation.

13. Annex A-3 of the EA OD lists the types of projects or components which commonly fall into each category. Certain types of projects almost always fall into a particular category -- thermal and hydropower development, for example. In other project types, the category depends on scale and on other factors such as the status of environmental management capability in the country. Large-scale irrigation and drainage projects are usually Category A, whereas small-scale projects of the same type may fall into Category B. Category B projects are a diverse group, and the scope of the environmental analysis may vary -- from a detailed study of certain components that is almost as complex as that for an "A" project, to a routine check that project design conforms to applicable standards. Category C projects may not be entirely devoid of environmental impacts; in a health project, for example, the design may have to provide for disposal of medical wastes.

14. Other outputs of the screening process are the key environmental issues, the type of environmental analysis recommended, and a preliminary schedule for conducting that analysis. This information is incorporated into the IEPS and discussed at the IEPS meeting. The meeting results in decisions regarding type, timing, and major issues for the environmental review, unless those decisions have to be deferred pending receipt of additional information. It is helpful in reviewing the environmental information to include a map in the IEPS showing the geographical location of the proposed project.

15. Results of screening are also reported to the Bank's executive directors in the Monthly Operational Summary (MOS). Overview sheets (Table 1.1) have been designed to record the information necessary for preparing the MOS. In addition to basic data on the project and a description of its principal components, the sheets record the project category (A,B,C, or D), the major environmental issues, proposed actions (such as special studies to be conducted, environmental components to be added, other environmental work to be done in the sector), the projected date for completion of the environmental assessment or other analysis, and a report on the current status of that analysis. The TM prepares the draft overview sheet, which is then reviewed by the RED. Once any revisions are agreed and made, the overview sheet is cleared by the Sector Operations Division (SOD) or Country Operations Division (COD) chief, signed by the RED chief, and forwarded to be processed for the next MOS. The complete overview sheet appears in the MOS, for Category A projects; only header information is shown for Category B. Overview sheet information is updated whenever the Executive Project Summary (EPS) is revised, whenever the project category is changed (for instance, because a component with significant impacts is deleted) or whenever there are other significant changes in the information on the sheet. Overview sheets are made final at the Final Executive Project Summary (FEPS) stage.

16. In some cases, screening requires reconnaissance by Bank environmental specialists or consultants in order to develop a full understanding of the pertinent environmental issues and the items which need to be included in any further environmental analysis. Where site visits are necessary, as is normally the case in sensitive areas or with complex environmental issues, REDs assist the TM in preparing terms of reference (TORs) for the mission. Often a product of this mission is a draft of the TORs for the EA or other environmental analysis. Annex 1-2 contains sample TORs for a reconnaissance mission.

17. It is good practice for the TM to keep the borrower informed of the initial results of the Bank's screening. The EA OD specifies that the Bank should review the results with the borrower, especially with regard to the type of environmental review required and its general scope, schedule, and implementing arrangements.

Preparing for an Environmental Assessment

18. It is the borrower's responsibility to prepare TORs for the EA or other analysis and to obtain the necessary experts to carry it out. The Bank is available to assist the borrower as necessary. The task of determining the scope of the EA is critical, and is therefore one in which the Bank normally participates. It is important not only to cover the environmental issues known at the inception of the study, but also to allow breadth and flexibility so that new issues can be identified and, if significant, addressed. However, it is also important to frame the investigation so that time and resources are concentrated in the areas where potential impacts are likely to be found. There are many examples of EAs in which massive amounts of money and effort were expended in collecting and reporting data on every aspect of the environment and producing voluminous reports in which there was much insignificant and irrelevant information than there were findings of significance. The Bank intends that EAs be useful to decision-makers in the country and to Bank staff in determining whether or not to proceed with a given project and how to implement the project efficiently. This means that the work must be focused on the issues which are critical to such decisions.

Table 1.1. Example of a Completed Overview Sheet

**ENVIRONMENTAL OVERVIEW OF PROJECTS
IN THE IBRD/IDA LENDING PROGRAM**

PROJECT ID: 4SRIPA082
 COUNTRY: SRI LANKA
 PROJECT: Local Government Development
 EST BOARD DATE: February 91
 TOTAL PROJECT COST: US\$36.0 m
 LOAN/CREDIT AMOUNT: US\$25.0 m

FY AND STATUS: FY91
 SECTOR: Infrastructure/Urban
 EST APPRAISAL DATE: May 1990
 MANAGING DIVISION: ASIIN
 TASK MANAGER: Patrick McCarthy

ENVIRONMENTAL IMPACT CLASSIFICATION: B

PROJECT DATE FOR COMPLETION OF ENVIRONMENTAL ASSESSMENT: To be determined during sub-project appraisal, as necessary.

MAJOR PROJECT COMPONENTS: Support to the restructured Local Loans Development Fund (LLDF) as a vehicle for financing the investment requirements of Local Authorities (LAs). Project will consist of (a) line of credit to the LLDF; and (b) technical assistance and training for LAs. Subloans would finance (a) social infrastructure projects, e.g., roads and sidewalks, parks and playgrounds, drainage, street lighting; and (b) revenue generating projects, e.g., offices, markets, trade centers and slaughterhouses.

MAJOR ENVIRONMENTAL ISSUES: A number of sub-projects which may be proposed for financing would likely have adverse environmental impacts. An integrated part of the sub-project appraisal process by the LLDF, and by the Bank over the specific free limit sub-loan, would be an environmental appraisal. The loan proposal would have to be modified to the extent necessary to accommodate environmental issues before a loan is granted.

PROPOSED ACTIONS: Where loan proposals would clearly demonstrate an adverse environmental impact if implemented, the urban local authority would be requested to amend its proposal accordingly. This could take into account, for example, providing adequate sanitation for offices, market complexes etc., or re-siting slaughterhouses.

STATUS OF EA (IF ANY): A draft environmental issues paper for Sri Lanka has been prepared. The first report would likely include recommendations for a strategy to be adopted by the Government to prioritize environmental investments.

REMARKS: Overall, the project is expected to have a positive environmental impact as the LLDF appraisal process will include addressing environmental issues.


SIGNATURE:



 Iain P. Christie

Chief, Infrastructure Operations Division
 Asia Country Department One

SIGNATURE:



 Gloria Davis

Chief, Environmental Division
 Technical Department

19. In determining the scope of an EA, it is useful to consult with sources besides the borrower, the implementing agency or organization, and the technical experts. In addition, other government agencies can provide valuable perspective. They often have special information about the region and proposed site(s) of the project, and may be able to identify potential intersectoral impacts which should be examined. Consequently, the EA OD recommends that an interagency meeting be held soon after the decision is made to prepare an EA, and that at least one more be held when the EA is completed and submitted for review by the government. At the initial meeting, participants should agree on arrangements for ongoing coordination.

20. The concerns of communities affected by the project and of local nongovernmental organizations (NGOs) with environmental interests also should be covered in the EA. These groups can provide information useful for the EA; in fact, sometimes they are the only source of detailed knowledge about the local study area. Chapter 7 provides guidance for discussions obtaining the informed views of affected communities and for involving them and local NGOs in EA (see para 51).

21. An EA may already have been developed under official procedures of the country or a co-donor to the project. Such EAs should be examined and where elements appear to be missing or inadequate, Bank TMs may call for selective and enhancing studies. Where the Bank and another donor are co-financing a project, TMs should clarify at the beginning which EA procedures--of the borrower, Bank or co-donor--will be used to ensure that EA OD requirements are met.

22. TMs, assisted as necessary by RED staff, should review the detailed TORs before the EA begins, paying particular attention to the provisions for interagency coordination and community involvement and to the design of baseline data collection programs. The latter are often the most expensive aspect of EA, and borrowers should seek the advice of experts in design of environmental or sociological data collection programs to avoid three pitfalls: (a) collecting data that are not relevant to the decisions to be made, (b) sampling the correct parameters but timing the observations incorrectly or making an insufficient number of observations for an acceptable representation of the phenomena being studied, and (c) omitting key parameters from the program. Avoiding these pitfalls at the outset minimizes the risk of reaching the end of a program, which might extend over an entire year or more, and discovering that the expended time and money have been wasted. Annex 1-3 contains a sample of a "generic TOR" which can be used in preparing project-specific ones.

23. The TM should also review the EA implementation schedule with the borrower, to determine whether it is consistent with key decision points in project preparation and provides for adequate integration of findings into feasibility studies and designs. The Bank can also advise borrowers about obtaining consultants and funding for EA, as discussed later in this chapter (paras 58-71).

Conducting the Environmental Assessment

24. Carrying out the actual EA is the borrower's responsibility. The government or project sponsor arranges for the EA; they often select consultants or an institution to conduct the analyses. When it is necessary to use international experts to supply skills not available in the borrowing country, the Bank encourages involvement of local consultants as well, in order to take advantage of local knowledge and to strengthen their capability for future EA work.

25. EA is most effective when even preliminary findings are made available early in the preparation process. At that time, alternatives which might be desirable from an environmental viewpoint (sites, technologies, etc.) can be considered realistically, and implementation and operating plans can be designed to respond to critical environmental issues in the most cost-effective manner. Later on, making a major design change or selecting an alternative proposal—or deciding not to proceed at all with a project—become very expensive. Even more costly are delays in implementation of a project because of environmental issues which were not considered during design. Consequently, integration between EA and feasibility studies and design work is essential. (See Chapter 7 for further discussion of dissemination of EA findings.)

26. The EA implementation plan should provide for frequent coordination meetings between EA and feasibility study teams to exchange information on environmental issues and the responses they require. Preliminary drafts of the key sections of the EA and working papers on specific issues are also useful modes of communication between the teams, especially when key decisions are made as preparation proceeds. Most successful EAs have thorough mid-term reviews.

27. The TM should agree with the borrower on which drafts, if any, the Bank wishes to see, and when. At a minimum, however, the TM should review a final draft, with RED assistance, in order to ascertain that the issues of importance to the Bank have been addressed, to obtain any clarification needed, and to provide other comments to the borrower in the interest of having information on all the critical environmental issues ready before appraisal. Since, in practice, some final EAs may be available only shortly before appraisal, preliminary review at an appropriate interim stage (for example, when the significant environmental issues are all identified and mitigating measures described) is highly desirable as well. This will ensure that the scope of the EA is correct, that communication between designers and the EA team is occurring, and that changes are actually being made in the project to address environmental concerns. In general, most major concerns become known within the first few months; the remainder of the EA period focusses on mitigating measures.

28. The EA schedule must specify submission of the final EA report to the Bank for detailed examination prior to the start of project appraisal. Annex A-1 of the EA OD is a sample report outline. As general guidance, the main text of the report should not exceed 100 pages. The report should provide an Executive Summary highlighting the significant findings and recommended actions (in order of importance), in relatively non-technical language and not more than 20 pages in length. More detailed information, such as summaries of baseline data, model results, records of community involvement activities and reports of special studies, should be placed in a separate volume as a technical annex to the main report.

29. The Bank recommends that interim EAs and related studies be released to interested agencies and to affected communities, and to NGOs involved in project preparation. It encourages member countries to prepare EAs on this basis. However, as the EA is the property of the borrower, public release of the document can only be made with the borrower's consent.

Environmental Assessment Review and Project Appraisal

30. The borrower should review the EA to ensure that the consultants or agency staff followed the TORs and met both Bank and country requirements. The TM, assisted by RED staff, should also review the adequacy of the EA report, checking especially the following items:

- **Were the TORs followed?**
- **Are the items required by the EA OD included?**
- **Is the Executive Summary adequate? Decision-makers may read only the summary, therefore it must present the significant impacts (in order of importance), clarifying which are unavoidable and which are irreversible; the measures which can be taken to mitigate them; the cumulative effect of impacts; and the requirements for monitoring and supervision.**
- **Are recommendations clearly stated in the Executive Summary?**
- **Is the project outline description complete, insofar as the aspects which can affect the environment are concerned?**
- **Are project alternatives described?**
- **Is the baseline study section in the main report concise and useful to readers who are not specialists in the scientific disciplines covered? Does the section give an overall picture of present conditions and trends, and include ongoing and proposed development activities in the study area? Does it provide comments on the quality of the data and the completeness of the database?**
- **Is there consideration of probability in the section in which impacts are predicted and evaluated? Are potential impacts mentioned that were expected *a priori* but not found? Are significant impacts analyzed in more detail than less significant ones? Is sufficient justification provided for dropping topics from further consideration?**
- **Do mitigating measures both control adverse impacts and enhance project benefits? Are the institutional arrangements for implementing the measures defined? Are the costs of implementing all its recommendations adequately budgeted in the cost tables?**
- **Where monitoring programs are described, are the reasons for and costs of the monitoring activities covered? Is there a description of the institutional arrangements for carrying out the work, evaluating the results, and initiating any necessary action to limit adverse impacts disclosed by monitoring?**
- **Will the project be in compliance with Bank directives and policies on environmental matters, such as involuntary resettlement, cultural properties and wildlands?**
- **Are proposals for institutional strengthening and training adequate?**

- Is there documentation of community involvement, including an overview of the issues raised and their disposition?
- In general, is the report free of jargon, and are technical terms defined where they occur or in a glossary?
- Where existing databases, planning studies, other EAs, scientific papers, etc., are used as information sources, are the references given?

31. Bank staff review in detail the EA findings and recommendations and include in the Final Executive Project Summary (FEPS) a summary of the EA status, the major environmental issues, and how those issues have been or will be addressed. It notes any proposed environmental conditionalities.

32. The appraisal mission reviews the EA with the borrower, resolves any remaining environmental questions, assesses the capacity of country institutions to implement EA recommendations, determines whether the EA findings have been properly addressed during project preparation, and discusses environmental conditionalities to the loan agreements. The Staff Appraisal Report (SAR) and President's Report (PR) contain summaries of the EA and its main findings. An annex to the SAR should provide a more complete summary, including (but not limited to): baseline conditions; alternatives considered; significant impacts and preventive, mitigative or compensatory actions; capability of environmental institutions and steps to strengthen them; environmental monitoring arrangements; and consultations with affected groups and local NGOs. Any necessary changes in country or agency environmental policy should also be stated in the SAR.

33. The RED chief issues formal environmental clearance for the project, based on the information presented in the SAR and the EA. Clearance is a necessary prerequisite to the Regional Vice President's authorization to begin negotiations. In the negotiations themselves, the issues and actions critical to environmental soundness and sustainability in the project are discussed, and appropriate covenants are incorporated into loan or credit documents.

Implementation and Supervision

34. EA recommendations provide the basis for supervising the environmental aspects of project implementation. The borrower is obliged to implement measures to mitigate anticipated environmental impacts, to monitor programs, to correct unanticipated impacts, and to comply with any environmental conditionalities. Procedures for start-up and continuing operation of the project will normally specify these agreements, as well as measures to protect the health and safety of project staff. Proper staffing, staff training, and procurement of spare parts and equipment to support preventive, predictive and corrective maintenance are also necessary elements of implementation.

35. Supervision is an essential aspect of the Bank's environmental review, since the environmental clearance decision is based in part on the assumption that mitigating measures and other provisions will be fully implemented and will be effective in avoiding or controlling adverse impacts that might otherwise

have made the project unacceptable for Bank support. Supervision is carried out through a combination of the following:

- reports required from the borrower on compliance with environmental conditionalities, status of mitigating measures, results of monitoring programs and other environmental aspects of the project;
- oversight by line agency with responsibility for the sector, and/or by environmental management, land use control, resource conservation, or permit-issuing agencies at the local, regional or national level;
- early warning by the borrower's staff about impending unforeseen impacts;
- Bank supervision missions to review implementation of environmental provisions, corrective actions taken to respond to impacts, and compliance with environmental conditionalities, including institutional strengthening components; and
- site visits by Bank environmental specialists or consultants as required to supervise complex environmental components or respond to environmental problems.

36. Annex D-2 of OD 13.05: "Project Supervision," contains guidelines for supervision reports. Paragraph 36 prescribes the general content for the section on environment. In reporting on the environmental aspects of projects, Bank staff should cover critical environmental data (e.g., violations of environmental quality standards or pollutant discharge limits), descriptions of impacts observed, progress on mitigating measures, the status of monitoring programs (especially those for detecting new impacts), progress on institutional strengthening, and adherence to environmental conditionalities.

37. OD 13.05 encourages TMs to exhaust all means of persuasion before resorting to contractual remedies when the borrower is not meeting obligations of loan, guarantee or credit agreements. Such obligations include implementation of environmental components or mitigation measures and adherence to environmental conditionalities. The contractual remedies available include informal or formal suspension of disbursements under loans or credits, cancellation of all or portions of outstanding loan or credit balances, and acceleration of maturity. These are described in Articles VI and VII of "General Conditions Applicable to Development Credit Agreements" and "General Conditions Applicable to Loan and Guarantee Agreements." OD 13.40: "Suspension of Disbursements" and OD 13.50: "Cancellations" set forth guidelines and procedures to be followed in exercising these remedies.

Completion and Evaluation

38. At the conclusion of a project (after the last disbursement), the PCR is prepared and submitted to the Operations Evaluation Department (OED). The borrower is responsible for submitting information that will be the basis of the report. It is important that environmental information be included so that the Bank's environmental review process can be improved as necessary, and progress toward funding of projects that are environmentally sound and sustainable can be monitored and maintained. The EA OD requires that the PCR include a description of the impacts that actually occurred, a determination for each as to whether or not it was anticipated in the EA report (if one was required), and evaluations of the effectiveness of mitigating measures and of institutional strengthening and training. Additional items useful in evaluating environmental review include:

- discussion of the extent to which recommendations of the EA or other environmental analysis were followed;
- an assessment of the extent to which environmental review influenced decision-making during project preparation, appraisal, negotiation, and implementation;
- particular problem areas to be considered in future environmental review work;
- an assessment of project operation and maintenance, as it affects the environment (e.g., functioning of pollution control equipment, compliance with effluent or emission limits, status of staff training programs); and
- evaluation of the benefits which resulted from environmental components of the project.

REGIONAL AND SECTORAL ENVIRONMENTAL ASSESSMENTS

39. EA procedures may be applied to development activities other than specific projects. EA can be adapted to regional or sectoral scales and used to assess impacts of sector-wide programs, multiple projects, or development policies and plans. A regional or sectoral EA can reduce the time and effort required for project-specific EAs in the same region or sector by identifying issues, initiating baseline data collection, and assembling existing data in advance, or in certain cases, by eliminating the need for the project-specific EA altogether.

Regional Environmental Assessments

40. Regional EAs are desirable when a number of development activities are planned or proposed for a relatively localized geographic area, such as several projects in one watershed (see Table 1.2). They serve a number of useful purposes, for example:

- definition of study areas in terms which make environmental sense (e.g., river catchment basin, airshed, coastal zone);
- selection of sustainable development patterns from alternatives in a region under development pressure (e.g., the coastal zone), or being programmed for development for the first time;
- identification of cumulative impacts of different activities (e.g., the combined effects on receiving water quality of the effluents of several municipal and industrial treated wastewater discharges), and design or implementation schedule changes and other measures to avoid or mitigate them;
- identification of environmental interactions or conflicting demands on resources among projects in which the impacts of one project may reduce the benefits of another, and of measures to avoid such a result;
- formulation of criteria for environmentally sustainable development in the region, including treatment of environmentally sensitive areas and resources, site selection criteria, design criteria, region-specific measures to mitigate adverse impacts, and land-use planning guidelines;
- identification of monitoring data needs and definition of data collection programs to support EA and development decisions; and
- examination of policy alternatives and institutional elements needed for achieving sustainable development in the region.

Table 1.2. Regional Environmental Assessment for Exploration and Production of Hydrocarbon in Coastal Alabama and Mississippi (USA)

The purposes of this EA were to identify the effects of generic unit actions and the cumulative impacts of the issuance of permits for hydrocarbon resource development projects in a coastal area over a thirty-year period and to expedite the permit issuance process. Generic unit actions investigated included site preparation, well completion, gathering system construction, and gas treatment facility operation. Alternative means of undertaking each action were considered. Environmental effects were determined for each unit action, and these were used as the basis of the cumulative impacts analysis. The U.S. Army Corps of Engineers was lead agency; 12 other agencies participated.

In the cumulative analysis, it was assumed that the impacts would be a function of the different unit activities occurring together at various sites in the region at one time. A number of development scenarios were used in this analysis, not as predictions but rather as a means to establish limits within which future development would occur. Potential adverse impacts included loss of wetland values for sites not located in a waterway (unless the alternatives of using platforms for drilling and trestles for access were selected), removal of vegetation from pipeline rights-of-way, temporary turbidity with possible damage to oyster and sea grass beds, and loss of benthic habitat at open water drilling and pipeline sites extending for one to two years after completion of construction. Operation of facilities would contribute to air pollution. Loss of well control or oil pipeline rupture could have an extensive impact on regional ecosystems, commercial and sport fishing, and tourism. Loss of gas well control or gas pipeline rupture could release hydrogen sulfide, a hazard to public health and safety, and to nearby plant and animal communities.

The EA concluded with a number of products:

- a set of impact-limiting assumptions applicable to all sites, e.g., no discharge of cuttings, drilling fluids, formation waters
- a set of nine general permit conditions which, if met, development to proceed without site-specific permit application
- a designated part of the study area in which no general permit would apply, requiring site-specific permit applications
- a list of environmentally preferred drilling and construction techniques
- a regional monitoring program

41. Regional EAs fit into the Bank project cycle in a number of ways, depending on which of the above purposes are being met. They can:

- serve as planning tools, assisting in the identification of environmentally sound projects;
- contribute to implementation strategies which take into account the combined impacts of a set of projects already being pursued; and
- assist in project preparation by supporting plans and designs which are sensitive to cumulative impacts, synergisms, interactions, and competition for natural and sociocultural resources.

42. Regional EAs contribute to the efficiency of project preparation by reducing the time and effort spent on project-specific EAs. At the least, a regional EA will have defined the major issues that need to be considered in studying individual projects (and perhaps prepared the TORs for the studies), and will have assembled existing environmental data. It may also have initiated monitoring programs to remedy data deficiencies which would otherwise delay the project-specific EA. When the regional EA has developed criteria and guidelines for individual projects and institutional arrangements for ensuring their implementation, the need for project-specific EAs may be eliminated altogether, or reduced to more limited studies of environmental effects unique to the individual projects.

Sectoral Environmental Assessments

43. Like regional EAs, a sectoral EA can be used to examine the cumulative impacts of multiple projects planned in the same sector. Sectoral EAs usually address the mixture of projects proposed for the next few years. For example, in a power sector, a program including three coal-fired plants, two major hydroelectric stations, a loss reduction component, and a major institution building and training component may be studied. They may address several large Category A projects together (e.g., thermoelectric power), or a number of small projects (e.g., run-of-river hydropower) that may not warrant EAs individually. When applied in this way, sectoral EAs offer the same advantages as regional EAs and have a comparable relationship to project-specific EAs. They can, in some cases, substitute for project-specific EAs, by producing guidelines and criteria for the design and implementation of projects in the sector. More often, they will result in identification of the major environmental issues in the sector and development of a data base, enabling project-specific EAs to proceed more expeditiously. (See Tables 1.3 and 1.4 for examples of sectoral EAs.)

44. A variant of this application, often called a "programmatic" EA, is the use of a sectoral EA to assess the impacts of a sector-wide program, such as locust control. These are programs that will be replicated at a variety of locations, and for which the impacts are more or less the same at any location (see Table 1.5). A programmatic EA may include among its outputs guidelines for conduct of the activity and site-specific questions which must be answered before initiating the activity.

45. The other purposes of sectoral EAs are somewhat different:

- review of the environmental impacts of sector investment alternatives, e.g., centralized or decentralized wastewater treatment, expansion of existing power generation capacity versus construction of new facilities;

Table 1.3. Pakistan Drainage Sector Environmental Assessment

The government of Pakistan has undertaken a 21-month sectoral EA of its national drainage program, with grant funding from Japan and leadership by the Water and Power Development Authority. Its products are to be (a) an environmental assessment for a national drainage program which is intended to relieve widespread waterlogging and salinity problems, and (b) a "framework concept" for the program, emphasizing institutional arrangements and procedures to facilitate the efficient planning, design, implementation, operation and maintenance of drainage schemes.

The scope of work requires the EA consultant to address engineering, environment, health, institutions, policy and programs in the entire Indus Basin, in all areas with existing and proposed irrigation and drainage facilities, and in all natural resource areas adjacent to or affected by irrigation and drainage programs and projects. The consultant must evaluate existing drainage systems, estimate future drainage requirements, and predict significant impacts, such as water quality changes in receiving waters, health hazards from irrigation or drainage systems, and deterioration of land quality resulting from irrigation. The consultant is required to identify environmentally acceptable drainage alternatives and possible mitigation and enhancement measures, including reuse of drainage water and treated effluent to minimize drainage.

Institutional components of the EA are to be recommendations on linkages between environmental agencies, improved sustainability in terms of cost recovery and effective operation and maintenance, planning procedures for drainage systems, and training programs. The "framework" emphasizes flexible approaches to improve efficiency in identification, planning, construction, operation and maintenance of drainage facilities.

The EA core team is composed of a team leader (planner, engineer, or economist), a drainage engineer, a resource economist, an institutional specialist, and an ecologist. Together, they account for 165 of the estimated 220 staff weeks. Other specialists, with participation ranging from two to seven staff weeks each, include a chemist, microbiologist, soil scientist, hydrogeologist, training specialist, social scientist, environmental health specialist, environmental engineer, anthropologist, irrigation engineer, and entomologist.

- evaluation of the environmental effects of sector policy changes, e.g., implementation of industrial waste minimization standards, pricing water to reflect true cost of service, requiring energy conservation to offset new generating capacity needs, modification of criteria for reuse of treated effluents, differentiation between new sources and existing sources in setting air emission standards, and use of alternative fuels for fossil-fuel power and heating plants; and

Table 1.4. Nigeria Multi-State Roads Project Sectoral Environmental Assessment

The Nigerian road network consists of interstate highways managed by the Federal Ministry of Works and Housing (FMWH), secondary roads managed by State Ministries of Works (SMOWs), and rural roads administered by Local Government Councils. International assistance has concentrated on rural roads in agricultural development projects and on the Federal highways. The State system includes 30,000 km of secondary roads, 10,000 km of which are paved. Many of them, constructed or last upgraded in the 1970s, urgently require rehabilitation followed by an effective program of routine maintenance.

The Government of Nigeria is preparing a project for a five-year program of road maintenance in selected states. It would finance repair of priority roads, paving of high-priority unsurfaced roads, routine maintenance, and an institutional development and training component. The project is being prepared by a Coordination Unit within FMWH, in collaboration with selected SMOWs.

An environmental reconnaissance was conducted by a consultant and staff members from FMWH and FEPA (the Nigerian Federal Environmental Protection Agency), to provide focus to project preparation studies. It established baseline conditions in the selected states, identified the environmental issues associated with road upgrading/rehabilitation and maintenance in each state, and recommended ways in which EA could be incorporated into the project planning process. Recommendations included: (a) surveying and environmental screening and ranking of proposed subprojects; (b) preparation by FEPA of EA guidelines for secondary roads; (c) preparation of EAs for subprojects likely to have a major impact; and (d) review and revision of standards contract specifications to require environmental safeguards, such as reseeding and embankment protection, and research by FMWH to propose measures to address the most important problems, such as gully erosion.

The reconnaissance study also addressed the institutional capacity of FEPA, FMWH, and the SMOWs to carry out the work identified. It recommended EA training for FEPA staff, training for FMWH and SMOW design engineers in general environmental practices, in-service training for construction supervisors, and joint FEPA/FMWH workshops on specific aspects of the problem of land degradation.

- assessment of (i) requirements in the sector for environmental review, implementation of environmental management and mitigation measures, and monitoring programs, (ii) the capacities of sectoral institutions to carry out those activities, and (iii) needs for training, development of guidelines, or other aspects of institutional strengthening.

46. When used in these three ways, sectoral EAs provide information which can most effectively be used to plan sector strategies, investment programs, and institutional strengthening efforts. They relate to the project cycle from the beginning by contributing to the identification of projects which are consistent with sustainable development in the sector.

Table 1.5. "Programmatic" Environmental Assessment for Locust Control

Consultants prepared a programmatic EA for the United States Agency for International Development (USAID) for locust control in Africa which had the following objectives:

- to describe the impacts of current and projected locust and grasshopper programs, with specific reference to pesticide use;
- to evaluate alternative control measures and mitigative actions which may have less adverse impacts; and
- to provide comprehensive recommendations to ensure that environmental concerns are fully addressed in future control programs.

The 32 programmatic recommendations included preparing an inventory and mapping program of environmentally sensitive areas; prohibiting spraying in human settlements and environmentally fragile areas; selecting pesticides with the least impact on non-target species; monitoring selected organisms, and soil and water for pesticide residues; supplementing control techniques with a strong technical assistance component; assisting countries in disposal of obsolete pesticides; testing biological control in the field; and providing training and equipment.

ALTERNATIVES TO ENVIRONMENTAL ASSESSMENT

47. Bank policy in the EA OD allows for flexibility and alternatives to EA in projects where the range of environmental issues is comparatively narrow and the issues can be understood and managed through less extensive analysis. These are typically smaller projects, not located in environmentally sensitive areas. They usually fall into Category B in the screening process. Reconnaissance and informal scoping are normally completed, followed by the design of preventive or mitigating measures. Alternatives include:

- specific design criteria to safeguard the environment that will be applicable, for example, to rural electrification, rural water and sanitation, small-scale irrigation systems;
- pollution control standards or effluent and emission limits for small-scale industrial plants;
- "best practice" standards for certain activities, such as small-scale irrigation;
- integrated pest management programs for agricultural projects which do not involve major irrigation or land development;
- reliance on local government permit programs covering actions such as siting, construction, operation, pollutant discharge, and waste disposal;

- preparation of environmental manuals, and institutional strengthening and training; and
- application to individual projects of design criteria, guidelines, and standards developed in regional or sectoral EAs.

48. Alternatives to EA allow the effort devoted to environmental considerations to be commensurate with the magnitude of potential impact. It is important to remember, however, that their acceptability in any given situation depends in part on the environmental policy and regulatory structure in the country and the institutional capabilities of the borrower and the government. It will not be effective, for example, to manage the environmental impacts of small- and medium-scale industry by pollution control standards and design criteria if inspection, monitoring, and enforcement functions are weak. Similarly, relying on "best practice" or integrated pest management for agricultural projects will be unsatisfactory where there is no effective agricultural extension service and inspection. In these cases, unless an institutional strengthening component with a high probability of successful implementation can be included in the project, a project-specific EA should be conducted.

INSTITUTIONAL ASPECTS OF ENVIRONMENTAL ASSESSMENT

Interagency Coordination

49. Interagency coordination is crucial to effective EA because environmental issues, in their complexity and variety, are often intersectoral and regional, even international. The authority and responsibility to deal with them—to collect information, prepare plans, approve designs, issue permits, allocate resources, develop budgets, monitor progress and regulate activities—is spread over a number of agencies at all levels of government. An EA team needs to take advantage of all major information sources and specialized knowledge. Successful implementation of EA recommendations will depend on the capabilities of the institutions involved in environmental management.

50. Interagency coordination is best achieved through interagency meetings at key points in the EA schedule. A meeting at the time of scoping is vitally important: to inform all interested agencies about the project and the intention to prepare an EA; to seek their views throughout the process; to identify issues; to discuss any special types of analysis required, data sources and management procedures, responsibilities and schedules; and to draft TORs for the EA. At that meeting, the participants should agree on a schedule for additional meetings and other means of communication and coordination. It is also appropriate to hold a meeting when the draft final report is submitted for government review. Other meetings—such as a mid-term review—are very useful in complex EAs. Circulation of interim drafts on issues of special interest to other agencies is an effective means of interagency coordination. TMs should attend at least the initial meeting, and in any case should ensure that the borrower includes adequate interagency coordination in the EA process.

Involvement of Affected Groups and Local NGOs

51. The EA OD states that borrowers are expected to take the views of affected groups and local NGOs fully into account in project design and implementation, and in particular during the preparation

of EAs. Community involvement is important in order to understand the nature and extent of potential impacts, especially the sociocultural, and to assess the suitability and acceptability of various measures that might be used to prevent or mitigate impacts, or to compensate affected groups for unavoidable ones. Community involvement is also useful in the analysis of the distribution of project costs and benefits. Moreover, a genuine effort to provide the public with information about a project and to solicit public reactions and suggestions leads to projects that are more acceptable and more likely to be supported. There are many different ways to foster community involvement, not all of which will be appropriate in any given situation. Chapter 7 amplifies this topic and provides guidelines for successful community involvement.

Strengthening Environmental Capabilities

52. The ultimate success of EA depends on strengthening environmental capability in agencies and organizations concerned with natural resource management and environmental protection. Projects with major potential impacts normally require institutional strengthening and training components, not only in the organization executing the project but in the line agency and other governmental departments or ministries as well. Involvement of these units throughout the EA process is a logical element of institutional strengthening, since it provides on-the-job training and continuity which will contribute to successful implementation of EA recommendations. It is also important to use local expertise (supported by international consultants where necessary) in preparing EAs, so that country EA capability is strengthened.

53. Because EA requires analysis of the institutional requirements for implementation of environmentally sound projects, it often recommends institutional strengthening that extends beyond the project itself. Thus, there may be linkages between EAs and sector or country environmental strategy, policy, legislation and organization. Institutional strengthening is often the most important part of project work. However, there are limitations to what can be accomplished in a single project, besides strengthening the agencies directly involved.

54. TMs should take advantage of opportunities to produce an incremental improvement in institutional capacity outside the boundaries of the project—including line ministry staff in an EA training course for the implementing agency, for example—but there will often be need for strengthening beyond that which can reasonably be included. TMs should ensure that any such recommendations emerging from an EA are brought to the attention of colleagues concerned with sectoral policy planning and with formulation of environmental action plans (EAPs), environmental issues papers (EIPs), and country strategy. Chapter 5 discusses the strengthening of local capabilities and institutions.

Financial Intermediary Lending

55. The Bank increasingly supports development projects through loans to financial institutions, for onlending to sub-borrowers. The subprojects may be in a single sector, in the case of sector investment loans, or in more than one sector. The details of the subprojects are usually not known at the time of appraisal. Under these circumstances, the EA OD makes it clear that the participating organizations must fulfill the requirements for environmental review. Chapter 6 addresses alternative approaches for environmental reviews in financial intermediary lending.

MANAGEMENT OF ENVIRONMENTAL ASSESSMENT

Cost and Time to Prepare Environmental Assessments

56. The time required to prepare an EA, and the resulting cost, vary with the type, size and complexity of the project; the characteristics of its physical, sociocultural and institutional settings; and the amount and quality of environmental data already available. EAs need as much time as the feasibility study, of which EA is essentially a part. Therefore, EAs can take from less than six months to more than 18 months to complete, but many require about 12 months. EAs conducted according to Bank procedures do not delay projects; on the contrary, in many cases, they have shortened the total time from identification to operation, by revealing promptly environmental issues that might have halted work altogether, had they emerged at a later stage. Whether or not a particular EA actually delays a project depends largely on how well it is coordinated with feasibility studies and other preparation activities.

57. EA preparation cost rarely exceeds one percent of the total capital cost of the project and is frequently less than that. The cost of implementing mitigating measures can range from 0 to 10 percent of total project cost, with 3 to 5 percent being common. These estimates do not take into account possible cost savings that result from implementing EA recommendations that reduce or avoid the costs of environmental impacts or allow environmental objectives to be met in a more cost-effective manner. For example, project-induced epidemics of malaria or schistosomiasis, ignoring the costs in human misery, may cost millions (US\$) to bring under control, compared to the relatively minor costs of preventing them.

Sources of Financing

58. It is the borrower's responsibility to conduct and finance EAs, and in general, they are financed in the same way as feasibility studies. EAs can be considered part of project preparation costs and funded through Project Preparation Facilities, or through grants from various environmental trust funds. Other possible sources of EA funding are international NGOs and major foundations with environmental interests. In the case of financial intermediary lending, where the participating institutions have to carry out much or all of the entire environmental review, technical assistance components can be incorporated into the project to set up the procedures and organization. The routine costs thereafter become the responsibility of the participating institutions.

Procurement of Consultants

59. Although there are countries where government agencies themselves are capable of preparing EAs, the usual method is for the borrower to obtain specialist consultants, just as they often do for feasibility studies. EAs require interdisciplinary analysis and are therefore prepared by teams: members work together in the field. The disciplines listed below are generally represented on the core team for any EA.

- project manager: often a planner, social or natural scientist, or environmental engineer; has experience in preparing several, similar EAs; has management skills and sufficiently broad

training and/or experience to be able to provide overall guidance and to integrate the findings of individual disciplines;

- ecologist or biologist (aquatic, marine or terrestrial specializations, as appropriate);
- sociologist/anthropologist: has experience with communities similar to that of the project;
- geographer or geologist/hydrologist/soils scientist; and
- urban or regional planner: has experience in developing countries.

If the project is in the agricultural sector, an agronomist, land-use specialist, forest scientist, or fisheries biologist, as appropriate, should be included in the core team. For industrial or energy projects, an engineer with the corresponding expertise (such as in pollution control) will be needed.

60. The core team needs to be supported by various specialists depending on the project and its setting. Table 1.6 shows some of the specialties that should be called upon.

61. EA specialists can be obtained from a variety of sources. Large international environmental consulting firms have many of the necessary disciplines on staff or in subconsultant arrangements, and can form and manage teams for any EA. There are also smaller firms that specialize in EA and manage EAs. They are more likely to need subconsultants to fill out EA teams.

62. The expertise of local consulting firms varies from country to country. Frequently a local firm will be able to provide experts (e.g., from local universities or institutions) to participate in an EA as a core team member or a specialist. It is less common, at present, to find local firms with experience and capability to carry out an EA on their own. Where such firms do exist, they should be seriously considered for EA projects. Where they do not, the Bank is committed to using the EA process to promote and develop such capabilities. Therefore, local firms should be participants in EAs being managed by international firms. This provides the local staff with on-the-job training, and provides the international staff with essential local knowledge and experience.

63. Other sources of experts include research institutions (e.g., marine institutes, tropical medicine research centers, national research institutions), colleges and universities, academies of science and technology, government agencies in the country and in other countries (loans and exchanges may be possible), and NGOs.

64. The method for selecting consultants depends on the source of finance. The Bank has published its procedures in Use of Consultants by World Bank Borrowers and by The World Bank as Executing Agency: Guidelines. The borrowing country may have established procedures for obtaining consultants for studies and design projects, or for EA. Other donors may be involved and they, too, have procedures. TMs should review such procedures to ensure that they are generally consistent with the Bank's objectives.

65. When the Bank is funding the EA directly, the Guidelines should supersede the borrower's procedures. In any case, the Bank's recommended method for procuring consulting services is for the borrower to invite proposals from a short list of three to six firms or joint ventures and to follow formal procedures to select the best qualified. The REDs may be requested to assist TMs in advising the borrowers, where appropriate.

Table 1.6. Specialists Related to Environmental Assessment

Natural Resource	Subcomponent	Specialist
Air	Air quality Wind direction/speed Precipitation/humidity Temperature Noise	Air quality/pollution analyst Air pollution control engineer Meteorologist Noise expert
Land	Land capability Soil resources/structure Mineral resources Tectonic activity Unique features	Agronomist Soils engineer Soils scientist Civil engineer Geologist Geotechnical engineer Mineralogist Mining engineer Engineering geologist Seismologist
Water	Surface waters Groundwater regime Hydrologic balance Drainage/channel pattern Flooding Sedimentation	Hydrologist Water pollution control engineer Water quality/pollution analyst Marine biologist/engineer Chemist Civil/sanitary engineer Hydrogeologist
Flora and fauna	Environmentally sensitive areas: wetlands, marshes, wildlands, grasslands, etc. Species inventory Productivity Biogeochemical/nutrient cycling	Ecologist Forester Wildlife biologist Botanist Zoologist Conservationist
Human	Social infrastructure/ institutions Cultural characteristics Physiological and psychological well-being Economic resources	Social anthropologist Sociologist Archaeologist Architect Social planner Geographer Demographer Urban planner Transportation planner Economist

66. The Bank can assist and advise the borrower in the procurement process on request. The Bank does not ordinarily take part in preparing short lists (except in very unusual cases, which are covered in the Guidelines), evaluating proposals, or negotiating contracts. However, the Bank reviews TORs and short lists, and will guide borrowers to sources of information on available consultants. The Bank officially approves TORs, short lists and draft contracts only when it is funding the EA.

67. It is sometimes useful to prepare the short list by soliciting letters of qualifications from a longer list of consultants. This yields a short list made up of firms which are both qualified to perform the work and interested in being considered to perform it. It is not necessary when the borrower develops an adequate list without it.

68. The selection process should be based primarily on technical competence and experience. The Guidelines allow the use of price as a selection criterion only under very restricted circumstances. It is highly unlikely that such circumstances would apply to an EA, as such studies are inherently complex, with outputs that are difficult to specify completely in advance.

69. Under technical competence, the borrower should examine the following:

- the experience in EA of the firm or joint venture;
- the adequacy of the proposed work plan in terms of demonstrated understanding of the project, responsiveness to the TORs, and effective management of the work; and
- the qualifications of the personnel to be assigned, in terms of education, training and experience; suitability to perform the duties to be assigned; language skills; successful EA experience in similar situations; experience in developing countries; and experience in the particular country or region.

70. If overseas firms are used, the REDs and the CD Environmental Coordinators can package assignments so that the experts' time and cost can be shared by several projects in the region. Packaging opportunities within one CD can reap major cost savings.

71. The Bank normally comments on the successful proposal before the borrower begins negotiations, and on the contract before it is executed. Negotiation often results in changes to the consultant's proposed work plan or EA team, to best suit the needs of the borrower and the project.

CONCLUSION

72. EA is a tool to assist TMs in making good decisions: to screen projects efficiently for their environmental impacts; to clarify to governments what is needed for sustainable projects; and to design them effectively. If EA is approached positively as an opportunity to find out a lot about a project before costly problems arise, the combined experience gained Bank-wide will produce increasingly flexible and cost-effective procedures. It is in that spirit and with that goal that this Sourcebook is offered.

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Operational Directive

Operational Directive 4.00, Annex A: Environmental Assessment

Introduction

1. This annex outlines Bank policy and procedures for the environmental assessment (EA) of Bank investment lending operations,¹ and related types of environmental analysis. EA is a flexible procedure, which can vary in breadth, depth, and type of analysis, depending on the project. It may be carried out at one point in time, stretched over a year to account for seasonal variations, or done in discrete stages.

2. For the purpose of this annex, EA covers also project impacts on health, cultural property, and tribal people, and the environmental impact of project-induced resettlement.² EAs utilize the findings of country environmental studies and action plans which cover nationwide issues, the overall policy framework, legislation, and institutional capabilities in the country.

Purpose and Nature of EA

3. The purpose of EA is to ensure that the development options under consideration are environmentally sound and sustainable, and that any environmental consequences are recognized early in the project cycle and taken into account in project design. EAs identify ways of improving projects environmentally, and minimizing, mitigating, or compensating for adverse impacts. By alerting project designers, implementing agencies, and borrower and Bank staff to issues early, EAs (a) enable them to address environmental issues

in a timely and practical fashion, (b) reduce the need for project conditionality, because appropriate steps can be taken in advance or incorporated into project design, and (c) help avoid costs and delays in implementation due to unanticipated environmental problems. EAs also provide a formal mechanism for inter-agency coordination and for addressing the concerns of affected groups and local nongovernmental organizations (NGOs). In addition, they can play a major role in building environmental capability in the country.

4. Like economic, financial, institutional, and engineering analyses, EA is part of project preparation, and is therefore the borrower's responsibility. Close integration of EA with these other aspects of project preparation ensures that (a) environmental considerations are given due weight in project selection, siting, and design decisions, and (b) carrying out EAs does not unduly delay project processing.

Types of Environmental Analysis

Project-Specific EAs

5. Project-specific EAs are used to analyze specific investment projects (e.g., dams, factories, irrigation systems) with significant environmental issues. The detail and sophistication of analysis should be commensurate with the expected impacts. A project-specific EA should normally cover: (a) existing environmental "baseline" conditions; (b) potential environmental

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1. References to the Bank include IBRD and IDA; "loans" include credits. Investment lending covers specific and sector investments including rehabilitation, loans through financial intermediaries, and the investment component of hybrid loans. Sector and structural adjustment loans are not covered by this annex, but are subject to the general policies in OMS 2.36, *Environmental Aspects of Bank Work* (to be reissued as OD 4.00, *Environmental Policies*). IFC is developing similar procedures for environmental review, which reflect the special circumstances of its work. Bearing in mind its special circumstances, MIGA will cooperate with the Bank to ensure, to the extent possible, that the objectives of the directive are met in its operations.
2. For Bank policies regarding such impacts, see (a) OPN 11.03, *Management of Cultural Property in Bank-Financed Projects*, to be reissued as OD 4.50, *Cultural Property*; (b) OMS 2.34, *Tribal People in Bank-Financed Projects*, to be reissued as OD 4.40, *Tribal People*; and (c) OMS 2.33, *Social Issues Associated with Involuntary Resettlement in Bank-Financed Projects*, and OPN 10.08, *Operations Issues in the Treatment of Involuntary Resettlement in Bank-Financed Projects*, to be reissued as OD 4.30, *Involuntary Resettlement*.

impacts, direct and indirect,³ including opportunities for environmental enhancement; (c) systematic environmental comparison of alternative investments, sites, technologies, and designs; (d) preventive, mitigatory, and compensatory measures, generally in the form of an action plan; (e) environmental management and training, and (f) monitoring. To the extent possible, capital and recurrent costs, environmental staffing, training, and monitoring requirements, and the benefits of proposed alternatives and mitigation measures, should be quantified. Annex A1 gives a sample outline for a project-specific EA report, and Annex A2 is a checklist of specific issues to be covered where relevant.

Regional and Sectoral EAs

6. Regional EAs are used where a number of significant development activities with potentially cumulative impacts are planned for a reasonably localized area. In such cases, they are generally more efficient than a series of project-specific EAs, and may identify issues that the latter might overlook (e.g., interaction among effluents, or competition for water or land). Regional EAs compare alternative development scenarios, and recommend environmentally sustainable growth rates and land use patterns and policies. The study area is normally defined on a physical and/or biological basis (e.g., airshed, habitat type, river basin), and may sometimes extend across national boundaries; however, regional EAs with an institutional focus might follow administrative boundaries instead.

7. Sectoral EAs are used for the design of sector investment programs. They are particularly suitable for reviewing (a) sector investment alternatives; (b) the effect of sector policy changes; (c) institutional capacities and requirements for environmental review, implementation, and monitoring at the sectoral level; and (d) the cumulative impacts of many relatively small, similar investments which do not merit individual project-specific EAs.

8. In some cases, regional or sectoral EAs cover all the normal requirements of project-specific EAs. More often, the latter are still needed for major investments (see para. 14 concerning sector investment loans), but the regional or sectoral EAs will have identified the relevant issues, collected much of the data, and, in general, greatly reduced the work needed in the project-specific EAs.

Alternatives to EAs

9. Alternative approaches that focus on a narrower range of issues are acceptable for many types of projects, especially smaller ones and those not in environmentally sensitive areas. These approaches may be more effective in integrating environmental concerns into the borrower's planning process. Such alternative approaches include:

- (a) integrated pest management programs for many agricultural projects which do not involve major irrigation or land development;
- (b) specific environmental design criteria and pollution standards for small- or medium-scale industrial plants; and
- (c) specific environmental design criteria and construction supervision programs for small-scale rural works projects.

Other examples of projects for which alternative approaches are generally acceptable are listed in Annex A3, para. 3, under "Category B."

Consideration of Global Issues

10. A number of specialized agencies—inside and outside the U.N. system—carry out scientific investigations of global environmental issues (ozone depletion, global warming, hazardous wastes, etc.). The Bank keeps fully abreast of findings, primarily through its Principal Adviser, Science and Technology, and draws upon prevailing views

3. Indirect impacts are the induced consequences of the project which occur later or in another part of the environment, e.g., if a river is channelled or dammed, its capacity for self-purification may be reduced and the original aquatic ecosystem damaged or destroyed.

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in developing its own environmental, economic, and sectoral policies, with a view to minimizing possible adverse impacts on global systems such as the atmosphere and oceans. While EAs should collect or refer to the relevant data, the Bank does not normally expect global environmental issues to require separate analysis in project-specific EAs. Such issues should, however, be addressed where relevant in policy and sector work.

Institutional Aspects of Projects

Inter-Agency Coordination

11. Because environmental issues generally involve national, regional, and local government agencies, and cover a broad range of responsibilities (wildlife, health, water and land use, tourism, etc.), coordination among government agencies is crucial. This is best achieved through inter-agency meetings at key points in the EA cycle. The first meeting, normally held soon after the decision to prepare an EA, identifies the issues, types of analysis required, sources of relevant expertise, responsibilities and schedule for the EA, and mitigating measures to be considered. Another meeting should normally be held when the EA report is completed and submitted for final government review.

Involvement of Affected Groups and Nongovernmental Organizations

12. The Bank expects the borrower to take the views of affected groups and local NGOs⁴ fully into account in project design and implementation, and in particular in the preparation of EAs. This is important in order to understand both the nature and extent of any social or environmental impact, and the acceptability of proposed mitigation measures. An approach which has proven effective in many countries is to expand the initial inter-agency meeting (para. 11) into a "forum" or "scoping session" with representatives of affected groups and relevant NGOs. Similar con-

sultations after the EA report is completed are also a valuable way to obtain feedback on the report and to increase community cooperation in implementing the recommendations.

Strengthening Environmental Capabilities

13. The ultimate success of EA depends upon the development of environmental capability and understanding in the agencies concerned. Projects with major potential impacts normally require the establishment or strengthening of in-house environmental units for the project (located or represented on site), the implementing agency and the ministry. Involvement of these units throughout the EA process (a) ensures that the agency's/ministry's knowledge and perspective are taken into account in the EA, (b) provides on-the-job training for the staff, and (c) provides continuity for the implementation of the EA's recommendations. Such projects normally need to include an institutional development and training component for such units. In addition, to help develop EA capability in the country, the Bank should (a) encourage the use of local expertise in EA preparation (in association with international consultants, where appropriate), and (b) help arrange EA training courses for local specialist staff and consultants.

Sector and Financial Intermediary Lending

14. For sector investment loans and loans through financial intermediaries, subproject details may not be known at the time of project appraisal. In such cases, the project implementing institutions will need to screen subprojects (see para. 18) and carry out environmental analyses consistent with this directive. To ensure that this can be done, the Bank should appraise the implementing agencies' capabilities for EA, and strengthen them where necessary. The appraisal mission should also indicate the proper division of responsibility for preparing and reviewing EAs between the ultimate borrower, the financial

4. See OD 14.70, *Involving Nongovernmental Organizations in Bank-Supported Activities* for the Bank's overall approach to NGOs.

intermediary or sector agency, and the agencies responsible for environmental regulation.

Environmental Advisory Panels

15. For major projects with serious and multi-dimensional environmental concerns, the Bank should explore with the borrower whether the latter needs to engage an advisory panel of independent, internationally recognized, environmental specialists, to review and advise on, *inter alia*, the terms of reference (TOR) and findings of the EA, the implementation of its recommendations, and the development of environmental capacity in the implementing agency/ministry. Such a panel should meet at least once a year until the project is operating routinely and environmental issues have been addressed satisfactorily.⁵

EA Procedures

Overview

16. Though EA preparation is the responsibility of the borrower, the task manager (TM) in the Bank assists and monitors the EA process, with support mainly from the Regional environment division (RED). The borrower and the Bank should agree as early as possible on the selection of consultants or borrower staff to prepare the EA, and the EA procedures, schedule, and outline. Major steps in the EA process normally include: (a) screening, (b) decisions based on the Initial Executive Project Summary (IEPS), (c) notification to the Board through the Monthly Operational Summary (MOS), (d) preparation of TORs for the EA, (e) EA preparation, (f) EA review and incorporation of environmental measures into the project, (g) supervision, and (h) ex post evaluation.

17. Since project and country conditions, national legislation, and institutional experience vary among borrowers, both the borrower and the Bank must exercise judgement in using these procedures to design and implement projects

which are both environmentally and economically sound, and consistent with the environmental laws, policies, and procedures of the borrower. The Environment Department (ENV), Legal Department, and the REDs maintain information on these requirements.

Screening

18. Projects/components should be screened at identification by the TM, with advice from the RED, and assigned to one of the following categories based upon the nature, magnitude, and sensitivity of environmental issues:

Category A—EA is normally required as the project may have diverse and significant environmental impacts.

Category B—More limited environmental analysis is appropriate, as the project may have specific environmental impacts.

Category C—Environmental analysis is normally unnecessary.

Category D—Environmental projects, for which separate EAs may not be required, as environment would be a major focus of project preparation.

Annex 3 gives illustrative lists, to be applied flexibly, of the type of project/component in each category.

Initial Executive Project Summary

19. In the IEPS, the TM, in consultation with the RED, should (a) identify key environmental issues, (b) indicate the category (A-D) and the type of environmental analysis recommended, and (c) provide a preliminary EA schedule. If an EA is not likely to be available prior to appraisal, the

5. See OD 4.00, Annex B, *Environmental Policy for Dam and Reservoir Projects*, para. 18, for more details on the selection and functions of the panel.

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IEPS should propose special procedures to address the situation. The IEPS meeting would confirm the type, timing, and issues of environmental analysis (although in the event of inadequate information, the decision may be deferred).

Monthly Operational Summary

20. The TM should ensure that the MOS, which is used to alert the executive directors to forthcoming projects, contains the following information as soon as available: (a) the category assigned (A-D); (b) the main issues to be examined; (c) whether agreement with the borrower has been reached on EA preparation; and (d) the EA schedule. The MOS entry should be updated whenever appropriate to reflect the progress of the EA, and the related Bank and borrower decisions.

Preparation of TORs for the EA

21. Following the IEPS meeting, the Bank should discuss with the borrower the scope of the EA, and assist the borrower, as necessary, in preparing TORs for the EA. For this purpose, a field visit by Bank environmental staff is generally desirable. The Bank should ensure that the TORs provide for adequate inter-agency coordination (para. 11) and consultation with affected groups and local NGOs (para. 12).

EA Preparation

22. An EA for a major project typically takes 6-18 months to prepare and review. EA drafts should be available at key points in the project cycle. The final EA should be available prior to appraisal, to minimize the risk of project design changes and resultant delays at a late stage.

23. In most cases, the EA should form part of the overall feasibility study, so that the EA's findings are directly integrated into project design. However, the EA is normally prepared separately by specialists. For projects which would have major impacts, such as large dams or projects

involving large scale resettlement, it is recommended that the borrower retain independent experts not affiliated with the project. Borrowers may request Bank assistance for financing EAs through a Project Preparation Facility (PPF) advance,⁶ or from the Technical Assistance Grant Program for the Environment. EAs generally account for 5-10 percent of the cost of project preparation.

24. For some projects, a full year of baseline data is desirable to capture the seasonal effects of certain environmental phenomena; however, so as not to delay critical project decisions, short-term monitoring should be used to provide conservative estimates of environmental impacts, while longer-term data collection is being undertaken. Since special care in designing the baseline monitoring program is warranted, the borrower should be encouraged to discuss the matter with the Bank.

EA Review and Project Appraisal

25. The borrower should submit the final EA report to the Bank prior to Bank appraisal. The EA report is the borrower's property, but the Bank encourages the borrower to release relevant information to appropriate interested parties. The Final Executive Project Summary should summarize the EA's status and describe how major environmental issues have been resolved or are to be addressed, noting any proposed conditionality. The appraisal mission should review both the procedural and substantive elements of the EA with the borrower, resolve any issues, assess the adequacy of the institutions responsible for environmental management in light of the EA's findings, and determine if the EA's recommendations are properly addressed in project design and economic analysis.

Loan Documents

26. The EA procedures followed and the EA's main findings should be explained briefly in the text of the Staff Appraisal Report (SAR) and the

6. See OMS 2.15, *Project Preparation Facility*, to be reissued as OD 8.00.

³²
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Memorandum and Recommendation of the President. An SAR annex should summarize the EA more fully, covering, *inter alia*, environmental baseline conditions, alternatives considered, mitigating and compensatory actions, capability of environmental units and measures to strengthen them, environmental monitoring arrangements, and the borrower's consultations with affected groups and NGOs. These factors will provide the basis for the RED's formal environmental clearance prior to the authorization of negotiations by the Regional vice president. Measures critical to sound project implementation may require specific loan conditionality.

Supervision

27. EA recommendations provide the basis for supervising the environmental aspects of project

implementation. Compliance with environmental conditionality, the status of mitigating measures, and the findings of monitoring programs should be part of borrower reporting requirements and project supervision. When major issues arise, special supervision missions with adequate environmental expertise may be needed.

Ex Post Evaluation

28. The project completion report⁷ submitted to the Operations Evaluation Department should evaluate (a) environmental impacts, noting whether they were anticipated in the EA report, and (b) the effectiveness of mitigating measures taken and of institutional development and training.

7. See the OPNSV memoranda, *Guidelines for Preparing Project Completion Reports*, June 7, 1989, and OMS 3.58, *General Guidelines for Preparing Project Completion Reports*, which are to be combined and reissued as OD 13.55, *Project Completion Reports*.

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Sample Outline of a Project-Specific EA Report

1. EA reports should be concise and limited to significant environmental issues. The detail and sophistication of analysis should be commensurate with the potential impacts. The target audience should be project designers, implementing agencies, and borrower and Bank staff.
2. The EA report should include:
 - (a) *Executive Summary.* Concise discussion of significant findings and recommended actions.
 - (b) *Policy, legal, and administrative framework* within which the EA is prepared. The environmental requirements of any cofinanciers should be explained.
 - (c) *Project description* in a geographic, ecological, social, and temporal context, including any off-site investments that may be required by the project (e.g., dedicated pipelines, access roads, power plants, water supply, housing, and raw material and product storage facilities).
 - (d) *Baseline Data.* Dimensions of the study area and description of relevant physical, biological, and socio-economic conditions, including any changes anticipated before the project commences. Current and proposed development activities within the project area (but not directly connected to the project) should also be taken into account.
 - (e) *Environmental Impacts.* The positive and negative impacts likely to result from the proposed project should be identified and assessed. Mitigation measures and the residual impacts that cannot be mitigated should be identified. Opportunities for environmental enhancement should be explored. The extent and quality of available data, key data gaps, and uncertainties associated with predictions should be identified/estimated. Topics that do not require further attention should be specified.
 - (f) *Analysis of Alternatives.* Proposed investment design, site, technology, and operational alternatives should be compared systematically in terms of their potential environmental impacts; capital and recurrent costs; suitability under local conditions; and institutional, training, and monitoring requirements. To the extent possible, for each of the alternatives, the environmental costs and benefits should be quantified, and economic values attached where feasible.
 - (g) *Mitigation Plan.* Feasible and cost-effective measures which may reduce potentially significant adverse environmental impacts to acceptable levels should be proposed, and the potential environmental impacts, capital and recurrent costs, and institutional and training requirements of those measures estimated. The plan (sometimes known as an "action plan" or "environmental management plan") should provide details on proposed work programs and schedules, to ensure that the proposed environmental actions are in phase with engineering activities throughout preparation. The plan should consider compensatory measures if mitigation measures are not feasible or cost-effective.
 - (h) *Environmental Management and Training.* The existence, role, and capability of environmental units at the on-site, agency, and ministry level should be assessed, and recommendations made concerning the

establishment and/or expansion of such units, and the training of staff, to the point that EA recommendations can be implemented.

- (i) *Monitoring Plan* regarding environmental impacts and performance. The plan should specify the type of monitoring, who would do it, how much it would cost, and what other inputs (e.g., training) are necessary.

Appendices

- (i) *List of EA preparers*—individuals and organizations.

- (ii) *References*—written materials used in study preparation. This is especially important given the large amount of unpublished documentation often used.

- (iii) *Record of Inter-Agency/Forum Meeting*, including list of both invitees and attendees. Where the views of affected groups and local NGOs were obtained by other means, these should be specified.

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Checklist of Potential Issues for an EA

Where applicable, EAs should address the following issues, which are subject to the Bank policies and guidelines identified below.

- (a) *Agrochemicals.* The Bank promotes the use of integrated pest management (IPM) and the careful selection, application, and disposal of pesticides (see OPN 11.01, *Guidelines for the Selection and Use of Pesticides in Bank-Financed Projects and their Procurement when Financed by the Bank*, to be reissued as OD 4.00, Annex C, *Agricultural Pest Management, and Selection and Use of Pesticides*). The use of fertilizers, due to their impacts on surface and groundwater quality, must also be carefully assessed.
- (b) *Biological Diversity.* The Bank promotes conservation of endangered plant and animal species, critical habitats, and protected areas (para. 9b, OMS 2.36, *Environmental Aspects of Bank Work*, and OPN 11.02, *Wildlands: Their Protection and Management in Economic Development*, to be reissued as OD 4.00, Annex D, *Wildlands: Their Protection and Management*).
- (c) *Coastal and Marine Resources Management.* Guidelines are available from the Environmental Department (ENV) on the planning and management of coastal marine resources including coral reefs, mangroves, and wetlands.
- (d) *Cultural Properties.* OPN 11.03, *Management of Cultural Property in Bank-Financed Projects* (to be reissued as OD 4.50, *Cultural Property*), confirms the Bank's commitment to actively protect archaeological sites, historic monuments, and historic settlements.
- (e) *Dams and Reservoirs.* OD 4.00, Annex B, *Environmental Policy for Dam and Reservoir Projects*, provides specific guidance for addressing environmental issues in the planning, implementation, and operation of dam and reservoir projects.
- (f) *Hazardous and Toxic Materials.* Guidelines are available from ENV on the safe manufacture, use, transport, storage, and disposal of hazardous and toxic materials.
- (g) *Induced Development and Other Socio-Cultural Aspects.* Secondary growth of settlements and infrastructure, often referred to as "induced development" or "boomtown" effects, can have major indirect environmental impacts, which relatively weak local governments may have difficulty addressing.
- (h) *Industrial Hazards.* All energy and industry projects should include a formal plan to prevent and manage industrial hazards. (See *Techniques of Assessing Industrial Hazards—A Manual*, World Bank Technical Paper No. 55.)
- (i) *International Treaties and Agreements on the Environment and Natural Resources.* EAs should review the status and application of such current and pending treaties and agreements, including their notification requirements. The Legal Department maintains a list of international treaties, and could obtain, whenever required, information on applicable law in individual countries.
- (j) *International Waterways.* OD 7.50, *Projects on International Waterways* provides guidance. This OD exempts from notification requirements rehabilitation projects which will not affect the quality or quantity of water flows.
- (k) *Involuntary Resettlement.* OMS 2.33, *Social Issues Associated with Involuntary Resettlement in Bank-Financed Projects*, and OPN 10.08, *Operations Issues in the Treatment of Involuntary Resettlement in Bank-Financed Projects* (to be reissued as OD 4.30, *Involuntary Resettlement*), provide guidance.

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- (l) *Land Settlement.* Due to the complex physical, biological, socioeconomic, and cultural impacts, land settlement should generally be carefully reviewed (see OD 4.31, *Land Settlement*, to be issued).
- (m) *Natural Hazards.* EAs should review whether the project may be affected by natural hazards (e.g., earthquakes, floods, volcanic activity), and should propose specific measures to address these concerns when appropriate (see OD 8.50, *Emergency Recovery Assistance*, to be issued).
- (n) *Occupational Health and Safety.* All industry and energy projects, and projects in other sectors where relevant, should include a formal plan to promote occupational health and safety (*Occupational Health and Safety Guidelines*, World Bank, 1988).
- (o) *Tribal Peoples.* OMS 2.34, *Tribal People in Bank-Financed Projects* (to be reissued as OD 4.40, *Tribal People*), provides specific guidance for addressing the rights of tribal peoples, including traditional land and water rights.
- (p) *Tropical Forests.* The Bank co-authored the Tropical Forest Action Plan (published in 1984); up-to-date information is available from ENV. OPN 11.02, *Wildlands: Their Protection and Management in Economic Development* (to be reissued as OD 4.00, Annex D), also addresses issues relating to tropical forests.
- (q) *Watersheds.* Bank policy is to promote protection and management of watersheds as an element of lending operations for dams, reservoirs, and irrigation systems (OD 4.00, Annex B, *Environmental Policy for Dam and Reservoir Projects*, para. 6).
- (r) *Wetlands.* The Bank promotes conservation and management of wetlands (e.g., estuaries, lakes, mangroves, marshes, and swamps). This is covered by OPN 11.02 on wildlands (see (s) below).
- (s) *Wildlands.* The Bank is committed to protect wildlands, including through compensatory measures when lending could result in adverse impacts (see OPN 11.02, *Wildlands: Their Protection and Management in Economic Development*, to be reissued as OD 4.00, Annex D, *Wildlands: Their Protection and Management*).

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Environmental Screening

Introduction

1. The task manager, in consultation with the Regional environment division, is responsible for screening a proposed project to determine the appropriate type of environmental analysis, based on the nature, potential magnitude, and sensitivity of the issues. The categories below, based upon prior Bank staff experience, are strictly illustrative. Alternatives to EA are acceptable where they are expected to result in an environmentally sound project.

2. *Category A: Projects/Components Which May Have Diverse and Significant Environmental Impacts—Normally Require EA¹*

- (i) Aquaculture/Mariculture (large scale);
- (ii) Dams and Reservoirs;²
- (iii) Electrical Transmission (large scale);
- (iv) Forestry;
- (v) Industrial Plants (large scale) and Industrial Estates;
- (vi) Irrigation and Drainage (large scale);
- (vii) Land Clearance and Leveling;
- (viii) Mineral Development (including oil and gas);
- (ix) Pipelines (oil, gas, and water);

- (x) Port and Harbor Development;
- (xi) Reclamation and New Land Development;
- (xii) Resettlement;³
- (xiii) River Basin Development;
- (xiv) Rural Roads;
- (xv) Thermal and Hydropower Development;
- (xvi) Tourism (large scale);
- (xvii) Transportation (airports, railways, roads, waterways);
- (xviii) Urban Development (large scale);
- (xix) Urban Water Supply and Sanitation (large scale);
- (xx) Manufacture, Transportation, and Use of Pesticides or other Hazardous and/or Toxic Materials;⁴ and
- (xxi) Projects which Pose Serious Accident Risks.⁵

3. *Category B: Projects/Components which may Have Specific Environmental Impacts—More Limited Environmental Analysis Appropriate*

Projects in this category normally require more limited environmental analysis than an EA.

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1. Except generally for projects directed to rehabilitation, improved operation and maintenance, and limited upgrading of facilities.
 2. See OD 4.00, Annex B, *Environmental Policy for Dam and Reservoir Projects*.
 3. While OMS 2.33, *Social Issues Associated with Involuntary Resettlement in Bank-Financed Projects* (to be reissued as OD 4.30, *Involuntary Resettlement*), covers the social aspects of resettlement, the environmental implications of the resettlement itself can be major.
 4. In some cases, adherence to existing directives is an acceptable alternative to an EA (e.g., OPN 11.01, *Guidelines for the Selection and Use of Pesticides in Bank-Financed Projects and their Procurements when Financed by the Bank*, to be reissued as OD 4.00 Annex C, *Agricultural Pest Management, and Selection and Use of Pesticides*). Certain materials (e.g. PCBs) are not to be used in Bank projects and other materials (e.g. asbestos) are to be used only under extremely restricted conditions. A Restricted Toxic Materials List (RTML) will be available from ENV and updated periodically.
 5. See *Techniques of Assessing Industrial Hazard—A Manual*, World Bank Technical Paper No. 55.

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A wide range of environmental guidelines, developed by a number of organizations, are applicable. In addition, specific environmental pollution standards or design criteria can be developed for individual projects.

- (i) Agroindustries (small scale);
- (ii) Aquaculture and Mariculture (small scale);
- (iii) Electrical Transmission (small scale);
- (iv) Industries (small scale);
- (v) Irrigation and Drainage (small scale);
- (vi) Mini Hydro-Power;
- (vii) Public Facilities (hospitals, housing, schools, etc.);
- (viii) Renewable Energy;
- (ix) Rural Electrification;
- (x) Telecommunications;
- (xi) Tourism (small scale);
- (xii) Urban Development (small scale); and
- (xiii) Rural Water Supply and Sanitation.

4. *Category C: Projects/Components which Normally Do Not Result in Significant Environmental Impact—Environmental Analysis Normally Unnecessary*

Opportunities to enhance environmental benefits should be sought in these projects.

- (i) Education (except school construction);
- (ii) Family Planning;
- (iii) Health (except hospital construction);
- (iv) Nutrition;
- (v) Institutional Development; and
- (vi) Technical Assistance.

5. *Category D: Environmental Projects*

Projects with a major environmental focus may not require a separate EA, as environment would be a major part of the project preparation.

6. *Emergency Recovery Projects*

Because emergency recovery projects (a) need to be processed rapidly, and (b) seek mainly to restore existing facilities, they normally would not require a full EA. However, the extent to which the emergency was precipitated and/or exacerbated by inappropriate environmental practices should be determined, and corrective measures built into either the emergency project or a future lending operation.⁶

ANNEX 1-2

Sample Terms of Reference (TOR) for Environmental Reconnaissance

1. Background information.

- Brief project description and alternatives considered in its planning
- Description of site: geographical and state of development (developed vs. greenfield)
- Potential impacts of project
- Purpose of overall mission to which expert will be assigned (project preparation, appraisal)
- Types of other experts on mission
- People and institutions whom expert should meet
- Mission timing
- Expected output of mission
- Background documents, including maps (as annexes)

2. Technical aspects.

- (a) **Objectives of the expert services.** A brief statement to ensure that all parties understand the purposes of the expert services and what is to be delivered upon its completion.
- (b) **Issues for study.** Describe the key issues to be studied by the expert.
- (c) **Scope of study.** Describe here the nature and extent to which the expert will examine the issues. Include phrase "not necessarily limited to" as indication that the expert is to identify and, after authorization, to work on other issues of importance should they emerge.
- (d) **Government's role in EA.** If not done by others it may be desirable for the expert also to appraise the government's role and capabilities to carry out and deliver environmental assessments and to recommend how this may be implemented and, if necessary, strengthened.
- (e) **Content of outputs.** Background, analysis, findings, recommendations, further actions, with timing and cost estimates.
- (f) **Form of outputs.** (Section of Aide Memoire, sections of other reports, free-standing report.)

3. Administrative aspects. (These could be in the letter of solicitation and not duplicated here if in the letter.)

- Mission timing
- Expected person-days of effort: at home for background reading, in field, in Washington, home for report writing, and maximum number of paid days

ANNEX 1-3**Sample Terms of Reference (TOR)
for Environmental Assessment
(Name of Project Category)**

Note: Comments in [brackets and bold face type] in this TOR Outline indicate where content may have been included, excluded or modified in the project-specific sample TORs (see Annex 1-3A). When combined, the TOR Outline and the project-specific sample TORs provide comprehensive guidance for TOR preparation. Paragraph numbers in each text correspond for ease of reference.

1. **Introduction.** This section should state the purpose of the terms of reference, identify the development project to be assessed, and explain the executing arrangements for the environmental assessment.
2. **Background Information.** Pertinent background for potential parties who may conduct the environmental assessment, whether they are consultants or government agencies, would include a brief description of the major components of the proposed project, a statement of the need for it and the objectives it is intended to meet, the implementing agency, a brief history of the project (including alternatives considered), its current status and timetable, and the identities of any associated projects. If there are other projects in progress or planned within the region which may compete for the same resources, they should also be identified here.
3. **Objectives.** This section will summarize the general scope of the environmental assessment and discuss its timing in relation to the processes of project preparation, design, and execution.
4. **Environmental Assessment Requirements.** This paragraph should identify any regulations and guidelines which will govern the conduct of the assessment or specify the content of its report. They may include any or all of the following:
 - World Bank Operational Directive 4.00, Annex A: "Environmental Assessment," and other pertinent ODs, OMSs, OPNs, and Guidelines;
 - national laws and/or regulations on environmental reviews and impact assessments;
 - regional, provincial or communal environmental assessment regulations; and
 - environmental assessment regulations of any other financing organizations involved in the project.
5. **Study Area.** Specify the boundaries of the study area for the assessment (e.g., water catchment, airshed). If there are any adjacent or remote areas which should be considered with respect to

6. **Scope of Work.** In some cases, the tasks to be carried out by a consultant will be known with sufficient certainty to be specified completely in the terms of reference. In other cases, information deficiencies need to be alleviated or specialized field studies or modelling activities performed to assess impacts, and the consultant will be asked to define particular tasks in more detail for contracting agency review and approval. Task 4 in the Scope of Work is an example of the latter situation.
7. **Task 1. Description of the Proposed Project.** Provide a brief description of the relevant parts of the project, using maps (at appropriate scale) where necessary, and including the following information: location; general layout; size, capacity, etc.; pre-construction activities; construction activities; schedule; staffing and support; facilities and services; operation and maintenance activities; required off-site investments; and life span.

[Note: there may be particular types of information appropriate in the description of the project category you are concerned with. Please specify them here.]

8. **Task 2. Description of the Environment.** Assemble, evaluate and present baseline data on the relevant environmental characteristics of the study area. Include information on any changes anticipated before the project commences. [Annotate or modify the lists below to show the critical information for this project category, or that which is irrelevant to it. You should particularly avoid compiling irrelevant data.]
- (a) Physical environment: geology; topography; soils; climate and meteorology; ambient air quality; surface and groundwater hydrology; coastal and oceanic parameters; existing sources of air emissions; existing water pollution discharges; and receiving water quality.
 - (b) Biological environment: flora; fauna; rare or endangered species; sensitive habitats, including parks or preserves, significant natural sites, etc.; species of commercial importance; and species with potential to become nuisances, vectors or dangerous.
 - (c) Socio-cultural environment (include both present and projected where appropriate): population; land use; planned development activities; community structure; employment; distribution of income, goods and services; recreation; public health; cultural properties; tribal peoples; and customs, aspirations and attitudes.
9. **Task 3. Legislative and Regulatory Considerations.** Describe the pertinent regulations and standards governing environmental quality, health and safety, protection of sensitive areas, protection of endangered species, siting, land use control, etc., at international, national, regional and local levels (The TOR should specify those that are known and require the consultant to investigate for others.)
10. **Task 4. Determination of the Potential Impacts of the Proposed Project.** In this analysis, distinguish between significant positive and negative impacts, direct and indirect impacts, and immediate and long-term impacts. Identify impacts which are unavoidable or irreversible. Wherever possible, describe impacts quantitatively, in terms of environmental costs and benefits.

Assign economic values when feasible. Characterize the extent and quality of available data, explaining significant information deficiencies and any uncertainties associated with predictions of impact. If possible, give the TOR for studies to obtain the missing information. **[Identify the types of special studies likely to be needed for this project category.]**

11. **Task 5. Analysis of Alternatives to the Proposed Project.** Describe alternatives that were examined in the course of developing the proposed project and identify other alternatives which would achieve the same objectives. The concept of alternatives extends to siting, design, technology selection, construction techniques and phasing, and operating and maintenance procedures. Compare alternatives in terms of potential environmental impacts; capital and operating costs; suitability under local conditions; and institutional, training, and monitoring requirements. When describing the impacts, indicate which are irreversible or unavoidable and which can be mitigated. To the extent possible, quantify the costs and benefits of each alternative, incorporating the estimated costs of any associated mitigating measures. Include the alternative of not constructing the project, in order to demonstrate environmental conditions without it.
12. **Task 6. Development of Management Plan to Mitigate Negative Impacts.** Recommend feasible and cost-effective measures to prevent or reduce significant negative impacts to acceptable levels. Estimate the impacts and costs of those measures, and of the institutional and training requirements to implement them. Consider compensation to affected parties for impacts which cannot be mitigated. Prepare a management plan including proposed work programs, budget estimates, schedules, staffing and training requirements, and other necessary support services to implement the mitigating measures.
13. **Task 7. Identification of Institutional Needs to Implement Environmental Assessment Recommendations.** Review the authority and capability of institutions at local, provincial/regional, and national levels and recommend steps to strengthen or expand them so that the management and monitoring plans in the environmental assessment can be implemented. The recommendations may extend to new laws and regulations, new agencies or agency functions, intersectoral arrangements, management procedures and training, staffing, operation and maintenance training, budgeting, and financial support.
14. **Task 8. Development of a Monitoring Plan.** Prepare a detailed plan to monitor the implementation of mitigating measures and the impacts of the project during construction and operation. Include in the plan an estimate of capital and operating costs and a description of other inputs (such as training and institutional strengthening) needed to carry it out.
15. **Task 9. Assist in Inter-Agency Coordination and Public/NGO Participation.** Assist in coordinating the environmental assessment with other government agencies, in obtaining the views of local NGO's and affected groups, and in keeping records of meetings and other activities, communications, and comments and their disposition. (The TOR should specify the types of activities; e.g., interagency scoping session, environmental briefings for project staff and interagency committees, support to environmental advisory panels, public forum.)

16. **Report.** The environmental assessment report should be concise and limited to significant environmental issues. The main text should focus on findings, conclusions and recommended actions, supported by summaries of the data collected and citations for any references used in interpreting those data. Detailed or uninterpreted data are not appropriate in the main text and should be presented in appendices or a separate volume. Unpublished documents used in the assessment may not be readily available and should also be assembled in an appendix. Organize the environmental assessment report according to the outline below.

- Executive Summary
- Policy, Legal and Administrative Framework
- Description of the Proposed Project
- Description of the Environment
- Significant Environmental Impacts
- Analysis of Alternatives
- Mitigation Management Plan
- Environmental Management and Training
- Monitoring Plan
- Inter-Agency and Public/NGO Involvement
- List of References
- Appendices:
 - List of Environmental Assessment Preparers
 - Records of Inter-Agency and Public/NGO Communications
 - Data and Unpublished Reference Documents

(This is the format suggested in OD 4.00, Annex A-1; the TOR may specify a different one to satisfy national agency requirements as long as the topics required in the Bank's directive are covered.)

17. **Consulting Team.**

[Environmental assessment requires interdisciplinary analysis. Identify in this paragraph which specializations ought to be included on the team for the particular project category.]

18. **Schedule.** Specify dates for progress reviews, interim and final reports, and other significant events.

19. **Other Information.** Include here lists of data sources, project background reports and studies, relevant publications, and other items to which the consultant's attention should be directed.

ANNEX 1-3A**Sample Terms of Reference (TOR) for
Environmental Assessment of Wastewater Collection,
Treatment, Reuse, and Disposal Systems**

Note: paragraph numbers
correspond to TOR Outline

5. **Study Area.** The drainage area to be serviced by the wastewater collection system; the tracts of land on which effluent or sludge are to be applied in reuse systems; marine, estuarine or inland waters which could be influenced by effluent discharge; remote sites identified for disposal of solid waste generated in the treatment process; and, if incineration is included as a sludge disposal technique, the airshed which might be affected.

7. **Task 1. Description of the Proposed Project.** Provide a full description of the project, using maps (at appropriate scale) where necessary, and including the following information: location; general layout; unit process description and diagram; size in terms of population and population equivalents, present and projected; number and types of connected industries; anticipated influent and effluent characteristics; pre-construction activities; construction activities, schedule, staffing and support facilities and services; operation and maintenance activities, staffing and support facilities and services; required off-site investments; life span.

8. **Task 2. Description of the Environment.**
 - (a) **Physical environment:** geology (general description for overall study area; details for land application sites); topography; soils (general description for overall study area; details for land application sites); monthly average temperatures, rainfall and runoff characteristics; description of receiving waters (identity of streams, lakes, or marine waters; annual average discharge or current data by month, chemical quality; existing discharges or withdrawals).

 - (b) **Biological environment:** terrestrial communities in areas affected by construction, facility siting, land application or disposal; aquatic, estuarine or marine communities in affected waters; rare or endangered species; sensitive habitats, including parks or preserves, significant natural sites; species of commercial importance in land application sites and receiving waters.

 - (c) **Sociocultural environment:** present and projected population; present land use; planned development activities; community structure; present and projected employment by industrial category; distribution of income, goods and services; recreation; public health; cultural properties; tribal peoples, customs, aspirations, and attitudes.

9. **Task 3. Legislative and Regulatory Considerations.** Describe the pertinent regulations and standards governing environmental quality, pollutant discharges to surface waters and land, industrial discharges to public sewers, water reclamation and reuse, agricultural and landscape

use of sludge, health and safety, protection of sensitive areas, protection of endangered species, siting, land use control, etc., at international, national, regional and local levels. (The TOR should specify those that are known and require the consultant to investigate for others.)

10. **Task 4. Determination of the Potential Impacts of the Proposed Project.**

Special attention should be given to:

- the extent to which receiving water quality standards and/or beneficial use objectives will be achieved with the proposed type and level of treatment;
- the length of stream or expanse of lake or marine waters which will be positively or negatively affected by the discharge, and the magnitude of the changes in water quality parameters;
- projected quantitative changes in beneficial uses, such as fisheries (species composition, productivity), recreation and tourism (visitor-days, overnights, expenditures), waters available for portable supply, irrigation, industrial use; and
- sanitation and public health benefits anticipated.

17. **Consulting Team.**

Core team: environmental engineer; environmental planner (or environmental generalist); specialist in ecology (terrestrial, aquatic or marine, depending on type of discharge), water quality, soils science (for land application), wastewater utility management, and sociology/anthropology.

Other specialties that may be needed, depending on the nature of the project, are: public health, agronomy, hydrology, land use planning, oceanography, water quality modelling, and resource economics.

19. **Other Information.** Examples are pre-feasibility studies, population and land use projections, land use plans, industrial activity information, water quality studies, sewerage service needs surveys, public health reports, sewer system evaluations.

ANNEX 1-4

Operational Directives, Operational Manual Statements, and Operational Policy Notes Related to Environmental Review and Assessments

Note: In each subsection, precursory Manual Statements or Policy Notes are listed for further reference. Proposed Operational Directives are listed, whether or not a draft is available. In such cases, descriptive notes for the precursory policy will be provided in the appropriate section. Direct quotations are from the policy statements themselves.

Operational Directives

1. **OD 4.00: "Environmental Policies"** (to be issued). Will replace OMS 2.36: Environmental Aspects of Bank Work (May 1984).
2. **OD 4.00, Annex A: "Environmental Assessment"** (October 1989). "This annex outlines Bank policy and procedures for the environmental assessment (EA) of the Bank investment lending operations, and related types of environmental analysis." Annex A-1 is a sample outline of a project-specific EA report. Annex A-2 is a checklist of typical environmental issues encountered in Bank projects. Annex A-3 discusses Environmental Screening, the process of labeling projects according to probable environmental impacts.
3. **OD 4.00, Annex B: "Environmental Policy for Dam and Reservoir Projects"** (April 1989). Principles of planning (e.g., determination of affected area, costs and benefits, alternatives), environmental issues at each stage of the project cycle and institutional aspects are specified. Annex B-1 details typical environmental effects of dams and reservoir projects. Annex B-2 defines the area of influence for projects of this type. Annex B-3 is a sample TOR for environmental reconnaissance. Annex B-4 is "Sample Clauses for Inclusion in the Bidding Documents Related to the Construction of Dam and Reservoir Projects."
4. **OD 4.00, Annex D: "Wildlands: Their Protection and Management"** (to be issued). Will replace OPN 11.02: "Wildlands: Their Protection and Management in Economic Development" (June 1986).
5. **OD 4.02: "Agricultural Pest Management"** (Draft; replaces OD 4.00, Annex C). Provides guidance for pest management and the use of pesticides and promotes adoption of the Integrated Pest Management (IPM) approach, toward the "fundamental goal of increasing agricultural productivity on a sustainable basis." OD 4.02 is the guidelines for implementation of an IPM program, and it sets forth comprehensive guidance for the selection and use of pesticides. OD 11.00: "Guidelines for the Procurement of Pesticides" (Technical Note) will accompany OD 4.02. Replaces OPN 11.01: "Guidelines for Selection and Use of Pesticides in Bank-Financed Projects and Their Procurement when Financed by the Bank" (March 1985).
6. **OD 4.30: "Involuntary Resettlement"** (June 1990). Emphasizes: minimizing involuntary resettlement; providing people displaced with the means to restore or improve their former living standard;

resettlement planning; community participation; and compensation valuation and principles. Also provides practical guidance concerning project options, processing, documentation, etc.

7. OD 4.31: "Land Settlement" (to be issued).

8. OD 4.40: "Cultural Property." Replaces OMS 2.34: "Tribal People in Bank-Financed Projects" (February 1982).

9. OD 4.50: "Cultural Property." Replaces OPN 11.03: "Management of Cultural Property in Bank-Financed Projects" (September 1986).

10. OD 7.50: "Projects on International Waterways" (September 1989). Projects on international waterways require special handling as they may affect relations not only between the Bank and its borrowers but also between states, whether members of the Bank or not." This directive describes what types of waterways and projects are affected and the governing procedure. Annex A sets procedure for circumstances requiring technical advice from independent experts.

11. OD 8.0: "Project Preparation Facility" (to be issued). Will replace OMS 2.15: "Project Preparation Facility" (July 1986).

12. OD 8.30: "Financial Intermediary Lending" (to be issued). Will replace OMS 3.73: "Development Finance Companies" (September 1976).

13. OD 8.50: "Emergency Recovery Assistance" (Draft). This directive defines Bank objectives in emergency recovery loans (ERLS), i.e., to support broad recovery activities rather than provide immediate emergency relief. Preparation and implementation of ERLS is discussed comprehensively, as well as strategies for mitigating the impacts of future emergencies. Annex A discusses issues needing immediate attention after a disaster. Annex B lists and discusses special considerations in designing ERLS. Annex C provides guidance for preparation of a Technical Annex in lieu of the Staff Appraisal Report (when speed is essential). Replaces OPN 10.07: "Guidelines for Bank Participation in Reconstruction Projects after Disasters" (July 1984).

14. OD 9.00, Annex D: "Project Brief System" (to be issued). Will replace OMS 2.13 "Project Brief System."

15. OD 10.00 "Project Generation and Preparation" (to be issued). Will replace OMS 2.12: "Project Generation and Design" (August 1972).

16. OD 10.10: "Project Appraisal" (to be issued). Will replace OMS 2.20: "Project Appraisal" (January 1984).

17. OD 10.70: "Project Monitoring and Evaluation" (September 1989). Defines and distinguishes between monitoring and evaluation, and discusses Bank objectives in each. Provides comprehensive discussion of monitoring and the development of a management information system (MIS). An annex lists useful publications on project monitoring and evaluation.

18. **OD 11.10: "Use of Consultants"** (to be issued). Will replace OMS 2.18: **"The Development of Local Capabilities and the Use of Local Consultants"** (April 1977) and OMS 2.50: **"Services of Consulting Firms for Bank Group Projects and UNDP Studies"** (April 1973).

19. **OD 12.10: "Retroactive Financing"** (March 1989). Provides comprehensive discussion, including: policy regarding lending operations (investment, adjustment, hybrid, emergency recovery); exception to policy; safeguards; and notification procedures. Annexes provide sample formats for: **Monthly Operational Summary (Adjustment Operations)**; **Notice of Invitation to Negotiate for an Adjustment Operation Requiring an Exception to the Guidelines on Retroactive Financing**; and **Notice of Status of Negotiations for an Adjustment operation Requiring an Exception...etc.** (These last two annexes are adapted for an "Investment Operation" as well.

20. **OD 13.55: "Project Completion Reports"** (to be issued). Will replace OMS 3.58: **"General Guidelines for Preparing Project Completion Reports"** (June 1977) and OPNSV Memorandum: **"Guidelines for Preparing Completion Reports"** June (1989).

21. **OD 14.30: "Aid Coordination Groups"** (March 1989). This Directive provides guidance for coordination, taking into account not only various development assistance programs but also government policies and programs. Annex A is practical guidelines and procedures for preparing a **"Sample Transmittal Memorandum for Chairman's Report of Proceedings."** Annex C is a **"Sample Transmittal Memorandum for World Bank and Government Reports."** Annex D is a **"Sample Notice of Meeting, Proposed Agenda, and Note on Administrative Arrangements."**

22. **OD 14.70: "Involving Nongovernmental Organizations in Bank-Supported Activities"** (August 1989). The diversity of nongovernmental organizations (NGOs) is discussed, and ways to involve them in projects are laid out.

Operational Manual Statements

23. **OMS 2.12: "Project Generation and Design"** (August 1972). Discusses the Bank's approach to generating projects; the impacts of design alternatives on project outcome; Bank/Borrower relationships in project generation and design; and management of the process. Annex titles are: **Project Generation and Design: Definitions**; **Origin of Project Ideas**; **Project Identification/Formulation/Analysis Process Flow Chart**; and **Sources of Assistance in Project Identification and Preparation**. Will be replaced by OD 10.00.

24. **OMS 2.13: "Project Brief System"** (April 1977). Discussion of objectives of project brief (PB), "the basic issues-oriented operational document relating to the early part of the project cycle." Annex 1 provides practical guidance for preparation of documents. Annex 2 is comprehensive discussion of the PB system. Will be replaced by OD 9.00 Annex D.

25. **OMS 2.15: "Project Preparation Facility"** (July 1986). Provides discussion of rationale for Project Preparation Facility (PPF), including financial characteristics, appropriate application, and operating procedures. Annex A lists sources available for necessary preparatory work for Bank projects. Annex B-1 is a **"Model of Government Letter Requesting a PPF Advance."** Annex B-2 sets forth stipulations for financial advances. Annex B-3 is a **"Model of a Bank Response Granting a PPF Advance."**

Annex C is a sample agreement of how the special account will be set up. Annex D is a sample agreement for reporting arrangements. Annex E is a "PPF Request Transmittal Sheet." Will be replaced by OD 8.00.

26. **OMS 2.18: "The Development of Local Capabilities and the Use of Local Consultants"** (April 1977). Discusses the Bank's commitment to developing local capabilities to conceive, design and carry out development work, and to developing capabilities among local consultants specifically. Will be replaced by OD 11.10.

27. **OMS 2.20: "Project Appraisal"** (January 1984). Provides discussion of general objectives of appraisal; major aspects of the project (economic, technical, institutional, financial, commercial, sociological); technical assistance requirements; and procedures and responsibilities for appraisal. A circular is filed with OMS 2.20: "Construction Insurance Consultants" (with an annex listing analysis of project risks and insurance needs). Will be replaced by OD 10.10.

28. **OMS 2.34: "Tribal People in Bank-Financed Projects"** (February 1982). Discussion of characteristics of tribal people that make them particularly vulnerable to being adversely affected by projects. Concise overview of Bank policy and applicability.

29. **OMS 2.36: "Environmental Aspects of Bank Work."** States the Bank's emphasis on environmental opportunities and risks introduced by the development process: local, regional and global. Discussion of Bank environmental policies and responsibilities. Will be replaced by OD 4.00.

30. **OMS 2.50: "Services of Consulting Firms for Bank Group Projects and UNDP Studies."** Provides practical suggestions for involving local consultants in Bank projects; e.g., preparation of "short list," evaluation of consultants, and sample letter of invitation. Will be replaced by OD 11.10.

31. **OMS 3.02: "Format and Content of President's Report and Recommendations"** (December 1977). Comprehensive guidelines for preparation of the President's Report. Attachments provide instructions and sample formats for various parts of the report.

32. **OMS 3.58: "General Guidelines for Preparing Project Completion Reports"** (June 1977). Will be replaced by OD 13.55.

33. **OMS 3.73: "Development Finance Companies"** (September 1976). Will be replaced by OD 8.30.

Operational Policy Notes

34. **Addendum to OPN 11.01: "Guidelines for the Use, Selection and Specification of Pesticides in Public Health Programs"** (September 1987). Discusses vector control, guidelines for selecting pesticides for public health use, and specifications.

35. OPN 11.02: "Wildlands: Their Protection and Management in Economic Development" (June 1986). Provides discussion of justification for protection, the Bank's involvement to date, policy guidance, and design of wildland management areas (WMAs). Annex titles are: Categories of Wildland Management; Some Tropical Wildlands of Special Concern; [inclusion of wildlands management in] the Project Cycle; Physical Inputs required in Most WMAs [supplies, staffing, facilities]; and Wildland Survey and Management Form [sample]. Will be replaced by OD 4.00, Annex D.

36. OPN 11.03: "Management of Cultural Property in Bank-Financed Projects" (September 1986). Provides United Nations definition of cultural property, discussion of Bank policy, and guidance for procedure. Will be replaced by OD 4.50.

ANNEX 1-5**On Project-Level Guides
for Environmental Sustainability**

1. The Bank's OD on environmental assessment states that sustainability is a requirement that Bank projects must meet. "The purpose of EA is to ensure that the development options under consideration are environmentally sound and sustainable...." (OD 4.00 para 3, October 1989). Note that this language does not treat sustainability as one value to be traded off against others in an economic analysis. Rather it states that the "development options under consideration", i.e., all the options to be compared must be sustainable, so whatever is not sustainable is not even to be included among the options to be ranked economically. Some guidance on the operational meaning of sustainability was given in OMS 2.36 (May 1984), under the general heading of heading of "Environmental Aspects of Bank Work," para 9(a): "The Bank endeavors to ensure that each project affecting renewable natural resources (e.g., as a sink for residues or as a source of raw materials) does not exceed the regenerative capacities of the environment."
2. The stringency of the above requirements may sound extreme on first reading – as if we had abandoned economics as a criterion. Nothing could be further from the truth, however. The insistence that projects be sustainable is in fact the reassertion of the elementary economic principle that capital consumption must not be counted as income. Income is by definition the maximum amount that can be consumed out of the receipts of a project without impairing the capacity of that project to continue producing that amount in the future. A project that exceeds the regenerative capacities of its environment is reducing its future capacity to produce and to that extent is counting capital liquidation or depreciation as income. The World Bank should not be in the business of financing capital consumption. In an era in which natural capital was considered infinite relative to the scale of human use, it was reasonable not to deduct natural capital consumption from gross receipts in calculating income. That era is now past. The goal of a sustainability is the conservative effort to maintain the traditional meaning and measure of income in an era in which natural capital is no longer a free good. At a conceptual level the justification for making sustainability a sine qua non for project eligibility could not be stronger or more conservative. The difficulties in applying the concept arise mainly from operational problems of measurement and valuation of natural capital. These problems are addressed below.
3. The following guides seek to elaborate this principle and extend it to nonrenewable resources in so far as possible. Below are some rules of thumb. It is a matter of judgment for EA teams to apply them in a reasonable way to diverse projects. Where the EA team finds wide divergence from sustainability, it should work with the project designers to narrow the gap as early in the project cycle as possible.
4. In what follows the use of the terms "assimilative or regenerative capacity" should not be taken necessarily to imply that there is a discontinuous threshold of use intensity below which there is no effect on the ecosystem being used. Capacity may be thought of as a current level of a particular ecosystem service beyond which further use will cause unacceptable (e.g., cumulative, irreversible, excessive) degradation of the ecosystem and loss of its future services. Also capacity refers to the capacity of the relevant ecosystem, not to individual species in isolation. There are many difficulties in defining sustainable yield and sustainable use, just as there are many analogous difficulties in defining income.

But to answer the unavoidable question -- How much can we consume this year without reducing our capacity to produce next year? -- requires that we at least give a prudent rule of thumb.

Output Guide

5. Waste emissions from a project should be within the assimilative capacity of the local environment to absorb without unacceptable degradation of its future waste absorptive capacity or other important services.

Input Guide

6. Harvest rates of renewable resource inputs should be within regenerative capacity of the natural system that generates them; depletion rates of nonrenewable resource inputs should be equal to the rate at which renewable substitutes are developed by human invention and investment.

Discussion: Output Guide

7. If each project obeyed this rule, then the sum of all projects, or the average project, would also conform to the rule. But the average or sum may obey the rule even though each project fails to, as long as there is compensation among project pairs or other combinations. Of course it is easier for earlier projects to meet this condition than for later ones added after assimilative capacities have been largely used up or even decreased. Once capacity has been reached a new project might be paired with an old one that is removed to make room for it, if the new one is more valuable than the old one. Alternatively the new project may be paired with another new project that makes room by absorbing the waste outputs of other projects up to the amount emitted by the new one. The pairing idea has been discussed by David Pearce, and is a variant of the "bubble concept". Under the "bubble concept" the total emissions for an area must be set collectively, but the market can allocate that total among competing uses by exchange of emission permits.

Discussion: Input Guide

8. The inputs of interest are the primary inputs from nature, not the interindustry or intermediate inputs from other firms. This rule then only applies to the extractive sector, whereas the previous rule applies to all sectors. Inputs from nature are of two kinds, renewable and nonrenewable.

(a) **Renewable inputs:** The rule is that harvest rates should not exceed regeneration rates. In other words sustainable yield exploitation should be the rule. The sustainable yield concept presents two problems: measurement difficulties, and the existence of many different sustainable yields, one for each possible population of the exploited resource. The measurement problem is similar to that faced by the income accountant -- measuring income in a way that keeps capital (productive capacity) intact and prevents inadvertent impoverishment by overconsumption. The point in both cases is to find a prudent rule of thumb to avoid overconsumption, not to find the "theoretically unique scientifically precise number." But the rule to exploit at sustainable yield does not tell us what size population of the exploited resource should be maintained in this way. Choosing the population size that gives maximum sustainable yield does not give a sufficient answer, although it is relevant consideration. The economically optimum yield generally does not coincide with the biological maximum yield (they coincide only when harvest costs are

constant with respect to the amount harvested). There is no warrant for assuming that the existing population size of an exploited species is optimal. It can be quite reasonable up to a point to cut down forest for farmland. But when we do this we must be clear that the trees from the virgin forest cut in excess of replacement represent capital consumption, not income. If total capital is to be maintained intact the net receipts from the cut virgin timber should be treated as a depreciation fund to be reinvested in some alternative renewable resource that is more valuable at the margin.

(b) Nonrenewable inputs. The rule is to deplete at a rate equal to the rate of development of renewable substitutes. Thus extractive projects based on nonrenewables must be paired with a project that develops the renewable substitute. Net receipts of nonrenewable exploitation are divided into two components (income and a capital set-aside) such that the capital set-aside, when invested in a renewable substitute each year will, by the time the nonrenewable is depleted, have grown to a stock size whose sustainable yield is equal to the income component that was being consumed all along. The capital set-side will be greater the lower the growth rate of the renewable substitute (real or biological discount rate) and the shorter the lifetime of the nonrenewable reserves (i.e., the reserve stock divided by annual depletion). The logic and calculations have been worked out by El Serafy in the context of national income accounting, but apply with equal relevance to accounting at the project level. (See S. El Serafy, "The Proper Accounting of Income from Depletable Natural Resources", in Y. J. Ahmed, S. El Serafy, and E. Lutz, Environmental Accounting for Sustainable Development.) The true rate of return would on the project pair would be calculated on the basis of the income component only as net revenue. Difficulties remain in the question of defining "substitute" – whether narrowly or broadly. Probably a broad definition would be indicated initially – at least broad enough to encompass improvements in energy efficiency as a renewable substitute for petroleum depletion, and improvements in recycling as a renewable substitute for copper depletion.

Further Discussion

9. In the case of renewables, capital consumption is treated as depreciation of a productive asset (the sacrificed base population that was producing a permanent yield). Depreciation should be deducted from gross income to get net income. In the case of nonrenewables, the reduction of stocks is treated as a liquidation of existing inventories rather than as running down of capacity for future production, and consequently should not even be a part of gross income, as El Serafy rightly insists.

10. Although the input and output rules of thumb have been treated independently, it should be noted that, thanks to the law of conservation of matter-energy, the reduction of inputs to a sustainable yield level will help in the reduction of outputs to a sustainable absorption level. But "given the spatial separation of input production and output disposal, and especially the generation of many new and toxic substances in the production process, the output rule cannot be avoided. Nevertheless the mere fact of mass balance would lead us to suspect that in some cases the input rule will be binding and the output rule redundant, and in other cases vice versa.

11. Some writers have advocated the pairing rule in theory, but have backed off in practice. For example, in Blueprint for a Green Economy, Barbier, Markandya and Pearce state: "at the level of each project such a requirement would be stultifying. Few projects would be feasible." The authors advocate

applying the principle at a program (multi-project) level, so that the nondegradation of natural capital stock criterion would only hold on the average for the set of projects in the program and not for each project. This may be a sensible modification from an administrative standpoint, but seems to sacrifice efficiency by "socializing" the costs of sustainability among all the projects in a program instead of making each project bear its own full marginal social opportunity cost – a principle eloquently defended elsewhere in their book.

12. In any event it is not sufficient to say that sustainability is a macroeconomic criterion that is irrelevant at a project level, unless we are able and willing to limit the aggregate throughput of matter-energy (by severance taxes or depletion quotas) to a flow volume that is within gross regenerative and absorptive capacities of a country. In this sense a macro approach to sustainability may be the best strategy. Since all projects would have to pay the same prices, which then would reflect the cost of sustainability in the aggregate sense, there would be no cost in efficiency from socializing the costs among various projects in a program by non-price means. Also, applying the rules at a project level requires a lot of micro level information and interference.

13. Although the macro approach seems better from the point of view of a country applying a national policy, the micro or project-level rules may be the more relevant from the point of view of a development bank that is committed to sustainable development as a criterion governing its own lending, but which is not in a position to dictate national policies at the macro level. Of course imposing macroeconomic policies as a condition for making project loans, or lending directly to finance macroeconomic policy change is exactly what structural adjustment lending does. So one could indeed argue that sustainability ought to be treated as a macroeconomic goal to be attained by structural adjustment, and not as a set of project-level conditions. It could be argued that the proper way to treat sustainability is as a macroeconomic goal to be pursued through structural adjustment or through macroeconomic conditions tied to project lending, rather than as a characteristic of individual projects. Emphasis in this case would then shift from the project-level guides to some analogous macro-level guides limiting the overall resource throughput to within the regenerative capacities of the larger national ecosystem. Because the EA OD focuses almost entirely on projects, this issue is not analysed further here. But it remains an important question for further reflection and research.

CHAPTER 2

GLOBAL AND CROSS-SECTORAL ISSUES IN ENVIRONMENTAL REVIEW

This chapter presents information and guidance on a number of pervasive natural resource issues. By discussing them in a single chapter, the Sourcebook avoids the multiple presentations that would otherwise result, since these issues are encountered in a wide variety of Bank-supported projects.

Whether the topic is one of global significance, such as atmospheric pollution or biological diversity, or concerns a particular category of ecosystem, such as wetlands, the format is generally the same. Each section introduces the issue, presents any Bank policies or procedures that have been established, discusses the relationship of the issue to Bank lending, and provides guidance for TMs who must deal with the issue in environmental assessments.

GLOBAL AND TRANS-BOUNDARY CONCERNS AND REGULATIONS

Atmospheric Pollution

1. Atmospheric pollution refers to a variety of physical and chemical alterations of the atmosphere, including natural alterations such as volcanic emissions of particulate matter, and anthropogenic (manmade) alterations such as climate warming (the "greenhouse effect"), ozone depletion, acid rain, and the release of airborne toxic pollutants. This section will discuss two phenomena of global significance, climate warming and ozone depletion, together referred to as global change. It will also consider acid rain, which can have significant transboundary impacts.
2. The greenhouse effect is a natural component of the earth's climate by which certain atmospheric gases (known as greenhouse gases) absorb some of the radiant heat which the earth emits after receiving solar energy. This phenomenon is essential to life on earth as we know it, since without it the earth would be approximately 30°C cooler. However, certain anthropogenic activities have the potential to amplify the greenhouse effect by emitting greenhouse gases (primarily carbon dioxide, methane, nitrous oxide, chlorofluorocarbons and halons, and tropospheric ozone) to the atmosphere and causing their concentrations to increase. The result is an increase in mean global temperatures, i.e., climate warming.
3. Ozone (O₃) is a gas that occurs at low concentrations throughout the earth's atmosphere, although most resides in the upper atmosphere, or stratosphere (from about 10 to 50 kilometers above the earth's surface), where it acts as a protective shield, preventing harmful ultraviolet radiation from reaching the earth's surface. Ozone is constantly formed and destroyed in the stratosphere, forming a balance between O₃, O₂, and O. However, reactive chlorine and bromine species, originating primarily from the use of chlorofluorocarbons (CFCs) and halons, promote the destruction of ozone and upset this balance. It is the chemical stability of CFCs and halons, and consequently their extremely long atmospheric lifetimes of up to a century and longer, that allows them to reach the stratosphere. Once in the stratosphere, ultraviolet radiation causes the release of chlorine and bromine atoms, which act as catalysts in the de-

struction of ozone. Through this process, CFCs and halons contribute to general ozone depletion, as well as to localized seasonal ozone holes over Antarctica and perhaps also in the Arctic.

4. The anthropogenic activities that contribute to climate warming and ozone depletion are an integral part of human life and economic development. Anthropogenic increases in concentrations of carbon dioxide (CO₂), which are responsible for about half of the climate forcing that occurred during the 1980s, result primarily from the combustion of fossil fuels (coal, oil, and natural gas) and tropical deforestation. Cement production produces a minor amount of CO₂. Anthropogenic methane (CH₄) emissions, responsible for about 15 percent of the climate forcing in the 1980s, result from agricultural activities (anaerobic decomposition of organic material in flooded rice fields and in the guts of domestic animals, burning of lands for pasture and crop management, and burning of agricultural wastes such as rice straw), fossil fuel production (coalbed methane release during mining, and venting and leakage of natural gas during production and transmission), and anaerobic decomposition in landfills. Anthropogenic nitrous oxide (N₂O) emissions, responsible for about 5 percent of the climate forcing in the 1980s, result primarily from agricultural activities (use of nitrogen fertilizers, land clearing, and biomass burning). A small, uncertain portion of the N₂O emissions arise from fossil fuel combustion. Tropospheric ozone, responsible for a small and highly uncertain portion of the climate forcing of the 1980s, is not emitted directly by human activity. However, its concentration is strongly governed by trace gas emissions resulting from industrial activity and transportation.

5. CFCs and halons are manmade chemicals, responsible for about 17 percent of the present climate forcing, and believed to be the main cause of the ozone depletion observed to date. CFCs are used as aerosol propellants, refrigerants, electronics solvents, and in foam blowing and chemical production; halons are used for fire extinguishers. Two other long-lived, manmade chemicals, carbon tetrachloride, which is used in chemical production, as a solvent, and as a grain fumigant, and methyl chloroform, used in industrial degreasing, cold cleaning, and as a solvent, are additional important greenhouse gases as well as ozone depleters. Table 2.1 presents anthropogenic emissions of the major greenhouse gases, by activity, and the effect of those emissions on climate forcing over the last decade.

6. Anthropogenic emissions of greenhouse gases over the last century have already committed the earth to a warming of 1-2°C. An effective doubling of CO₂ (an increase in the atmospheric concentrations of all the greenhouse gases that in total is equivalent to a doubling of the pre-industrial concentration of CO₂), expected to occur around the middle of the next century, is predicted to result in warming of 1.5-4.5°C. For comparison, between the last glacial maximum (about 18,000 years ago) and today, average global temperature has risen about 5°C. Even over the last 700,000 years, the maximum global temperature swing was no greater than 5°C.

7. It is not only the magnitude of the potential warming that is alarming, it is also the rate of expected climate change. Natural ecosystems that could possibly migrate or adapt in a less rapidly changing world, may not be able to adjust quickly enough to survive. Potential impacts include loss of forests, wetlands, and other ecosystems, and the decline and possible extinction of many species. Managed systems may be more resilient, although impacts are still likely to be large, particularly in countries that are least equipped to adapt. Changes in temperature and precipitation will affect agricultural and water management practices. Sea level rise will cause coastal flooding and salt water intrusion into bays and coastal aquifers to increase, and will destroy valuable wetlands. The frequency of extreme weather events (e.g., heatwaves, hurricanes) is likely to increase, affecting human health and

Table 2.1. Greenhouse Gases

Anthropogenic Emissions, Contribution to Climate Forcing,
and Atmospheric Lifetimes (1985 Data)

Trace Gas	Emissions (million tons/yr)	Approximate Contribution to Climate Forcing for the 1980s (%)	Atmospheric Lifetime (years)
Carbon Dioxide (CO₂)	(C)		
Fossil Fuel Combustion	5208		
Deforestation	400-2600		
Cement Production	<u>130</u>	50	50-200
Total CO₂	5800-8000		
Methane (CH₄)	(CH₄)		
Rice Paddies	60-170		
Domestic Animals	65-100		
Biomass Burning	50-100		
Natural Gas Production and Transmission	25-50		
Coal Mining	25-45		
Landfills	<u>30-70</u>	20	8-12
Total CH₄	250-500		
Nitrous Oxide (N₂O)	(N)		
Nitrogen Fertilizers	0.2-2.4		
Contaminated Aquifers	0.8-1.7		
Land-Use Modification	1.0-1.5		
Fossil Fuel Combustion	<u><1</u>	5	120-150
Total N₂O	3.6		
CFCs and halons		17	≈ 25-200+

Note: Ranges represent uncertainties in emissions estimates. The trace gas totals are not sums of the individual sources, since the totals are better constrained than individual sources. Emission estimates for CFCs and halons are not given because of the lack of information on emissions of these chemicals.

Source: USEPA 1990.

property, and natural and managed ecosystems. Higher temperatures may exacerbate air pollution, especially smog.

8. The Antarctic ozone "hole" was first recognized in the late 1970s, and its connection to the use of CFCs and halons was established about a decade later. Significant declines in ozone in the Southern Hemisphere mid-latitudes and more modest declines in the northern mid-latitudes observed in the 1980s, as well as the decrease in the global concentration of ozone of a few percent between 1969 and 1986, are also believed to be due primarily to the use of CFCs and halons.

9. Continued stratospheric ozone depletion and the resultant increase in penetration of biologically-damaging ultraviolet radiation to the earth's surface will have harmful effects on human health and the environment. Solar ultraviolet radiation induces skin cancer, cataracts, suppression of the human immune response system, and indirectly (through immunosuppression) the development of some cutaneous infections, such as herpes. Natural and managed ecosystems are likely to be affected through three mechanisms: (a) general damage to biological functions in plants resulting in stunted growth and lowered competitive capacity, (b) specific damage to DNA with similar effects, and (c) specific damage to germ cells resulting in increased mutation rates. Agricultural yields are likely to decrease and be of poorer quality, although plant breeding and genetic engineering may produce ultraviolet-resistant crops. Non-managed ecosystems, however, may not fare so well; less resistant species will be more vulnerable and ecological balance may thus be threatened. Ozone depletion is also likely to cause accelerated degradation of plastics and paints used outdoors, and to exacerbate urban smog.

10. Because the gases responsible for climate warming and ozone depletion have very long lifetimes once they are introduced into the atmosphere, delays in reducing emissions produce a relatively longer commitment to global change (see Table 2.1.). Although the magnitude of the effects are uncertain, they are potentially severe and possibly irreversible. Taking prompt action seems wise, in light of the risks associated with delay, as well as the fact that many commonly proposed actions make economic, social, and environmental sense on their own.

- more efficient use of fossil fuel energy and development of alternative, renewable energy sources;
- reducing the rate of deforestation and increasing reforestation (e.g., carbon sink forests);
- collection and use (as an energy source) of coalbed methane and methane generated from anaerobic systems (landfills, animal wastes, etc.);
- more efficient agricultural practices (more efficient fertilizer use, sustainable rather than shifting agriculture); and
- development and use of less damaging replacements for CFCs and halons.

11. Acid rain results from the presence of abnormally high atmospheric concentrations of substances that form acids in reaction with water – principally sulfur dioxide (SO₂) and, to a lesser extent, nitrogen oxides (NO_x). These oxides are formed in nature (in volcanic gases and sea spray, for instance), but in highly industrialized or urbanized areas, man-made sources emit quantities which exceed natural amounts. Coal- and oil-fired generating plants are the largest sources of SO₂, followed by use of high-sulfur coal and oil in industry and home heating. Energy generation and internal combustion engines are the largest sources of NO_x. Data show that precipitation in wide areas of both Europe and North America is abnormally acidic.

12. Available evidence does not permit a complete assessment of the extent of damage caused by acid rain worldwide. However, poorly-buffered lakes and streams are susceptible to the changes in pH acid rain can cause, and food chains have been shown to be affected in North America and northern Europe. Certain tree species are also sensitive to acid rain, and forests have been affected on both of those continents. Stone buildings and monuments, among them many properties of historic and cultural importance, deteriorate faster where precipitation is acidic. In the cases of Canada, Germany, Yugoslavia and the Scandinavian countries, major sources of the SO₂ that forms the acid rain are located in other countries.

Bank Policies, Procedures, and Guidelines

13. Although there is no separate Bank policy on climate warming and ozone depletion, guidance on global environmental issues is provided in the Bank publications, and work on the Global Environmental Facility is accelerating. Operational Directive 4.00, Annex A: "Environmental Assessment," states that the Bank "keeps fully abreast of findings [of investigations of global environmental issues], primarily through its Principal Advisor, Science and Technology, and draws upon prevailing views in developing its own environmental, economic, and sectoral policies, with a view to minimizing possible adverse impacts on global systems such as the atmosphere and oceans. While EAs should collect or refer to the relevant data, the Bank does not normally expect global environmental issues to require separate analysis in project-specific EAs. Such issues should, however, be addressed where relevant in policy and sector work."

14. A 1989 policy paper from the Energy Sector Management Assistance Program (ESMAP) emphasized the challenges to the energy sector by the potentially disastrous effects of climate warming. The paper stresses the need for developing countries to increase sustainable energy use and improve the efficiency of production and distribution.

15. A World Bank Discussion Paper on climate warming outlines the present state of the science of climate warming, and reviews its implications for economic development (Anderson and Waltz, 1990). Policy on energy-efficiency is stressed as making sense environmentally and economically as well. Also, international collaboration is recognized as essential for effective response to climate warming (see paragraph 20).

16. The Bank, through such actions as sponsorship of the Consultative Group on International Agricultural Research (CGIAR), participates in programs to improve our understanding of the science of climate change. CGIAR supports the International Rice Research Institute, which is involved in research to quantify and reduce methane emissions from rice paddies.

17. The Bank's Environmental Guidelines recommend limits on SO₂ and NO_x from industrial and energy sector projects. Adherence to them or to comparable limits through selection of low-sulfur fuels and installation of pollution control equipment, important in the management of regional air quality, contributes to control of acid rain as well. The Bank has also supported numerous urban projects involving conversion of heating systems from coal to gas. Sarajevo, Yugoslavia is an example. Such investments, made primarily to alleviate unhealthful air quality, act to reduce acid rain formation.

Relationship to Bank Investments

18. Numerous development activities, such as the following, may influence climate change and ozone depletion:

- energy projects involving increased production, transportation, and consumption of fossil fuels;
- forestry projects involving clear-felling or intensive logging, construction of access roads and establishment of forest products industries which induce development and further forest clearing;
- agriculture projects involving conversion of forests to pasture or crops, cultivation of paddy rice, livestock management, use of nitrogen fertilizers, burning of savanna and other lands for pasture management, burning of agricultural wastes; and
- industrial development projects involving the use of CFCs, halons, and related manmade chemicals; and construction of landfills.

19. Activities that may decelerate the threat of global change are:

- energy projects involving increased fossil energy efficiency and conservation, the development of alternative energy sources (e.g., biomass, solar, wind, hydroelectric, and cogeneration), collection and use of coalbed methane as an energy source, improved natural gas transmission systems to reduce leakage;
- industrial development projects involving the use of substitutes for CFCs, halons, and related manmade chemicals; collection of methane from landfills and other waste streams and use as an energy source;
- forestry projects involving sustainable fuelwood use and agroforestry development, forest conservation and reforestation/afforestation;
- agriculture projects involving the development of sustainable systems, restoration of degraded lands and accumulation of soil carbon, and improved efficiency of livestock management and fertilizer use; and
- development of effective environmental regulations and agencies.

20. Energy-related investments mentioned in paragraphs 11 and 12 have implications for acid rain as well. In addition, the following projects or components can have positive impacts on the problem:

- requirements for SO₂-removal equipment in industry and energy projects;
- conversion to low-sulfur energy sources in urban and industrial areas; and
- transportation sector policies which emphasize alternatives to automobiles.

21. The Bank finances projects in all of these sectors. It can therefore influence potential greenhouse warming, ozone depletion and acid precipitation through the selection and management of projects that minimize emissions of gases that contribute to these problems, and through recommendations regarding sectoral and national development strategies of borrowing countries. Of particular importance are those

projects that increase efficient energy generation and energy use, and that reduce reliance on CFCs and halons and fossil fuels.

22. The Bank already supports programs designed to improve energy efficiency and conservation. Examples include the FY88 and FY89 projects in Argentina, Bangladesh, India, Malawi, Morocco, Somalia, and Zimbabwe, all of which specifically addressed improvements in utility efficiency.

23. The Bank has undertaken a series of bilateral discussions to assess interest in the establishment of a Global Environment Facility, a mechanism through which additional funds for global environmental problems would be mobilized and managed. Such funds would be used to assist developing countries reduce use of substances that are ozone depleting (e.g., make technology transfer to reduce CFC-dependency; adopt cleaner fuels and technologies in the energy sector; retrofit or design plants in the power and industry sectors to reduce greenhouse gas emissions; and improve forest management and conservation to increase the absorption of atmospheric CO₂).

24. Actions that can reduce the risk associated with global change, include:

- scaling down and/or delaying long-lived projects in favor of shorter-lived ones until future regional climatic change can be more accurately predicted;
- carefully evaluating coastal development projects in light of expected future relative sea level rise (a function of the global rise due to climate warming plus local land motion due to groundwater withdrawal, tectonic forces, etc.);
- conservation of an adequate gene pool to ensure the ability to develop agricultural species able to withstand climate extremes and increased ultraviolet radiation.

Guidance for Environmental Assessments

25. Ideally, contributions to climate warming and/or ozone depletion will be among the major issues identified during the screening of proposed projects. During initial environmental reconnaissance, the significance of the contributions should be determined and any additional concerns identified. Although the absolute magnitude of the contribution to global change, e.g., extent of climate warming attributable to the project over its expected life, will often be difficult to estimate, the relative magnitude of the contribution should be assessed. A draft Congressional Report by the U.S. Environmental Protection Agency (EPA) contains extensive information on greenhouse gas emission coefficients that can be used in this process, e.g., grams of CO₂ per gigajoule of delivered energy for a combined cycle gas turbine versus a simple cycle gas turbine (USEPA 1990). Also, studies are available that quantify the relative effects on ozone depletion of CFCs, halons, and their potential replacements (Fisher 1990).

26. Options to reduce a project's contribution to global change without adversely affecting the cost or success of the project should be evaluated. For example, expansion of domestic coal mining operations is likely to result in methane emissions. Collection of the coalbed methane and use as an energy source would not only reduce the contribution to climate warming, but might also be economic. Similarly, the development and use of alternatives to CFCs and halons should be encouraged when appropriate. Several U.S. EPA reports contain detailed discussions of technical options to reduce greenhouse gas emissions (Gibbs and Lewis 1990).

27. When evaluating various alternative projects, not only should potential total gas emissions be considered, but also the particular gases that are released since not all the gases are equally efficient in terms of their greenhouse and ozone depletion capacity. For example, even though natural gas emits approximately 30 percent less CO₂ per unit of energy produced than oil (and over 40 percent less than coal), the production and distribution of natural gas often results in the release of CH₄, which radiatively is a much more effective greenhouse gas than CO₂ – over 20 times more effective (kilogram for kilogram) over a 100-year period. Therefore, when considering switching from oil to natural gas in order to reduce CO₂ emissions, the increased potential for CH₄ emissions must also be considered (Shine 1990).

28. Implications of climate warming and ozone depletion for a proposed project should also be assessed. For example, projected sea level rise and increased coastal flooding should be considered when evaluating the design of a coastal drainage and wastewater system. The Report of Working Group 1 of the IPCC (1990) provides estimates of future sea level rise.

29. The effect of existing government policies and institutions on activities that contribute to global change should be examined, and those that provide disincentives to reducing emissions of trace gases identified. For example, certain economic policies (e.g., tax concessions, subsidies) may promote deforestation or inefficient use of energy. Construction of roads and industrial logging development may provide access to previously inaccessible forests and indirectly contribute to loss of forest lands. Technologies that use chemicals that are likely to be phased out over the next decade (i.e., certain CFCs) should not be endorsed (USEPA 1990).

30. Innovative methods to fund reductions in emissions of greenhouse gases and ozone depleters and/or compensate local affected groups for costs they may incur, include:

- levy of a carbon (or greenhouse warming potential) tax on the basis of a country's emission of greenhouse gases, measured in terms of the impact of the emitted gases on global warming;
- establishment of a clearinghouse fund through which countries can substitute action at home for a more efficient, i.e., economic, action in another country;
- private investment, especially in renewable energy, energy conservation, and sustainable forest management; and
- an environmental levy from all countries based on GNP.

These and other funding mechanisms are discussed in more detail in the World Bank Discussion Paper, Funding for the Global Environment, May 1990.

31. In project-specific, regional and sectoral EAs in urban, transportation, energy and industry sectors, implications for acid rain formation should be considered. Where acidification of precipitation is found to be a probable effect of the project, the assessment should proceed to identify the geographical area which could be affected (which may greatly exceed the limits of the study area for other environmental impacts) and to characterize the resources within it in terms of susceptibility to damage from acid rain. The presence of poorly-buffered (low alkalinity) lakes and streams, cultural properties constructed of acid-soluble rock (limestone, marble and serpentine, for example) or sensitive tree species (e.g., northern red spruce) should raise concerns about possible ecological or cultural property damage which should be encompassed in the assessment of impacts and development of mitigating measures.

International Treaties and Agreements on the Environment and Natural Resources

1. Public international law governs the conduct among states and other international "persons", namely international public organizations. The World Bank, an organization created and governed by public international law, undertakes its operations in compliance with applicable public international law principles. These are commonly reflected through such legal instruments as treaties, conventions, or other legally binding multilateral, regional, or bilateral agreements.

2. Environmental and conservation matters fall within the ambit of public international law in a number of instances. First, many resource and environmental questions can only be properly addressed if a number of states adopt common rules for the solution of the problems posed, the most frequently cited examples being those affecting the entire global community (e.g., high seas, atmosphere). The principle applies equally within a narrower geographic scope (e.g., regional seas or rivers). Similarly, the proper management of shared resources (such as fish stocks) can only be achieved by action on the regional or sub-regional level. Second, actions taking place within one state may produce effects which impinge upon resources or environmental quality in one or more other states or beyond the limits of national jurisdiction. These results may be direct and apparent, as in the case of air pollutants affecting a state downwind of their sources; or, they may illustrate more complex consequences of the action complained of, as when a lower riparian state suffers from flooding or siltation caused by deforestation in a state upstream. In general, the scope of the appropriate legal response is determined by the nature of the issue to be addressed.

Scope of International Environmental Law

3. More than 300 multilateral treaties and formal agreements relevant to environmental protection have been adopted since 1869 and many of these carry substantive obligations for the states which are parties to the treaty. In addition, a much larger number of bilateral agreements have been concluded, ranging from understandings between states about the exchange of information and research cooperation, to substantive questions like those on boundary water management. Where a country has assumed international or bilateral environmental law obligations, they must be taken into account in project design to prevent violations and, if possible, to promote compliance. Accordingly, EA will identify whether there are international environmental law obligations of the borrower that may affect or be affected by the project.

4. The subject matter of international environmental law instruments includes (a) issues that traditionally have been considered global, and (b) issues that traditionally were considered domestic matters but whose ecosystem linkages or resource use considerations made international cooperation necessary. Historically, marine pollution on the high seas received the most attention. Recent years have brought increased focus to other global issues, such as:

- protection of the ozone layer (Vienna Convention for the Protection of the Ozone Layer, 1985);
- trade in endangered wildlife (Convention on International Trade in Wild Flora and Fauna, 1975, commonly known as CITES);

- regulation of the seas (The United Nations Convention of the Law of the Sea, 1982 – not yet in force); and
- trade in toxic substances (Convention on the Control of Transfrontier Movement of Hazardous Substances, 1989, commonly known as the Basel Convention – not yet in force).

A global law of the atmosphere also is being developed.

5. In the category of issues which traditionally were considered domestic, most of the international law activity has related to conservation of natural resources. In particular, the Convention on Wetlands of International Importance Especially as Waterfowl Habitat, 1971, (commonly known as the Ramsar Convention) provides international mechanisms for declaration of national wetlands of international significance which, once declared, carry state obligations to protect. The Convention Concerning the Protection of the World Cultural and Natural Heritage, 1972, provides an international mechanism for recognizing important national heritage sites, of either outstanding cultural or natural value, with similar state obligations. A number of treaties or bilateral agreements also exist dealing with regional resource management issues, such as regional fisheries use, protection of wildlife habitat or river basin management. The African Convention on the Conservation of Nature and Natural Resources, 1968, the Convention of Nature Protection and Wildlife Preservation in the Western Hemisphere, 1940, and the ASEAN Agreement on the Conservation of Nature and Natural Resources, 1984, incorporate principles for the protection of wildlife and parks and the sustainable use of harvested natural resources. Recent initiatives for a global umbrella convention in biodiversity conservation (both habitat and species) have produced a draft text, but formal deliberations by states have not yet begun.

Analyzing Obligations Under International Law

6. When identifying international environmental law obligations of a particular borrower, it is important to look beyond the text of formal treaties to a number of subsidiary devices which may be used to avoid delays in bringing multilateral treaties into force. One of the most common forms of subsidiary agreements is the "protocol" which is authorized by the treaty in question and generally contains far more detailed provisions on some aspects of the subject matter of the treaty than the text of the treaty itself. Familiar examples include protocols under the Regional Seas Agreements relating to oil-pollution control, control of land-based sources of pollution, and specially protected areas. Similarly, there is the Montreal Protocol on Substances that Deplete the Ozone Layer, 1987, under the Vienna Convention for the Protection of the Ozone Layer. It is important to be aware of which protocols borrower states may be party to, for such agreements have the potential to develop almost as if they were sub-conventions devoted to precise questions with very specific implications as to resulting state obligations.

7. Another subsidiary device used under international law to speed implementation and regular updating of treaties is to put references to technical matters in an appendix or annex, with the treaty specifying that annex amendments are possible by less rigorous or formal means than for the body of the treaty itself. Common examples of this approach include the list of protected species in appendices to CITES, various annexes to conventions dealing with marine pollution from different harmful substances, and the new Basel Convention on toxic trade (not yet in force). As part of the analysis of a country's treaty obligations, it is important to understand the specific content of such technical annexes and the borrower's legal standing with them (e.g., has the borrower ratified, renounced, made reservations, etc.).

Implementation

8. International or bilateral treaties by themselves have little direct impact on environmental quality or natural resource conservation. They operate primarily through domestic policies, statutes, and programs. A number of situations may arise under national law when a treaty is ratified by a state and triggers an obligation for implementation. First, the treaty in question may be entirely consonant with domestic law and practice, and thus be implemented exactly as domestic law. Second, while consonant in all material respects with domestic law, the treaty may require the government to monitor or report on environmental conditions or natural resource degradation to an international body or another country; thus, the treaty may assign government authorities a role in implementation which they did not have earlier (e.g., CITES reporting, toxic dumping reporting, CFC reporting). Third, the treaty may require a material change in the law.

9. A further implementation consideration resides in which domestic agencies have implementation responsibility. While commonly it is the role of the Ministry of Foreign Affairs (or equivalent) to negotiate treaties abroad on behalf of the country, once a multilateral treaty or agreement has been ratified, some technical entity typically will be responsible for implementation. Frequently, local capacity to deal with the technical complexities and reporting and enforcement requirements may lag far behind what is anticipated during the treaty negotiation process. Therefore, an analysis of existing institutional capacity to implement treaty obligations also may provide important information on whether compliance is feasible in practice and what strengthening measures might be warranted to ensure compliance.

Legal Information and Analysis

10. There are several publications on international treaties and agreements in force. These are updated periodically (see References). TMs can obtain the most recent information for a particular country by consulting the country counsel in the Legal Department of the Bank. Identification of the actual national environmental obligations under public international law generally requires the assistance of legal experts in the country concerned. Typically, the Ministry of Justice and/or Ministry of Foreign Affairs (or equivalent) maintain a list of international and bilateral agreements to which the state is a party. With this list, it is possible to identify obligations which may have a relationship to proposed development projects. The Legal Department is available to assist through the country counsels and environmental counsels in identifying and working with local lawyers and reviewing details of particular treaty obligations and their implications for proposed projects.

International Waterways

1. Projects involving international waterways and subject to the World Bank Operational Directive (OD) 7.50 "Projects on International Waterways" are those corresponding to the following descriptions:^{1/}

^{1/} Definitions and project descriptions are the same as those used in OD 7.50 "Projects on International Waterways."

(a) Types of international waterways:

- (i) river, canal, lake or any similar body of water which forms a boundary between, or any river or body of surface water which flows through two or more states, whether members of the Bank or not;
- (ii) any tributary or any other body of surface water which is a part or a component of any waterway described in (i) above; and
- (iii) bays, gulfs, straits, or channels--bounded by two or more states or, if within one state, recognized as necessary channels of communication between the open sea and other states--and any river flowing into such waters.

(b) Types of projects:

- (i) hydroelectric, irrigation, flood control, navigation, drainage, water and sewerage, industrial, or similar projects which involve the use or pollution of international waterways as described above; and
- (ii) detailed design and engineering studies of projects under (b)(i) above, including those to be carried out by the Bank as executing agency.

2. Waterways have always been important to countries, for trade and defense and as a commodity to be used, and likely will become more so as awareness of the interconnectedness of global resources (as reflected in such terms as "global commons") and as concern for global pollution and potential global threats (such as depletion of the ozone layer and global warming or forcing) grow.

Bank Policy

3. The Bank recognized the significance of international waterways to its members and incorporated into OD 7.50 explicit guidelines for projects involving them. This operational directive will be summarized and quoted from here, but should there be a difference of emphasis, the directive should be followed. The guidelines emphasize the necessity of identifying early in project planning the possibility of international waterways being involved and of notifying Bank officers and the other parties involved (e.g., the other riparians).

Notification of Bank Officers

4. The process of reporting begins with the Initial Executive Project Summary (IEPS). Throughout the project, the Senior Vice President, Operations (OPNSV), should be kept informed by the director of the Country Department (CD), through the Regional Vice President (RVP) and in consultation with the Legal Department. Before an appraisal is undertaken, the transmittal memorandum for the Final Executive Project Summary (FEPS) should be prepared in collaboration with the Legal Department and should convey all relevant information on the international aspects of the project. The transmittal memo should be addressed to the RVP and copied to the OPNSV and the Vice President and General Counsel.

5. The Staff Appraisal Report (SAR) and the Memorandum and Recommendation of the President (MOP) should deal with the international aspects of the project, and should state that Bank staff have considered these aspects and are satisfied that:

- (a) the issues involved are covered by appropriate agreement or arrangement between the beneficiary state and other riparians; or**
- (b) the other riparians have given a positive response to the beneficiary state or to the Bank, in the form of consent, no objection, support to the project, or confirmation that the project will not be harmful to their interests; or**
- (c) in all other cases, in the assessment of Bank staff, the project would not cause appreciable harm to the other riparians, or would not be harmed in like manner by the use of the waters by other riparians.**

Notification of Other Riparians

6. As early as possible during the identification stage of the project cycle, the Bank should advise the state proposing the project on an international waterway (the beneficiary state) that, if it has not already done so, it should formally notify the other riparians of the proposed project. If the beneficiary state does not wish to give notification, the Bank normally will do so. If the beneficiary state objects to the Bank's giving notice, the Bank will discontinue further processing of the project. The executive directors should be informed of these developments and of any further steps taken.

7. OD 7.50 (para 8) describes cases where notification of riparians will not normally be required.

- (a) Projects involving additions or alterations to any ongoing schemes that in the judgment of the Bank meet the following criteria:**
 - (i) they will not adversely change the quality or quantity of water flows to downstream riparians; and**
 - (ii) they will not be adversely affected by the use of water that upstream riparians might make.**

However, if there is any agreement or arrangement between the riparians, Bank staff should secure compliance with such agreements.

- (b) Water resource surveys and feasibility studies on or involving international waterways. Beneficiary states should, however, be required to include in the terms of reference for such surveys and studies, an examination of any potential riparian issues.**

8. Explicit procedure is provided (OD 7.50, paras 10-14) for complex situations where there are conflicting objectives between riparians.

Integration into Environmental Assessment Process

9. The environmental impacts of projects always should be evaluated as early as possible in planning, but it is crucial when international waterways are concerned. When the other riparians are notified of a project that may involve their waterways, enough data should be provided to enable them to determine its potential effects. If Project Details are not available at the time of notification, they should be made available as soon as possible after the notification. Bank staff should evaluate the information and ensure that it is adequate for the purpose of making an informed determination.

10. If it is proposed to go ahead with project appraisal prior to the availability of project details, the CD director should notify the OPNSV (according to specified procedure in OD 7.50, para 4), clarifying the international aspects, and request approval to so proceed with appraisal.

11. The Bank's Legal Department will explore the various international agreements, country legislation and regulations and so forth, that will affect a project involving international waterways. (See section on "International Treaties and Agreements on the Environment and Natural Resources" for further discussion.) The TM will normally need only to be advised of the sensitivity of such projects, to foresee as quickly as possible their involvement, and to bring the matter to the attention of the appropriate Bank officers.

International Waterways as a Global Concern

12. There is growing awareness about the global environment and growing concern about the far-reaching effects of a country's practices – practices that at one time seemed to be the proper concern only of the state in which they occurred. For example, one nation's industries or agriculture have become the proper concern of another when they pollute its lakes and rivers. If the trend toward global awareness continues, it can be expected that Bank projects increasingly will be defined as involving international waterways and thus be regulated both by Bank policy and international law.

CROSS-SECTORAL ISSUES

Biological Diversity

1. Biological diversity, or biodiversity, refers to the variety of the world's biological resources – its living organisms. It is a function not simply of the number of ecosystems and distinct plant and animal species in existence at any given time, but also of genetic differences within individual species. This great diversity of the world's plant and animal species has intrinsic value, simply for existing. Further, biological diversity is more than a concept; it is a precious natural resource – a resource essential to human existence and commerce.

2. All principal food crops of today were derived from wild species, and the existence of genetic variability in the form of wild relatives of domestic crops is the source for continued improvement in yield and resistance to disease or stressful changes in environmental conditions. Many industries depend on plants and animals for tannin, resins, dyes, oils and other raw materials. A large number of modern

drugs originate from wild species of fungi, bacteria, higher plants and animals. Many crops are pollinated by naturally occurring events. Wild species help prevent pest outbreaks. With only a small fraction of existing species inventoried (perhaps as few as five percent), the diversity of biological resources promises numerous discoveries of useful products as yet unidentified.

3. No less important are the intangible, cultural values of biodiversity. Wild plant and animal species are sources of recreation and aesthetic pleasure to many people. They are deeply embedded in folklore and our shared heritage; they inspire works of art and expressions in languages and figure prominently in religions.

4. Biological diversity is also the characteristic of wild species and natural ecosystems that allows them to withstand external stress. Genetic variability within a species is the basis for its developing resistance to a disease or a change in climate which would otherwise cause its extinction. Species diversity affords stability to ecosystems; while a particular pollutant may destroy or drive away some of the species at one level in a food chain, others which are more resistant may remain to reproduce in greater numbers and sustain the organisms which depend on them.

5. Conservation of biological diversity is therefore a form of natural resource management which has as its primary goal maintaining the long-term potential of world biological resources to meet the needs and aspirations of future generations – a fundamental principle of sustainable development. Natural resource management practices which seek only to maximize short-term productivity, and even some practices which maximize long-term productivity of specific resources, often have the opposite effect. Thus we are witnessing loss of biological diversity at an alarming rate, due largely to the demands of growing populations on biological resources and habitats – and the losses are irreversible. Some scientists believe 15 to 20 percent of the estimated 10 to 30 million species of plants and animals extant in 1980 may become extinct by the year 2000 if present trends continue. They estimate that extinctions are occurring 1,000 to 10,000 times more rapidly today than during the millions of years before human intervention became a significant force. These statistics illustrate the urgent need for sound management of natural resources (and especially for conservation of biological diversity) in the work of development agencies worldwide.

Bank Policy, Procedures, and Guidelines

6. The Bank has two policies directly relevant to biological diversity – preservation of endangered species and critical habitats, and conservation and management of wildlands. The Bank's biodiversity working group addresses other aspects of the issue also and is promoting ways for the Bank to increase its role in this field.

7. Operational Manual Statement 2.36 "Environmental Aspects of Bank Work," issued in May 1984, states in paragraph 9(b) that the Bank "will not finance projects that cause severe or irreversible environmental degradation, including species extinctions without mitigatory measures acceptable to the Bank." In para 9(g), it states that the Bank "will not finance projects which would significantly modify natural areas designated by international conventions as World Heritage sites or Biosphere Reserves, by national legislation as national parks, wildlife refuges, or other protected areas."

8. **Operational Policy Note 11.02 "Wildlands: Their Protection and Management in Economic Development,"** issued in June 1986, is based heavily on the principle of conserving biological diversity. Because most of the world's plant and animal species depend on wildlands for their existence, the destruction of wildlands is accelerating the extinction of species. The Bank has derived its primary wildlands strategy from this relationship: conserve biological diversity by preserving sufficient amounts of representative wildlands and protecting or managing them to sustain their viability as plant and animal habitat.

Relationship to Bank Investments

9. **Examples of development activities which may have the most significant negative consequences for biological diversity are:**

- **agriculture and livestock projects involving land clearing, wetlands elimination, inundation for irrigation storage reservoirs, displacement of wildlife by fences or domestic livestock, heavy use of pesticides, introduction of cash crop monoculture into settings previously dependent on a large suite of local crops for subsistence agriculture;**
- **fisheries projects involving conversion of important natural breeding or nursery sites for aquaculture or mariculture, over-fishing, introduction of exotic species in natural aquatic ecosystems;**
- **forestry projects involving construction of access roads, intensive logging, establishment of forest products industries which induce other development near the project site;**
- **transportation projects involving construction of highways, bridges, rural roads, railways, or canals, all of which may facilitate access to and spontaneous settlements in natural areas;**
- **channelization of rivers;**
- **dredge and fill activities in coastal or inland wetlands;**
- **hydropower projects involving large water diversion, inundation or other major transformation of aquatic or terrestrial natural areas, leading to habitat reduction or modification with resultant forced movement of fauna into new areas and likely violation of carrying capacity there;**
- **irrigation and other water supply projects that may remove water, drain wetland habitats or eliminate essential watering sources;**
- **industrial projects involving air, water, or soil pollution;**
- **large-scale loss of habitats due to mining and mineral exploration; and**
- **conversion of biological resources for industrial fuels or feedstocks.**

10. The Bank finances projects in all of these categories. It can therefore influence the management and protection of biological resources and promote conservation of biological diversity through selection of projects, participation in the project preparation and environmental review process, project appraisal, implementation and recommendations regarding the sectoral and national development strategies of borrowing countries.

11. Between 1975 and 1988, the Bank has assisted in the finance or execution of more than 40 projects with components for conservation of biological diversity, primarily in the course of implementing its wildlands protection policy. Most of these projects have involved the establishment and/or strengthening of institutions responsible for wildlands management areas. More recently in Madagascar, the first country where the Bank assisted in developing an Environmental Action Plan, a major investment program entitled Environmental I Project includes watershed management and protection of biological resources in the Malagasy patrimony in association with the development of tourism.

12. The Bank participates in programs to improve the international gene bank network; it has been direct donor to the Consultative Group on International Agricultural Research (CGIAR) and an indirect supporter of the International Board for Plant Genetic Resources. CGIAR has enabled agricultural research centers in a number of regions to become storage centers for wild (and locally important) species and varieties of economically important food crops.

Guidance for Environmental Assessments

Determination of Impacts

13. Ideally, any implications for biological diversity will be among the major issues identified during the screening of proposed projects. During environmental reconnaissance conducted as part of an early preparation mission, the significance of the issues can be determined and any additional concerns identified. The resulting information is useful both for integrating biological diversity into project planning and design and for establishing the scope of an environmental assessment or other environmental study which may be conducted in conjunction with project preparation. A simple checklist to assist in early identification of biological diversity issues is provided here.

- (a) Identify the specific types of ecosystem the proposed project will affect (e.g., tropical forest, salt marsh, wet savanna, etc.). Are any of them wildlands of special concern or designated natural sites of national or international importance?
- (b) What are important biological features of the ecosystems; e.g., habitat for endangered species, or only breeding and nesting area for a particular species.
- (c) Determine the general nature of the project's impact on ecosystems; e.g., deforestation, flooding, draining, changing hydrologic regime, facilitating human access, vehicle traffic and noise.
- (d) Assess the significance of likely negative impacts relative to:
 - total area of ecosystem type in region and/or country (e.g., project will destroy approximately 10 percent of nation's remaining lowland swamp forest); and

- cumulative effects and trends for ecosystem type (e.g., tidal wetlands area is being lost in the country at an annual rate of three percent a year; this project and two other harbor facilities projects planned for the coastal zone will involve a total of 6 percent of the remaining area).

14. When a project has implications for biological diversity but the issue is relatively uncomplicated and the nature of the project permits, the design may be modified to eliminate the concern (e.g., change in highway alignment to avoid a wildlife refuge). Otherwise, the issue should be incorporated explicitly into the scope of an environmental assessment or other study where it will receive more detailed analysis and will be considered when measures to mitigate adverse impacts are developed. In most cases, a qualified specialist will be essential.

15. The sample terms of reference for environmental assessments presented in the Sourcebook and the survey techniques just described should yield most of the information needed to assess project impacts on biological resources. In making a rapid assessment of habitats and species composition of plant and animal communities, the following are important information sources:

- publications on natural areas of special concern or international importance;
- national compilations of flora and fauna;
- stock assessments; timber, fish or other biological surveys providing census data and trends in species and populations;
- national or regional programs monitoring the status of or trends in biological resources; and
- local and regional research institutions and NGOs.

16. The contribution of particular ecosystems to the region and country probably exceeds simple conservation of biological diversity. OPN 11.02 discusses free environmental services that wildlands provide. Sometimes these contributions to national, regional and local economies can be measured in monetary or other terms, and can be included in any consideration of the costs and benefits of a project modification or mitigating measure to conserve specific biological resources. When not measurable, they should be described quantitatively.

Determination of Institutional Resources to Mitigate Impacts

17. In conjunction with preparing an inventory of biological resources, examine existing government policies and laws and the institutions available for their management.

- Review legislation and policies in sectors that may affect biological diversity, the extent to which conservation of biological diversity is integrated into rural development programs, and conflicts or cooperation between agencies responsible for natural resources exploitation and/or conservation – agriculture, fisheries, forestry, mineral resources, energy, water resources, recreational lands.
- Determine whether sectors such as commerce, transport or the military will have major impacts on biological resources and, if so, whether their policies are consistent with

conserving biological diversity or, at least, do not unnecessarily deplete the resources in question.

- Identify policies that provide disincentives to conservation of the biological resources important to sustaining diversity, including tax concessions, credits, subsidies, grants, or indirect incentives such as construction of roads or other infrastructure in forest reserves.
- Evaluate the effectiveness of procedures and organizations for implementation of policies, laws and regulations.

Mitigating Measures

18. The technical aspects of mitigation plans for projects which may have adverse impacts on biological diversity include actions such as:

- establishing wildlands management areas or other protected habitats in the project's area of influence;
- establishing equivalent conservation units elsewhere in the region to offset unavoidable loss of habitat in the project area;
- designing buffer zones, wildlife corridors, and other features to maximize the benefits of the wildlife management areas or minimize impacts of the project on wildlife;
- restoring damaged habitats;
- creating new habitat, such as wetlands, artificial reefs, bird nesting sites; and
- maintaining rare or endangered species in special facilities, such as zoos, botanical gardens, seed storage.

19. Institutional aspects of mitigation plans may include:

- strengthening existing agencies with management responsibility for parks and preserves, other wildlands management areas, and biological resources in general;
- establishing new institutions, procedures and regulations;
- promoting regional perspectives in development planning to avoid loss of biological diversity through cumulative or intersectoral impacts;
- strengthening land use planning and control institutions and instruments;
- supporting scientific research pertinent to biological diversity;
- environmental education;
- incentives for conservation; and
- compensation and/or concessions to groups negatively affected by conservation measures.

OPN 11.02 on wildlands provides more information and references on these topics.

20. Community involvement is critical to conserving biological diversity, especially in cases where the approach involves imposing restrictions on the use of lands enjoyed by the public or considered the domain of indigenous peoples. It is especially important to pursue dialogue with affected groups on the following topics:

- the importance of biological diversity;
- benefits to be gained from conservation of diversity;
- local costs and benefits of the project;
- realistic management options; and
- local customs, traditions, and cultural values.

21. Project components for conserving biological diversity are usually a small percentage of total project costs. However, they do not often produce revenue directly, and their operating costs may fall on agencies which are not participating in the main components of the project. It will be difficult to obtain enthusiastic cooperation from the local parks and recreation department, for example, if it finds itself burdened by the additional expense of managing a reserve established as part of a hydroelectric power project, from which it derives no income. Implementing agencies must receive the necessary resources.

22. There are a number of methods to finance conservation of biological diversity and/or compensate local affected groups for costs they may incur in participating:

- charging entry fees to natural areas where visitors are permitted;
- taxing tourism revenues in localities where natural areas are tourist attractions;
- returning a portion of the profits from exploiting biological resources to the local community;
- implementing water use charges for the water produced by a protected area;
- including a modest charge in electricity rates where power source is a reservoir protected by the conservation unit;
- "renting" the inundated area in perpetuity to the hydroelectric power producer;
- establishing linkages with other development projects;
- building conditionality into extractive concession agreements;
- seeking support from international organizations; and
- establishing local "ownership" by implementing conservation through local special-purpose corporations or conservation NGOs.

23. Sectoral and intersectoral opportunities to support biological diversity initiatives do not normally arise of their own accord. In many instances they must be pursued out of the project context, for example:

- incorporation of biological diversity concerns into economic and sector planning documents;
- assistance with government planning for the management of biological resources;
- inclusion of biological diversity management issues in policy dialogues between governments and international agencies;
- cooperation with national and international NGOs; and
- incorporation of biological diversity into the curricula of development training institutions such as EDI.

(See Table 2.2 for examples of how these initiatives can be carried out.)

24. Supervision is a key aspect of conservation of biological diversity in Bank projects. It is important to monitor the implementation of biodiversity components and to evaluate the quality of the work. In addition, longer-term monitoring, perhaps beyond the end of the actual project implementation,

Table 2.2. Objectives and Examples of Management Systems to Maintain Biological Diversity

Onsite		Offsite	
Ecosystem maintenance	Species management	Living collections	Germplasm storage
←————— Increasing natural processes		Increasing human intervention—————→	
<p>Maintain:</p> <ul style="list-style-type: none"> • a reservoir or "library" of genetic resources • evolutionary potential • functioning of various ecological processes • vast majority of known and unknown species • representatives of unique natural ecosystems 	<p>Maintain:</p> <ul style="list-style-type: none"> • genetic interaction between semidomesticated species and wild relatives • wild populations for sustainable exploitation • viable populations of threatened species • species that provide important indirect benefits (for pollination or pest control) • "keystone" species with important ecosystems support or regulating function 	<p>Maintain:</p> <ul style="list-style-type: none"> • breeding material that cannot be stored in genebanks • field research and development on new varieties and breeds • offsite cultivation and propagation • captive breeding stock of populations threatened in the wild • ready access to wild species for research, education, and display 	<p>Maintain:</p> <ul style="list-style-type: none"> • convenient source of germplasm for breeding programs • collections of germplasm from uncertain or threatened sources • reference or type collections as standard for research and patenting purposes • access to germplasm from wide geographic areas • genetic materials from critically endangered species
<p>National parks Research natural areas Marine sanctuaries Resource development planning</p>	<p>Agroecosystems Wildlife refuges In-situ genebanks Game parks and reserves</p>	<p>Zoological parks Botanic gardens Field collections Captive breeding programs</p>	<p>Seed and pollen banks</p>

Source: Office of Technology Assessment, 1986

may be the only way to determine the extent to which the project components are being sustained and are actually contributing to conserving biological diversity. That information should be fed back into country strategy and project planning to improve biodiversity components in future work.

Wildlands

1. Wildlands are natural land and water areas that have been modified by human activities only slightly or not at all. Any relatively undisturbed natural ecosystem may be a wildland; forests, grasslands, inland bodies of water, inland and coastal wetlands, and marine areas such as coral reefs are all examples.

2. Wildlands merit special attention in environmental assessments. They are valuable because: (a) they constitute habitats for indigenous plant and animal species (and thus contribute to maintaining biological diversity); (b) they perform important environmental services for society at little or no direct cost; and (c) they are in some cases essential to the livelihood of indigenous peoples (see sections on "Social Issues in Ecologically Sensitive Areas" and "Indigenous Peoples"). Wildlands are vulnerable to the pressures of population growth, landlessness, and economic development and have been rapidly disappearing in many countries, developing and developed alike.

3. Wildlands of special concern are those recognized as exceptionally important in preserving biological diversity or performing environmental services. Some of these have been officially designated by national governments, sometimes in collaboration with international agencies such as the United Nations (e.g., World Heritage Natural Sites). Others are as yet unprotected but recognized nationally or internationally as biologically unique, ecologically fragile, or of special importance for local people or environmental services.

Bank Policy, Procedures, and Guidelines

4. The Bank's Operational Policy Note No. 11.02 "Wildlands: Their Protection and Management in Economic Development" expresses its general policy:

- (a) The Bank normally declines to finance projects involving conversion of wildlands of special concern, even if this conversion occurred prior to the Bank's being invited to participate in the project.
- (b) When wildlands other than those of special concern may become involved, the Bank prefers to site projects on lands already converted sometime in the past, rather than in anticipation of a Bank project.
- (c) Where development of wildlands is justified, then less valuable wildlands should be converted rather than more valuable ones.

- (d) When significant conversion (100 km² or a significant proportion of the remaining wildland area of a specific ecosystem, if smaller) of wildlands is justified, the loss should be compensated by inclusion of wildland management components in the project concerned, rather than in some future project. This component should directly support protection of an ecologically similar area.

5. This policy pertains to any project in which the Bank is involved, whether or not the Bank is financing a component that affects wildlands.

6. Bank policy further states that, where the success of a project depends on environmental services provided by certain wildlands, a project component should be included which will conserve the wildlands. Where the wildlands do not directly serve the project, the project may be improved through wildland management to provide socio-economic benefits in the general area. Projects with wildlands management as their sole objective are to be encouraged.

Relationship to Bank Investments

7. Wildlands are potentially linked to virtually every sector of Bank lending operations, either as resources which may be damaged or eliminated as a direct or indirect impact of a project, or as resources on which the success of the project in part depends.

- Agriculture and livestock projects may result in the displacement of wildlife and elimination of wildlands.
- Aquaculture projects sometimes lead to loss of natural breeding and nursery grounds and disturbance of ecosystems by introduction of exotic species; many natural fisheries, however, are dependent on headwater and wetland nursery areas and may be adversely affected if these are not protected.
- Forestry projects may include logging of wildland areas and can facilitate uncontrolled access to them via logging roads.
- A variety of transportation projects, including roads, railways, canals, river dredging, and port development, also make wildland areas more accessible, induce development, and may directly eliminate wildlands.
- Shipping channel maintenance becomes more costly when a watershed has a high rate of soil erosion, which may be caused by elimination of natural vegetation.
- Dams may inundate wildland areas but may also benefit from them for control of siltation, protection of reservoir water quality, and maintenance of a balanced hydrologic cycle.
- Industrial development can affect wildlands adversely (through thermal pollution from cooling water discharges, for example, or chemical pollution of aquatic and terrestrial wildlands via water or air).

8. Environmental impacts on wildlands are often intersectoral. For instance, wetlands and headwaters are vulnerable to industrial or municipal wastewater discharges, agricultural runoff, siltation from forestry operations, or dredging and filling for transportation projects or shoreline development. If these wildland areas are not protected, fishery productivity and revenue can be diminished. Where the wildlands in question are tourist attractions, loss or damage can reduce tourism revenues as well.

9. There are also linkages to regional or global environmental conditions. Wildlands can be breeding, resting or wintering sites for fish or bird species which migrate long distances to other ecosystems. Large tracts of forest can have a moderating effect on regional climate, and destruction of them may also contribute to global warming.

10. Experience from more than 40 Bank-supported projects that included an explicit wildlands management component, has demonstrated that failure to include wildland management provisions early in the project cycle can reduce project benefits. While it may increase project complexity somewhat, it has rarely caused significant delays. The main exceptions are cases where not incorporating wildland management early caused costly delays later. The Bank therefore concluded that wildland management should routinely be incorporated into certain types of projects, and that this should be done as early as possible in the project cycle to minimize costs and facilitate implementation.

Guidance for Environmental Assessments

11. The environmental assessment process provides a framework within which the costs and benefits of converting wildlands to more intensive uses can be compared with those of conserving them. It also serves as a vehicle for discovering project alternatives or components which have neutral or positive impacts on wildlands and for identifying and implementing measures to mitigate or offset negative impacts when they are otherwise unavoidable.

12. The process of describing the environment of a proposed project in an environmental assessment includes locating and characterizing all wildlands which exist in the study area. The following information should be obtained for each wildland:

- site name (if an official name has been given);
- type of ecosystems;
- geographical extent (best shown by map) and size;
- important physical, biological and socio-cultural characteristics (e.g., recharge area for significant aquifer, habitat for endangered species, presence of tribal people, religious significance, etc.);
- international, national or other designation, if any;
- current site condition (e.g., undisturbed, degraded);
- type of protection or management, if any, using IUCN wildlands management area (WMA) categories (see Annex I of OPN 11.02) or relating local nomenclature to those categories;
- agency responsible for management; and
- source of above information.

13. Information on internationally recognized wildlands—such as UNESCO World Heritage natural sites, wetlands of international importance, endangered species habitats and national parks and protected

areas can be obtained from the publications and computerized data base of the International Union for Conservation of Nature (IUCN). Within individual countries, agencies responsible for wildland management can provide locations and descriptions of nationally significant wildlands. National nongovernmental organizations can be good information sources, as can conservation-oriented international NGOs like World Wildlife Fund and The Nature Conservancy. "Wildlands: Their Protection and Management in Economic Development" contains directories of governmental and nongovernmental organizations concerned with wildlands and an extensive bibliography of pertinent publications.

14. There may be wildlands in a project study area which will not be discovered from the sources just described; they may be small in size, unstudied, lacking international recognition, or without any national status as a wildland management area (WMA), yet may still be valuable to the region or important to the success of the project. National or local NGOs, scientific research organizations, and local governments may have information on these sites. Aerial photography and field reconnaissance should be employed when the project setting is such that there is reason to believe wildlands exist of which even these sources are not cognizant.

15. The processes of analyzing project alternatives and predicting environmental impacts of the proposed project include consideration of potential effects on wildlands, and the environmental assessment report should present the results explicitly. Measuring impacts is a task for specialists in the types of ecosystems involved. It includes but is not limited to the following concepts:

- area lost, in absolute terms and as a proportion of the total area of the ecosystem type in the region or country;
- area altered, in the same terms, and the nature of the alteration;
- extent of change in resources critical to the wildland, e.g., water quality, freshwater flow, tidal flushing, ambient air quality, nutrient cycles;
- extent and duration of external disturbances (e.g., noise, smoke, dust and fumes during construction or operation; vehicle or ship traffic; visitors to previously undisturbed site; interference with animal migration or daily movement);
- extent of habitat loss or modification and the likely effects on numbers and diversity of plant and animal species;
- changes in plant and animal productivity, including economic value when possible (e.g., annual fishery revenue);
- losses in environmental service levels (e.g., waste assimilation, erosion control, and groundwater recharge); replacement costs of the lost services);
- numbers of indigenous peoples affected and the nature of the impact;
- change in numbers of visitors, and associated revenues, if the wildland is an important tourist site;
- changes in other social benefits and services (e.g., recreation, aesthetic enjoyment, conservation education, medical research);
- indirect impacts of loss of wildland (e.g., increased pressures on remaining wildland areas, need for more frequent channel dredging); and
- indirect impacts of improved access to wildlands, such as increased tourist revenues, recreational benefits, poaching, disturbance of wildlife, illegal conversion to other land uses, and illegal harvesting.

16. Measures to avoid or mitigate negative impacts should be recommended and incorporated into the EA's Management Plan to Mitigate Negative Impacts. Where there are unavoidable negative impacts, such as conversions of significant amounts of wildland areas to other land uses, the environmental assessment should include not only mitigation measures but also recommendations for the wildlands management component of the project which OPN 11.02 requires to compensate for the loss.

17. Management systems vary depending on biological conservation needs, environmental services requiring protection, regional economic opportunities, subsistence needs of local people, and adjacent land use patterns. Often mitigation measures and management techniques, of which examples are listed below, will overlap or coincide. In every situation, the capacity of existing institutions to implement technical or regulatory solutions must be evaluated, and the Management Plan to Mitigate Negative Environmental Impacts and/or the wildland management component should incorporate appropriate recommendations for institution building or strengthening, training and education. Measures to be considered are:

- alternative project siting or routing to avoid wildlands;
- establishment of WMA's to provide for protection or some form of controlled use of wildlands (see Annex I of OPN 11.02 for categories of WMA) either in project area or elsewhere (as compensation for converted wildlands);
- including wildland-sensitive features in project design, such as fish ladders, wildlife passages or crossings, noise barriers;
- establishing buffer zones around wildlands;
- rehabilitating or creating ecosystems to offset wildland conversions or add to existing stock;
- supporting research programs relevant to wildlands management and preservation of biological diversity;
- strengthening wildland management institutions, both government and nongovernment, with staff, equipment, training, and support of enforcement activities; and
- establishing environmental and conservation education programs at local schools.

18. "Wildlands: Their Protection and Management in Economic Development" contains a great deal of practical information pertinent to project development and environmental assessment. The appendices listed below are particularly useful:

Appendix C:	Identifying Wildlands of Special Concern in the Project Design
Appendix D:	The Appropriate Siting, Size and Shape of WMAs
Appendix E:	Categories of WMAs
Appendix F:	The Management of WMAs
Appendix G:	Selected International Agreements Related to Wildland Management

Wetlands

1. The United Nations convention on Wetlands of International Importance (Ramsar Convention) defines wetlands as "areas of marsh, fen, peatland or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, including areas of marine water

the depth of which at low tide does not exceed six meters." Among the most important wetlands are: tidal and fresh water marshes, bogs, fens, herbaceous and wooded freshwater and peat swamps, mangroves, coastal lagoons, floodplains, deltas and estuaries.

2. Wetlands are wildlands of particular importance both economically and environmentally. The most important roles which wetlands perform are:

- **Production of services.** Wetlands can contribute to local rainfall and can be an efficient, low cost water purification system (herbaceous swamps), a recreation area (hunting, fishing, boating), a buffer against floods, and protection from coastal erosion by storms (mangroves).
- **Preservation of biological diversity.** For many species of shrimp, fish, and waterfowl, tidal and fresh water marshes, coastal lagoons and estuaries are of vital importance as breeding grounds as well as staging areas in their migration routes. All types of wetlands may harbour unique plants and animals.
- **Production of goods.** Wetlands are among the most productive ecosystems in the world. Estuaries and tidal wetlands, in particular mangroves, are important nursery areas for most species of fish and shrimp which are later caught offshore. Shallow water areas are, in general, rich fishing grounds. Floodplains are important grazing areas for cattle and wildlife and vital spawning grounds for many fish species. Swamp forest may yield valuable timber.

Note that certain of the roles of wetlands are institutionally significant. For example, fishes do not recognize national boundaries or may migrate long distances. Consequently, destruction or degradation of wetlands in one country may have direct impacts on the biological resources of others. (See section on "International Waterways.")

3. Despite their importance, wetlands everywhere are under threat. These threats come from conversion to intensive agriculture and/or aquaculture, industrial development, artificial hydrological changes or degradation through over-exploitation.

Relationship to Bank Investments

4. The issue of wetland conservation is relevant to a large variety of Bank projects, such as:

- projects which affect the hydrology of a wetland, such as construction of a road or high dam, flood control, lowering of the aquifer drainage, and irrigation and other water supply systems;
- direct conversion of wetlands for agriculture, port facilities, navigation projects, and aquaculture (in particular mangroves for shrimp culture);
- projects which indirectly influence wetlands through disturbance of the ecological conditions, such as those causing pollutants to flow into the wetlands, those posing the threat of

introduction of exotic species (aquaculture), those introducing physical disturbance by people, and those contributing to acid rain or to rise in sea level; and

- watershed management on other projects conducted for environmental purposes.

Bank Experience

5. The Bank has significant experience with wildlands conservation and management issues through financing of various projects on wetlands. Wetland management issues played major role in projects such as:

- the Nakdong Barrage and Land Reclamation Project in Korea, where the Bank financed a management study, changes in the design of the project and set loan agreement conditions to safeguard a wetland of international importance that was threatened by the project;
- the Southern Conveyor Project in Cyprus, where plans have been made to restore Akrotiri Lake, an important wetland;
- those within the context of the Environmental Program for the Mediterranean where management of the most important wetlands in that region has been foreseen;
- the Lower Guayas Flood Control Project in Ecuador which includes an Environmental Impact Assessment and a conservation component for wetlands; and
- conservation projects in Brazil's Pantanal, the world's largest freshwater swamp, through the North West Development Program and the National Environmental Project.

Bank Policy, Procedures, and Guidelines

6. The most important Bank policy document is the Operation Directive 4.00, Annex D: "Wildlands: Their Protection and Management," which lists wetlands as wildlands of particular importance.

7. Bank procedures, in turn, are supported by such international policy as the Ramsar Convention which encourages member countries to designate significant wetlands within their borders for a worldwide list of areas valued for their biological and other scientific features. (There are currently over 395 designated wetlands sites in 46 countries.) Wetlands listings are available through the regional environmental divisions. However, it is critical to remember that virtually all wetlands perform important functions. Large or "listed" sites are not the only ones to be considered in project preparation.

Guidance for Environmental Assessments

8. In case a particular project is likely to impact a wetland, the following questions are usually relevant.

- Is the area on the Ramsar list? (List available from the Bank's Environment Department.)
- Will there be changes in the hydrology of the wetland?
- Will the project pollute or increase nutrients or physical disturbance in the wetland?
- Will (parts of) the wetland be converted or will there be a change in use?
- What is the socioeconomic value of the wetland as it is used at present? What would be the sustainable yield under better management? What is the replacement cost of the free goods and services now being produced by the wetlands if it were destroyed?
- What institutions exist which can or could manage or protect the wetlands and what are their capabilities and limitations?
- Are local people willing and able to adapt their traditional exploitation systems to the eventual changes in the wetland caused by the project?

9. In conversion of wetlands for agriculture, the costs associated with the loss of opportunity to exploit the wetlands sustainably should be incorporated into the economic analysis. However, many wetlands contain poor acid soils, hardly suitable for agriculture. Drainage and exposure to air exacerbates acidity, especially in mangroves.

10. When a project has potential adverse impacts on wetlands, the design should be modified to avoid them, or to mitigate or compensate for those that are unavoidable. Options include any or all of the following:

- selections of alternative sites to avoid impact on wetland;
- design features to prevent disturbance of the flow patterns and hydrologic regimes critical to conservation of the wetland (e.g., flow regulating works, road crossings on trestles or pilings, rather than on embankments);
- enhancement and/or protection of other wetlands in substandard conditions to offset losses at project site;
- artificial construction of wetlands to replace areas lost (where experience has shown that the wetland type in question can, in fact, be constructed);
- strengthening institutions to manage and protect wetlands;
- including local NGOs in the institutional arrangements for wetlands conservation;
- promoting development of national wetland incentives and management strategies;
- requiring wetland concerns to be considered in national and local planning and law use decision-making processes; and
- environmental education programs to disseminate knowledge on importance of wetlands.

The section on "Wildlands" and OPN 11.02 on wildlands contain additional guidance for task managers.

Tropical Forests

The 1978 Forestry Policy is being completely revised and will be presented to the Advisory Board in May 1991. The main elements to this section will be inserted in the next revision.

Arid and Semi-Arid Lands

1. Drylands of the world constitute a natural low-productivity environment, where the major limiting factor to biological production is normally water. When limiting factors are overcome—economically and technically—drylands can become moderately productive. However, under intensive production systems they require careful management as they are highly prone to soil salinization, alkalization, waterlogging, and wind and water erosion. Insect pests also threaten to agricultural production (e.g., locusts, grasshoppers, aphids, etc.), especially where the project reduces the natural pest control value of the dry season.
2. The drylands of the developing world, including lands receiving a long-term annual average precipitation of 200-1000 mm, harbor some 550 million people, many of whom are among the poorest and most vulnerable groups.
3. Recent degradation and famines in drylands, together with frequent economic, physical and health problems in major irrigation schemes, have demonstrated the difficulties involved in developing suitable mechanisms and the need for concerted actions. Yet, drylands have remained remarkably resilient over generations, producing magnificent civilizations, as well as untold human misery.
4. The famines of the last few generations, in China, India and recently in Africa, have revealed the fragility of these ecologically marginal areas. While the media have focused on famines and the worst affected areas, little attention has been paid to the less marginal and potentially more productive environments. Recent evidence suggests that the impact on the environment of growing populations and their needs for food, energy and water may in the long run prove more acute in the more productive areas than in the driest ones.
5. Much uncertainty has developed among lending institutions and the donor community in general on how best to support drylands development. While some claim that investment in the drylands represents a low return, an unacceptable economic risk-taking, and a potential increase in debt-burden to borrowing dryland countries, others stress the need to avoid recent famines. It is important to consider the consequences of the economic (opportunity) costs of doing nothing.

Bank Policy, Procedures, and Guidelines

6. Although there is no separate, formal Bank policy on dryland intervention, the issue underlies policies in many related areas, such as agriculture, forestry, rangeland, energy, transportation, migration and resettlement. The different policy and guidelines of sector interventions will influence any dryland interventions and should be applied in an overall approach rather than restricted to sectors alone.
7. "Dryland Management Guidelines (DMG): The Key Elements in Dryland Project Design and Review" is a valuable reference. A presentation of strict standards may be too ambitious, given the many variations of physical, economic, social and cultural factors involved. The DMG has been developed as a tool for reflection and assistance to Bank staff in designing and reviewing dryland management projects.

Relationship to Bank Investment

8. By 1991 the Bank will have prepared and appraised at least twenty-nine projects with a direct impact on dryland areas and will have invested an estimated \$200 million a year to restore degraded areas and improve agricultural production.

9. Two elements have emerged as crucial in dryland investment:

- an increased emphasis on the ecological and human consequences of individual projects; and
- the integration of environmental issues into economic policy at all levels.

10. These changes are reflected by an 84% increase in Bank lending to dryland management-related sectors from 1982/85 to 1986/89 (\$929.2 million and \$1707.7 million, respectively) in Sahel and Sudan zones alone.

11. The issue of dryland intervention may be relevant to a large variety of Bank projects, such as:

- projects that affect the productivity of dryland irrigation schemes, flood control, agricultural and energy development, soil and water conservation, and forest and rangeland management;
- projects that indirectly influence drylands through resettlement or construction of roads or high dams; and
- policy interventions on the macroeconomic level (pricing, subsidies, taxation, and land tenure/rights).

Guidance for Environmental Assessment

12. The DMG discusses the limitations that sectoral and macroeconomic policies place on the sustainability of single projects. As long as incentives which may lead to deterioration of the environment (e.g., pricing policy on certain resources such as charcoal) are not dealt with, isolated interventions have proven to be unsustainable.

13. The DMG deals with three aspects of environmental assessment: an outline of development objectives; key indicators to be considered in project reviews; and an outline of essential project and policy issues. A selected bibliography is an annex. Some of the main points are outlined in the discussion below.

Overall Objectives for Interventions

14. Ongoing and potential dryland interventions should be evaluated, through active participation of the beneficiaries, on the improvement to physical, social and cultural wellbeing. This implies a long-term perspective where the resource base must be wisely utilized and conserved for future generations.

15. The environment, economic efficiency and equity must be considered when designing alternative interventions. The interventions should therefore have a solid economic, human, technical and scientific base. Once completed, these activities should prosper without a higher level of outside support or subvention than is justified by the returns from the project. This should also be achieved without unduly degrading the physical resource base that sustains it.

16. **Consistency with Established Socio-Economic Systems.** Utilization of traditional knowledge and strengthening of the cultural identity is important. The intervention must identify and support the welfare and cultural identity of affected indigenous people.

17. The intervention should also be consistent with existing systems for natural resources management at both national and local levels. In cases where management systems are shown to be in transition by the socio-economic analysis, a substantial monitoring and evaluation capability should be built into the activities to mitigate negative effects that may affect the population or the resource base. A long-term research activity should be carried out for large-scale interventions. As appropriate, follow-up design of a large-scale intervention should reflect the results of the research or lessons learned from a pilot effort.

18. **Resilient Management of Natural Resources.** Since dryland ecosystems are naturally dynamic, productivity will change despite any interventions. The capability of the land under given land use to return to its initial productivity should be sustained. Short-term (1 to 3 years) and long-term (5 to 30 years) studies of resilience may indicate degradation. Knowledge of short-term resilience should be included in planning, particularly in high risk areas; and long-term resilience should guide resettlement projects and long-term investments. Sustainable interventions must have a long-term perspective (15 years), where carefully selected incentives for the beneficiary population should be developed.

Operational Indicators in Project Design and Review

19. Objectives should be based on a non-sectoral approach. Site- and project-specific variations imply that the selection of key indicators and analyses must be flexible. However, it is crucial to identify the relative importance of each indicator. Systems approaches have proven to be promising tools in that respect. Rural Appraisal Techniques may also help the selection process in order to better reflect the concerns of the beneficiaries. The DMG provides a set of indicators (with sub-sets) to be considered at an early stage in the project cycle:

- climate
- population development
- health and nutrition
- energy
- economic factors
- access to land, goods and services
- state of the natural environment
- production systems and degree of risks
- livestock/rangeland management
- technological interventions and adoptions

Remedial Measures/Project and Policy Issues

20. The analysis of constraints and opportunities through selection of key indicators should reflect the overall objectives of intervention. The next step would be to formulate strategies and mitigating measures to reach those goals. The complexity of the problems and the site- and project-specific conditions make it impossible to formulate one single strategy. The next step would be to outline principles which may be applied in project design and reviews. The following aspects should be dealt with (cf. DMG):

- Rainfed Agriculture and Recession Cultivation
 - Water Harvesting and Conservation
 - Soil Fertility Technologies
 - Dune Stabilization
- Rangeland Management and Pastoral Association
- Forestry and Agroforestry
- Energy
- Institutional Issues
 - The Role of Central Governments
 - Institutional Reforms
 - Local Participation
- Land Security and Tenure
- Pricing Policy and Subsidies
- Migration and Off-Farm Income
- Infrastructure
- Natural Resources Inventory, GIS and Monitoring
- Wildlife and Conservation Units
- Women in Development

Coastal Zone Management

1. There is no precise definition of "the coastal zone." All definitions seek to include coastal waters, marine and estuarine (and nearshore waters of large lakes and inland seas), and some portion of the land along the coast in which human activities and natural processes both affect and are affected by those in the waters. The extent of land area included varies, because its limits are determined not only by ecological and geological characteristics but also by some concept of what is politically and administratively manageable. Thus while one might include the entire land area of watersheds which drain to the sea, and the entire water area out to the continental shelf, in practice the coastal zone is a relatively narrow band of water and land along a shoreline. Its natural features include beaches, wetlands, estuaries, lagoons, coral reefs, and dunes. Man-made features include ports, commercial fisheries and aquaculture operations, industries, recreational and tourist developments, archeological sites and, above all, some of the largest and most densely populated urban areas in the world.

2. The economic significance of the coastal zone is vast. Virtually all shellfish used by humans live and are harvested there. Most of the world's commercially important finfish depend on the coastal zone, and much of the commercial fishery takes place in it. Coastlines have been the obvious locations for seaports and for the siting of industrial and commercial operations which involve movement and processing of large volumes of raw materials or finished products. The land is attractive and valuable for residential use; in many areas of the developing world, population growth rates and urban population are highest along the coasts. Coastal areas have been used for recreation for centuries, but tourism is now big business, sometimes the largest sector of a country's economy. Less obvious, but also important economically, are services the natural features of the coastal zone perform, without cost: shoreline stabilization, protection from storms, fish nurture, flood control, nutrient cycling, and waste treatment.

3. It is a particular challenge to manage development in the coastal zone in a way which is environmentally sound and sustainable: coastal and marine areas are among the most sensitive to the impacts of development and, as described above, especially attractive for it. Some of the activities associated with coastline development, such as extensive dredging and filling, intensive urbanization of watersheds, siting of industries, and conversion for agriculture or aquaculture are relatively irreversible transformations. Most economic development projects in coastal and marine areas have the potential to seriously affect the resources located in these environments and to present conflicts among competing resource uses. Consequently, EA alone is insufficient for coastal zone management. Special attention to regional planning is required, both to minimize or mitigate adverse impacts and promote optimal use of the resources available.

Relationship to Bank Investments

Projects Where Issue Is Relevant

4. The following types of projects have potential impacts on coastal and marine areas:

- Agriculture: coastal and upland; large irrigation dams.
- Fisheries: coastal capture fisheries and mariculture/aquaculture, including conversion of marshes and mangroves.
- Forestry: mangrove forest products harvesting; fuelwood and other renewable resources; large-scale forestry in uplands.
- Energy: oil and gas exploration and operation; coastal power generation; large inland hydroelectric dams.
- Transportation: ports and harbors; channel construction and maintenance dredging; dredge spoil disposal; roads, railroads and bridges.
- Urbanization: shoreline modification; waste disposal; recreation and tourism; large-scale water resource development; urbanization of watersheds.
- Industry/commerce: industrial plant siting; coastal and marine mining (e.g., sand); salt manufacture; and waste disposal.

Sectoral and Intersectoral Linkages

5. Three broad categories of issues are related to development of coastal and marine areas which are linked and interdependent with respect to sound management of associated resources. First, sectoral

development programs tend to focus on large, single-purpose projects such as building a large port facility (amplified in the "Port and Harbor Facilities" section), implementing an extensive capture fishery project (see "Fisheries" section), or devising a scheme to convert mangroves to rice production and shrimp pond culture (see "Natural Forest Management" section). Multiple-use resource management is particularly appropriate in the coastal zone.

6. Second, as a result of the economic interests associated with sector development, government agencies, lending institutions, and public constituencies tend to align themselves with one sector or another. Conflicts can arise between individual economic interests, among government agencies responsible for the management of the individual resources, or between those agencies and the organizations charged with broader planning responsibilities. These conflicts can manifest themselves ecologically and economically, since the productivity of coastal and marine areas and their ability to recover from heavy pollution or other perturbations are often diminished by the effects of one development activity on another. Integrated approaches to planning and resource management are essential to avoid adverse intersectoral impacts and institute mitigative measures.

7. Third, coastal and marine zones encompass many different kinds of resources that are demonstrating, in many parts of the world, a decreasing ability to sustain development. This is evidenced by increasing pollution, rising human health hazards, declining fisheries, spoiled beaches, conflicts between local cultures and tourists (see "Tourism Development" section), and displacement of groups which subsist on coastal zone resources. It is a trend which can be reversed, when the unique management needs of the coastal zone are recognized.

Bank Experience

8. The Bank experience in coastal zone management projects is not extensive, but significant steps have been taken during the last ten years to incorporate coastal and marine environmental management principles in a number of projects. A sample of this involvement follows.

and also by controlling activities inland which have downstream impacts.

- (a) The Central Visayas Regional Project, Philippines, undertaken in 1983, is contributing to production of coastal fisheries by protecting vital mangrove and coral reef habitats and by partially rehabilitating selected fish habitats (e.g., by planting of mangroves and by construction of artificial reefs) damaged by non-product related activities.
- (b) The Tourism Development Project, Honduras, completed in 1989, included an environmental control master plan for Roatan Island, relocated Tourasal beach development to protect mangroves and other coastal ecosystems of Quemada Lagoon, and established a small national archeological park at Copan.
- (c) The Environmental Program for the Mediterranean, a regional study begun in 1988, consists of an assessment of environmental problems and priorities for 18 countries in the region, and eventual development of an action plan covering policy reform, institutional strengthening and investment needs. Many of the environmental problems of this region are coastal and marine in origin, providing a unique opportunity for the Bank to be involved in helping these countries set priorities to protect and manage aspects of the coastal environment.

- (d) **The Nakdong Barrage and Land Reclamation Project near Pusan, Korea, where changes in the design of the civil engineering works were made to protect a National Treasure; in addition, a nature reserve was established including the financing of studies and management programs to safeguard environmental, production and conservation values in the estuary.**

9. In addition to specific project interventions, the Bank indirectly is promoting protection and management of coastal and marine resources through the implementation of sound environmental guidelines for infrastructure and urban development projects and through support to the Asia Wetland Bureau, an NGO located in Kuala Lumpur, Malaysia.

Bank Policy, Procedures, and Guidelines

10. There are no formal Bank policies or guidelines on overall coastal and marine area planning and management. However, a number of Bank policies and guidelines on other subjects have direct applicability to development activities in the coastal zones. Two of particular importance concerns dams and biodiversity. First, the policy on dams and reservoirs requires examination of downstream effects. (See "Dams and Reservoirs" section for list of references on this and related topics.) Second, conservation of biological diversity and environmental services are two of the basic elements of the Bank's wildlands policy, and they mean that coastal area developments should be planned to avoid impacts on mangroves and other coastal wetlands, coral reefs, or other protected and biologically important areas (see sections on "Wildlands" and "Wetlands"). A number of Bank policy and guidance documents are concerned with port and harbor developments and dredged material disposal (see "Port and Harbor Facilities" section). Finally, the Bank has stated at the Oslo Conference on Sustainable Development, held in 1988, that it will not support projects involving the ocean dumping of hazardous waste. (See "Hazardous Materials Management" section.)

Guidance for Environmental Assessments

11. A growing number of developed and developing countries employ coastal zone planning as a basis for land and water resource use decisions. Such planning, which is characterized by its integrated approach to all sectors and resources, should be encouraged in country environmental strategies and sector work. Each investment project may present an opportunity for incremental progress toward the same objective. Integrated environmental planning is especially critical in the coastal zone because of the high social, ecological and economic values of the resources there; the intense demand for those resources for a variety of competing and potentially mutually inconsistent uses; and the extreme sensitivity of those resources to damage.

12. Such planning may offset the need to conduct detailed EAs for specific projects, if it has led to environmentally sound physical plans, standards and guidelines, and if adequate resource use control instruments are in place. In the absence of coastal zone planning, the EA process should be used to ensure that community involvement and interagency coordination are initiated at the project identification stage, that the full range of alternatives and intersectoral impacts are considered before the sponsoring agency makes its decision about the project, that appropriate implementation plans are prepared, and that institutions are competent to implement those plans.

13. A large number of treaties and international conventions exist to protect the coastal and marine environments (see "International Treaties and Agreements on the Environment and Natural Resources" section). Most countries have signed them, but adherence to them is inconsistent. Compliance with these agreements in design, construction and operation should be considered as part of EAs on projects in the coastal zone.

14. Several international organizations, including UNEP, EEC, the International Maritime Organization, and the International Association of Ports and Harbors have published guidelines for managing environmental impacts of various activities in coastal areas. The EA team should assess the extent to which applicable guidelines are being used in project planning and design.

15. Sociocultural impacts can be especially significant and should not be neglected (see "Social Issues in Ecologically Sensitive Areas" section in Chapter 3).

Land and Water Resource Management

1. The Sourcebook is not intended to be a guide for natural resource management. This section merely identifies some critical issues and key concepts the user should keep in mind when examining environmental impacts of projects which involve modification of the land's surface contour or cover or commitment of significant quantities of groundwater or surface water to various human uses. The discussion is particularly relevant to preparation and review of the plan for mitigating adverse impacts on land and water resources that must be included in every EA report.

2. The section is written with no particular type of ecosystem in mind; for land and water resource concerns related to sensitive ecosystems, the reader should consult the section on "Cross-Sectoral Issues." Sociocultural issues related to land and water resource management appear in Chapter 3.

3. Land and water resources are considered together because of the inescapable causal relationships between them. A change in the way one is managed is likely to have an effect on the other, especially if insufficient attention is given to the interactions in project planning.

Environmental Issues in Land Resource Management

4. Almost any development project will involve disturbance of the land surface. When the area involved is small, the environmental impact is likely to be minimal. However, the cumulative impacts of many separate small disturbances can be substantial. The kinds of alterations to the land that are of concern are listed below. Many of these topics are discussed elsewhere in the Sourcebook, as indicated by a cross reference in parentheses, and most are therefore discussed only in general in this section.

- clearing (Roads and Highways; Large-Scale Housing Projects)
- topsoil removal (see above)
- grading (see above)
- filling (Wetlands; Coastal Zone Management; Roads and Highways)
- draining (Wetlands)
- landscape planting (Large-Scale Housing Projects)
- cultivation (Agricultural Management; Forestry)

- paving (Roads and Highways; Large-Scale Housing Projects)
- building construction (Large-Scale Housing Projects)
- waste disposal (Solid Waste Collection and Disposal Systems; Wastewater Collection, Treatment, Reuse and Disposal Systems)

The direct and immediate environmental impacts of these alterations can be grouped into four categories.

Loss of Habitat

5. Any of the activities listed result in loss of habitat. The seriousness of the impact depends on the type of habitat being converted, as well as on the way in which the conversion is carried out. When wildlands, wetlands, tropical forests or other sensitive ecosystems are involved, the EA team should carefully assess the impacts, examine the alternatives that were considered, and perhaps propose new alternatives. (See section on "Wildlands.")

Loss of Soil Productivity

6. Certain forest soils, when stripped of natural cover, become laterized or subject to rapid erosion, and essentially unproductive. Removal of topsoil during grading also reduces productivity. Soil loss through erosion has the same effect, and in addition may degrade water resources. Conversion of high-quality agricultural land to urban uses also reduces productivity. Mitigation measures an EA might recommend include avoidance of construction on steep slopes, retention of forest cover, stockpiling and replacement of topsoil, conservation of prime agricultural land, application of good cultivation practices, and control of erosion and sedimentation through use of mulch during construction and rapid replacement of vegetative cover on slopes and construction of siltation basins and barriers of straw or filter fabric to protect waterways.

Modified Hydrology

7. Clearing, grading, filling, paving or construction of buildings alter patterns of surface runoff and infiltration. The results include local ponding and flooding, increased flood frequency and/or magnitude downstream, lowered water table, diminished groundwater recharge, and increase in low flows in streams. Management measures include design and construction techniques to maintain or replace local drainage channels, retention or detention structures to avoid increases in rates of runoff, measures to offset reduced infiltration (porous pavement, infiltration ponds, etc.), and conservation of open space on critical aquifer recharge areas.

Soil Contamination

8. Soil can be contaminated through salinization if irrigation systems are not properly designed and operated. It can also be contaminated by disposal of hazardous waste or improper operation of solid waste and land-base wastewater disposal systems. Mitigation measures for irrigation systems are described in the "Irrigation and Drainage" section. Measures for waste disposal, solid waste and wastewater are discussed in Chapter 10.

Land Clearing

9. Land clearing for agriculture is discussed as a separate topic because of the environmental implications of the choice of land to be cleared and the method employed to clear it. In general, the impacts of clearing are more significant in tropical than temperate regions because the former experience higher temperatures which accelerate chemical degradation of soils and higher intensity of precipitation leading to more severe erosion.

Land Clearing Methods

10. There are three basic methods, and they are often used in combination on single project:
- (a) Manual methods -- felling or cutting vegetation, allowing a drying period, and then burning the debris;
 - (b) Mechanical methods -- using heavy equipment (e.g., bulldozers, heavy chains and tractors) to fell trees and cut and lay down underbrush, windrowing (raking debris into rows or piles), burning, and final clearing of the residue;
 - (c) chemical methods -- using herbicides to establish areas for crops, either leaving dead trees standing, felled, or burned.

Mechanical methods have significant adverse impacts, including topsoil loss or inversion, destruction of soil structure, and compaction leading to increased runoff. Both mechanical and manual methods involve burning, which often reduces soil nutrient content and the activities of beneficial soil organisms as well as contributing to elevated atmospheric carbon dioxide concentrations. Chemical techniques have been shown to have less drastic effects on soil. However, the long-term effects of herbicide use in the tropics are not well understood.

Post-Clearing Management

11. Inappropriate post-clearing management practices, such as lack of manuring, failure to employ soil conservation practices, and repeated fires have often led to reduction in soil fertility to the point at which economic agricultural production cannot be sustained. Abandonment and weed infestation are the ultimate results.

Environmental Issues in Water Resource Management

12. Water resource management issues that may emerge in an EA are associated with water use or land use decisions that affect the quantity or quality of surface water or groundwater. Changes in quantity or quality may in turn affect the range of uses the particular water resource can support or alter the functions of a natural system dependent on the water.

13. The actions related to development projects which can alter water quality or quantity include: contamination of surface water by directly discharged effluents (Chapters 8, 9 and 10); contamination of surface water by non-point or diffuse pollutant sources (Chapters 8, 9, and 10); contamination of surface water by atmospheric pollutants (Chapter 2); contamination of ground or surface water by wastes disposed

of on or beneath the land (Chapter 9); increase in runoff by clearing, grading, paving, drainage or channel modification; decrease in surface water flow by diversion, impoundment, consumptive use; and reduction in water table elevation or artesian flow by interference with groundwater recharge or excessive groundwater withdrawals.

The first four topics, which concern water quality, have been discussed elsewhere in the Sourcebook, as indicated by the cross-references. The topics related to water quantity will be considered here in more detail.

Environmental Impacts of Increased Runoff

14. Increases in runoff, result from any activities which make the land surface less permeable, "smoother" or both. The rate of runoff, the total amount of runoff or both may be affected. The impacts include declining water tables, more frequent or more intense flooding, more prolonged or extreme dry-weather flows, and scouring or silting of channels. Changes in natural flow patterns can modify or eliminate wetlands and affect agriculture that depends on seasonal flooding for irrigation and maintenance of soil fertility. Where these impacts are predicted, structural and non-structural measures can be incorporated into projects to mitigate them.

Environmental Impacts of Reduced Surface Water Flow

15. When the overall flow of surface water is reduced significantly by impoundment, diversion, or consumptive use, downstream users and natural systems experience impacts. Two common causes of the flow reductions are growth in the watershed in excess of that which existing water resources can support or overcommitment of water resources from failure to take all uses and users into consideration in project planning. The immediate impacts may include: decline in water quality from diminished dilution of pollutants; seasonal or continuous shortfall in supply for downstream users; reduction in wetland area; and increases in salinity and changes in circulation in estuaries.

Each of these impacts can in turn have secondary impacts, such as decline in shellfish harvests, loss of revenue from water-dependent industry and commerce, or reduced hydroelectric power output. Mitigating measures are few, and most are expensive; relocating industries or importing water from other watersheds are examples. The sound approach is prevention through water resource planning and management on a watershed scale. The terms of reference for the EA on any project involving large-scale water consumption or diversion should require analysis of existing, planned and projected water availability and use to avoid these impacts from the outset.

Environmental Impacts of Lowered Water Table or Reduction in Artesian Flow

16. The most obvious impact is the increased cost of drilling deeper wells and pumping water from greater depths. More disruptive is interruption of previously reliable water supply as a result of overpumping from nearby wells or cessation of artesian flow. When the aquifers affected are near the seacoast, saline water may intrude as fresh-water flow diminishes, making coastal wells unusable. Finally, a long-term impact which can occur over a large area and be virtually impossible to reverse is subsidence of the land surface caused by reduced water pressure in unconsolidated rock. Mitigation measures are again few and quite difficult. They involve replacing lost or salt-contaminated groundwater

supplies with surface water. Attempts at reversing saline intrusion have met with only limited success. Subsidence may be arrested but is not realistically reversible by any artificial means.

Watershed Planning and Management

17. Water use and land use are interrelated. Water use decisions in one part of a watershed are likely to pose opportunities and constraints for users in another part. These circumstances argue for integrated planning on a watershed basis, to ensure that the basin's water is not overcommitted, that upstream water users do not deprive those downstream of opportunities, that projects meet their intended purposes, and that patterns and amounts of growth are kept in balance with the capacity of the water resources. Tools and technical knowledge exist to accomplish such planning and management. The difficulties are institutional. Water resources do not respect political boundaries, and there is thus a need for an institution with sufficient capacity and power to influence land and water use decisions in multiple jurisdictions. This frequently entails a corresponding willingness on the part of those jurisdictions to subordinate their authority to the watershed institution. In projects which depend on watershed-wide planning and management, EA teams should carefully analyze the institutional structure, the needs for strengthening it, and whether it is politically realistic to anticipate success in the effort.

Natural Hazards

1. Major areas of the world are subject to risks from natural hazards. Earthquakes, volcanic eruptions, droughts, floods and hurricanes hinder development through their direct, indirect and cumulative impacts. There is a two-way, direct relationship between environmental deterioration and natural hazards; that is, soil erosion, deforestation, desertification, and coastal degradation increase the risks of extreme events, and in turn, natural hazards exacerbate environmental degradation. Furthermore, the potential for human and economic losses in an area is directly related to its vulnerability to natural hazards.

2. The resilience and sustainability of development may be significantly improved by reducing disaster vulnerability. Reducing losses from natural hazards can be brought about through appropriate and sound planning strategies and management. Disaster-resilient planning and management must be based on a sound understanding of natural hazard risk and such understanding must be incorporated into social and economic planning. In addition, scenarios concerning climate change indicate a potential for sea level rise, increased severe droughts, shifting in agricultural zones and more frequent hurricanes which underline the need for efficient mitigation and preparedness.

Relationship to Bank Investments

3. Over the last decade, extreme events have increased in number and impact, seriously hampering the development process and requiring a substantial reallocation of resources from development to relief and recovery. Vulnerability to natural disasters is increasing due to continued environmental degradation, population growth, location of investments in high risk areas, and concentration of infrastructure and industry in disaster prone areas. Lending by the Bank as a response to major disasters has increased significantly in the last five years. In fiscal years 1988 and 1989, the total amount for emergency recovery—including both reallocations from existing operations and new emergency recovery projects—amounted to about four percent of the Bank's total lending portfolio. This significant amount indicates

a need to (a) increase the resilience of member-countries to disasters, and (b) incorporate natural hazard risk management into investment decisions.

4. Natural hazards are relevant in virtually every sector of Bank lending and in every region of Bank operations. Bank investments in different sectors--industry, energy, education, health, agriculture and urban development--are vulnerable to disruption from extreme events. In many countries the existing capacity in both the public and private sectors to address natural hazard risk and to integrate disaster prevention and mitigation into development programs is limited. In addition, understanding of the potential economic and financial impact of natural hazard risk is limited.

5. For example, in the industrial sector, the decision to locate a given investment in an area subject to extreme events implies taking a chance with such investment in general, and specifically with the physical plant and the well being of its employees. If the investment is destroyed by an extreme event, the true measure of the negative impact is not merely the value of the assets lost. The real measure is such loss, plus the revenues lost over the life of the industry, plus income and additional investments that would have accrued from the indirect and multiplier effects of an alternate, prospering, risk-resilient enterprise. Risk resilient enterprises in these cases, even if more expensive initially, ultimately would prove to be the more efficient use of resources. Similar examples can be drawn for other sectors, such as infrastructure, energy, agriculture, health, education and housing.

6. The most notable reasons for the failure to integrate natural hazard risk into development programs are (a) inadequate understanding of mitigation options to prevent/reduce catastrophic losses, (b) weak institutions, (c) inappropriate mechanisms for collecting and processing the necessary information about natural hazard risk, (d) lack of a coordinated policy for risk reduction across sectors, and (e) inadequate emphasis on implementing and monitoring mitigation.

Bank Experience

7. Since its creation in 1947 the World Bank has been requested to provide assistance in about 100 cases of disruption after natural disasters, such as floods, hurricanes, earthquakes, volcanic eruptions, and forest fires. Examples of the countries that have received emergency recovery assistance are:

- Bangladesh, Pakistan, Sudan, Brazil, Nepal, Yemen AR, India, Honduras, Nicaragua, Peru, Romania, and Western Samoa (for floods);
- Mexico, Nicaragua, Peru, Romania, Guatemala, Ecuador and Nepal (for earthquakes);
- Costa Rica, Jamaica, Mexico, Madagascar, Dominican Republic, Swaziland, Fiji, Mauritius, and Bangladesh (for hurricanes);
- Colombia and Iceland (for volcanic eruptions); and
- China (for forest fires).

8. In the past few years there has been an increased concern for disaster reduction in Bank programs. The inclusion of disaster prevention and mitigation in emergency recovery projects was encouraged in an Operational Policy Note on emergency lending (1984), and more recently in a Policy Paper on emergencies (November 1988) and in Operational Directive 8.50 (October 1989) on emergency recovery operations. This recommendation was based on the notion that disasters provide a "window of opportunity" to introduce measures to reduce losses. The concern for vulnerability reduction goes

beyond emergency recovery projects and recent efforts have been made to develop self-standing prevention and mitigation projects and to include those concerns in sectoral work and in country dialogue.

9. Disaster mitigation and prevention are now the main objectives of the International Decade for Natural Disaster Prevention, declared by the United Nations in the 1990s. Both international and national agencies are currently developing programs for the Decade, with significant participation from NGOs and from the private sector. Natural hazard risk reduction is also a main concern in the many initiatives currently under consideration concerning global climate change. Global climate change and the potential increase of extreme events is being discussed in a number of international fora, including *inter alia* the Intergovernmental Panel on Climate Change (IPCC) and the planning for the 1992 UN Conference on the Environment.

Bank Policy and Operational Directives

10. Operational Directive 4.00, Annex A: "Environmental Assessment" (October 1989), recommends that environmental assessments review whether the project may be affected by natural hazards and if so that they propose specific measures to address those concerns.

The policy for "Lending by the Bank for Emergencies" (issued as Operational Directive 8.50: "Emergency Recovery Assistance") was adopted by the Executive Board of Directors on November 1988. According to the policy, the main criteria for mounting an emergency lending operation include:

- focus on economic reconstruction and recovery, rather than on relief;
- demonstrable (even if not easily quantifiable) economic benefits;
- significant scale, but nevertheless temporary nature of impact of the emergency;
- urgency and effectiveness of short or medium-term action; and
- prospects for mitigating the impact of future emergencies.

11. The policies for reducing the impact of future emergencies are: (a) attention in country strategy work and in national planning and investment programs to the risks of large-scale natural disasters; (b) close collaboration in this area with the official international and NGO communities; (c) increased focus within the Bank on technologies to reduce natural hazards; and (d) inclusion of prevention/mitigation components where appropriate in regular loans as well as in emergency lending operations.

12. Operational Directive 8.50 "Emergency Recovery Assistance" addresses procedures for recovery assistance after disasters of slow and sudden onset. The OD defines the main objective of recovery assistance as the immediate restoration of assets and productivity. It outlines special considerations for designing Emergency Recovery Loans (ERLs), including:

- early involvement of Bank staff;
- limited objectives and realistic schedule;
- conditionalities linked only to the emergency rather than to macroeconomic policies;

- simple implementation arrangements and full use of existing institutions, including sector agencies, NGOs, and community groups, use of disaster-resilient reconstruction design standards; and
- inclusion of measures for preventing and mitigating the impact of future disasters.

The OD also outlines special procedures for processing ERLs, including compact documentation and simplified processing.

Guidance for Environmental Assessments

13. The environmental assessment process provides a framework within which to analyze natural hazard risk and to evaluate the costs and benefits of disaster prevention and mitigation. It also serves as a vehicle for analyzing development alternatives which do not have negative impacts on disaster vulnerability and for identifying disaster prevention and loss reduction measures.

14. In assessing natural hazard risk it is important to consider the specific qualities and characteristics of different types of disaster agents, as well as their potential direct and secondary effects. For instance, damage caused by hurricanes could be due to the direct effect of violent wind and excessive rainfall, and from the secondary effects of river flooding, storm surge and landslides. Earthquakes can have numerous direct and indirect effects such as tsunamis, fires and landslides. It is also important to identify those activities that may increase the potential for extreme events. For example, deforestation degrades watersheds, promotes erosion and soil degradation, and increases flooding. The compiled information concerning the two-way relationship between natural hazards and development should give a status profile for risk assessment as well as for response purposes.

15. The EA of natural hazard risk includes the following:

- (a) Identify specific natural hazards, including natural hazard characteristics, distribution, intensities, qualities, and historical records to review frequency, and probability of occurrence and regional and local characteristics.
- (b) Identify the critical sectors in the economy and natural resources that may be impacted by the identified hazards, analyze the constraints and conflicts that may be imposed by the natural hazards on each relevant sector and on natural resources and examine the possible structural and non-structural actions required to mitigate risks.
- (c) For each sector/area at risk, evaluate its degree of vulnerability including facilities, infrastructure and population exposed and specify mechanisms that would help in reducing the identified vulnerabilities.
- (d) For each sector/area at risk, examine standards, design criteria and maintenance practices that may foster vulnerability and make appropriate changes to help reduce it.
- (e) Identify the location of facilities such as hydroelectric plants, oil storage plants, gas storage plants, nuclear facilities or industries that may be exposed to natural hazard risks.

- (f) For the facilities/industries at risk, identify risk reduction strategies including alternate sites and analyze the cost and effectiveness of the different reduction alternatives.
- (g) Examine the institutional capabilities for disaster prevention and mitigation at the national/regional/local levels, highlighting inter-institutional coordination mechanisms and the areas that may require strengthening.
- (h) Analyze the role of the private sector (e.g., NGOs, insurance, banking, developers) both in promoting or in reducing vulnerability in the different sectors/regions under analysis.
- (i) Identify the specific capabilities of local NGOs in vulnerability reduction activities, particularly concerning community involvement, education and training.
- (j) Examine the existence/need for disaster prevention and mitigation policies and regulations both at the local and national levels.
- (k) Analyze development options in terms of their impact on natural hazards.

16. Most of the information in disaster-prone countries that could be used for natural hazard impact reduction or for post disaster planning and management has not been collected specifically for that purpose. Thus, adaptation will be necessary for using such information from disparate sources in risk reduction.

17. In every case analyzed, the capacity of existing institutions to develop policy on natural hazards and to implement it through regulations (ordinances), economic incentives/disincentives (taxation, credit, subsidies), land use and building codes should be evaluated. Likewise, the institutional capacity to develop and implement education and training programs should be assessed. Appropriate recommendations for institutional strengthening and for training and education programs that facilitate the participation of the concerned agencies and communities in disaster mitigation program should be included in the plan.

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CHAPTER 3

SOCIAL AND CULTURAL ISSUES IN ENVIRONMENTAL REVIEW

Development projects are intended to modify social and natural environments in order to create or enhance the economic, health, educational and other benefits that are valued by society. This goal, however, can be denied through unanticipated or unintended negative social or environmental impacts that reduce desired benefits or, if severe enough, threaten the sustainability of the project. Environmental review provides an opportunity to identify major environmental impacts so that measures can be proposed to avoid or mitigate negative ones and to reinforce positive ones. An environmental assessment should identify the social changes, evaluate the social costs of long-term continuation of the project, and formulate strategies to achieve the desired objectives. Information on social processes gained through environmental assessment is likely to be useful in other areas of project design.

Social analysis in EA 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, EA is concerned primarily with those relating to environmental resources and the informed participation of affected groups.

Social changes resulting from projects can have positive or negative – temporary or permanent – effects on environmental resources. For example, in Brazil, large-scale farmers whose lands were expropriated for a dam and reservoir received sufficient cash compensation to purchase replacement farms elsewhere, but the smallholders' shares were insufficient to compete in the steeply rising prices of the local market. The latter had little choice but to clear public forest lands for agriculture. In another case, diversion of water for an irrigation scheme in Mexico killed riverine reeds used by mat weavers living downstream. The unemployed weavers adjusted to this loss by producing charcoal to sell to urban consumers, exacerbating deforestation problems that were already serious. Similarly, the clearing of brush from a river bank for a dam in Kenya eliminated tsetse-fly habitats, which in turn stimulated unanticipated growth of agricultural settlements in the area, which eventually seriously depleted wildlife and exhausted fuelwood in the region.

Frequently in the past, environmental impacts from social change resulting from Bank projects have not been anticipated or systematically incorporated into project preparation and appraisal. The social analysis component of the Bank's EA OD now furnishes the means to achieve both of these objectives.

Chapter 3 is devoted to practical discussion of key issues in social analysis related to environmental review. It provides a description of specific core concerns and an overview of social issues in ecologically sensitive areas. In addition, five topics of particular significance to Bank projects are discussed: indigenous peoples, cultural property, involuntary resettlement, new land settlement and induced development. The EA OD requires that, where they are relevant, these topics are to be explicitly addressed in the EA.

CORE CONCERNS IN SOCIAL ANALYSIS

1. **Social assessment for EA purposes focuses 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. In projects involving indigenous people or people dependent on fragile ecosystems, social assessment is particularly important because of the close relationship between the way of life of a group of people and the resources they exploit. Projects with involuntary resettlement, new land settlement and induced development also introduce changes in the relationships between local communities and their use of environmental resources. To identify and assess social impacts that arise in these cases, information is needed in the following areas.**

Variation Within Communities

2. **Communities are composed of diverse groups of people, including, but not restricted to the intended beneficiaries of a development project. Organized social groups hold territory, divide labor and distribute resources. Social assessment in EA disaggregates the affected population into social groups which may be affected in different ways, to different degrees and in different locations. Important social differences which may be environmentally significant include ethnic or tribal affiliation, occupation, socioeconomic status, age and gender.**

- **Ethnic/Tribal groups.** A project area may include a range of different ethnic or tribal groups whose competition for environmental resources can become a source of conflict. Ethnicity can have important environmental implications. For example, a resettlement authority may inadvertently create competition for scarce resources if it grants land to new settlers while ignoring customary rights to that land by indigenous tribal groups. These issues are covered in more detail in the section on "Social Issues in Ecologically Sensitive Areas."
- **Occupational groups.** A project area may also include people with a wide array of occupations who may have diverse and perhaps competing interests in using environmental resources. Farmers require fertile land and water, herders require grazing lands, and artisans may require forest products such as wood to produce goods. A project may provide benefits to one group while negatively affecting another. For example, while construction of dams and reservoirs for irrigation and power clearly benefits farmers with irrigation, they may adversely affect rural populations engaged in other activities living downstream of the dam.
- **Socioeconomic Stratification.** The population in the project area will also vary according to the land and capital they control. Some will be landless poor, others will be wealthy landowners, tenant farmers or middlemen entrepreneurs. Disaggregating the population by economic status is important because access to capital and land can result in different responses to project benefits. For example, tree crop development may benefit wealthy farmers, but displace the livestock of poor farmers to more marginal areas.
- **Age and Gender.** A social assessment should include identification of project impacts on different individuals within households. Old people may be more adversely affected by

resettlement than young people. Men, women, and children play different economic roles, have different access to resources, and projects may have different impacts on them as a result. For example, a project that changes access to resources in fragile ecosystems may have unanticipated impacts on local women who use those resources for income or domestic purposes.

Control Over Local Resources

3. All local communities have some degree of sovereignty or spheres of semi-autonomous action regarding environmental resources, whether recognized formally in law or not. Sovereignty is defined here as the actual capability of people to make major decisions regarding uses of natural resources upon which they depend for livelihood. Social assessment in EA begins with sorting out the degree of local control over natural resources.

4. A forest area, for example, may be formally owned by the State and managed by a specialized agency of government. But at a practical level the forest area is often the habitat of local communities which determine to a great extent what happens to the forest. For example, rights to farm land or fish at a favorable spot on the river may be vested customarily in a kin group or village, but such rights may not be recorded or registered outside the area. Rights to use an area which vary seasonally, as when one group grazes cattle on land that another group farms, may not be recognized in law. Community grazing areas may be formally common property for use by everyone, but in fact be set aside for the poorest members of the community. Village wood lots which are legally common property may actually be harvested by families powerful enough to deny access to others. People who are legally landless may actually depend for most of their income upon gathering fuel, grass, medicinal plants and other products on public lands

Variation Within Production Systems

5. Obviously, production systems have environmental implications, but the components of a production system are also more complex than they appear to outsiders. A farming system, for example, typically involves management of over one hundred plant species in fields, orchards, gardens, grasslands and forests as well as livestock species. An important, but often overlooked, farm strategy to minimize risk is to cultivate a mixture of perennial and annual crops (the latter being interplanted and maturing at different times) and to work separate plots of land. Changes in such patterns can have unexpected consequences. Farm families are also often engaged in processing and marketing activities and off-farm wage labor. Fishing communities typically divide production activities between the water, beach and inland areas, with the latter two often providing more than 50 percent of dietary intake. Nomadic pastoralists who depend largely upon their livestock may also own land along their annual migration route, which they rent to sedentary relatives and others.

Institutions

6. Access to natural resources, decision making regarding use of resources, conflict resolution among competitors for access to resources, and relations with groups outside the local community seeking access to resources take place within an institutional setting. The term institution implies an authority or leadership structure, a set of procedures or customs for handling issues, and a system of incentives

and constraints or rewards and sanctions which govern and guide the behavior of people. Depending upon the society, relevant institutions may be village councils, elders of a clan, a religious brotherhood or an agency of local government. They may have customs which are locally unique, as well as elements of cultures with regional, national, and international distribution.

7. It is through institutional structures that individual participation in activities is mobilized and controlled; followers are made responsive to leaders; leaders are made accountable to followers; and competition and conflict are resolved and cooperation occurs. Social assessment in EA identifies the local structure of incentives and constraints that guide and govern behavior with respect to natural resources. This is particularly important to the process of consultation with local communities in conducting an EA, and involves the forging of links between agencies of government (project) and the traditional institutions of the people. Mechanisms to promote community participation in project design are provided in Chapter 7.

Use of Social Information in Environmental Assessments

8. Social information in the areas indicated above is useful at several levels. First, the information is used to verify or modify existing assumptions about the local population that may be pivotal in environmental assessment. Actual patterns of access to and use of natural resources by local communities, for example, may differ considerably from what people in a capital city believe. Officials appointed to manage natural resources by a central government may in fact have little practical authority and no influence over locally powerful groups. The findings of social analysis may challenge prevailing assumptions and introduce more accurate information.

9. Second, social analysis is used to predict the likely response of local groups to a project. In a hypothetical example, a project requires the resettlement of farming villages from a watershed area where the average holding is 5 ha. Compensation for acquisition of 5 ha is sufficient for the farmers to buy 3 ha of replacement farm land, which is enough to resettle without further project assistance. Disaggregation of the affected population, however, reveals that the average of 5 ha results from a few families owning large parcels while the majority farm marginal plots of less than 1 ha and still others who rent or sharecrop the land. Compensation for less than 1 ha will not be sufficient to buy a plot large enough to support a family. Moreover, fifty percent of the village is technically landless and these families receive no compensation with which to resettle. One likely outcome would be clearing of forest in the upper watershed for agriculture by the marginal farmers and landless in order to survive.

10. Third, social analysis is useful in the process of formulating social strategies for addressing environmental impacts. Probably the most important individual criterion of a viable social strategy to manage environmental impacts is that it is self-supporting and, therefore, can be sustained by local people when political fashions change. Strategies that require inputs or subsidies from beyond the area usually cease when external priorities shift or when external budgets are otherwise constrained. Equally important, a viable social strategy must fit the social organization and institutional structure of local communities. For example, if social analysis reveals the importance of decentralized corporate groups led by elders who lack authority beyond a single settlement, then an environmental management strategy calling for consolidating control over, say, forest resources under one individual elder would produce resistance on the part of the other settlements.

SOCIAL ISSUES IN ECOLOGICALLY SENSITIVE AREAS

1. Development investments in zones of unique biological diversity or ecologically fragile ecosystems, such as tropical forests, coastal and marine areas, may entail significant social changes for human populations whose livelihoods and cultures are dependent upon them. Social changes in communities dependent upon ecologically sensitive areas may lead, in turn, to unacceptable environmental risks. The EA should identify potential social changes which may result in negative and positive environmental impacts and formulate strategies to prevent or mitigate undesirable impacts and enhance positive impacts in ecologically sensitive areas.

Relationship to Bank Investments

2. Some human communities have occupied ecological sensitive areas for thousands of years, while others have moved into these areas only recently. Due to the fragility of the environmental resources in ecologically sensitive areas, human populations are normally small and have often not increased in size or density over many centuries. In addition to their small numbers, people traditionally presented little threat to sensitive ecological zones because their production systems were sustainable and resource-extensive, dispersed over a large territory, and they had the power to keep encroachers, poachers and others out of the area. These factors are changing in each of the major types of ecologically sensitive areas. The EA should therefore assess the likely social changes which will accompany a development investment and which have the potential for changing resource access and use patterns in the following areas.

Forest Areas

3. Tropical forests and temperate forests in mountain regions are considered by the Bank and others as fragile ecosystems. Tropical forest zones are fragile in part because high annual rainfall is concentrated in brief but violent storms so that areas of even slight slope have a high level of erosion when not protected by vegetation. Temperate forest zones on the steep slopes of mountain regions are also subject to high erosion hazard. Forest cut in zones prone to erosion and other forms of soil degradation can be regenerated only under controlled conditions and at great expense.

4. Human communities in forest areas depend on agriculture, gathering of forest produce, fishing and hunting for the bulk of their diet. They collect resins, seeds, nuts, fruits, roots, fibers, and medicinal products of many kinds for cash income. Social changes introduced by projects in fragile forest areas can entail displacement of people or changes in forest policies and/or resources which require changes in the subsistence patterns of populations living there or the introduction of additional settlements.

Coastal Marine Areas

5. Some of the most biologically productive ecological zones in the world are coastal marine areas. They include beaches, sand dunes, estuaries, mangrove and other swamps, marshes and coral reefs. Estuaries, mangroves, marshes and other wetland areas provide the breeding grounds, nurseries and habitats for many major commercial species of shellfish and finfish consumed worldwide. Coastal marine ecological areas are fragile because the complex food chains and life cycles of all species are easily

damaged when a few are affected by environmental changes. Thus, dumping urban and industrial wastes or runoff of agricultural chemicals may damage a relatively small area, but the impacts may ricochet throughout the rest of the ecosystem.

6. Development projects that may adversely affect coastal marine areas commonly involve mariculture, tourism, port and harbor improvements, energy generation from dams and thermal power stations, industrial effluent discharges, runoff of agricultural fertilizers and pesticides, and improper watershed management. The abundance of marine resources in certain seasons is marked by scarcity in other seasons, leading to a "boom and bust" cycle characteristic of fishing communities. For this reason, human communities in coastal marine zones traditionally exploit not only the sea but also the beach and inland areas through agriculture, hunting and gathering. As much as half of diet and income may be derived from beach and inland areas of the zone. Women run the communities while men are at sea or working inland during the heights of boom and bust periods. Social changes associated with development investment in coastal marine areas include restricted access to one or more of the sub-zones of the area, over-exploitation of selected species to meet demands of new markets, population displacement, and attraction of new settlements. Adjustment to these social changes often leads to additional environmental impacts elsewhere in the coastal marine zone.

Rangeland

7. Land with natural or semi-natural vegetation that provides habitat for domestic ruminants and wildlife is generally defined as rangeland. The term is often used interchangeably with arid and semiarid land, shrubland, wasteland, savanna and grassland. These areas are characterized by low population densities, human populations that are heavily dependent on herds of domesticated livestock, mobility over an extensive area, and complex cultures specially adapted to the harsh conditions of drought-prone areas.

8. Development projects that affect rangeland commonly involve dryland farming, plantation forestry, irrigation, sedentarization and settlement, livestock development, dairy production, tourism and conservation wildlife parks. Rangelands are often perceived to be little utilized, so social impacts may not be readily perceived. Human populations are mobile within a territory which often includes marginal lands with meager resources which may not be used most years, that are nonetheless critically important in drought years. Such areas may contain traditional "famine food" consumed only when hungry livestock and people must turn to them. Contrary to common assumptions, property ownership in most rangelands is highly skewed, often with a small percentage of families controlling most livestock. Many communities that use rangelands are organized along tribal lines and rights to water sources and grazing are regulated by clan elders. In other cases, water points and grazing may be controlled by certain families powerful enough to dominate others. Social changes commonly associated with development investments in rangeland areas include worsened land/population ratios, exacerbation of income inequalities, loss of territory and consequent population displacement and health risks associated with conversion of subsistence products like milk to commodities for urban consumption. Sedentarization of migratory or nomadic herders almost invariably leads to significant environmental deterioration and impoverishment of affected people.

Zones of Unique Biological Diversity

9. Many zones of biological diversity have been remote or isolated from development processes until recently, and scientists may have incomplete knowledge of the full range of species present and the

environmental functions served may not be well established. For example, tropical forests provide habitats for the greatest variety of plant species of any ecosystem, but only a fraction of these have been identified, systematically studied, and their biological, medicinal or economic values estimated. Fragile forest areas, coastal marine areas and rangelands may also be viewed as zones of biological diversity that constitute unique habitats for indigenous plant and animal species, and at the same time serve environmental functions at little or no cost. Development investments that may introduce social changes which impact upon zones of unique biological diversity are generally those which "open up" previously remote areas to resource extraction and new human settlements. In such circumstances the role of local indigenous knowledge becomes critical to the definition of unique biological diversity zones and to the identification of issues in the protection of resources that might be endangered by development projects.

Guidelines for Environmental Assessment

10. The EA should assess the changes in pressures on natural resources in ecologically sensitive areas likely to be introduced by the development investment. A first step is to disaggregate the human population found in and around the area. Normally there are at least three broad categories of resource users: people who have lived in the area for several generations, people who have recently moved into the area, and non-resident populations who enter the area periodically to extract or utilize selected resources. Each category could be further divided into subcategories.

11. Social groups that have lived in ecologically sensitive areas for generations, while well aware of environmental constraints on their activities, have been able to evolve stable, low-energy, sustained-yield production systems which are well adapted to the environment and compatible with contemporary approaches to environmental management. Development investments should be designed to increase natural resource yields result in modifying stable and sustainable practices, with negative impacts on the people and their environment.

12. Stable, low-energy, sustained-yield production systems are based on knowledge transmitted from generation to generation that contain a wealth of information about the natural resources of the area and resources management practices. The EA can be strengthened by including local knowledge of plants, animals, ocean currents, hydrology, soils and other aspects of the environment that may be affected by the development investment. The EA can help avoid harmful impacts by assuming that where stable systems of this kind are found that most natural resource use practices are environmentally appropriate.

13. Recent settlers into ecologically sensitive zones may be another type of social group residing in the area. In contrast to groups which have traditionally lived there, settlers usually have little knowledge of environmental constraints or sustainable resource use practices. As a result, settlers sometimes colonize areas which are unsuitable for the production systems they operate; for example, some areas in the humid tropics where lush vegetation is mistakenly thought to be an indicator of fertile soil.

14. Where agriculture fails, settlers may derive the bulk of their income from logging, often in the employ of neighboring plantations or cattle estates which are attempting to expand the cleared-land area they exploit. The EA should define the effects of colonization, the social institutions and processes which produce them, and alternatives for mitigating their impacts.

15. Non-resident populations that extract or utilize selected resources include fuelwood suppliers to urban areas, logging concessions, mining and petroleum companies, hunters or poachers, tourists,

electricity companies, cattle ranchers, and plantation enterprises. With some exceptions most enterprises of this kind are controlled by absentee owners.

16. Development investments that have major impacts on forests commonly involve road construction which directly leads to land clearing and new settlements; forest clearing for mining, agriculture, forest plantations, or industry; commercial logging for construction materials, manufacturing paper, forest-products processing, wood-based industries as well as fuel consumption; and, closure of forest areas for commercial or conservation purposes.

INDIGENOUS PEOPLES^{1/}

1. Special action is required when Bank investments affect local communities composed partly or entirely of indigenous, tribal, low caste, or ethnic minority groups. This is particularly true where their social status restricts their capacity to assert or defend their interests in the land and other resources upon which they depend for their livelihood. Because of their powerlessness such groups are vulnerable to dislocation and impoverishment in conditions of rapid socioeconomic change. This can lead, in turn, to the adoption of inappropriate production systems with negative environmental impacts. To lower the risk of impoverishment and environmental degradation, special development plans tailored to the social, cultural and ecological conditions of these groups are required.

Concepts and Definitions

2. The terms indigenous, tribal, caste and ethnic minority emphasize the different historical, cultural and social contexts in which these groups have become vulnerable as well as certain features of their social organization.

- **Indigenous** generally refers to native peoples distinguished by their close cultural attachment and economic dependence upon ancestral lands or upon lands to which they have been pushed by dominant groups. Indigenous peoples threatened by the encroachment of dominant groups have increasingly sought the protection of their lands and their rights to self-determination under domestic and international law. Indigenous groups may be organized into tribes, loosely-knit bands or villages. While tribes have a strong leadership hierarchy, band or village headmen lead by force of personality and have little mandate to make decisions for the group.
- **Tribes** are people organized into local descent group lineages and clans.^{2/} Genealogical position in the clan often determines the right to use land held in customary ownership by the tribe. Tribes are often stratified into age sets, whereby young men and young women in one generation are treated as a "set" for their entire lives. Age sets cross lineage and clan ties. Resource management activity is often organized along age set lines, but decision-making

^{1/} For background on this subject see: Tribal Peoples and Economic Development: Human Ecological Considerations. (Goodland, 1982).

^{2/} Local descent groups are composed of living members of a lineage: lineages are all descendants of a known ancestor and clans are several lineages claiming common origins.

authority for management of land, livestock and other resources is usually vested with elders of the lineage or clan.

- **Castes** are social and occupational categories based on beliefs in religious purity. People often occupy prescribed positions in society by virtue of the caste group to which they are born. Society is stratified into a complex system of exchanges of ritual, social and economic services among castes. Lower castes are often technically landless, but many in fact survive by cultivation, livestock rearing and gathering on public lands and forests.
- **Ethnic minorities** are a segment of society set apart by dialect, race, religion or historical origin, characteristics which often are taken as the basis for discrimination against them by other groups. Ethnic minority groups may identify with specific territories, but generally lack an organizational structure based on ethnicity alone.

Group Variations and Legal Status

3. In some countries the rights of indigenous peoples to own or use lands and other environmental resources are established in special constitutional provisions, government policies or legal rulings. However, in practice these formal arrangements may be nullified by local social, economic and political restrictions on the ability of indigenous people to manage their own affairs. For example, many indigenous tribes in lowland Latin America do not have security of land tenure or other normal protections of their country's legal system despite constitutional guarantees. In other countries, indigenous languages, land tenure systems, and other customs important to survival of the group are not recognized under law or are insufficiently supported by public officials and conventional development programs.

4. Most rural areas of Africa are inhabited by people who belong to tribes and it is not uncommon for towns and cities to be divided into separate wards, each identified by the predominant tribe of its inhabitants. Tribes in most countries in Africa are elements of the national culture and the basic building blocks of society. There is a tendency for national politics in some countries to be dominated by certain tribes, and for the interests of other, weaker tribes to be ignored or denied. In some countries dominant groups define tribal differences as an obstacle to development, thereby downplaying inequality among different groups by promoting nationalism. In such contexts the label tribal may be considered pejorative. The situation is similar in North Africa and parts of the Middle East. Tribes remain important forms of rural and urban social organization in some countries, whereas in other countries tribal groups have given way to less cohesive ethnic, language and religious groups.

5. The population of Asia is made up of highly diverse cultures, many of which are distinguished by their caste, tribal and ethnic social status. Nomadic graziers who migrate through arid regions or mountain areas of the Himalayan region are tribals, as are many highland agricultural people in Southeast Asia and forest-dwelling people of the Indian subcontinent. Millions of these people are traditionally allowed to occupy and use state-owned lands, but have no constitutional or legal rights to the land or resources. Several million people in China are classified as National Ethnic Minorities. Some of these are tribal, and occupy prefectures which have been granted varying degrees of semi-autonomy. In South Asia the caste system is reflected in the constitutions of most countries through special protection for

certain "scheduled" tribes and lower castes, but in parts of West Africa and China where castes also occur no such formal protection exists.

Bank Policy

6. The Bank will not assist development projects that knowingly involve encroachment on lands being used or occupied by vulnerable indigenous, tribal, low-caste or ethnic minority people, unless adequate safeguards are provided to at least mitigate the negative or adverse effects of such projects on these people, their cultures and their environments. This is particularly applicable to development projects which affect relatively isolated and unacculturated indigenous groups.

7. It is important to recognize, however, that some indigenous groups are not isolated and participate in the economy, political processes, educational system and other institutions of the larger society. Many are fully convinced of the value of development and want a share of their country's economic resources. Others have a strong antipathy to what representatives of the dominant society define as the benefits of development or are convinced they will not benefit from development projects. Still others do not know enough to choose. Key concerns in EA, therefore, relate to the preferences of indigenous, tribal, low-caste or ethnic minority people and their responses to development opportunities.

Relationship to Bank Financing

8. Vulnerable indigenous, tribal, caste and ethnic minority groups are usually dependent upon a specific territory. Many have developed stable, low-energy, sustained-yield production systems which are well adapted to their environment. Others have been pushed by more dominant groups into marginal and fragile environments where traditional production systems fail to adequately sustain them. Still others occupy ancestral lands, the quality and size of which have been reduced by population growth and pressure from dominant groups. Development investments which threaten further reduction or degradation of the natural resources of the territory may impoverish these people. Since such groups have little recourse but to intensify exploitation of remaining marginal and fragile environments, the result is environmental degradation.

9. The experiences of vulnerable indigenous, tribal, caste and ethnic minority groups affected by development investments have rarely been satisfactory. Two of the major reasons have been failure to understand the needs of such groups or to formulate and appraise a development plan tailored to the local situation. This has often led to under-designed and under-financed development programs in which investments did not achieve development objectives for the affected groups. The most significant environmental impact of failed development programs for indigenous groups is impoverishment and the environmental degradation that poverty produces.

Guidance for Environmental Assessments

10. Environmental assessments for projects which will affect vulnerable populations should explicitly address any significant environmental impacts that may result from the project's effect on these social groups. Significant social and environmental impacts usually occur in areas where new infrastructure and new production systems are introduced or where existing infrastructure and production systems are modified. Assessment should therefore take place during the formulation of development plans so that the needs of indigenous people can be taken into account in preparing the project proposal.

11. An environmental assessment of project impacts on vulnerable groups should include information such as the following:

- **Formal Legal and Customary Use-Rights.** Determine actual workings of constitutional, legislative, administrative, contractual or customary rights to use natural resources.
- **Resource Use Patterns.** Assess changes in patterns of access to or use of land, water, forest, pasturage or other natural resources affected by the project plan, including farming, livestock rearing, manufacturing, gathering systems.
- **Use of Area by Non-Residents.** Analyze data on use of seasonal resources by graziers, fisherfolk, collectors of forest products, logging companies, suppliers of industrial materials.
- **Community Participation.** Determine the extent to which indigenous groups feel proposed development is environmentally sound and culturally appropriate, which environmental constraints are to be addressed in project design and implementation, which environmental opportunities are to be enhanced, and so forth.
- **Identification, Demarcation and Registry of Area.** Evaluate effectiveness of local mechanisms to resolve territorial disputes; establish boundaries and buffer zones; develop ways to keep out loggers, encroachers.
- **Inventory of Flora and Fauna.** Survey and analyze fauna and flora and habitats, particularly endangered species, under both adverse and normal conditions; uses by resident and non-resident people; indigenous knowledge of biodiversity.
- **Social Infrastructure.** Evaluate impacts on schools, medical facilities, communications/transport networks, markets; impacts on water supply, drainage, waste disposal systems.
- **Public Health Conditions.** Evaluate health risks and diseases in the area; environmental pollution; health, sanitation and hygienic conditions; traditional medicines and practices.
- **Institutional Assessment.** Determine capacity of local organizations and indigenous groups to participate in decision-making, implementation, operations and evaluation.

12. This baseline sociocultural and environmental information should be taken into account in project design. A primary concern is whether or not the natural resources base is adequate to support the present population as well as potential growth. Increased density may call for special measures to address sanitary and public health conditions where none were needed before. Development may increase competition for certain scarce natural resources and thereby place them under greater exploitation. Introduction of mining or manufacturing increases the risks from pollution, as well as from new health and safety hazards. Agricultural improvements may affect certain soils, flora and fauna, and water sources which will require mitigation measures. Other users of the area may be negatively affected by indigenous development if they are denied continued access.

13. The economic viability of proposed production systems is a critical element of the assessment. If new production systems fail, people may turn to extraction of natural resources to achieve desired income levels. For example, an industrial forestry plantation project in India was designed to employ tribal groups who would be affected by clearing tropical hardwoods for export. After the primary forest had been cleared, the selected plantation species was discovered to be unsuitable for the area. The tribals did not benefit from the sale of a portion of the forest, but are today criticized for intensifying their use of what remains.

14. The infrastructure requirements of development require special emphasis. Access roads may be needed, which can be expected to induce resource extraction activities by loggers, hunters or others. Improperly designed roads may disrupt drainage systems, animal migration routes, and in sloping terrain become major sources of soil erosion. Contamination of water supplies from new economic activities, such as runoff from crop, livestock or manufacturing areas, should be examined. Introduction of a construction work force from outside the indigenous territory without proper health screening or health care of local people creates unacceptable health and safety risks. Outsiders may also disrupt areas of religious significance and induce social tensions. Employment of local people in construction of infrastructure lowers most risks introduced by an outside work force, but this must also be planned. Training to enhance employability of local people can be assisted by the Bank.

Plans for Affected Groups

15. In general, unless special measures are adopted, indigenous, tribal, low-caste and ethnic minority people are more likely to be harmed than helped by development projects designed to benefit groups other than themselves. In such cases the development investment should be designed so as to prevent or mitigate negative effects. Experience has shown that where vulnerable minority people are to be affected by a development investment, a separate plan for indigenous peoples, tailored to their specific needs and local situation, is necessary. The objective is to move toward the active participation of indigenous people in ways which enhance social and environmental conditions.

16. Satisfactory plans to achieve this objective should include the following:

- **Baseline Data of Affected Area and Population.** Census of population. Demarcation of lands and territories upon which they depend for livelihood. Maps of area. Environmental resources inventory and identification of constraints and opportunities for development.
- **Development Policy and Legal Framework.** Legal rights to develop lands and territories, including rights to possess and use natural resources (e.g., forests, wildlife, medicinal plants, etc.) vital to their subsistence and reproduction. Development objectives, strategies, grievance procedures, and legal assistance required.
- **Participation of the Affected People.** Formal mechanisms necessary for participating directly, or indirectly through NGOs, in decision-making, implementation, operation, and evaluation of development plan. Formal incorporation of indigenous knowledge, personnel and practice into land and natural resource management systems and environmental protection schemes.

- **Development Plan.** Detailed plans for development of infrastructure, education, public health, credit, or other services. Detailed plans for development of production systems in agriculture, transport, industry or manufacturing sectors. Monitoring and evaluation arrangements.
- **Organizational Capacity for Implementation.** Evaluation of departments responsible for development planning and implementation, natural resources management, indigenous affairs, public health protection; and line agencies expected to assist. Plans for staff training and organizational development.
- **Cost Estimate, Financing Plan and Implementation Schedule.** Activities, cost and financing by year.

17. Equally important is the capacity of institutions responsible for indigenous development to implement development plans. In Senegal a public health investment failed because health workers assigned to serve tribal beneficiaries were from different, antagonistic groups. In Brazil, despite agreed development plans, institutional weaknesses impede progress on demarcation of territories, public health care, effective registry and protection of land.

Special Issues Regarding Indigenous Peoples

Involuntary Resettlement

18. Project design should avoid involuntary resettlement, especially where vulnerable minorities are involved. Where resettlement is necessary, Bank OD 4.30 should be consulted for policy guidance. During project identification and preparation, the advice of qualified social scientists and direct consultation with local ethnic and religious leaders are essential as the basis for planning. TMs should also encourage the affected groups to actively participate in the resettlement process. Replacement land of equal productive potential, ideally within areas of traditional occupancy, is also required.

Protected Areas Management

19. In those areas where there is overlap between protected areas (national parks, ecological reserves, protected forests, etc.) and areas of traditional indigenous occupancy, the Bank's OD 4.00, Annex D on Wildlands (to be released) should be consulted for policy guidance. Indigenous groups should be incorporated as equal partners in the design and implementation of management plans. Copartnership arrangements, such as those implied in the "biosphere reserve" concept, should be implemented.

Compensation

20. Where projects require the acquisition of land or the extraction of resources (e.g., water, minerals, timber, etc.) from indigenous territories, the indigenous people affected should be compensated in kind or in cash at replacement value for the expropriated assets. In other cases, the peoples concerned may want the benefits of ongoing participation in the design, operation and profits of resource extraction activities. Depending upon circumstances, it may be prudent to lease rather than acquire land outright from indigenous peoples.

Tourism

21. Projects that promote tourism in indigenous areas should be designed in consultation with the indigenous population. In some cases, special measures may be needed to protect indigenous societies and cultures from disruption by tourism.

CULTURAL PROPERTY

1. "Cultural property" refers to sites, structures, and remains of archaeological, historical, religious, cultural, or aesthetic value. Many projects or project components have a potential impact on archaeological sites, building complexes, architecture, monumental sculpture, painting, inscriptions, and other physical remains left by previous human inhabitants and considered part of a country's cultural heritage. In numerous cases cultural property sites coincide with important natural sites. Cultural resources are a part of the resource base, and it is therefore important that development options under consideration are screened for potential impacts on cultural property. As discussed in the World Bank Operational Directive 4.50: "Cultural Property," the Bank's approach to the conservation and management of cultural property is to assist in the protection and enhancement of cultural property affected by Bank-financed projects.

Policy, Procedures, and Guidelines

2. The Bank recognizes that socially stable development requires societies to retain and keep alive ties to their past and their cultural traditions. The Bank's policy as stated in Operational Directive 4.50 (which updates Operational Policy Note 11.03: "Management of Cultural Property in Bank-Financed Projects") is to: (a) assist in protecting and enhancing cultural property through specific project components and (b) decline to finance projects which significantly damage cultural property, and assist only those that are designed to prevent or minimize such damage. Bank Operational Directives on environmental assessment, involuntary resettlement, and tribal peoples also deal with cultural property concerns.

Relationship to Bank Investments

3. Recognizing the value of their cultural heritage, most countries have enacted legislation aimed at the protection of their cultural properties. Unless development projects address the interests of archaeological and historical conservation as an integral element in planning, expensive delays can result and cultural resources can be inadvertently destroyed. Contractors can avoid costly construction delays by maintaining close contact with the appropriate department of antiquities or national museum of archeology. If archaeologists are notified well in advance, they can complete their investigation of a site before the construction begins, without affecting the contractor's schedule. If antiquities are encountered in the course of construction, a team from the department of antiquities and/or an international archaeological institute usually needs only a few days to excavate and record vital information. In most cases, the construction work can continue while the archaeologists are on site.

4. Any project which involves excavation, levelling or filling of earth as part of construction operational practices, is a potential threat to archaeological and historical remains (see OD 4.00, Annex

A: "Environmental Assessment" and Chapter 1 of the Sourcebook for a listing of environmental screening category A and B projects). While it is not possible to generalize about the extent of impact of projects on cultural property, infrastructure and energy are the sectors most affected by cultural resource issues. Both urban and rural development schemes may also encounter cultural property in carrying out urban infrastructure improvement: road building, land reclamation, irrigation, drainage, etc. Public facilities (schools, hospitals, housing, etc.) can also affect cultural property if facilities are constructed upon or adjacent to archaeological sites.

5. The relationships between cultural property issues and a project can range from direct to indirect. A hydropower project may result in the inundation of cultural sites unless mitigating measures are implemented or relocation of the project are undertaken. A new road adjacent to an archaeological site or historic building may facilitate access and therefore increase the cultural property's vulnerability. Construction work near archaeological or historical remains may cause damaging vibrations and disturbances. The location of a new industrial facility may bring cultural resources into contact with airborne pollutants. Environmental projects aimed at improving air quality may have a notable effect on decreasing air pollution that damages stone structures. Reducing drainage problems associated with both irrigation and wastewater, which disturb building foundations, may also have a direct favorable impact on the condition of historic structures.

Guidance for Environmental Assessments

6. At the earliest stages of project identification and preparation, it is incumbent on the task manager, with advice and operational support provided by the Regional Environment Division (RED) and the Environment Department (ENV) to alert governments to potential cultural property issues. A first step would be to check the list of Unesco World Heritage Sites, which now numbers over 300 sites defined as constituting a recognized heritage of outstanding universal value. Responsible government agencies (including ministries of antiquities or culture), museums, university departments of archaeology, art history, or architecture, should be contacted for information and expertise about the cultural resources in the project area. National inventories of cultural resources can provide important data to assist project officers. International research institutes (foreign archaeological missions are present in a number of countries) are also sources of expertise. Relevant nongovernmental organizations, such as the national committees of the International Committee of Monuments and Sites (ICOMOS), and the International Centre for the Study of the Preservation and the Restoration of Cultural Property (ICCROM), may also be helpful in gaining a full understanding of the cultural property that may be affected, its relative importance, and conservation needs. International organizations with expertise in cultural property protection (for example, Unesco) are other sources of expert advice.

7. To coordinate the various government agencies, a representative of the department of antiquities should be invited to participate in interagency meetings held at key points in the EA cycle, as well as in forum meetings with representatives of affected groups and relevant NGOs.

8. For certain types of projects that involve large-scale modification and/or disturbance of earth surfaces (such as dams, irrigation systems, ports, principal roads, pipelines, subways, sewers, mines, and land reclamation) and that are located in areas where there is reasonable evidence to believe cultural resources are present, a field survey by a qualified expert (e.g., an archaeologist or architectural historian) is required. Informed decisions can be made about subsequent actions on the basis of this survey. Full inventories and further studies may be needed.

9. Detailed analyses, including review of project alternatives, mitigation measures, and institutional, training and monitoring requirements, should be used to assist the project executing agency and Bank staff in deciding whether to redesign or relocate the project so that sites and structures can be preserved, studied, or conserved intact *in situ*. In certain cases, it may be feasible for structures and remains of cultural value to be relocated, restored, preserved, and studied on alternative sites. Archaeological field survey, selective salvage, and preservation of excavated finds in museums prior to large-scale excavation, land levelling or tilling may help to minimize the loss of or damage to cultural property.

10. Sites that are buried or not located by the survey may be discovered during project implementation, especially in the course of construction or mining. Such unanticipated discoveries of remains of an archaeological and/or historical nature, termed archaeological chance finds, are frequently found within 0-3 meters of the present surface. Most often they are concentrations of pottery, worked stone, and human and animal bones, without commercial value, but of significance to archaeologists, historians, anthropologists and paleontologists. In general, the following archaeological chance find procedures should be adopted in project design and construction contracts:

- notification of the relevant department of antiquities;
- request for a representative to make a site inspection;
- cessation of work in the vicinity of the find until the visit of a representative; and
- decision by department of antiquities on possible salvage or excavation (usually required within 48-72 hours of notification).

National laws normally assess penalties for violations of archaeological chance find procedures.

11. In projects with major impacts on cultural resources, consideration should be given to setting up a conservation unit located in a ministry or line agency. Efforts should also be made to develop local institutional capacity through technical assistance and training.

12. Archaeological and historic sites, settlements, and structures are vulnerable to disturbances of various types. Among these are flooding, changes in water table, deterioration of air quality, coastal erosion, seismic disturbances, vibrations caused by construction activities, building, or airplanes, and human intrusion. Cultural sites can tolerate finite numbers of visitors, just as natural sites, and this should be assessed in project design. The number of visitors and areas of access need to be controlled in order to prevent sites from deterioration due to overuse and physical proximity (visitors touching walls, paintings, sculptures).

13. It is not enough to acknowledge the existence of cultural property that will be affected by a Bank project. The site's long-term sustainability should be considered and a well-designed management plan be devised that addresses conservation and maintenance requirements. In this context, the Bank is willing to provide technical assistance for training in conservation and management.

14. Where sites are considered sacred, as in the case of religious shrines, the impact of relocation is complex. In such instances it is strongly advised that a team be formed to develop mitigation measures. The team should have an art or architectural historian knowledgeable about the particular cultural tradition, an architectural conservator, an anthropologist familiar with the population of the area, and a coordinator who would bring together the relevant government organizations, experts, and community leaders. It is important that such interventions be scientifically sound, and that they respond, as completely as

possible, to patterns of social organization and existing social and cultural institutions. Project staff should ensure that the cultural heritage of nondominant cultures are accorded the same care as that of the dominant cultures.

INVOLUNTARY RESETTLEMENT

1. Bank-financed activities that entail land acquisition usually cause involuntary resettlement. Most irrigation, hydropower and water supply projects, but also some urban, transport and industry projects can only be implemented if people are resettled from land required for civil works. Involuntary resettlement is complex because lost income sources such as farmland, forests, pastures, shops, and other production resources, must be replaced, or equally productive alternative assets provided, if affected people are to reconstruct their lives and economic productivity. Even acquisition of small strips of land, where the loss makes farming nonviable, or where people are dislodged from their homes and shops for highways or transport lines, require planning for involuntary resettlement.

Bank Policy

2. Treatment of resettlement in Bank projects is covered in OD 4.30: "Involuntary Resettlement" (June 1990). Due to the social and economic disruption it causes, World Bank policy enjoins staff to avoid or minimize involuntary resettlement. When forced resettlement is unavoidable and fully justified, Bank policy requires that a resettlement plan be formulated and financed to ensure that people displaced are provided development opportunities to improve, or at least restore, the standards of living they had before the project.

3. The first objective of an EA on a resettlement project should be to estimate the capacity of the receiving area to sustain additional population under the conditions introduced by the resettlement operation. Second, the EA should identify the environmental risks the resettlement plan will entail, such as those stemming from increased pressure on natural resources, construction of infrastructure, and others mentioned above. Third, an Environmental Management Plan should be formulated which addresses these risks to mitigate impacts on and protect the natural, human-made and social environments.

Social Aspects of Resettlement

4. Involuntary resettlement in the past has been one of the least satisfactory components of Bank-assisted development projects. A major reason has been failure to appraise a resettlement plan in the field. This has often led to under-designed and under-financed resettlement components, which turned into relief rather than development operations. The most significant environmental impact of poor resettlement operations is impoverishment and the environmental degradation poverty produces.

5. The risk of impoverishment in forced resettlement operations is high because of the loss of a productive resource base. In addition, unlike voluntary settlement which involves self-selected, younger families, involuntary resettlement compels everyone to move. This means that resettled communities must support not only the able bodied but also less productive people, such as the old, the incapacitated and the unskilled. Moreover, wealthier and better-educated families tend to split off, taking with them important sources of local investment capital and socioeconomic support, leaving a disproportionately poor community to be resettled.

6. For these reasons the Bank stipulates that the Resettlement Plan should be prepared so as to be ready at the time of appraisal, at the latest. This is true regardless of the size of the operation. Where the number of people displaced is relatively small (hundreds), a modest plan may be adequate; where the displaced people number in the thousands the resettlement plan should be comprehensive and part of wider or regional development strategies. In all cases resettlement planning should be started as early as possible, as part of the feasibility stage.

7. In accordance with OD 4.30, resettlement plans satisfactory to the Bank should provide information in the following areas:

- **Organizational Capacity for Resettlement and Development.** Department responsible; line agencies to assist; plan for organizational development, training.
- **Participation of Affected People.** Strategies for direct or indirect participation in decision-making, implementation, operation, and evaluation of the resettlement of both settlers and host populations.
- **Baseline Data on Affected Area and Population.** Census of population; property and common areas inventory; map of receiving area; environmental constraints in receiving area.
- **Resettlement Policy and Legal Framework.** Definition of affected lands, structures; compensation and entitlement criteria; resettlement objectives; grievance procedures.
- **Development Plan for New Sites.** Detailed engineering plans and layouts; agricultural development packages; non-agricultural employment packages; monitoring arrangements; environmental protection.
- **Transfer Arrangements.** Information campaign; transition monitoring; maintenance arrangement; mobilization schedule.
- **Cost Estimate, Financing Plan and Implementation Schedule.** Diagram of activities, cost and financing by year.

Environmental Impacts of Resettlement

8. EAs should include analysis of the impacts of the Resettlement Plan on natural, human-made and social environments. The most significant environmental impacts occur in the resettlement receiving areas to which people are moved and stem mainly from new productive activities they take up once there. Assessment therefore takes place once development plans are detailed enough to specify alternative resettlement sites and proposed production systems.

9. Environmental assessment begins with the section of the Resettlement Plan which analyzes the environmental constraints in the alternative receiving areas. Resettlement will mean increased population density, with consequences for local people as well as natural resources. Increased population densities may call for special measures to address sanitary and public health conditions where none were needed before. Relocated people may introduce new disease risks to which host people have little resistance.

More people usually means more livestock, which increases competition with hosts for pasture. Game, fish and bird species may be more heavily exploited. Forests may be damaged by increased fuel and forest products gathering. Migratory or seasonal users of the area may be negatively affected by the new settlements. The information provided in the development plan for the new sites should encompass:

- **Host Population.** Census of people already residing in receiving area; social organization of the host communities; ethnic, linguistic, religious and other cultural features of groups; population density and growth rates.
- **Resource Use Patterns.** Customs which regulate access to land, water, forest and other resources; uses of resources in production systems, including farming, livestock rearing, manufacturing, gathering systems.
- **Use of Area by Non-Residents.** Seasonal use by graziers, fisherfolk, collectors of forest products, logging companies, suppliers of industrial materials.
- **Formal Legal and Customary Use-Rights.** Inventory of constitutional, legislative, administrative, contractual or customary rights to use resources.
- **Inventory of Fauna and Flora.** Surveys under both adverse and normal conditions; uses by host population.
- **Social Infrastructure.** Inventory of schools, medical facilities, communications/transport networks, marketplaces; information on water supply, drainage, and waste disposal systems.
- **Assessment of Public Health Conditions.** Epidemiology of health risks and diseases in the area; environmental pollution problems; sanitary and hygienic conditions.
- **Institutional Assessment.** Capacity of local, regional and national organizations to participate in decision-making, implementation, operations and maintenance, and evaluation of the resettlement.

10. The economic viability of proposed production systems is a critical element of the assessment. If new production systems fail to restore or improve incomes, displaced people may turn to extraction of natural resources to survive. For example, studies of tribals relocated in India without provision of agricultural land to replace that lost indicate that almost half resorted to cutting and selling firewood after construction employment opportunities ceased. In the Philippines resettlement without provision for means to support themselves turned farmers into loggers and charcoal manufacturers, resulting in degradation of the watershed, reservoir siltation and reduction of the estimated useful life of the reservoir from 100 years to 30. In Mexico failure to maintain market roads to new settlement areas transformed relocated commercial agriculturalists into slash-and-burn subsistence cultivators in only a few seasons and resulted in degraded forests and erosion.

11. The infrastructure requirements of new settlements demand special emphasis. Access roads may be needed to establish resettlement sites, which can be expected to induce resource extraction activities by loggers and hunters. Improperly designed roads disrupt drainage systems, game migration routes, and in sloping terrain become major sources of erosion. Studies have shown that availability of potable water is a major element of successful resettlement; contamination of water supplies from the new economic activities, such as runoff from residential, cropping and livestock areas, should be examined.

12. The construction work force brought in to build new roads as well as schools, clinics, water supply systems, and so forth will require residential colonies to be established, together with equipment yards, supply depots, and commissaries. Spontaneous or voluntary settlements are likely to appear on the outskirts of planned settlements due to work opportunity, the provision or improvement of infrastructure, and new social services. Indeed, the construction work force for the resettlement operation (as well as the main project civil works) may be induced to remain in the area following completion of the work. Part of the solution to this problem is to employ displaced people in construction of infrastructure for resettlement sites.

13. Similar considerations apply in urban areas. Population densities and the health and safety risks associated with crowding are major constraints on involuntary resettlement. Land speculation together with the need to accommodate tenants and squatters often limits options for urban resettlement and results in greater nucleation than environmental health consideration would permit.

14. Like their rural counterparts, urban people depend upon a network of kin and neighbors who provide a large number of low-cost socioeconomic support services. These range from child care to diversification of income-earning opportunities to informal credit arrangements. Disruption of these networks due to involuntary resettlement places urban people, and in particular women, at risk. As in rural situations, compressing different and sometimes hostile ethnic groups into one area will introduce unacceptable risks. Resettlement site location in relation to people's jobs is critical, in that even small increases in transportation costs or time spent in travel may jeopardize employment. Finally, in many societies urban households produce a substantial portion of their diet and some cash from garden, patio or yard areas. House plot areas must be sized and designed to accommodate customary social and economic production activity.

NEW LAND SETTLEMENT

Planned Agricultural Settlement

1. Many governments have invested in land settlement schemes with various objectives in mind. The division of large farms into small parcels for redistribution to settlers (Zimbabwe and Kenya), the clearing of apparently underutilized land for allocation to landless settlers represent types of approach which emphasize the redistribution of land (Bolivia). A second type is exemplified by the estate project approach, under which a commercially run estate supervises and purchases the produce (cash crops) of the small holders who are often settlers (Malaysia, Indonesia). Typically the estate type project produces rubber, oil palm, sugar, coconuts, and other cash crops. The Bank does not have a specific policy on land settlement in general but is developing an operational directive, expected to be issued in 1991. Further guidance is provided in World Bank Report, Experience of the World Bank with Government-Sponsored Land Settlement.

Guidance for Environmental Assessments

Impact on Local People

2. Any land considered to be suitable for a settlement scheme will have been used by people previously, unless it lies in an area from which endemic disease has been recently eradicated. Even though such areas bear few signs of cultivation, they often support sizable populations who gain their livelihood through hunting, fishing and the collection of forest products such as sago, rattan, traditional medicines, fruits, and fallen tree limbs for sale as firewood. Such people may also cultivate crops in valley bottoms and practice agriculture through land rotation to provide basic foodstuffs. Grasslands may form part of an intricate grazing system developed by transient pastoralists. Frequently such users of the land have no recognized title to the land, and the EA should estimate the effects which the proposed project may have on indigenous people socially, and its effects on their sources of livelihood.

3. Settlement plans need careful examination as there is a strong possibility that the other land is already used. The issue is not one of equity alone, but of virtually increasing the population density in an area in which the people already present live in an ecological balance with the natural environment. The resulting increase in population may lead to damage to watersheds and forested areas, due to the shorter land rotation cycles imposed by the newcomers and the ecological imbalance their presence brings.

Land Allocation

4. The area of land to be allocated to each settler will vary with land capability, the crops to be grown and the family income target. There is a tendency to overestimate the fertility of the soils of lands to be used for settlement, so that expected farm areas and yields can be checked against local performances. The size of holding provided should be workable within the amount of labor available and produce an adequate income, but without imposing a strain on its capacity for sustained production.

5. The EA should also examine the proposed tenancy arrangements in relation to their effects on the environment. A variety of land tenure devices may be employed. These range from a type of renewable tenancy under which lazy and otherwise unwanted settlers can be expelled to "free-hold" ownership of the land by the settler (usually after a period of probation). Whatever system of tenure is adopted it must provide settlers with a sufficient degree of security to provide the motivation to conserve their land as a viable asset and to invest their own resources in its improvement. Either the title itself, or general legislation, should discourage or prohibit the sub-division of farm holdings below the point that they can remain viable in terms of subsistence and saleable surpluses for their occupants.

Titling and Inheritance

6. In many parts of the world, women often hold land in their own right, or at least have an inalienable right to cultivate lands belonging to clans, families or other groups to which they may belong. Most settlement schemes seem to assume that wives are there to assist their husbands regardless of the type of division of labor normally practiced. This may work well in cases where the returns from farming are shared between men and women, but in situations where the women's farms provide subsistence and cash for children's needs the issue needs close attention. Bearing in mind that the acquisition of land is usually the greatest incentive for would-be settlers to volunteer, an appropriate form of title guaranteeing security for women and their children is a necessary part of the project design.

7. The EA process should analyze what is likely to happen to a settlement farm holding on the decease of the original settler. Will the wife inherit the farm, or will it be the eldest son? If polygamy is the practice, what will happen to the second wife, or to the wife(s) who is not the mother of the son who inherits. Also what will happen to the other children? These issues are not only related to equity, but to the environment. Unless there is provision within the settlement area for the allocation of new farms for the increasing population, or there are other employment opportunities open to settlers' children, greater pressure on the land resources, both on the farm holding and on the surrounding forests (sources of firewood etc.) will lead to reduced yields and incomes and environmental degradation. Bank staff need to evaluate the trade-offs between leaving fertile land near settlements for future use by settlers' children, the costs of leaving land now reasonably accessible in an undeveloped state, and the risk of spontaneous settlers moving into those lands in an uncontrolled manner.

Settler Selection

8. Settlers need to have an agricultural background, be married and be strong and healthy. Settlements dependant on unmarried school-leaving males generally do not work, nor do those intended for vagrants and the homeless recruited (conscripted) from cities. Care must be taken with the proteges and relatives of influential personages as prospective settlers, as such people usually seek future windfall profits from sale of the land, and their wards will probably not make good farmers in the interim, although the presence of some may attract secondary investment and maintenance of infrastructure by the government.

Cropping Systems and Land Use

9. Cropping patterns should be designed according to land suitability. It makes little sense to expect settlers to continue to cultivate the crops they are used to in their areas of origin if the soil, slope or rainfall are different. During the stage of project preparation it pays to look at the type of agriculture practiced by the people already living in the surrounding areas, noting the mix of crops and the ways in which the land is protected by plant canopies. Although forested areas (South East Asia and South America) look lush and fertile, it must be remembered that the clearing of this land exposes it to the weather and forest soils rapidly lose their initial fertility (mainly from organic material), and suffer from leaching, laterization and the build-up of aluminum toxicity. Nowhere has it been proven that nonirrigated tropical soils can be used for continuous arable cultivation without lengthy fallow periods or application of fertilizers.

10. Settlers should be encouraged to plant fruit trees on their home gardens, and the cropping plan should ensure that only land with less than an eight degree slope is used for annual crops. Provision for fallow periods needs to be made, and to the extent possible perennial crops, especially trees should be grown. The conversion of forest land to pasture should not be supported by the Bank.

Family Planning

11. Newly arrived settlers tend to want large families, as the amount of work required to bring new lands into full production is usually greater than the labor needs of a mature farm. Thus settlers tend to have fewest family helpers when they are most needed in the early years of settlement, and too many mouths to feed after the period of peak labor needs is over. A family planning component to counsel and

advise settlers from the beginning is advisable, otherwise overcrowding will lead to cropping with increasing intensity and overgrazing.

Spontaneous or Unplanned Agricultural Settlement

12. Spontaneous or unplanned agricultural settlement generally entails expansion into areas hitherto used or reserved for other purposes, and it often means expanding agricultural frontiers into areas which are potentially subject to severe land degradation (Southgate and Pierce, 1988). Such expansion may or may not be as a result of official encouragement by governments. There are a number of features of the this kind of agricultural expansion which can cause damage to the environment. These features are:

- the area of land being cleared for agriculture is greater than the area recovering through adequate fallow periods;
- there is a tendency to move into forest areas, catchment areas, wetlands and marginal areas of low rainfall;
- both the mode of clearing (mechanized) and the crops grown (often annuals) may deplete soil fertility and erode topsoil; and
- an absence of clear land tenure leads to the maximization of short-term gains to the detriment of the environment.

13. While Bank projects themselves are planned, the incentives and infrastructure they foster may be unplanned, and there may be land settlement as a secondary effect. (See section on "Induced Development," for further discussion). Such projects with limited control over the resultant settlement of land need to be viewed from the perspectives provided below.

Relationship to Bank Lending

14. Spontaneous agricultural settlement is relevant to many types of Bank-financed projects. Any project requiring new or improved access will enable, and likely attract, people into the area to cultivate newly accessible land and to sell to new markets created by the project itself. For example, mining, agricultural (including planned land settlement), hydroelectric, thermal electric power, and of course highway projects may all encourage spontaneous agricultural settlement. Bank staff need to consider very carefully the potential effects of each project, not only as direct cause and effect but as sets of effects which would not have occurred had the project not been constructed. Typically migrant laborers move to project sites in the hope of employment and clear land for farming, while others engage in trading and providing services to those that have jobs.

15. In addition to projects which provide access to land through road construction, there are others which convert untenable areas into habitable ones, mainly through the eradication of holo-endemic diseases such as onchocerciasis (river blindness) and trypanosomiasis (sleeping sickness). A classic example of the former is the UN/Bank supported program in West Africa, and plans of the Zambian

authorities to eradicate sleeping sickness. Scrupulous analysis of the trade-offs needs to be made when such programs are being considered: for example, the value of production to be expected from settlement of the area, with the strong possibility of environmental degradation, against the value of leaving the area uninhabitable for people, but with watersheds protected from erosion, with consequent benefits derived from the green cover and water management and quality.

Guidance for Environmental Assessments

16. In situations where there are incentives for the expansion of frontier agricultural colonization, estimates of the rate that this will occur as a result of the project should be made, and the effects on both the natural environment and the indigenous people. Changes in tax laws which encourage frontier agriculture may take time to be implemented, even if governments are willing to undertake such action. If the land is technically suitable for agriculture and there are no conflicting claims by local people, it may be possible to include a project component for planned settlement in the area.

17. Typical effects will include those which are deliberate, e.g., the construction of roads, villages, land clearing and cultivation, etc., and the unplanned but foreseeable impacts caused by people. These latter impacts would include the attraction of immigrants to the area who will construct dwellings, need water and drainage, and will either clear land for farming or will use some land for trade or other business. Agricultural effects can be considerable, especially cultivation, and can include leaching of the soil, sheet and gully erosion, and undesirable effects from run-off and seepage containing dissolved chemicals such as fertilizers, pesticides and herbicides. The foreseeable direct and indirect effects of the likely consequences for the natural environment, the indigenous people and the new colonists should be analyzed.

INDUCED DEVELOPMENT

1. There are a number of important but indirect social impacts of development, which may be overlooked in project design and monitoring. Often these are impacts which result from secondary or induced growth. Some of these impacts can be predicted, fairly reliably, based on past experience, while others are unexpected and can only be identified and addressed if an adequate system of impact monitoring is put into place during project implementation. This section examines some of the negative social impacts which can result from induced development and outlines some mitigating actions that can be undertaken. It does not address the social impacts which are the direct result of development projects. These are addressed elsewhere in this section on social issues.

Relationship to Bank Investments

2. A variety of development projects can result in significant secondary changes in the project area. These include large dam projects, mining projects, large industrial projects, planned agricultural colonization projects, integrated rural development projects which generate new markets and infrastructure, and roads projects which open up remote areas. A common shortcoming in the design and environmental assessment of such projects is the failure to plan for the influx of a secondary population of voluntary migrants who take advantage of the new economic opportunities created. For example, large dam or mining projects usually make provisions for housing, food, schools, and other essential services for the construction workers or miners that will move into the area around the project site. What may

not be taken into account is the influx of an equally large population of people who seek employment or who come to provide other services that are not available to the new population, and who may also place a burden on the surrounding environment given their needs for food, fuelwood and living space. It is important to take account of such impacts in environmental assessments.

Impacts from Increased Population Size

3. The entrepreneurs who come to project sites provide alternative sources of commodities to the construction crews or mining population. These include the sale of construction materials, tools, and goods such as cigarettes or cooking oil; cheaper varieties of the goods provided in company stores, such as plastic shoes or lower-quality clothing, tools, and household goods; or pre-cooked street foods from venter stalls or small restaurants. It also includes service industries, like repairing of leather, tools, clothing, or household items; bars, prostitution and gambling concerns; or transport services to the nearby towns. Voluntary migrants also include the families of entrepreneurs if the time-period is relatively long.

4. The influx of an unexpected number of outsiders has predictable social impacts on the local population, including the following:

- (a) Pressure on existing resources and infrastructure: competition for fuelwood, housing materials, electricity, water supplies, waste disposal, fisheries, and land areas diverted for shops or squatter housing.
- (b) Pressure on existing institutions: small town or village institutions are unable to handle the increased incidence of violence, crime, and disputes over land and other resources in scarce supply; or to take over more sophisticated planning functions.
- (c) Increased pressures on health and sanitary facilities, due to an increased incidence of contagious diseases or pest outbreaks.
- (d) Breakdown of traditional methods of social control and discipline and social disorientation of the local population, resulting from the rise in social problems, changes in the values of children and adolescents, and the possible rise in the cost of living due to inflation.
- (e) Increased marginalization of the minority groups in the local population and a widening of the poverty gap, since the more vulnerable groups in the population, including the aged and women, must compete both with the local population and with outsiders who may have more political and physical clout.^{1/}

^{1/} Although the opposite may occur if the newcomers are the ethnic and cultural minorities, and the local population begin to exploit them instead.

Special Cases of Induced Migration

Boom Towns

5. There is comprehensive literature on a specific sub-set of induced development, the "boom town". Boom towns arise in situations of temporary population increase, e.g., the construction of large projects or road networks, or the mining of temporarily productive sites. Boom towns have a particularly dramatic effect on nearby environments since prices rise and the normal mechanisms for natural resource management break down, leading both newcomers and long-term residents to exploit their environments for short-term gain.

6. Because of the temporary nature of the population influx, there is a distinct cycle to boom towns which needs to be understood when planning measures for mitigating negative impacts. In general, boom towns pass through a cycle of (a) rapid growth before and during construction, (b) high population densities during construction, (c) declining population after construction, and (d) a demographic and economic "bust" after construction. Social impacts from boom towns follow the cycle as well. Social disorientation changes in dimension from one stage of the cycle to another. The local population may be quite euphoric in the initial stages of the boom, due to increased economic opportunities, then sour as social problems surface and life slows down to a pre-boom pace, with the induced problems of resource overuse and degradation remaining behind.

Planned Colonization

7. In planned agricultural colonization or planned urban settlement, a large population is often brought into a relatively undeveloped geographic area. Projects of this type plan for a fixed number of immigrants, but the creation of new infrastructure, economic opportunities, and services also draw a number of spontaneous migrants to the site. Unlike the boom town situation, the influx of new colonists results in a permanent population increase and there is no cycle of boom and bust. Otherwise the types of pressures resulting from an unplanned number of immigrants are similar to those for a boom town or temporary construction situation.

8. One negative impact on the local population that occurs in planned colonization is that, even in the absence of spontaneous in-migration, local people can be marginalized in the development process if colonists are provided special educational, financial, technical, and service resources, while local people are left with the normal level of development services. This has been a problem for tribal populations in India, for example, when refugees from the Sind and Bangladesh were settled in the fifties and early seventies on forest lands cleared for agriculture nearby and provided agricultural development services, including irrigation, that raised the migrant population's standard of living and resulted in the eventual exploitation of the tribal population by the migrants. In such cases, there are often both adverse social and environmental impacts.

Assessment and Mitigation of Adverse Impacts

Duration of Assessment

9. An assessment of the social impacts on the environment should include a comprehensive demographic survey of the project population (surveying all sites, not a limited sample of sites), as well

as a survey of the local resources and seasonal resource management strategies. The objective of the EA should be to assess the magnitude of the expected impacts of induced development, so that mitigating actions are planned on an adequate scale. To do this, observations must be made over different seasons, different times of the day, and take into account the overlapping use of resources by sedentary farmers, pastoralists, fisherfolk, and migratory wage workers. What looks like an empty hillside or field in March may be filled with grazing animals in August. There should also be adequate analysis of the nature of the local and regional institutions which may have responsibility for planning and administrative decisions.

Mitigating Actions

10. Mitigating measures, such as the following, address the problems related to spontaneous immigration and minimize the need for masses of temporary workers from outside.

- (a) Train local people beforehand, especially for less skilled jobs, making special efforts to provide training for local minority peoples; and improve transport facilities to and from the site to enable local people to work at those sites.
- (b) When budgeting for new infrastructure and services, plan adequately for the voluntary immigrants as well as the known numbers of construction workers, miners, or colonists.
- (c) Promote investment in local resources (e.g., fish ponds, animal raising, local water supplies, literacy and job training) to improve the local resource base and capacity to produce food or services for sale to the migrants; to reduce the pressures during a boom period; and to buffer the population against the economic bust which follows.
- (d) Locally, strengthen existing institutions or develop new ones to undertake long-term development and regional planning that addresses changes, to handle an increased number of disputes and social problems, and to accommodate a much more diversified population.
- (e) Plan adequate health, drinking water and sanitary facilities to deal with the unexpected rise in the incidence of disease and pest problems.
- (f) Provide the necessary social, psychological and counseling services to old and new residents to enable them to cope with socioeconomic changes, particularly for vulnerable groups and the aged.

Monitoring

11. In addition to the above measures, an evaluation system should assess periodically the impacts of development intervention/induced development that are not predictable or anticipated at the outset. Such impacts include the proliferation of unexpected diseases or the informal establishment of environmentally-harmful or population-drawing industries or enterprises as a result of the general economic growth in the area.

12. For example, individuals living near major construction sites who develop skills during the period of construction may subsequently start informal businesses that draw upon their acquired skills. When a large number of such individuals start new enterprises, this leads to an unexpected proliferation of new industries, with potential problems of noise, air, or water pollution or inadequate waste disposal. Such enterprises can include smelting enterprises near a mine, electricity-based enterprises in an area of new power distribution or agricultural processing industries which use large quantities of fuelwood.

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CHAPTER 4

ECONOMIC ANALYSIS OF PROJECTS AND POLICIES WITH CONSIDERATION OF ENVIRONMENTAL COSTS AND BENEFITS

1. This chapter reviews current economic approaches to the analysis of projects and policies and discusses possibilities for better integrating environmental concerns. Part I outlines current practices as they relate to the analysis of traditional projects, to public expenditure and investment reviews, and to the analysis of economic policies, such as in the context of economic and sector work, or in connection with structural or sectoral adjustment operations.

2. Part II deals with four key issues:

- physical impacts of projects and policies
- valuing these in monetary terms
- the discount rate
- issues of risk and uncertainty

Approaches for valuing environmental impacts are emphasized. Where possible, practical examples are given for "broad-based" analyses, which deal with what has often been referred to as "externalities." Conclusions are presented in Part III.

PART I: REVIEW OF CURRENT PRACTICES

The Context for Economic Analysis of Projects and Policies

3. Most governments pursue certain general objectives in terms of economic growth, income distribution/poverty alleviation, and proper management of natural resources. There may be some complementarities in these objectives, but it is accepted that significant trade-offs are involved, at least in the short term. Given the existing scarcities of financial and human resources in developing countries, it is particularly important to invest the limited resources in such a way as to reap the maximum benefit in terms of the country's objectives. Sound economic analysis of projects and policies is an important means of making the allocation process more efficient.

Economic Analysis of Projects

4. Project analysis is a method of presenting systematically the choice between competing uses of resources. It assesses costs and benefits with a common yardstick. Benefits are defined relative to their effects on the improvements in human well-being. Costs are defined in terms of their opportunity costs, which is the benefit foregone by not using these resources in the best of the available alternative investments.

Economic Analysis Versus Financial Analysis

5. Economic analysis of projects differs from financial analysis. The latter focuses on money profits accruing to the project entity. Various financial indicators are used to evaluate the entity's ability to meet its financial obligations and to finance future investments. The economic analysis, on the other hand, measures the project's effect on the efficiency of the whole economy. Rather than financial prices, shadow prices are used that reflect opportunity cost. The cost and benefit streams are compared, and indicators such as net present value (NPV) and internal rate of return (IRR) are calculated. Sensitivity analyses are undertaken to determine which component(s) of the project are particularly important for a satisfactory outcome.

Social Cost-Benefit Analysis

6. Basic cost-benefit analysis (CBA) uses economically efficient values of costs and benefits to determine which projects contribute the most toward the growth/efficiency objective of the economy, independent of who the beneficiaries are. The SCBA tries to take income distribution effects into account by assigning higher weights to benefits accrued by the poor (Squire and van der Tak 1975). In practice, formal weighting systems have seldom been used in project analysis. Income distribution, and indeed other social goals, have typically been treated ad hoc.

Past Shortcomings with Regard to the Environment

7. In principle, economic analyses are to take into account all costs and benefits of a project. With regard to environmental impacts, however, there are two basic problems. First, environmental impacts are often difficult to measure in physical terms. Second, even when impacts can be measured in physical terms, valuation in monetary terms is difficult. In spite of such difficulties, a greater effort needs to be made now to "internalize" environmental costs and benefits by measuring them in money terms and integrating these values in economic appraisal (see Part II).

The Value of Considering Environmental Effects Early on in the Project Cycle

8. The main purpose of the economic analysis of a project is to ascertain whether the project can be expected to create more net benefits than any other, mutually exclusive option, including the option of not doing it. Consideration of alternative options therefore is a key feature in proper project analysis. Often, important choices about alternative project options are made early on in the project cycle. These options may differ considerably in their general economic contribution, and they may also differ greatly in environmental impact. Therefore, including environmental effects in the early economic analyses, however approximately, should improve the quality of decision-making.

Public Investment Reviews

9. An important lending institution like the Bank needs to consider not only the viability of individual projects, but also the overall investment program of a country. The Bank's leverage is limited, however, and governments may be sensitive about outsiders' views on priority-setting based on explicit criteria. This is particularly so when "national security concerns" are invoked in justification of projects, or when projects are politically motivated. Nevertheless, an overall appraisal of a country's public investment program (PIP) is important. Money is fungible, and the financing of a sound project by the

Bank might permit a country to utilize its own or other resources to finance a project that may make only a limited contribution to the overall objectives.

10. An analysis of Public Investment/Expenditure Reviews (PI/ERs) has been undertaken by the Bank. The following recommendations were made to improve their cost-effectiveness: (a) clear, achievable objectives should be set (e.g., by limiting the number of sectors covered); (b) coverage of issues should be selective and tailored to country circumstances, except for core components (PIP and recurrent expenditures for the main sectors); (c) the Bank should avoid taking direct responsibility for drawing up the PIP; (d) more attention should be paid to upstream sector work (to be included in the PI/ER); and (e) for a crisis mission, a detailed aide-memoire will be more timely and often more cost-effective than a full report (de Melo 1988).

Analysis of Economic Policies

11. Previous Bank guidelines on the economic analysis of projects dealt exclusively with projects in a narrower sense. Since the guidelines were issued in 1980, sectoral and structural adjustment lending has increased rapidly and stabilized at around 25 percent of Bank lending. Also, "hybrid" projects are now financed that contain elements of both investment-type and policy-based operations. For sound economic analysis, the same cost-benefit standards should apply to the whole spectrum of "projects" that are financed.

12. Most of the policy and institutional reforms supported under structural adjustment loans are intended to increase the efficiency of the economy and to promote economic development. The extent to which economic growth is increased by the reforms is seldom explicitly expressed in quantitative terms. The design of policy reforms would be improved if better attempts could be made to identify and (wherever possible) estimate their costs and benefits, based on a comparison of the standard "with policy" and "without policy" projections (Kanbur 1990).

13. With regard to recognizing and including environmental concerns in economic analyses explicitly of macro-policies, a number of observations can be made, particularly on national income accounts and the environmental effects of macro-policies on the natural resource base.

Performance Measurement in the National Income Accounts

14. Performance is currently measured by the growth in Gross Domestic Product GDP, and policy reforms are justified on the basis of their short-, medium-, or long-term contribution to such growth. While GDP measures market activity reasonably well, it does not include non-market value added. More importantly, since GDP does not consider depreciation of man-made capital and also leaves out the degradation of "natural capital", it is an inaccurate measure of true, sustainable income (Ahmad, El Serafy and Lutz 1989).

15. The Bank and the United Nations Statistical Office (UNSO) are conducting case studies to develop methods for deriving and Environmentally-adjusted Net Domestic Product (EDP). Until such work has come to fruition, policy analysts should keep in mind the limitations of current national accounts information. The most desirable policy reforms are those that increase EDP rather than GDP, since EDP more accurately measures "sustainable" income.

Tracing Policy Effects on the Natural Resource Base

16. Interactions between the economic system and the environment are complex and our understanding of them limited. Ideally, a comprehensive model is needed that traces the package of policy reform through the economic and ecological system. Generally, time and data limitations preclude the use of such models in developing countries. Practical policy analysis is usually limited to a more "partial equilibrium" approach that seeks to trace the most important impacts of specific reforms, qualitatively and, where possible, quantitatively.

17. Several studies contain practical examples of what an analyst can achieve even with limited time and resources available. Binswanger (1989) showed that in Brazil general tax policies, special tax incentives, the rules and land allocation, and the agricultural credit system all accelerate deforestation in the Amazon. These policies also increase the size of land holdings and reduce the chances of the poor to become farmers. Mahar (1989) made a thorough historical analysis of government policies and programs in Brazil. He traced many of today's problems in the Amazon to the decision in the mid-1960s to provide overland access to Amazonia — a decision made before enough was known about the region's natural resources to be able to develop it in a sustainable manner.

18. In a study on Costa Rica, Lutz and Daly (1990) reviewed incentives and regulation, and attempted to assess how these affect deforestation and sustainable land use. They found that most of the deforestation at present is being done not by squatters, but by the logging industry, banana companies and large cattle ranchers, driven by profit and asset maximization motives.

19. In another study, Lutz and Young (1990) traced the effects of agricultural policies on the natural resource base. Some of these can be assessed relatively easily, at least in quantitative terms. For example, where the removal of a fertilizer or pesticide subsidy is being considered in an adjustment program, it is clear that, as a result of the proposed reform, government expenditures will decrease, farmers' use of these products will decrease, and environmental effects will tend to diminish as well. The quantitative effects essentially depend on the relative elasticities involved.

20. For certain policy or institutional reforms it may not be possible *a priori* to determine the environmental impact in the short or long run, since there may be both positive and negative environmental effects. The net effect may depend on the size of the relevant parameters that are case-specific and which must be estimated.

The Case for More Environmental Analysis Under Resource Constraints

21. Little and Mirrlees (1990) noted that between the mid-1970s and 1990, there occurred a "rise and decline of project appraisal in the World Bank and elsewhere," and claim that currently the incentives are inadequate for project analysts to undertake thorough, in-depth analysis of projects.

22. In view of the existing discrepancy between what ought to/could be done and what is actually being done, the question arises whether it is realistic to expect more thorough treatment of externality issues. However, even in situations where task managers have limited resources at their disposal, natural resource and environmental issues may be critical to the success or failure of a project or policy. Therefore, even under budget constraints, where environmental issues are involved, some funds should be spent on environmentally-oriented economic analysis, preferably early in the project cycle. Part II

suggests "best practice" for integrating natural resource and environmental issues into economic analyses of projects and policies.

PART II: POSSIBILITIES AND CONSTRAINTS FOR INCLUDING ENVIRONMENTAL COSTS AND BENEFITS INTO ECONOMIC ANALYSIS OF PROJECTS AND POLICIES

23. Four key issues in measuring environmental costs and benefits are discussed here: (a) determining physical impacts and relationships; (b) valuing impacts in monetary terms; (c) discounting; and (d) risk and uncertainty. Emphasis is given to methods and approaches.

Physical Impacts and Relationships

24. The first step in environmentally sound economic analyses is to determine the environmental and natural resource impacts of the project or the policies in question. These impacts are determined by comparing the "with project" and the "without project" impacts. The difficulty in doing this varies greatly. For example, solid waste production of an industrial plant can be estimated easily, whereas it is much more difficult to identify all the environmental impacts of a trade policy reform, of air pollution, or even of soil erosion on agricultural productivity.

25. For determining physical impacts, an economist will have to rely on the expertise of engineers, ecologists, agronomists, social scientists, and other specialists. The task is complex in that some physical relationships may not be known, may be stochastic or may occur only over the long-term.

Valuing the Impacts in Monetary Terms

26. A number of conceptual approaches have been developed for valuing physical impacts and relationships. An environmental impact can show itself in a measurable change in production or environmental quality. Different methods are appropriate depending on the types of effects (see Table 4.1).

27. The methods and approaches discussed below are applicable or potentially applicable in developing countries. The techniques are presented in decreasing order of reliance upon market information, beginning with those that rely on actual market prices, and ending with survey-based and other hypothetical methods.

Market-Based Methods

28. The primary feature of these methods is that they are based directly on market prices or productivity. They are applicable where a change in environmental quality affects actual production or production capability.

Table 4.1. Chief Valuation Techniques		
DIRECT VALUATION	SURROGATE MARKET VALUES	POTENTIAL EXPENDITURES OR WILLINGNESS-TO-PAY
<ul style="list-style-type: none"> • Change of productivity • Loss of earnings • Defends expenditures 	<ul style="list-style-type: none"> • Property values • Wage differences • Travel costs • Marketed goods as proxies 	<ul style="list-style-type: none"> • Replacement costs • Shadow project • Contingent valuation

Change-in-Productivity Approach

29. Development products can affect production and productivity positively or negatively. For example, a land management project involving soil conservation measures, may yield increased agricultural output. The incremental output can be valued by using standard economic prices.

30. The environmental costs of reclaiming wetlands or of water pollution are now being recognized. Where these affect fish catch either in the short-term or long-term the value of fish catch can be estimated directly by using actual or projected market prices. (Wetlands are beneficial in more ways than fish catch, of course; for a detailed discussion, see Chapter 2.)

31. An empirical example of the change in productivity approach is a study by Anderson (1988) that measured the benefits of afforestation in Nigeria. Studies show that in Northern Nigeria, shelterbelts have significant effects on crop yields, generally in the range of 10 to 30 percent. Therefore, in addition to the wood production, the benefits from increased farm production should be considered (see Table 4.2).

32. *Loss-of-Earnings Approach.* Changes in environmental quality can have significant effects on human health. Ideally, the monetary value of health impacts should be determined by the individuals' willingness to pay for improved health. In practice, "second best" techniques may be necessary, such as valuing earnings that are foregone through premature death, sickness or absenteeism; and increased medical expenditures. This approach may be relevant, for example, when considering road and industrial plant safety, and projects that affect air pollution in major cities.

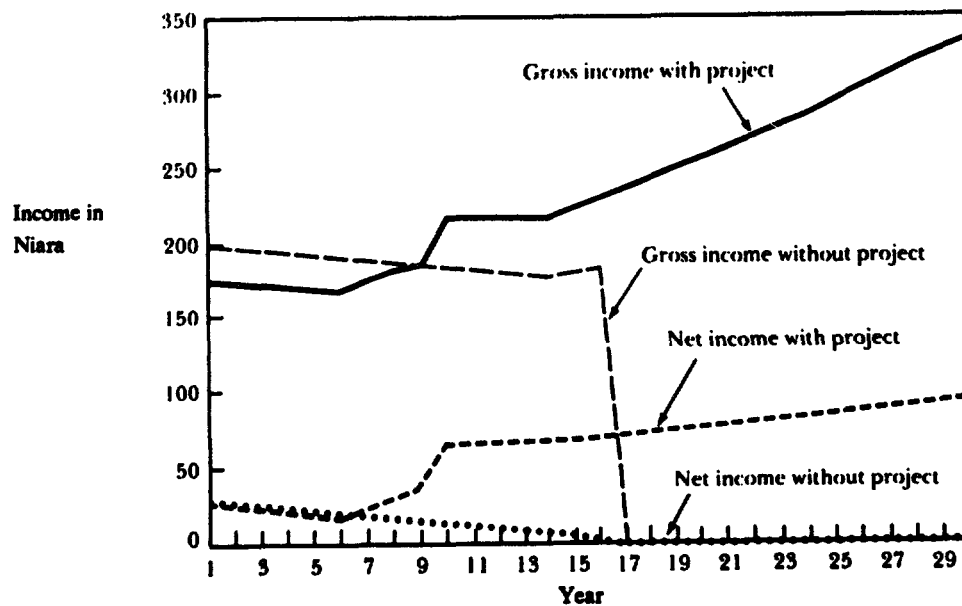
Table 4.2. Estimating the Benefits of Afforestation

Trees provide a variety of benefits other than wood. Thus, economic analyses concentrating only on wood production clearly underestimate total benefits from tree planting. In the Anderson study cited, four benefits of afforestation (for Northern Nigeria) were considered: (a) stemming future declines in soil fertility; (b) improving current levels of soil fertility; (c) acquiring tree products (firewood, poles, fruit, etc.); and (d) increasing the availability of fodder. (Fodder can be increased by increasing soil fertility and by planting fodder trees and shrubs as part of a farm forestry program. In turn, these practices can enhance economic output or livestock benefits.)

Considering the benefit of wood products alone results in a modest rates of return of approximately 5 percent. Evaluating the three other benefits raises the net present value fourfold and the economic rate of return to over 15 percent. These calculations were based on conservative estimates of the ecological benefits.

Anderson considered two types of investments: (a) shelterbelts and (b) tree plantings near farm dwellings and on farm boundaries by the farmers themselves. Both have similar qualitative ecological benefits, but different costs, risks, and quantitative effects.

Costs and benefits were estimated in seven steps: (a) determining gross and net farm income; (b) determining the growth of agricultural productivity; (c) determining the rise in gross farm income as a result of protecting the environment; (d) calculating the rate of change in soil fertility; (e) calculating the value of wood per hectare farmed; (f) determining the costs of a project; and (g) computing the value of the land area occupied by trees. Anderson shows how the calculations were done. The results are summarized in the figure below:



(Source: Anderson 1989)

33. The "value-of-health" approach is often questioned on ethical grounds. It is argued that it dehumanizes life, which is of infinite value. In practice, however, society implicitly places finite values on human life and health when it makes policy and project decisions that affect environmental quality, workers' health or safety, etc. If this were not so, we would be justified in spending all of GDP on health improvements.

34. In the case of an increase or reduction in numbers of deaths, a first estimate is made by evaluating the projected loss in earnings of the individuals involved. The value of an increase or reduction in sickness can be approximated by adding medical costs to loss in earnings.

Defensive or Preventive Expenditures

35. Individuals, firms, and governments undertake a variety of "defensive expenditures" in order to avoid or reduce unwanted environmental effects. Environmental damages are often difficult to assess, but defensive expenditures may be determined more easily in monetary terms than direct valuations of the environmental good in question. Such actual expenditures indicate that individuals, firms or governments judge the benefits greater than the costs. The defensive expenditures can then be interpreted as a minimum valuation of benefits.^{1/} However, caution is advisable with this approach, especially in cases where governments arbitrarily mandate defensive expenditures having little or no relationship to market forces or free choices.

Methods Based on Surrogate Market Values

36. The methods and techniques described in this section use market information indirectly. The approaches discussed are the property value approach, the wage differential approach, the travel cost method, and uses of marketed goods as surrogates for non-marketed goods. Each technique has its particular advantages and disadvantages, as well as requirements for data and resources. The task of the analyst is to determine which of the techniques might be applicable to a particular situation.

Property Value Approach

37. This approach, also referred to as the hedonic price technique, is a subset of the more general land value approach. Its objective is to determine the implicit prices of specific characteristics of properties. When used in environmental issues, its purpose is to place a value on improvements or deterioration in environmental quality.

38. The property value approach has been used to analyze the effects of air pollution in certain areas. Where pollution is localized, the method compares prices of houses in affected areas with houses of equal

^{1/} Considerable work is going on to identify defensive expenditures. Such expenditures by firms are treated in the current System of National Accounts (SNA) as intermediate cost and therefore are not part of value added or final output. Defensive expenditures by households and governments, on the other hand, are treated as final expenditures and included in GDP. This practice is being questioned, and proposals are being discussed to change this.

size and similar neighborhood characteristics elsewhere in the same metropolitan area. The approach is based on the assumption of a competitive real estate market, and its demands on information and statistical analysis are significant; therefore, applicability to developing countries is limited.

Wage Differential Approach

39. This approach is based on the theory that in a competitive market the demand for labor equals the value of the marginal product, and that the supply of labor varies with working and living conditions in an area. A higher wage is therefore necessary to attract workers to locate in polluted areas or to accept risky work. Again, as in the case of the property value approach, the wage differential approach can only be followed if the labor market is very competitive. Also, the approach reflects only private, not social, valuation of health risks.

Travel Cost Approach

40. This approach is most often used in analyzing the economic benefits of recreational facilities in industrial countries (parks, lakes, forests, wilderness, etc.). Essentially the same approach can also be used to value "travel time" in projects dealing with fuelwood and water collection (Hanley 1989).

41. The surrounding area of a site is divided into concentric zones of increasing distance, representing increasing levels of travel cost. A survey of users should be conducted at the site to determine the zone of origin, visitation rates, travel costs, and various socioeconomic characteristics. Users close to the site would be expected to make more use of it, because the implicit price for them, as measured by travel costs, is lower than for more distant users. Based on analysis of the questionnaires, a demand curve can be constructed and the associated consumers' surplus determined. This surplus represents an estimate of the value of the environmental good in question.

Marketed Goods as Surrogates for Non-Marketed Goods

42. There are situations where environmental goods have close substitutes that are marketed, and where therefore the value to the environmental good in question can be approximated by the observed market price. For example, the value of a non-marketed fish variety can be valued at the price of the most similar fish being sold in local markets.

Methods Based on Potential Expenditures or Willingness-to-Pay

43. Sometimes it is not possible to estimate the benefits of environmental quality protection or improvements. In some of these cases it may be possible to estimate benefits by calculating the costs of replacing the environmental services that have been or might be destroyed by a project, or by estimating what people might be willing to pay to protect an environmental asset. Once again, however, great care needs to be exercised to avoid improper valuation.

Replacement Cost Approach

44. Under this approach, the costs of replacing a damaged asset are estimated. The estimate is not a measure of the benefit of avoiding the damage in the first place, since damage costs may be higher or

lower than the replacement cost. However, it is an appropriate technique if there is compelling reason to restore the damaged asset, or certainty that it will be restored.

45. The replacement cost approach has been used to estimate the benefits of erosion prevention measures by calculating the cost of the fertilizer that would be needed to replace the nutrients lost through soil erosion. The method applies only if, in the absence of erosion control measures, the fertilizer would actually be applied.

Shadow Project Approach

46. Used for evaluating projects with negative environmental impacts, this approach involves the design and costing of one or more "shadow projects" that would provide substitute environmental services to compensate for the loss of the original assets. This approach is essentially the same as the replacement cost approach; it is being mentioned increasingly as a way to make operational the concept of sustainability at the project level. It assumes a constraint for maintaining environmental capital intact, and could therefore be most relevant when "critical" environmental assets are at risk.

Contingent Valuation Method

47. In the absence of market information about people's preferences, the contingent valuation method tries to identify them by posing direct questions about willingness to pay. Basically, it asks people what they are willing to pay for a benefit, and/or what they are willing to accept as compensation for tolerating a cost. This process of "asking" may be either through a direct questionnaire/survey, or by experimental techniques in which subjects respond to various stimuli in "laboratory" conditions. What is sought are personal valuations by the respondent for increases or decreases in the quantity of some good, contingent upon a hypothetical market. Willingness to pay is constrained by the income level of the respondent, whereas willingness to accept payment for a loss is not constrained. Estimates show that willingness to accept tends to be several times greater than willingness to pay.

48. Pearce and Markandya (1989) compared the contingent valuation method with other (more market-based) methods and found that in seven studies done in industrial countries the overlap of estimates is complete, if accuracy is expressed as plus or minus 60 percent of the estimates computed. This result is reasonably reassuring that the contingent valuation method, while not being very precise, nevertheless can produce useful valuations. Data based on the method may be sufficient to rule out certain alternative projects or favor others, and thus can be a valuable tool.

49. The contingent valuation method has many shortcomings, however, including problems in designing, implementing and interpreting questionnaires (The Energy Journal 1988). While its applicability may be limited, there is now considerable experience in applying this survey-based approach in developing countries, e.g., to evaluate the quality of supply of potable water and electricity services (Whittington and others; Munasinghe 1990). In certain circumstances, the contingent valuation method may be the only available technique for benefit estimation, and can be applied to common property resources, to amenity resources with scenic, ecological or other characteristics, or to other situations where market information is not available. Caution should be exercised in seeking to place a value on the more abstract benefits of environmental assets, such as existence or intrinsic value (Randall and Stoll 1983).

Multi-Objective Decision-Making

50. The methods described above seek to estimate costs and benefits of a given project in monetary terms. When projects/policies and their impacts are to be embedded in a system of broader (national) objectives, some of which cannot be easily quantified in monetary terms, multi-objective decision-making offers an alternative approach which may facilitate the optimal choice among investment options or policies available.

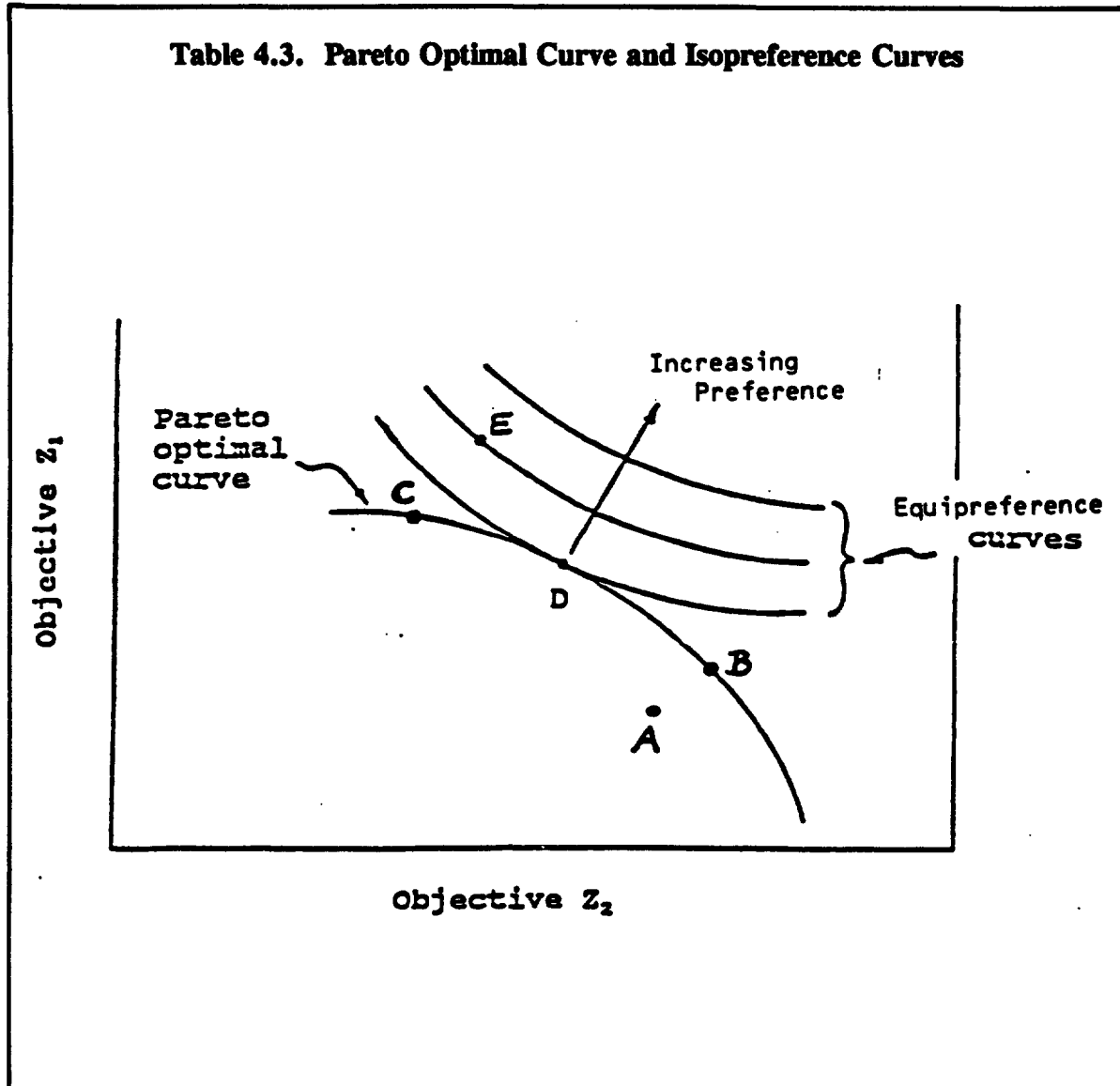
51. Desirable objectives need to be specified. These often exhibit a hierarchical structure. The highest level represents the broad overall objectives (e.g., improving the quality of life), often vaguely stated and, hence, not very operational. Some of these, however, can be broken down into more operational lower-level objectives (e.g., increase income), so that the extent to which the latter are met may be practically assessed. Sometimes only proxies are available (e.g., if the objective is "to enhance recreation opportunities", the attribute "number of recreation days" can be used). Although value judgements may be required to choose the proper attribute (especially if proxies are involved), measurement does not have to be in monetary terms, in contrast to the single-criterion methodologies used in economic cost benefit analysis. More explicit recognition is given to the fact that a variety of concerns may be associated with planning decisions.

52. An intuitive understanding of the fundamentals of multi-objective decision-making can be provided by a two-dimensional graphical such exposition such as in Table 4.3. Assume that a project has two non-commensurable and conflicting objectives, Z_1 and Z_2 . Assume further that alternative projects or solutions to the problem (A, B and C) have been identified. Clearly, point B is superior (or dominates) to A in terms of both Z_1 and Z_2 . Thus alternative A may be discarded. However, we can not make such a simple choice between solutions B and C since the former is better than the latter with respect to objective Z_2 , but worse with respect to Z_1 . In general, more points (or solutions) such as B and C may be identified to define the set of all non-dominated feasible solution points that form a Pareto optimal curve (or curve of best options). This line is also called a transformation curve or efficient frontier.

53. For an unconstrained problem, further ranking of alternatives cannot be conducted without the introduction of value judgements. Specific information has to be elicited from the decision-maker to determine the most preferred solution. In its most complete form such information may be summarized by a family of equi-preference curves that indicate the way in which the decision-maker trades off one objective against the other, as illustrated in Table 4.3. The preferred alternative is that which results in the greatest utility – which occurs (for continuous decision variables as shown here), at the point of tangency D of the highest equi-preference curve, with the Pareto optimal curve. In this case, the point E (on an even higher equi-preference curve) is not attainable.

54. Several multi-criteria methods have been developed (Romero and Rehman 1987; Petry 1990). Which practical method in particular is suitable to determine the "best" alternative available, depends on the nature of the decision situation. For instance, interactive involvement of the decision maker has proved useful in the case of problems characterized by a large number of decision variables and complex causal inter-relationships. Some objectives can be dealt with through direct optimization, while others require the satisfaction of a certain standard (e.g., level of biological oxygen [BOD] not below 5 mg/liter).

Table 4.3. Pareto Optimal Curve and Isopreference Curves



55. The major accomplishment of multi-objective decision models is that they allow for more accurate representation of decision problems, in the sense that several objectives can be accounted for. However, a key question concerns whose preferences are to be considered. The model only aids a single decision-maker (or a homogenous group). Various interested groups will often assign different priorities to the respective objectives, and normally it may not be possible to determine a single "best" solution via the multi-objective model. Also, the mathematical framework imposes constraints upon the ability to represent effectively the planning problem. Non-linear, stochastic and dynamic formulations can assist in better defining the problem, but impose costs in terms of complexity in formulation and solving the model (Cocklin 1989).

56. Nevertheless, in constructing the model the analyst communicates information about the nature of the problem. He specifies what factors are important and how they interact. Liebman (1976) observes that "modelling is thinking made public", and considers this transfer of knowledge to represent perhaps the most important contribution of modelling. With respect to the second point of criticism (i.e., diverse preferences), Liebman suggests that there is value to be gained in constructing models from differing perspectives and comparing the results.

The Discount Rate Issue

57. After the physical effects of projects and policies have been determined and, where possible, estimated in money terms, the next issue is the rate at which the cost and benefits streams are to be discounted. This is a general issue in cost-benefit analysis; but it is particularly important with regard to environmental costs and benefits, since at least some of them are of long-term.

58. In standard analysis, past costs and benefits are treated as "sunk" and are ignored in decisions about the present and future. Future costs and benefits are discounted to their equivalent present value and then compared. In theory, in a perfect market, the interest rate measures both the subjective rate of time preference and the rate of productivity of capital. These rates are equated at the margin by the market, so that the rate at which individuals are willing to trade present for future values is just equal at the margin to the rate at which they are able to transform present goods into future goods by capital investment.

59. Because of imperfect financial markets and government distortions introduced by taxation, the rate of time preference and the rate of capital productivity are not equal. Also, individual decisions differ from social decisions in that individuals are mortal and societies are quasi-immortal. Thus one strong reason for individual preference for the present—the certainty of death coupled with the uncertainty of when it will occur—is absent from the community's point of view. So, the community has reason to discount the future less than individuals.

60. In order to favor environmental projects that have benefits accruing in the long run, it has been suggested that lower discount rates be used. This has a drawback, however, in that not only environmentally sound activities would pass the cost-benefit test more frequently, but also a larger number of projects generally would pass the test and thus lead to additional environmental stress. The main recommendations, therefore, are that:

- (a) the standard opportunity cost of capital be used (e.g., 10 percent) for environmental cost-benefit analyses, as it is for NPV calculations and for computing the IRR comparator;
- (b) short- and long-term costs and benefits be estimated as carefully as possible; and
- (c) a rigorous analysis of non-monetary consequences (including those that might be irreversible) be made to supplement standard cost-benefit analyses.

Issues of Risk and Uncertainty

61. Projects and policies alike involve risks and uncertainties. Risks are involved when probabilities can be assigned to the likelihood of an event occurring, such as an industrial accident. Uncertainty

describes a situation where little is known about future impacts and where therefore no probabilities can be assigned to certain outcomes, or where even the outcomes are so novel that they cannot be anticipated.

62. Risk can be insured against and treated as a cost, but uncertainty defies actuarial principles because of novelty of outcomes, e.g., ozone layer depletion was an unknown outcome of CFCs and could not have been evaluated as a risk when they were introduced. Uncertainty is especially important in environmental issues. As projects grow larger in scale and introduce novel substances into the environment, the category of risk becomes less relevant and the category of uncertainty more relevant. The proper response to risk is to count it as a cost in expected value formulations. The proper response to uncertainty is likely a policy of general caution: if one cannot see very far ahead, slow down.

63. Much work has been undertaken on the subject of risk and uncertainty in project appraisal. (For a recent treatment, see Anderson and Quiggin 1990.) In practice, the way risk and uncertainty are included in project appraisal work is through sensitivity analyses, which determine how the IRR is dependent on different variables. Analyses should also be undertaken that indicate how environmental features can affect the IRR of a project and how the project might affect natural resources and the environment.

PART III: CONCLUSIONS

64. Incorporation of the effects of environmental degradation into public decision-making is an essential step towards achieving economically efficient management of natural resources and formulating a practical strategy for sustainable development. In particular, the economic analysis of projects and policies can help a country make investments of scarce resources that contribute most to its overall objectives. "External factors" have often been neglected in the past, but these should now be internalized to the extent possible. In this regard, rough qualitative assessments early in the project cycle can yield valuable returns by identifying environmentally unsound alternatives and focussing on those that are more sound overall—and designing the latter to achieve sustainable development goals.

65. The principles discussed in this chapter have been applied to evaluating environmental costs and benefits in only a limited number of actual situations. Therefore, more case study work is necessary and perhaps could be carried out as part of project preparation. A major purpose in such endeavor is to indicate orders of magnitude, rather than provide fine-tuned numbers. In this fashion, some alternatives could be ruled out, and the key estimates for decision-making identified and focussed on.

66. At this time, the best one can do is to use cost-benefit analysis to the extent possible—and push it to its acceptable limits. In addition, risks and consequences that cannot be measured in monetary terms should be identified and rigorously analyzed. These two approaches—and good judgement—are at present the best strategies for sound decision-making.

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CHAPTER 5

STRENGTHENING LOCAL CAPABILITIES AND INSTITUTIONS

1. The success of environmental assessment (EA) as a means to ensure that development projects are environmentally sound and sustainable depends in large measure on the existence of environmental management capability in the institutions of the borrowing countries. The Bank is committed to using the EA process as a means for strengthening environmental institutions and local capability to deal with environmental concerns and to integrate them into the identification, design and implementation of economic development activities (OD 4.00, Annex A: "Environmental Assessment" [the EA OD], para 13).

2. In a project with environmental issues, the institutions involved in EA should have or be able to obtain the capacity to produce a satisfactory EA, to incorporate the EA findings into designs and implementation plans, to monitor and manage the construction and operation of the project, and to evaluate the results in order to improve future activities. Many projects also represent an opportunity to promote progress toward a longer-term objective: strengthening the country's overall institutional structure and process so that natural resource use is consistent with environmentally sound and sustainable development, whether the Bank is participating or not.

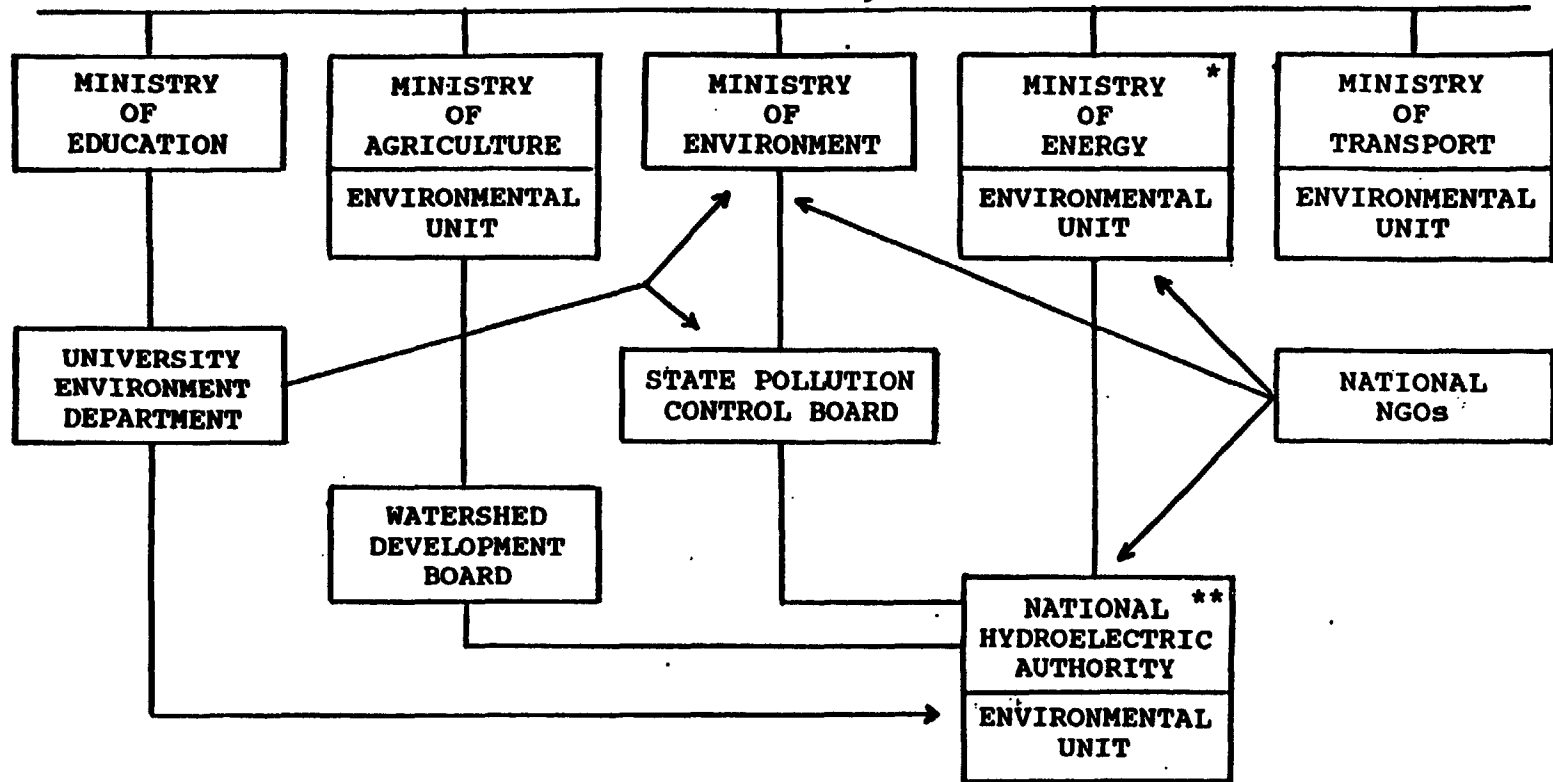
3. This Sourcebook chapter is intended primarily to provide guidance to Bank task managers (TMs) in using projects to help develop EA capabilities in the country. It is also intended to assist TMs in recognizing and making use of opportunities to contribute to improved environmental management capacity country-wide. There are three subsections: (a) Environmental Management Institutions; (b) Analyzing Institutional Capabilities; and (c) Recommendations for Strengthening Environmental Capabilities.

ENVIRONMENTAL MANAGEMENT INSTITUTIONS

4. The term "institutions" as used here covers government agencies, such as the Ministry of the Environment, the line agencies with activities that affect the environment (Ministries of Energy, Transportation, Agriculture, Tourism, etc.), or the State Pollution Control Board; nongovernmental organizations, such as a National Environmental Advocacy League; and private and quasi-private organizations, such as the environmental department of the national university, an industrial development corporation, or a national water supply and sewerage corporation. Also included under "institutions" are the legal framework within which the organizations function, including environmental laws and other legal instruments that define the organizations' responsibilities, authorities or privileges; the regulations or procedures with which the organizations carry out their functions; and the relationships that exist among them.

5. There is no universal model or set of institutions that will be satisfactory in every situation; nor is there necessarily one optimal institutional structure for any particular situation. Figure 5.1 is a diagram of a structure that is common, but no attempt is made here to define a standard. We can, however, describe the functional components that appear to be most useful in any structure.

Figure 5.1. Environmental Institutions in Typical Country Organizational Structures



* sponsoring ministry in this example

** implementing agency

6. In almost every country, some of these components will already exist. Which ones exist, and how effectively they function, will directly affect the ability of a project sponsor to conduct EA and apply the results in project preparation and implementation. For example, a project EA will be less difficult to carry out in countries where the legal framework already requires some form of EA and where government agencies already have the capacity to administer EA processes. Mitigating measures, monitoring programs, and special operating requirements identified in an EA will be difficult to put into practice without strong implementing organizations and without an institutional structure in place to provide independent oversight and technical assistance.

7. The logical starting point for building local capabilities is to work with the existing institutions, identifying approaches for strengthening, modifying and supplementing them in ways that are implementable and effective within the political and sociocultural context.

Policies and Legal Instruments

8. Clear policies, based in law, that facilitate incorporating environmental concerns into development planning and decision-making and that support environmental management and protection are fundamental. The form in which they are articulated is not particularly significant. However, the need for formal rather than *ad hoc* policies, implies the need for involvement of high-level leadership, a policy-making body, and a mechanism for policy formulation.

9. Environment-related responsibilities and powers are most effective when grounded in law. Legal authority to implement national environmental policy should be clearly established. Subsidiary legislation may be necessary to establish the authority for setting environmental quality and performance standards; for enforcing compliance with regulations; or for requiring licenses, permits or EAs for certain activities. These standards and procedures may themselves be promulgated as regulations, decrees or administrative orders.

10. The need for legal grounding does not necessarily imply passage of a new, comprehensive national environmental law; frequently much of the needed authority is already provided in legislation. What are then necessary are regulations to implement particular laws – e.g., environmental quality standards, EA guidelines and procedures, procedures for EA review and requirements for community involvement. Regulations are usually developed and issued through administrative processes, such as ministerial or presidential decrees.

National Environmental Organization for Policy-Making and Oversight

11. Effective environmental management depends on the existence of the following processes at the national level:

- (a) development of environmental policies and laws
- (b) incorporation of environmental concerns into economic development planning and budgeting
- (c) interagency coordination on environmental issues that cross sectoral boundaries
- (d) mechanism to resolve interagency disagreements on natural resource-use decisions

- (e) operation of monitoring programs
- (f) establishment of guidelines for EA
- (g) provision for independent review and approval of EAs prepared for line agencies

12. A variety of organizational approaches have been implemented to perform the policy-making and related functions:

- (a) an environmental committee of the existing cabinet
- (b) an interministerial environmental coordinating committee (with secretariat)
- (c) an environmental ministry
- (d) an environmental unit within an existing ministry, such as the Ministry of Planning
- (e) an environmental directorate within the Prime Minister's office

In federally-organized countries, some of the national functions may be decentralized through establishing branches of the national agency or through delegation to state, regional, provincial or municipal environmental agencies.

Implementing Environmental Policies in Sectoral Development Programs

13. Ministries and other line agencies with natural resource and/or environmental protection responsibilities most directly affect the quality of the environment and therefore need to be given the responsibility for ensuring environmentally sound production or service performance and the capacity and the day-to-day operational authority to carry it out. Ideally, environmental concerns should be considered throughout their planning, project development, financing, implementation, monitoring and enforcement activities.

14. Requiring, reviewing or conducting EAs are important aspects of this work. Within the framework of national EA guidelines, individual ministries may define more specific EA procedures applicable in their sectors. Some countries have established special environmental units within the sectoral agencies most directly involved with environmental issues, while others have relied on a single environmental agency or on the use of consultants (see Table 5.1). There has not been sufficient study of existing experience to permit general evaluation of different approaches. Experience does show, however, that institutional arrangements must be custom-tailored to the sociocultural and political contexts of country and site.

15. Environmental units can be particularly effective when housed within agencies that have intersectoral planning, development or regulatory authority for a particular region. The best-known example is a river basin commission, that has the potential to integrate environmental concerns into all water resource and related land use decisions affecting water supply or water quality within a watershed. Another example is a coastal zone management agency, that develops plans for and/or reviews all types of development projects in the coastal area.

Table 5.1. Institutional Development in Rwanda

As part of the Gitarama Agricultural Project, the Bank is financing the preparation of a Master Plan for the future development of the Nyabarongo River Valley. The planning process includes preparation of an EA to determine the potential impacts on the ecology of the valley.

An environmental coordinating unit already exists within the Ministry of Plan (Miniplan), but it has as yet no administrative structure. The government of Rwanda (GOR) is exploring options for a permanent organizational structure to oversee environmental studies such as this one and to coordinate all environment-related activities in the country. Japan has provided grant funds, to be administered by the Bank, to assist GOR in that effort.

An environmental component has been incorporated in the project, to be executed by Miniplan. In it, the grant funds will be used primarily to provide local and international consultants who will assist Miniplan in formulating TORs for the environmental unit, determining staffing and training needs, and defining its organizational and administrative relationships within Miniplan and with each of the other relevant ministries and departments. The grant will also finance local and overseas training for the environmental unit staff and defray its operating costs for nine months.

The objective of the institutional strengthening activities is to provide GOR with institutional capacity to:

- develop organizational mechanisms to ensure that environmental policies are followed in all development programs and projects
- provide interagency coordination on environmental issues
- assure follow-up to the National Strategy for the Environment and the Environmental Action Plan
- assist line agencies in strengthening their own capacity to deal with environmental issues and develop environmentally sound investment programs
- define overall needs for environmental education, information, promotion and training

Incorporating Environmental Concerns into Project Implementation

16. The line agencies or enterprises that implement development decisions are also the organizations that should usually conduct or commission environmental assessments; these agencies also should be responsible for incorporating the EA findings into designs and implementation programs (see Table 5.2). When they are public sector agencies, they may already have self-contained environmental expertise; for instance, an energy ministry may control energy planning, power plant siting, environmental assessment of proposed generating stations and transmission lines, licensing, and supervision of utility operation.

Table 5.2. Pakistan Drainage Sector Environmental Assessment

As part of a project to produce a sectoral EA of the national drainage program and develop a comprehensive approach to drainage investment, the consultant is required to recommend institutional strengthening activities to promote economic and sustainable development in the sector, with appropriate environmental safeguards. Organizations involved in construction, operation and maintenance are of the Water and Power Development Authority (WAPDA), the Provincial Irrigation Departments (PIDs), and the Water User Associations (WUAs). Responsibility for environmental protection is divided among the Pakistan Environmental Protection Agency (PEPA), the four provincial EPAs, and the environmental unit of WAPDA. The environmental protection agencies are new and small, and the links between them and the implementing agencies are weak. TORs call for recommendations on the following items:

- (a) improved linkages between the environmental institutions and WAPDA and the PIDs
- (b) improved interface between WAPDA and PIDs and their program to increase environmental awareness/capability
- (c) programs for adequate operation and maintenance, including funding, staffing, facilities and equipment
- (d) a rational and equitable cost recovery system to sustain the operation and maintenance functions
- (e) planning, authorizing and funding processes which provide decision-makers adequate information to meet their environmental protection responsibilities
- (f) training for national and provincial officials in environmental aspects of water sector planning
- (g) proposal for drainage staff development, including an evaluation of the benefits of a career ladder

WAPDA is lead agency for the EA and is designating a full-time project coordinator. The prime consultant is a local firm, with international subconsultants. WAPDA staff members who had been assembled for a previous Water Sector Investment Study participate in the project, as do planners in provincial Departments of Planning and Development. Institutional components account for 35 of the 222 staff-weeks estimated to prepare the EA.

In such cases, it is particularly important that there be an objective review and approval of the EA by the national environmental body or other outside agency. At the other extreme, such production or development agencies may need to contract for the services of other agencies or consultants for environmental expertise and regulation.

17. The Bank has found that establishing environmental units with the resources and skills to conduct and/or review and implement the findings of EAs within the line agencies that oversee or execute environmentally significant projects works effectively in certain cases. Consultants are normally employed to carry out the EA work. In countries where the capacity of the implementing agencies is limited, the consultants may actually do more than that, serving in effect as environmental advisors.

18. In large projects, environmental units are necessary at the project level to monitor impacts and implementation of mitigation measures. Project units typically need the expertise to deal with physical, biological, and social impacts. This implies a minimum staff of three specialists—e.g., a chemist or geologist, a biologist, and a sociologist or anthropologist—plus a manager. More staff may be needed in any of the three divisions, depending on the size and characteristics of the project.

Enforcement Agencies and Processes

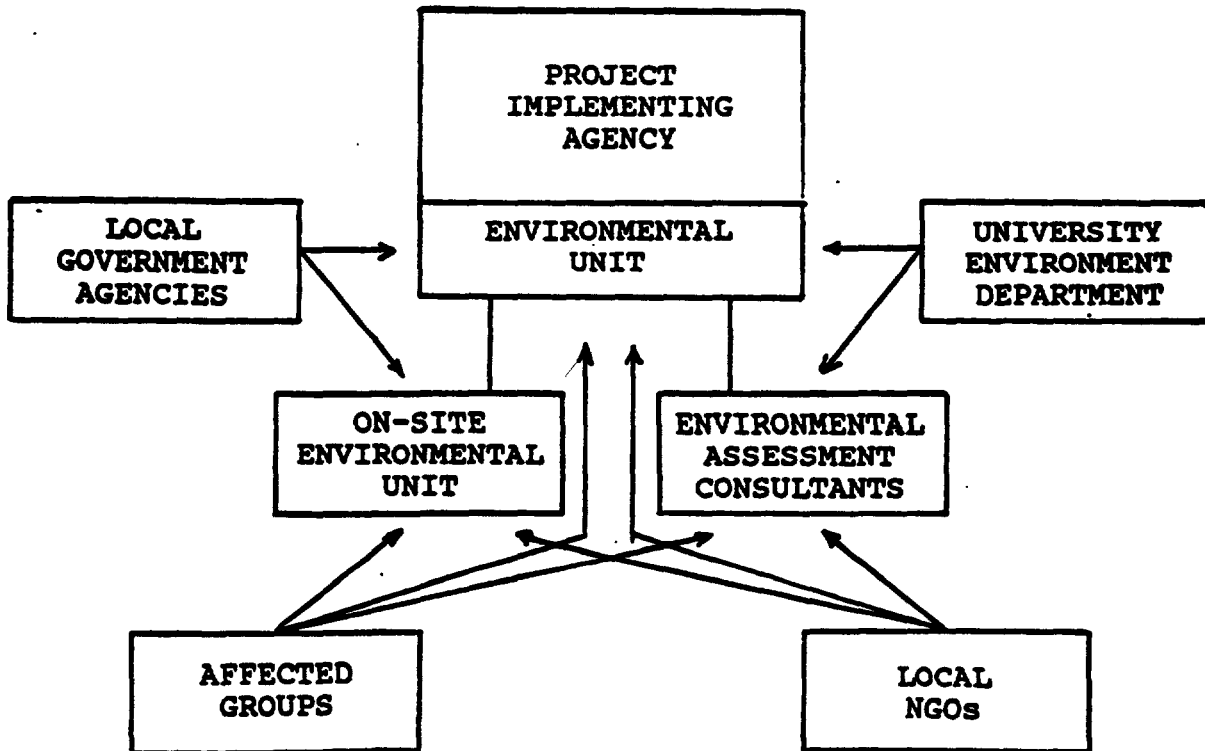
19. There must be institutional capability to monitor compliance and, where enforcement action is needed, to carry it out (see Figure 5.2). Where there is a national environmental organization, it may have regulatory and enforcement powers, which it may exercise directly or through regional offices. Alternatively, enforcement authority may be delegated to state, provincial, or municipal agencies. The main types of regulatory units are national environmental protection agencies, pollution control boards, health departments, local and regional environmental units, government prosecutors' offices, municipal and marine police, coast guard, and a multitude of national, state and local agencies that manage wastes, establish zoning and building codes, review development applications, issue permits and licenses, and inspect projects. Funding agencies (including the Bank) have the option of withholding disbursements or cancelling loans or credits if an executing agency does not adhere to requirements. It is important to note that the responsibility for enforcement of centralized decisions involving uses of particular natural resources may rest with local government, which therefore must not be neglected in institutional strengthening.

20. The courts may play a role in effecting compliance by efficiently enforcing environmental laws, but many court systems are severely overworked, with such large case backlogs that they are unable to respond to environmental offenses in a timely fashion. Moreover, many judges do not understand existing environmental laws and may be lax in enforcement.

ANALYZING INSTITUTIONAL CAPABILITIES

21. Experience with Bank projects that include institutional strengthening has shown the importance of adequate analysis of the existing institutional structure. This is true whether the institutional component has had a short-term focus, emphasizing implementation of a single project, or has been oriented toward longer-term sustainability, addressing more complex, sector-wide or intersectoral issues (see Paul 1989a and 1990). Both types are relevant within the context of EA: institutional strengthening components can range from development of EA preparation capability for one project to development of environmental review and approval and monitoring capacity for projects nationwide. The Bank may also support broader institutional initiatives, involving strengthening of sectoral or national environmental policy and organization.

Figure 5.2. Environmental Institutions in Typical Project Organizational Structures



22. There is no set methodology for assessing institutional capacity. Situations vary widely from one country to the next, defying any "cookbook" approach. TMs will have to rely on experience—their own or that of specialists, especially local experts. The Sourcebook can offer general principles derived from the history of Bank work in institutional strengthening.

Common Institutional Problems

23. The institutional weaknesses that can impair the effectiveness of environmental management in general and environmental assessment in particular may be divided into five broad categories. They are described below as a guide to TMs in planning for institutional analysis. Annex 5-1 supplements the discussion with lists of the typical problems that have been encountered in each area; these may be helpful to TMs in preparing for assessments of institutional capacity for EA and environmental management.

Human Resources

24. The most common institutional problems in any environmental organization stem from shortages of qualified personnel and/or deficiencies in the management of the personnel available. The causes are frequently found to be some combination of lack of managerial capacity, low salaries, low job status, lack of strong leadership and inadequate resources for education and training.

Organizational Structure

25. The most obvious structural shortcomings affecting EA are the absence of the unit(s) needed to perform one or more key functions, such as EA review, technical supervision, monitoring or regulation, and the fragmentation of responsibility for key functions among many units without an effective mechanism to coordinate them. Other common weaknesses stem from structures that do not integrate environmental considerations into development planning, especially when intersectoral issues are involved.

Environmental Policy, Laws and Regulations

26. Common problems with legal instruments include the absence of (or lack of commitment to) a clear national policy, lack of up-to-date laws on environmental protection and legal authority for EA and other environmental management procedures, lack of implementing regulations, and inadequate or inconsistent laws or rules. Examples of the last category are incentive structures inconsistent with environmental laws and sanctions that are inadequate to promote compliance with environmental requirements.

EA and Environmental Management Procedures

27. It is frequently the case that national procedures for EA preparation and review have not been defined. Even where the necessary institutions exist, there may be needs to strengthen the decision-making processes whereby programs and procedures are identified, assigned priority, and implemented to get results. Often monitoring programs, if any, have not provided adequate baseline data for EA work and environment-related decisions. Successful interagency coordination, without which many environmental issues cannot be resolved, is difficult to achieve in the absence of established procedures.

Many projects that result in adverse environmental impacts in spite of proper planning and design, do so because of weak or nonexistent programs essential to sound implementation—monitoring and supervision, operation and maintenance, and community involvement are the ones most frequently cited in this regard.

Financial Issues

28. Financial factors may be the basis for many of the human resource, organizational structure and procedural weaknesses listed. Funding for the EA process and for follow-up functions (supervision, implementation of mitigation plans, monitoring, measurement of impacts, feedback) may be inadequate, either because the environment has been given low priority in economic planning and budget preparation or because the available resources are not being managed effectively. Poor project performance many times can be traced to insufficient provision for operating and maintenance costs. In the case of public infrastructure and service projects, unreliable or ineffective cost recovery systems may be at fault.

Inventory of Institutions

29. Any analysis of institutional capacity for EA in the context of a specific project should begin with a "map" of the organizational structure involved (Paul 1990). The breadth and depth of this analysis depend on the environmental aspects of the project. In any case, the inventory is likely to include organizations at more than one level of government, as well as the private entities and NGOs that may be affected or involved.

30. The inventory should include all institutions responsible for EA or EA implementation in the project concerned. The basic information needed for each is:

- range of responsibilities or area of cognizance (health, natural resources, pollution control, etc.)
- principal functions (advisory, coordination, policy-making, resource management, regulatory, operating, EA, etc.)
- legal authority for existence and functions
- organizational structure
- capacity to carry out functions—staffing and management, facilities and equipment, funding, etc.

Much of this information may already exist, collected during previous work in the country and sector, or assimilated by staff with experience in the country.

Conceptual Framework for Analysis

31. The analysis should yield an evaluation of the strengths and weaknesses of the institutional structure, specifically regarding its capability to carry out recommendations from the EA. The range of typical institutional problems is wide, and the questions that can be asked are correspondingly varied. Fundamental questions include:

- **What EA procedures apply to the organization(s) identified? Are there guidelines to make them operational? Are they being carried out?**
- **How is environmental information assembled and analyzed, and by whom?**
- **How is the information used in selecting, planning, designing and executing projects? Who are the actors in these processes?**
- **When intersectoral issues arise, how are they resolved? Are the mechanisms for resolution formal or informal?**
- **What are the procedures for monitoring, evaluating and reporting on project impacts during construction? During operation?**
- **How clearly are responsibilities and authorities defined? Is each agency's authority commensurate with its responsibility?**
- **What are the formal and informal lines of communication among the involved organizations?**
- **Is there evidence of political and managerial commitment (adequate funding and other resources, leadership, etc.) to accomplish desired objectives?**

32. It is important to provide a framework so that the analysis is not haphazard but systematic (Paul 1990). Usually a checklist or an interview form showing the basic items on which responses are needed and providing room for additional items will be sufficient for a specific project. Paul (1989b) offers a more rigorous model of a framework that may be useful in situations where extensive institutional analysis is a major project component.

Methods of Institutional Analysis

33. There are three general approaches that are effective in analyzing institutions – survey methods, structure-analytical methods, and process methods. More than one may be applied in a single project (Paul 1989b).

34. Survey methods involve quantitative or qualitative data collection and are useful for assessing institutional needs that can be measured – staffing, funding, water treatment chemical supplies, etc. They are applicable to existing organizational structures and especially helpful where there are numerous units.

35. Structured-analytical methods are suitable for institutional issues that can be rather narrowly defined. They utilize concepts of structure and function that are widely accepted in comparable situations as a basis for analysis of the practices and procedures of the institutions being examined. Consultants are usually employed to carry out the analysis. These methods are likely to be well-suited to EA work on specific projects.

36. Process methods are advisable when issues are ambiguous or complex, and when the perceptions of involved individuals are essential. The "process" is a joint one, in which members of the institutions themselves (and often other stakeholders, such as consumers of the institutions' services) participate jointly with the project designers and are encouraged to offer their views as contributions to the understanding of the issues. The act of participating in identification of issues and problems, and the shared understanding that may result, can facilitate acceptance of change, or even build a constituency for it. If senior managers are involved, process methods may also elicit commitment of leadership to institutional strengthening.

RECOMMENDATIONS FOR STRENGTHENING ENVIRONMENTAL CAPABILITIES

37. The TM should identify and evaluate needs and opportunities for institutional strengthening that may arise in the EA process. Possibilities are manifold, and the approach to any particular situation is likely to be specific to country, sector, and type of loan. Nevertheless, there are some useful principles and typical activities.

Guidelines for Designing Implementable Solutions

38. Human resources are often the most critical element; they need to be developed and retained through education, training and opportunities for professional growth; support in the form of equipment and information; and compensation by means of adequate salaries, incentives, and career paths.

39. Existing organizational structure and procedures are the logical starting point for institutional strengthening. It is often tempting to create new agencies to conduct EA and oversee environmental management, but it will almost always be more difficult to implement such dramatic changes. Moreover, it is often the case that existing organizations are already able to conduct EA, perhaps with some modifications and additional resources. Existing laws and regulations may provide adequate authority to begin with; they may be strengthened gradually as needed or improved quickly through administrative orders or sub-sidiary legislation. The analytical work discussed above is therefore especially critical, to ensure that the existing capabilities are fully considered in the design of institutional strengthening components (see Table 5.3).

40. It is desirable to design organizational and procedural changes in concert with country officials and representatives of affected agencies. Their participation provides the benefit of local knowledge and may facilitate acceptance of change and commitment by leadership.

41. If new laws are needed, this may be an area for policy-based lending or dialogue.

42. When dramatic or complex organizational changes are necessary, it is preferable to implement them incrementally, allowing personnel and systems to assimilate the impacts of change gradually and providing time for funding, staffing and training so that the new functions begin as smoothly as possible (Paul 1989b).

Table 5.3. Institutional Strengthening in Mauritius

In 1988 the Bank sent a team to assist the Mauritian Government in preparing a National Environmental Action Plan (NEAP). The result was a report entitled "Economic Development with Environmental Management: Strategies for Mauritius." At the same time, the Government started an information and education campaign which led to intense public debate on the environment and quality of life.

The study's findings were incorporated into the NEAP, which was then endorsed by the Cabinet. Implementation began with the creation of a free-standing National Environment Commission (NEC), as well as an Environmental Protection Department (EPD) within the Ministry of Housing, Lands and the Environment. Responding to popular demand for environmental action, the Government organized an international conference in September 1988, with help from the Bank and UNDP. The participants discussed key environmental issues in Mauritius and assessed the technical soundness of the NEAP. Following the seminar, Government officials and a Bank team prepared an Environmental Investment Program (EIP), which includes a comprehensive list of environmental projects to implement the NEAP.

The NEAP and EIP formed the basis for discussions at a donors' meeting organized by the Government in Paris in 1989. The estimated cost of the EIP is US\$ 109 million, of which donors and international organizations pledged approximately US\$ 85 million. The Mauritian Government will provide the rest.

Since the Paris meeting, the Government has begun staffing the EPD and has recruited expatriate technical advisors under a UNDP technical assistance project executed by the Bank. A number of measures to protect the environment were announced, and a comprehensive legal framework was drafted. In June 1990, the Government approved a white paper on a National Environmental Policy. A project consisting of priority components of the EIP that are critical to implementation of other components and that are not being funded by other donors was identified for Bank funding. At the Government's request, the Bank has been assisting in donor coordination to speed implementation of the EIP.

43. Avoid overloading an organization (or a project) with so many goals, or such ambitious ones, that it cannot realistically achieve them. Success in achieving a part of the overall objective reinforces further progress, while failure in the attempt to reach the ultimate target all at once leads to frustration and disillusionment.

44. Emphasize the sustainability of institutional components, so that measures taken to strengthen local capabilities will endure. This implies paying attention to political and management commitment, reliable and predictable sources of funding for operation and maintenance, and provisions for support services.

45. Government agencies have limited budgets and may have ceilings on the sizes of their staffs. Retraining current employees may be the only way to introduce or augment environmental capability.

46. When consultants are needed, involve local experts as much as possible, in association with international consultants where appropriate. This provides the benefits of local knowledge, supports the strengthening of country capabilities in the private or academic sectors, and constitutes on-the-job training for the individuals employed.

47. Review of Bank projects with institutional strengthening components has shown that success is directly related to the degree of supervision (Paul 1989 and 1990). It is important that adequate resources be allocated to supervision of the institutional components, with special attention to:

- maintaining continuity of Bank personnel assigned;
- conducting periodic meetings with participants to review progress, adjust and fine-tune schedules, identify new problems and formulate solutions; and
- requiring evidence of real commitment by the borrower and government, in terms of leadership, staffing, and allocation of funds and other resources.

48. Project design should provide for flexibility in implementation. Design of institutional components is a process-oriented task, and there must be flexibility to adapt to contingencies (Paul 1989).

Recommendations for Strengthening the Environmental Assessment Process

49. The actual preparation of an EA is ordinarily undertaken by consultants, in accordance with TORs prepared by the borrower and reviewed by the Bank. The TM and the Bank EA specialist should ensure that the implementing agency has the capacity to oversee the consultant's work, to review the EA and to follow-up on its recommendations (see Table 5.4). For Category A projects, an environmental unit is normally needed at the project site (and is highly recommended by the Bank) to carry out the monitoring and supervision required for follow-up. It is the TM's responsibility to ensure that such units are adequately funded, staffed and equipped, as part of the project if necessary.

50. Ideally, local consultants should conduct the EA, using international experts only to meet special needs. However, experienced international consultants may be needed initially to manage EAs in countries where the capability is not yet well developed. To help develop that capability, TMs should ensure that local experts are included in the EA team, not only to provide specialized knowledge but also to benefit from on-the-job training in EA preparation.

51. Where multiple projects are anticipated in a sector or region, or where the project is an increment of a larger one, such as a segment of a highway or one of several wastewater treatment plants, the TM and/or EA specialist should explore options for strengthening local capacity to undertake the EAs and implement their findings. One option to be evaluated is the creation of an environmental unit with EA capability within the implementing agency.

52. Regardless of the option chosen, the TM should ensure that the institution responsible for implementing the project has personnel assigned during the EA and design phases to work on the preparation, review and application of environmental documentation. Otherwise, they will miss the opportunity any project provides for invaluable on-the-job training.

Table 5.4. Review of Environmental Assessment Procedures in India

India has environmental legislation and environmental management procedures at both national and state levels. The adoption of the EA OD and preparation of the Sourcebook provided useful opportunities to identify differences between Bank and Indian procedures and to further explore those areas where Indian officials themselves have felt the need for improvement.

In an initial meeting between Bank staff and Indian officials in late 1989, three useful areas for investigation were identified:

- (a) a portfolio review of planned projects to ensure that the Bank's standards for EA preparation and review could be met by following Indian procedures
- (b) a sector-by-sector review of key environmental issues and the relevant Bank and Indian guidelines
- (c) identification of recurrent issues in the EA process and discussion of the means to address them

Follow-up discussions are still in their early stages, but a number of useful steps have already been taken. The portfolio review indicated a very elaborate set of national and state guidelines and legislation, of which the Bank was only superficially aware. To address this, a study has been commissioned which compares Indian requirements with Bank guidelines.

Preliminary sector reviews revealed that strong guidelines had been promulgated for some sectors, such as mining and thermal power generation, but that less attention had been devoted to sectors which include some of the Bank's largest lending operations, irrigation in particular. An overview of the environmental and sociological concerns in irrigation development has since been carried out.

Finally, senior officials in the Ministry of Environment indicated that they themselves were concerned about the quality of consultants carrying out EA and about the standards and guidelines for EA review. Consultant training will be included in training programs supported by the Bank. Standards and guidelines are the subject of continuing discussion.

53. In establishing or strengthening in-house environmental units at the project, implementing agency or ministry, two factors deserve special attention. First, the units must be empowered not only to carry out EA work but also to use EA findings to influence the design and implementation of projects. Second, there is a tendency for such units to become isolated from other agencies involved in the development process; lines of communication and operating procedures should reinforce integration.

54. A primary objective of the Bank's EA process is integration of EA with project planning, design and implementation, and other related functions:

- Institutional arrangements that promote information exchange across sectoral and agency boundaries are desirable.
- Provisions for feedback from EA to project design and to planning for future projects are essential.
- Coordination with local and state permit-issuing agencies is especially important: permit application procedures may substitute for some EA components, and issuance of some permits may depend on completion of an EA.

55. Where appropriate, direct NGO involvement in EA is encouraged by the Bank. NGOs can be effective in providing local information, managing or assisting in the preparation of assessments, and monitoring aspects of EA implementation.

56. Emphasize the use of environmental assessments to identify institutional requirements for monitoring and management during project implementation. Findings of the assessment regarding (a) staffing, training and equipment needs of operating and oversight agencies and (b) required technical, financial and administrative support for operation and maintenance should be used in designing the project.

57. Note that certain training needs are likely to become obvious early in the EA process. In particular, the need for trained personnel to staff environmental units at the project site and to manage or monitor environment-related aspects of project implementation should become obvious at the time of scoping. The project should provide for timely training, including advanced degrees for professionals, in order to have those staff members available when construction begins.

58. It may be helpful to provide EA training courses for local officials and consultants. These should cover EA methods in general and the requirements of the EA OD in particular.

59. Consider the needs of local governments. EA and project implementation and operation may impose burdens directly or indirectly that local officials are ill-equipped to assume, yet their roles may be critical to project success. Local governments may be called upon to:

- participate in EA
- participate in project planning and design
- issue required permits
- monitor construction activities and impacts
- implement certain mitigation measures
- monitor project operation after construction
- operate public works constructed as part of the project

They may also have responsibility for managing indirect impacts of projects, such as:

- control of induced development
- participation in resettlement programs
- satisfaction of higher demand for municipal services

Additional staff, training, equipment and sources of funds may be called for to support local governmental agencies in these areas.

60. The concept of "twinning"—creating a working partnership between two institutions—can be applied to EA and other aspects of environmental management. It provides the opportunity for staff of a developing country institution to participate in the work of a similar organization, thus exchanging not only skills but also management and organizational experience. It is also more flexible than technical assistance by consultants, in that it creates a framework for solving newly-arising problems that may not have been envisioned when a technical assistance (TA) component was designed. (See Cooper 1984 for more details on Bank experience with twinning.)

Recommendations for National and Sectoral Levels

61. Strengthening of the existing legal framework may be necessary to provide authority for EA preparation and implementation of EA findings. Certain national agencies may need to be established or strengthened. In cases where the needs are limited, precisely known, and related to projects, a specific project can serve as a vehicle for such strengthening. In other cases involving needs for more extensive institutional changes, a project EA may not be an appropriate vehicle. Policy-based lending and dialogue at the national or sectoral level, technical assistance projects for institutional strengthening at the national level, and country environmental action plans may serve the purpose better. Free-standing environmental projects can also be excellent vehicles for strengthening capacity at all levels of government (see Table 5.5). It is important that any EA findings regarding needs for institutional strengthening beyond the limits of the project be brought to the attention of Bank staff working on country and sectoral issues and strategies so that they can be incorporated in appropriate lending and credit operations.

62. National policies, laws, sanctions and incentives should be consistent. A situation in which there are strong incentives for industrial expansion, inadequate laws to conserve sensitive natural areas, and weak penalties for failure to implement EA recommendations or control pollution is one in which it will be difficult to effect compliance with environmental policy and standards.

63. Ensure that the institutions responsible for review and monitoring of projects have adequate resources to perform their functions and procedures to communicate their findings to decision-makers.

64. Assist with clarification or redistribution of environmental assessment and management responsibilities and authorities to eliminate vertical and horizontal fragmentation and redundancy.

Table 5.5. Poland: Environmental Management Project

Pollution from the industrial and energy sectors is severe in Poland. The fundamental cause is institutional: fines are lower than control costs; there are no strong incentives for municipalities and industry to decrease pollution; and regulatory agencies have limited authority, a weak monitoring system, and poor laboratory equipment. This project will assist Poland in improving its environmental capacity through technical assistance, training, twinning, case studies and model projects in the following areas:

- (a) programming/budgeting in Ministry of Environmental Protection, Natural Resources and Forestry (MOE)
- (b) development of a country-wide monitoring strategy
- (c) economic incentives and institutional arrangements for environmentally sound resource use decision-making
- (d) preparation of environmental regulations
- (e) training for government, industry, and consultants in industrial pollution management
- (f) regional air quality management
- (g) water resources management on a basin-wide scale

Responsibility for project implementation rests with MOE, which has created a Project Implementation Unit. An inter-ministerial Project Steering Committee with local government representatives advises MOE. Project components at the field level are managed by new Local Implementation Units, except for the water resources component which is overseen by the Water Management Council for the Upper Vistula River Basin. The implementation units are expected to continue operation after project completion. To reinforce this, their funds are obtained from regular budgets.

This type of project requires a high level of supervision, especially at the outset, to ensure that objectives and implementation arrangements are clearly understood. The Bank has prepared a supervision plan, agreed to by the borrower, which shows the schedule for Bank supervisory inputs, the specialties required for technical review, the project elements requiring special attention from the Bank during supervision, and the monitoring, reporting and other supervisory responsibilities of the government of Poland.

65. Promote development of sectoral guidelines for environmental assessments. The EA process may be made more efficient and effective through the use of guidelines that are specific to both the kinds of projects the sectoral agencies carry out, support or oversee, and to the issues that are commonly encountered in them. The guidelines should be reviewed by the national agency responsible for EA policy and procedure. They may include:

- **baseline data collection requirements (parameters, frequency, duration, analytical techniques)**
- **special studies normally required (e.g., air emission dispersion model, water quality model, traffic generation projections)**
- **ecosystem types and sociocultural elements warranting special emphasis because of particular sensitivity to projects**
- **required or recommended mitigation measures**
- **monitoring and reporting requirements**

66. Establish environmental education programs at all academic levels. It is clear in both developed and developing countries that it will be difficult to establish sustainable patterns of resource use as long as the general population is unaware of the opportunities and limitations of their ecosystems. This awareness is best started in elementary and secondary schools and through community outreach programs. In addition, it may often be necessary to strengthen curricula in universities and technical institutes to train professionals and technicians in environmental fields. In a given project, two or three academic institutions might be selected for strengthening in the areas of ecology, environmental science, environmental engineering and management. For Category A projects, the training component should also include funding for advanced degrees for a significant number of professionals in environment-related fields, to further strengthen project, sector and country capacity, as appropriate.

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ANNEX 5-1**Common Institutional Problems****Human Resources**

- limited facilities and resources for education and training of professional and technical personnel
- low status accorded to employment in certain positions (e.g., wastewater treatment plants, local government)
- inadequate salary scales, benefits and incentives
- lack of career paths for technical and professional staff
- lack of support in terms of equipment, technical information, and continuing education
- civil service hiring restrictions included in economic reform programs
- inadequate operating budgets
- informal processes that allow circumvention of formal requirements in EA and development decision-making
- "hands off" public administrators, lacking in local knowledge
- lack of commitment to environmental laws and policies
- weak leadership in institutions, caused by lack of autonomy and accountability

Environmental Policy, Laws, and Regulations

- absence of environmental concerns in national policy formulation
- lack of clear environmental policies and/or commitment to them
- lack of legal authority for EA as part of resource development decision-making
- weak or nonexistent environmental laws regarding resource use, resource protection, environmental quality, pollutant discharge, waste disposal, facility siting, occupational safety and health
- lack of legal authority for community involvement in development decisions
- absence of regulations to implement the laws that exist
- unrealistic regulations that are unenforceable
- weak enforcement of laws and regulations
- lack of incentives for compliance
- existence of legal and financial disincentives for sustainable use of natural resources
- local regulatory agencies unable to enforce compliance by large, government-owned industrial operations

Organizational Structure

- lack of entities to perform one or more key functions
- vertical or horizontal fragmentation of environmental responsibility and authority
- environmental agency(ies) isolated, not integrated into economic development planning and decision-making

- national environmental agency limited in authority to influence resource development decisions by individual line agencies or to resolve conflicts among them
- structure not conducive to intersectoral coordination
- no agency to perform objective review of EA
- implementing agencies without EA capabilities
- implementing agencies not well-staffed for operation, maintenance and monitoring over life of project
- inadequate provision for collection, analysis and utilization of monitoring data
- local governments not prepared or equipped to cope with burdens imposed directly or indirectly by development projects
- centralized decision-making and political interference restrict authority of regional and local agency managers

Environmental Assessment and Environmental Management Procedures

- lack of procedures for project screening, EA preparation and review
- lack of effective monitoring programs to provide baseline data for EA
- lack of national and international information exchange
- low public confidence in EA process and development planning process
- lack of interagency coordination in project planning, EA, and project implementation
- no procedure to identify and resolve intersectoral issues or pursue integrated planning across sectors or within regions
- weak follow-up or supervision of projects, especially mitigating measures, during implementation and subsequent operation
- no feedback of results of monitoring and supervision to agencies responsible for taking remedial action or to those who could use the information to improve future projects
- failure of environmental projects or project components because of inadequate operation and maintenance
- deficient planning processes
- inconsistent enforcement procedures
- no procedures to take into account in project planning and design the needs of or impacts on affected local governments
- no procedures for involvement of affected groups and NGOs
- procurement processes insufficient to meet needs for spare parts, equipment, supplies to sustain environmental management components
- no comprehensive environmental education programs

Financial Issues

- lack of funding for the EA process and for follow-up functions (supervision, monitoring, measurement of impacts, feedback)
- environment not given priority in economic planning and budgets
- unreliable or ineffective cost recovery systems for public infrastructure and service projects
- inadequate provision for project operating and maintenance costs in planning and budgeting processes

CHAPTER 6

SECTOR AND FINANCIAL INTERMEDIARY LENDING AND ENVIRONMENTAL REVIEW

1. Operational Directive 4.00, Annex A: "Environmental Assessment" (the EA OD) states the purpose of environmental assessment: "to ensure that the development options under consideration are environmentally sound and sustainable, and that any environmental consequences are recognized early in the project cycle and taken into account in project design" (para 3). Later on, in paragraph 14, the directive's requirements are applied to sector investment loans and loans through financial intermediaries as well; it carries a brief statement of special options for these loans. This chapter will explore those considerations and options in depth.

2. For convenience, key terms to be used in this discussion (and previously defined in Chapter 1) will be repeated here. *Environmental review* will be used to indicate the complete procedure for screening, evaluating and supervising projects and sectoral activities from the standpoint of environmental soundness. *Environmental assessment* (EA) will indicate a specific study, a component of the environmental review process. An *environmental assessment report* is the document that is produced by an EA.

3. The trend in Bank lending is toward greater use of financial intermediary (FI) lending and toward more onlending independence for the intermediary; however, FI lending presents some special considerations to environmental review. At identification, the TM often knows little about subprojects other than perhaps their sector. Subproject details may not be available even at appraisal. Funds are often onlent in small amounts and not always for specific projects; intermediate credit is commonly used, with other funds, to support expansion or continuing operation of existing enterprises. The TM and other Bank staff usually have little or no contact with the ultimate borrowers. Thus the TM may be able to screen the loan only on the basis of assumptions about the types of subloans likely to be made by the FI. Therefore, while screening of individual subprojects will normally be necessary and additional environmental study may be required, these tasks are defined by the EA OD, in paragraph 14, as responsibilities of the "project implementing institutions."

4. Implementing institutions, themselves, are a diverse group. Intermediaries include public and privately-owned institutions: central banks, sectoral credit agencies, commercial banks, development finance corporations, rural credit cooperatives and nongovernmental organizations (NGOs). Ultimate borrowers include municipalities, cooperatives, government-owned industrial and agricultural operations, NGOs, and public and private ventures. Their capabilities and interests regarding the environment range from extensive to nonexistent, and they operate in contexts of environmental policy and regulation which vary widely from country to country, and sector to sector.

5. To provide a basis for ensuring that Bank participation in FI operations results in projects that are environmentally sound, this chapter will cover the following issues:

- special considerations for screening financial intermediary loans (FILs);
- institutional responsibility for environmental review;
- guidelines for appraising institutional capacity to meet EA OD objectives for FIs;
- options available for meeting EA OD requirements;
- options for strengthening institutional capacity and/or national policy; and
- options for financing the environmental review process.

6. Annex 6-1 contains examples of approaches recently applied in Bank projects. Table 6.1 diagrams the environmental review components in FI credit operations and options for consideration by the TM.

Screening of Loans to Financial Intermediaries

Screening Criteria

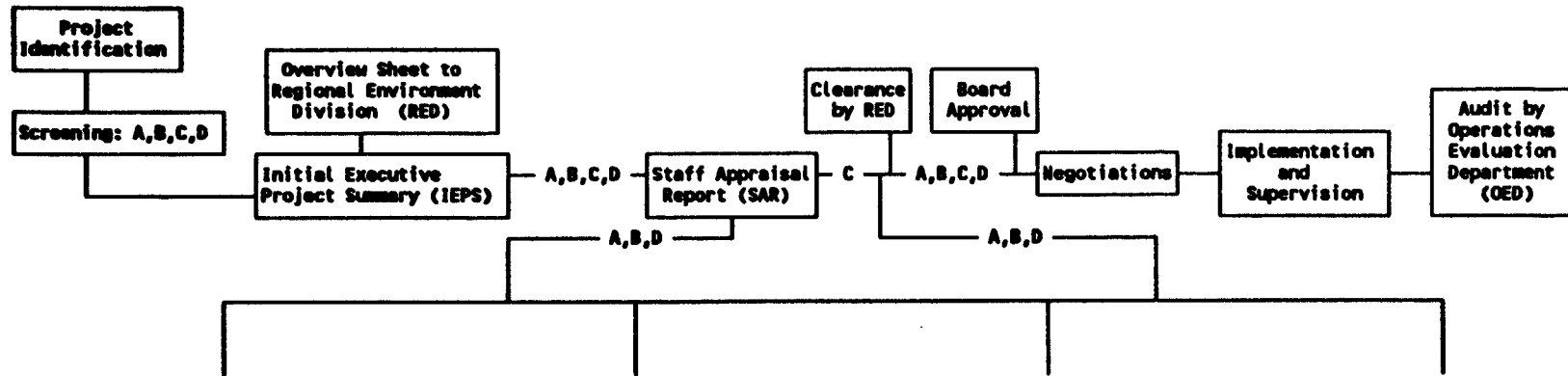
7. The TM will screen FILs loans at identification and categorize them as A, B, C or D based on available information about the sector involved and/or the range of subprojects that could be financed. (See EA OD provided in Annex 1-1 for definitions and examples of categories.) Where there is complete uncertainty, it is sensible to assign the loan to Category B. This will give participants flexibility in reviewing a variety of subprojects and keeping the level of environmental analysis of each subproject in proportion to the significance of potential impacts. The following additional guidelines may be helpful:

- (a) **Category A:** Any subproject that might be supported under the loan that would be categorized as an "A" project if it were financed directly by the Bank (e.g., land clearing that will affect tropical forest, thermal power development). A collection of subprojects whose cumulative impacts warrant an "A", although the individual subprojects are of a scale that would place them in a lower category.
- (b) **Category B:** Any subprojects classified individually as "B" projects, or that have a cumulative impact on a particular resource which would require the environmental treatment appropriate for "B" projects. Subprojects amenable to application of design criteria or performance standards, and will this environmental management approach be effective in the particular regulatory and institutional context.
- (c) **Category C:** Subprojects which normally do not result in significant environmental impact, and the same conclusion can be reached about the cumulative impact of the subprojects.
- (d) **Category D:** Subprojects whose major objective is environmental improvement.

Recommending Type of Environmental Analysis

8. TMs are obliged to identify not only the project category but also the type of environmental analysis recommended. There are a number of possibilities, depending on circumstances.

Table 6.1. Options for Environmental Review in Financial Intermediary Lending



<u>Appraising Institutional Capacity</u>	<u>Options for Project Screening and Review of Environmental Studies/Assessments</u>	<u>Options for Preparing the Environmental Assessments (EA)</u>	<u>Options for Project Monitoring and Evaluation</u>
<ol style="list-style-type: none"> 1. Assess national requirements for environmental reviews and assessments 2. Assess national environmental legislation and record of enforcement 3. Assess regulatory procedures relevant to nos. 1 and 2 above 4. Evaluate capability of the financial intermediary to screen, review, monitor, etc. 5. Determine advisability of developing capability (for no. 4) in intermediary 6. Assess capability of ultimate borrower for environmental review and assessment of subprojects 7. Determine availability in the country of expertise in screening, scoping, etc. 8. Evaluate previous experience with environmental issues in projects in same country or sector 	<ol style="list-style-type: none"> 1. By existing environment unit within financial intermediary 2. By new environmental unit within financial intermediary 3. By government environmental agency or relevant sectoral ministry 4. By consultants 5. By a local, non-governmental institution 6. By special-purpose organization 7. Review by Bank 	<ol style="list-style-type: none"> 1. EA by consultants to ultimate borrower (subprojects) 2. EA by consultants to the financial intermediary 3. EA by government agency 	<ol style="list-style-type: none"> 1. By financial intermediary 2. By consultants or research institutions 3. By nongovernmental organizations 4. By governmental agencies

- (a) **Category A or B Classification Based on Nature of Individual Subproject(s).** In this situation, the EA OD requires the FI to screen subprojects and perform appropriate environmental analyses as described in the directive.
- (b) **Category A or B Classification Based on Estimated Cumulative Impact.** In these cases, the subprojects have limited impacts individually. An efficient approach is to have the FI contract for a regional or sectoral environmental assessment, or a more restricted study, following the guidelines in Chapter 1 on regional and sectoral EAs and alternatives to EA. Bank staff will participate in scoping the study and will review it as a part of project appraisal. The study or assessment will provide an understanding of the major environmental issues and impacts, a set of measures to avoid them or to mitigate those which are unavoidable, and the estimated costs of those measures. The Bank can require the financial intermediary to include measures as conditions for subprojects loans; however, in many cases additional environmental studies of individual subprojects will not be necessary.
- (c) **Category D Classification.** These projects typically do not require special environmental studies. However, depending on the nature of the loan, it may be necessary to establish a review and supervision procedure to ensure that subprojects financed are ones which actually do produce the intended environmental benefits.

Planning Institutional Responsibility for Environmental Review

General Considerations

9. One of the TM's primary tasks during preparation is to formulate arrangements whereby EA OD requirements will be met. Delegation of Bank decision-making and loan administration authority represents one of the main advantages to FIL operations. If procedures for subloan approval are too restrictive or if they require a great deal of Bank involvement, this advantage will be diminished. TMs should therefore seek a balance of independent action and Bank oversight that minimizes the risk of approving subloans for environmentally unsound projects. This will vary with country, sector, loan amount, lending institution, and type of borrower, and thus necessitates a flexible approach.

10. The most desirable context for intermediary lending, from an environmental management perspective, is one in which:

- national policy and legislation require environmental impacts to be taken into account,
- regulations (or inducements) have been enacted to protect the environment,
- competent institutions exist to administer regulations, and
- enforcement is consistent and sufficiently stringent, and incentives are sufficiently attractive, to ensure compliance.

To the extent that a given situation departs from that ideal, environmental management will be more difficult to achieve.

11. When environmental requirements are attached only to Bank loans (and those of other international development agencies), Bank funds will be perceived as more costly than funds with no such conditions attached. This creates two particularly undesirable situations in intermediary lending: intermediaries using Bank funds for a large fraction of their portfolios will be at a competitive disadvantage, and individual intermediaries will be onlending funds both with and without environmental requirements. Borrowers and intermediaries likely will seek other sources of financing, and environmentally unsound projects could be implemented with the unrestricted funds.

12. Each Bank loan should be regarded as an opportunity for incremental improvement in a country's overall management of its resources. The strategy for FI lending, therefore, should include some linkage between demonstrated progress in overall environmental management and continued lending. The long-term objective is to make enough progress that special considerations for environmental review procedures are unnecessary. Until that objective is reached, each loan will require procedures to meet the Bank's environmental objectives.

Considerations for Formulating Institutional Arrangements

13. Various arrangements exist for implementing environmental review -- screening, scoping, developing terms of reference, conducting the assessments, reviewing the results, and monitoring subproject implementation (see paras 23-25). Except in the ideal case where environmental review procedures are established and enforced in the borrowing country, some project-specific arrangements consistent with the EA OD will have to be made. A primary task for the TM during project preparation will be to decide what will be effective and efficient in the particular circumstances, so that subloan processing is not unduly costly or delayed, and acceptable to the Bank and borrower.

14. It is important that there be consistency in the approach to intermediary lending in a particular country. Procedures chosen should be well defined and the guidelines for their application clear, so that each time a similar set of circumstances arises in one country, the environmental review approach applied to the loan will be essentially the same. Clear definition in the loan documents will also facilitate monitoring to evaluate the effectiveness of the selected approach and the extent to which implementing agencies are following it.

15. The level of effort devoted to environmental review should be commensurate with risk. For instance, greater potential risks to the environment are posed by loans for certain sectors or subsectors and by projects of larger size (see descriptions of categories in paras 7-8). Less obvious variables are the overall regulatory climate in the country and the resources and experience of the FIs involved.

16. The approach chosen should be appropriate in the demands it places on participants. It should allow the TM to take advantage of the strengths and missions of the organizations involved.

Guidelines for Appraising Institutional Capacity

17. TMs should consider the following in order to appraise borrowers' capabilities to meet the EA OD requirements:

- the status of national requirements for environmental review;
- the status of national environmental legislation and regulations and the record of their enforcement;
- where applicable, the status of international treaties on the environment signed and the record of compliance;
- the status of national, regional or local regulations and procedures relevant to the project (e.g., facilities siting, pollutant discharge limits, performance standards, construction and operating permits and licenses, building and plumbing codes, erosion controls, monitoring programs, etc.);
- the existence of government agencies with responsibilities for environmental assessment preparation and/or review and for administration of environmental regulations or functions described in (a) through (d), above;
- the effectiveness and consistency of administration of environmental functions and enforcement of environmental laws and regulations;
- the existing capabilities of the FI to screen subprojects, develop TORs for assessments, review assessments and monitor implementation of assessment recommendations;
- the advisability of developing such capacity for the FI (in terms of its primary mission, resources to attract and retain qualified staff, workload for the unit, degree of interest in having such capacity, and existence of alternatives such as qualified consulting firms and agencies of local government);
- the capacity of ultimate borrowers to conduct assessments or other studies;
- the availability elsewhere in the country of expertise in environmental review, e.g., consulting firms, NGOs, academic and research institutions, government agencies;
- the record of Bank experience with environmental issues in projects in same country or sector;
- the record of Bank experience with the implementing institutions; and
- the project sector and likely subproject characteristics (i.e., higher risk categories will require more environmental capability).

18. Findings in these areas will be the basis for recommending environmental responsibilities and guidelines for carrying them out. Issues related to national environmental policy and its management will emerge, as will needs for institutional development and technical assistance.

Options for Strengthening National Policy or Institutions

National Policy

19. The Bank may lend in situations where capacity to deal with environmental concerns is not well developed because of weaknesses in national policy and its execution. In addition to supporting development in sectors for which subloans are to be made and strengthening FIs, the Bank should also work with the government to improve environmental planning overall. However, to overload a single intermediary loan or credit operation with conditions, covering a wide range of concerns, may jeopardize project success. Thus, while a project may contain a component of institutional strengthening, issues of national policy probably should be kept separate as much as possible from those specific to the intermediary and the loan.

20. Progress in policy formulation and institutional strengthening will be gradual and may require technical assistance, and a flexible approach is called for. For example, a multiyear loan commitment, with an emphasis on strengthening institutional and policy areas, could be formulated. In such a case, evidence of overall progress in environmental management in the country could be a condition of continued Bank lending to FIs in the country. Thus, environmentally sound management of resources in all development projects would be addressed, not just those that are Bank financed.

21. In some cases, FI operations may be inappropriate altogether. Bank appraisal may reveal that the climate for environmental management in a given country is and will continue to be such that FIs are unlikely to pay adequate attention to negative impacts in appraising or implementing projects. The Bank must then make a special effort to avoid supporting through FIL projects that have high environmental risk, and to work toward policy change that will make such lending possible.

Institutions

22. The various environmental functions associated with FI lending many times will entail using existing environmental agencies or units, or creating new ones. The Bank can provide guidelines for capabilities and resources such groups should have. It should also be prepared to include technical assistance as a project component, and may make improvement of capability a determinant of the degree of decision-making flexibility to be granted to the FI. In multi-year loans, a mid-term review could be required, with adjustment of loan conditions contingent on demonstration of satisfactory progress (e.g., diminishing Bank involvement in environmental review could be a result).

Options for Meeting Environmental Assessment Operational Directive Requirements

Options for Subproject Screening and Review of Assessments

23. An organization with capacity for screening can probably also undertake review of environmental assessments, hence both functions are grouped here. It is certainly possible to assign these responsibilities separately, and it may be necessary when review is required by a government agency.

- (a) **By government agency.** Where there are well-established environmental regulations and responsible agencies for implementing them, screening and/or review of assessments by those agencies may be required or customary, and probably is the best option for FI lending. Appraisal should include identifying the requirements, determining their consistency with the Bank policy, and developing supporting procedures. If environmental review is not a requirement, the mission can identify this as a national policy issue. If a sectoral ministry other than an environmental agency performs reviews, whether and how it addresses intersectoral issues should be determined. Ideally, certification by a reviewing government agency would be the only proof needed that subprojects are environmentally sound.
- (b) **By existing procedure within FI.** A large FI may have in-house environmental capability to screen projects, identify issues, determine appropriate studies needed, and review results. Bank appraisal of such capability should focus on: procedures, experience, staff and re-

sources relative to workload, access to specialists when needed, and ability to influence decisions – especially decisions of project approval, modifications in design and implementation, and environmental performance conditions in loan contract documents.

- (c) **By new procedure within FI.** The loan may provide the opportunity to develop environmental review capacity. This is sensible for large development financing agencies and may be appropriate for large banks active in development financing. It is inappropriate for most small institutions or for any in which development projects or other activities with environmental implications represent a minor fraction of business. Appraisal should focus on the intermediary's degree of commitment to active involvement in environmental management of development lending and the resources accessible to it for that purpose. The Bank can provide advice on the staffing needs and appropriate procedures.
- (d) **By environmental consultants.** An FI may contract review services by consultants. This is perhaps the most practical option for smaller commercial banks and other purely financial institutions where establishing in-house capability would not be cost-effective. It is also potentially useful as an interim measure while capacity is being developed under one of the preceding alternatives. The Bank should review the consulting agreement. (For a discussion of procuring consultants for EA, see Chapter 1 [paras 59-71].)
- (e) **By local, scientific institution.** An FI might arrange for screening and review by a local university or environmental research institution. This would be much the same as working with a consulting firm. Advantages to such an arrangement are that the institution may be a repository of information on the local environment and may be perceived as responsible and unbiased. Disadvantages include: risk that an academic or research organization may not be sufficiently diversified to deal with the full range of potential environmental issues; incompatibility of academic and research work schedules with the demand for rapid response on subproject proposals; and political alignments of some institutions which may bias findings.
- (f) **By special-purpose organization.** In the case of an apex loan or other situation in which a relatively large number of commercial banks or similar financial entities will be intermediaries, it may be cost-effective for them to cooperate in establishing and funding an organization to review their projects. The Bank should assess whether the organization would have sufficient influence over subproject approval and preparation.
- (g) **By the Bank.** Where capacity of the FI needs strengthening, or where country regulations and institutions may not provide environmental review consistent with the EA OD requirements, or where the Bank simply has not had sufficient experience with a particular intermediary, the Bank may wish to review results of screening and EA reports of projects which pose significant risk to the environment. Criteria for determining which subprojects would require Bank concurrence prior to approval can be developed to suit the circumstances (see Annex 6-2 for sample). The loan agreement might include provisions for gradually reducing Bank involvement.

Options for Conducting EAs

24. TMs may discuss with the FI the following alternatives when deciding who will be responsible for conducting EAs:

- (a) **By ultimate borrower.** This parallels typical arrangements for Bank project lending. The borrower would typically rely on consultants or academic/research institutions to conduct the assessments. Subproject approval would be contingent in part upon submission of the study. Bank and/or national guidelines could be used by the FI in assisting the borrower.
- (b) **By financial intermediary.** The regional/sectoral assessment approach has already been discussed (para 8[b]). It is particularly attractive for multiple, relatively homogeneous subprojects. It offers the possibility of "generic" assessment, leading to development of guidelines or standards for subprojects (including, for example, reliance on local licensing and permitting functions). The FI would use the guidelines in subloan agreements, and subprojects would be exempt from further study provided they were in conformance. Again, consultants or academic/research institutions would be used to carry out the work.
- (c) **By government agencies.** In countries where assessments are routinely conducted by agencies of the central or regional governments, FIs may be able to take advantage of such arrangements, or may be required to do so. Questions which may arise are whether the environmental study process is sufficiently independent of development policy-making to allow for unbiased analysis and conclusions, whether NGO and community involvement would be possible, and whether adequate resources are available to the agency to sustain the workload which would be produced by the loan.

Options for Subproject Monitoring and Evaluation

25. Similar alternatives are available for monitoring subprojects during operation and evaluating their adherence to environmental considerations.

- (a) **By government agencies.** Environmental and sectoral ministries may have monitoring responsibilities, especially with regard to operation of subprojects. They should be taken into account in developing monitoring procedures in order to avoid duplication. There may be cases where a government agency monitoring program is sufficiently complete that no additional environmental information is required. Again, this is the preferred circumstance as it affects all development in the country, not just Bank lending.
- (b) **By financial intermediary.** When FIs have capability to screen subprojects and review environmental assessments, they also should be able to monitor subprojects for implementation of mitigating measures, guidelines and standards, and other environmental protection features. They could compile information needed by the Bank to evaluate projects after completion, as well. Monitoring and evaluation can be carried out in part through reporting requirements levied on the borrower, but the FI will need trained staff to make periodic inspections of activities in the field.

- (c) **By consultants or research institutions.** Either intermediaries or borrowers can make use of outside consulting assistance in monitoring subprojects, as they would for screening, environmental studies, and reviews.
- (d) **By nongovernmental organizations.** NGOs can be helpful in monitoring certain aspects of project implementation, especially where issues identified by affected communities have resulted in incorporation of special measures in subproject designs or implementation plans. For example, an NGO might monitor and report on progress in resettlement.

Financing Environmental Review and Assessments

26. There are four areas in financial intermediary (FI) lending where cost may be associated with environmental review:

- subproject screening, assessment review and supervision processes;
- environmental assessments or other studies of subprojects;
- institutional strengthening to support the environmental review process for specific intermediary loans; and
- institutional strengthening at the national level.

27. None of these cost categories is extraordinarily large. For instance, a single qualified environmental expert, with a modest amount of consultant support to deal with special issues, can screen at least 50 subprojects per year, develop terms of reference for those requiring further studies, and supervise implementation from an environmental standpoint. Environmental assessments themselves rarely amount to even 1 percent of project capital costs, except in the case of complex projects unlikely to be financed through intermediary lending. Developing review procedures and conducting training programs are not costly items either.

28. Institutional strengthening, such as retraining existing staff or establishing an environmental review unit, can be financed as technical assistance components of loans. Alternatively, environmental trust funds and bilateral donor agencies may make grant monies available for these purposes. Routine operating costs will become the responsibility of the FI or other implementing agency after the technical assistance is complete. Similarly, institutional strengthening at the national level can be supported as technical assistance or public administration training components of project loans. Again, grant funding may also be possible.

29. Although financing EAs is normally the responsibility of the ultimate borrowers, a case can be made for considering regional/sectoral assessments by the FI as project preparation costs, eligible for support under the loan.

Conclusion

30. As stated in the introduction, FI lending and environmental review present situations that can become complex. There is little experience available as reference, so care must be taken to formulate procedures that are unburdensome but effective. Such effort can be expected to yield benefits not only to the specific circumstance of FI lending but to the environmental review process as a whole. FI lending may present an invaluable opportunity for significant progress in the management of a country's resources. It should be expected, however, that as procedures are being developed a flexible approach will be required. Again, the long-term objective is to attain institutional capacity such that special Bank involvement in environmental review of subprojects is no longer necessary.

ANNEX 6-1**Examples of Arrangements for Environmental Reviews in Financial Intermediary Credit Operations****Agricultural Credit**

1. **The Pakistan Agricultural Credit Project (FY90)** provides an example of institutional strengthening in the context of an intermediate credit operation. Bank loan funds of \$148.5 million are to be on-lent by the government of Pakistan to the Agricultural Development Bank of Pakistan and five nationalized commercial banks. These intermediaries will in turn lend for a variety of agricultural improvement purposes, such as farm mechanization, livestock production, and inland fisheries development. Included in the project's implementation provisions are measures to increase environmental awareness:

- developing a training course for credit officers covering safe use of pesticides, pesticides restricted or not recommended, integrated pest management, effects of excessive fertilizer applications, and soil conservation practices;
- establishing linkages to extension services and increasing the emphasis on the environment in their training forums; and
- providing four staff-months of environmental specialist services to design courses and recommend policy measures to intermediaries and the central government.

2. The section of the SAR on agreements and recommendations specifies among the assurances to be sought during negotiations that all participating banks would "establish training courses regarding environmental concerns in lending" and "formalize linkages with the extension service through creation of CECC [Credit Extension Coordinating Committee]."

Industrial Development

3. **The Nepal Financial Institutions Development Project (FY91)** is an example of institution-building and national environmental policy and regulation development within the context of an intermediate credit operation. It is aimed primarily at improving the efficiency of Nepal's financial sector but includes a component for environmental review of industrial projects. It consists (a) an IDA credit of US\$10-15 million to the Government of Nepal, to be on-lent as credit lines to eligible financial institutions, and (b) technical assistance of US\$1-3 million to finance restructuring programs for the government-controlled financial institutions and to support the introduction of environmental impact guidelines for industry. Participating institutions are Nepal Industrial Development Corporation, two state-controlled banks, and two or three commercial banks. The line of credit is to be used to finance private sector investments that meet technical, financial, economic and environmental criteria in the industrial, agro-industrial, and services sectors.

4. As part of project appraisal, a procedure for obtaining environmental clearance within Nepal for proposed subprojects is to be developed. The Government has agreed in principle to go beyond this, by incorporating in the project an environmental component covering the industrial sector as a whole. IDA is considering the option of supporting the creation of a unit in the appropriate ministry to conduct environmental assessments of industrial projects. IDA's support would include assistance in developing and formulating assessment guidelines and staff training in impact assessment and monitoring. All subloans in this project would require prior clearance from the new environmental unit, regardless of size, originating institution, and whether or not they fall within the free limit for IDA approval.

5. The India Cement Industry Restructuring Project (FY91) is an example of a Category A industrial intermediate credit operation in a country in which environmental regulations and institutions are well established. IBRD will loan US\$300 million to the Government of India (GOI). US\$298 million will be relent to Industrial Development Bank of India and Industrial Credit and Investment Corporation of India Limited, which will on-lend for subprojects to modernize the cement industry and associated transport system and expand capacity. US\$2 million will be allocated to the budget of the Office of Development Commissioner for Cement Industry to finance employee training and studies of sectoral policy options and environmental protection and pollution control measures.

6. National pollution control standards exist for the Indian cement industry and are being enforced by the states (although poor control equipment operation and inadequate monitoring systems lead to particulate emission problems at many plants). Cement is also one of the industries for which GOI requires environmental clearance as a condition of project approval. Environmental clearance must be received from state pollution control boards before a Letter of Intent for Industrial License is issued. When construction is completed, the state board must certify that installed pollution control equipment is appropriate and adequate before an Industrial License is granted. Both GOI and state governments may demand comprehensive environmental assessments for quarries and plants.

7. At the time of appraisal, five major subprojects had already been identified. The appraisal mission met with their sponsors and consultants and agreed on environmental design and operating requirements for the plants and quarries (generally consistent with Indian regulations, except for more stringent air emission standards, and with additional measures for noise abatement) and on the scope and schedule for comprehensive environmental impact assessment reports to be prepared for each subproject and reviewed by the Bank.

8. The loan agreement specifies that all subprojects must be equipped to meet Indian environmental protection standards. Completion of satisfactory EAs and receipt of clearance by the concerned state pollution control board and, where applicable, GOI are conditions for subproject approval. For subprojects exceeding US\$20 million, the Bank will review the IDBI/ICICI appraisal report and the EIA, to be prepared according the scope agreed-on during the appraisal mission.

ANNEX 6-2**Example of Criteria for Bank Review
of Subproject Proposals**

The borrower (financial intermediary X) shall not approve Category A subprojects involving the following activities without prior concurrence by the Bank:

- **Manufacture, transportation, storage, use or disposal of hazardous or toxic materials.**
- **Encroachment on wildlands of regional, national or international significance.**
- **Conversion of wetlands or forest tracts of 10 hectares or more to other uses.**
- **Clearing or levelling land areas of 100 hectares or more.**
- **Involuntary resettlement of 50 households or more.**
- **Withdrawals from or discharges to surface waters or groundwater in excess of 5.0 litres per second.**

CHAPTER 7

COMMUNITY INVOLVEMENT AND THE ROLE OF NONGOVERNMENTAL ORGANIZATIONS IN ENVIRONMENTAL ASSESSMENT

WORLD BANK POLICY

1. "The Bank expects the borrower to take the views of affected groups and local NGOs (nongovernmental organizations) fully into account in project design and implementation, and in particular in the preparation of EAs."^{1/} The purpose of taking the views of the affected people into account is to improve project viability. The Bank has found that where such views have been incorporated in the design, the projects are more likely to be successful. The Bank has not found community participation to be an impediment to project execution. On the contrary, projects in which affected people's views have been excluded suffer from more frequent delays and poorer quality.
2. The Environmental Assessment Operational Directive (EA OD) clarifies Bank policy, which for more than a decade has encouraged community participation in Bank-supported projects. Sociological considerations had been added to the Bank's operational manual statement on project design and appraisal in 1984 (OMS 2.20), specifying that when effective project implementation requires the beneficiaries' full commitment, appraisal should verify that they were involved in project identification and preparation. More recently, instructions about participation have been added to guidelines on, for example, cultural property (OD 4.50), rural development (Briscoe and de Ferranti 1988), and monitoring and evaluation (OED 1985).
3. The operational directive on collaboration with nongovernmental organizations also urges Bank staff "as a matter of Bank policy" to develop contacts and operational collaboration with NGOs (OD 10.70). The directive defines NGOs as "private organizations that pursue activities to relieve suffering, promote the interests of the poor, protect the environment, or undertake community development."
4. At identification of EA category A projects, or as soon as the project becomes a category A, borrowers declining to consult local NGOs, to seek the informed views of the affected people, and to release relevant EAs, are not complying with this policy. It seems unlikely, in such cases, that the Bank would accept the invitation to continue with that project. EA requirements should be reviewed with the government in a general way well in advance of any project, and to seek a general agreement with the principles outlined in the EA OD, and in the two "Instructions to Staff" from the Senior Vice President for Operation of 10 April 1990 and 21 November 1990, on Borrower's consultations with affected groups, and the release of EAs to Executive Directors.

^{1/} World Bank's Operational Directive 4.00, Annex A: "Environmental Assessment," October 1989, (para 12).

5. The EA OD's provision for public consultation reflects a larger trend. Many forces are converging to make both governments and development agencies more interested in popular participation. In some countries, the change has been motivated by a shift to democracy. Experience and literature on "people-centered" development are growing and winning respectability and attention. The theme is repeated in statements by the Bank's senior management and emphasized in Bank reports, such as Sub-Saharan Africa: From Crisis to Sustainable Development (1989). Public participation has also emerged as an important theme among U.N. agencies and at meetings of the Development Assistance Committee of the Organization for Economic Cooperation and Development (OECD).

ROLES AND RESPONSIBILITIES

6. This chapter offers practical guidance for all involved in the EA process: Bank staff, especially task managers (TMs), affected people, local NGOs, and members of the EA team. Since borrowing member governments are responsible for EA, and for taking the views of affected groups and local NGOs fully into account, government's EA specialists will find this chapter important. This chapter may be usefully handed out early in the consultation process to government, potentially affected people and NGOs. TMs should ensure that the Bank's requirements are followed, and should be aware of what the EA team is doing. Training courses for EA in general and for community involvement in particular are often essential. These can be arranged through the REDs, Sociology Advisor (AGR), ENV, POPTR or EDI.

7. The Bank's primary responsibility is to appraise project proposals and to supervise project implementation, including the community involvement aspect of EA. However, because EA and its public participation requirements are new and sometimes sensitive, Bank staff should be more active in providing advice than in other aspects of project preparation and implementation. Bank staff also need to be involved in EA to assess its quality and to learn from it. In countries where the government engages consultants to carry out the EA, it is important that the Bank ensures that the short-listed consultants have the knowledge and experience necessary to deal adequately with community involvement requirements. Governments may request the Bank to assist with the preparation of TOR for the EA, and with selection criteria for EA specialists.

8. The Bank relies heavily on the good sense and judgment of the individual TMs and the officials with whom they work to ascertain how best to involve people from different cultures and backgrounds, and from countries with varying degrees of commitment to the full participation of its citizens, in what are often very technical EAs. The Bank and its member governments are gaining experience and developing procedures in this difficult and important subject for which there are few absolutes and little written history. Innovation and flexibility are essential. The next few years will be a learning experience in how best to involve affected communities, in evaluating which approaches work well and which do not. Later editions of this Sourcebook will reflect the results of that experience.

9. The Borrower's primary responsibility in this regard is to arrange for the EA to be carried out as is the case with the feasibility study of which the EA is normally an integral part. Thus, the Borrower draws up TORs, selects the EA team, and provides the means for the team to undertake the EA. The Borrower ensures that national laws, regulations and Bank procedures are followed by the EA team.

Although some parts of a feasibility study can be accelerated if necessary, this is much less so for the social aspects of the EA. Therefore, the social and cultural aspects of the EA should be started as soon as possible. The other two major parts of the EA – physical and biological – are preferably synchronized with the social components. And all three should maintain close collaboration with the feasibility study of which EA is an integral part. The Borrower submits the final EA to the Bank, together with or as part of the feasibility or detailed design study, to enable the Bank to appraise the project.

10. It is essential for the EA team to gain quickly a working knowledge of the area and of the people possibly to be affected. For all projects requiring an EA, the team should know most of the answers to the questions listed in Table 7.1 about the affected community early during preparation. General answers can be sought from the project agency and by on-site observation of the affected area itself, in order to be able to assign the appropriate EA category for the IEPS, and more comprehensively by the EA team as soon as the EA process starts.

THE PUBLIC CONSULTATION PROCESS

Two Levels of Public Consultation

11. Informed public participation in the environmental review process encompasses consultation with those both directly and indirectly involved. In the first case are the groups that would be directly affected by the project, for example fisherfolk downstream from a dam. It is important to remember that the most critical effects may occur some distance from the project itself, that the informed views of the potentially affected communities should be taken into account in the pre-design stages of the project, and that these communities should be involved in the EA.

12. The second group to be involved in public consultation consists of those who, because of their particular concern or expertise, may have relevant information regarding the nature, scope, and particulars of potential environmental effects. Obvious examples are societies of consulting engineers, experts on cultural property, environmental NGOs, or grassroots organizations concerned with environmental quality. Less obvious, but frequently important because of the perspectives they can bring, are educators or human rights, anti-poverty or religious groups.

13. The distinction in the groups cuts across two axes: one is the degree to which a group will be affected by the proposed project; the other is the kind of knowledge the group can bring to the EA. Local and external groups at various points along these axes should be consulted in the EA process. By far the most important point here is that such consultations have to start very early on if they are to be meaningful and in order that such views can influence decisions which will affect their lives. The views of the potentially affected people and the local NGOs should be solicited no later than the start of the scoping process. This information helps the Bank in assigning the project to the appropriate EA category. This means that at least preliminary contacts are best begun before the IEPS is finalized. This is easily accomplished by a reconnaissance of an experienced social scientist during the identification mission.

Table 7.1. General Social and Cultural Aspects

- (a) Who are the people who might be affected by the project? (Number and size of families, dwellings and villages.)
- (b) What are the broad social group structures (communities, classes, castes, tribes, etc.) through which the people organize?
- (c) What are the authority structures of the groups? Is the authority based on kinship, seniority, consensus, or democratic voting?
- (d) Which of the groups are responsible for access to or management of environmental resources (e.g., grazing rights, water and fishing rights, forest extraction rights)?
- (e) What is the annual cycle of activities? When and where do groups assemble? How are decisions reached?
- (f) Are there sacred sites or important archaeological or historical sites that might be affected by the project?
- (g) Which of these groups are aware of the proposed project and of any problems that might be associated with it?
- (h) What proportion of the affected community can read? Do they have access to radios, newspapers, or other media? Do they speak the national language?
- (i) What grassroots organizations exist in the areas to be affected by the project?
- (j) What NGOs are already in direct contact with the affected people and what is the nature of their relationship? Have the local NGOs adequate resources to undertake the roles expected of them in the EA process? Are the NGOs strong enough to be effective?
- (k) How negotiable is the project concept (e.g., by how much can the dam site be moved or the dam height lowered, and can the project be cancelled)?

14. In many cases during the identification phase, it is advisable to have some preliminary contacts with affected people. Most work on public participation begins as part of the EA, at the start of preparation, and at the same time the feasibility study begins. The EA lasts about as long as the feasibility study of which it is an integral component. Public participation is usually fostered by the social scientist members of the EA team, although the other two EA disciplines — physical and biological — cooperate fully, as needed. Where social impacts are large in scale or severity or where they are particularly complex, a locally resident social science team may be required at several intervals over the period of project feasibility and preparation studies. Where a few people are affected, a single social

scientist can in most instances reside in the area for a few months total time spread over a year, so studies will encompass the full annual cycle.

Although the bulk of the work is during preparation, there is still a great deal of social input needed during construction, less during operation and thereafter. The affected people and local NGOs and the public at large should participate in monitoring during operation and assist in post hoc evaluation.

A Challenging Task

15. It is rarely easy to "take the views of affected groups...fully into account...." as the Bank enjoins. For example, rural people may be unable to offer informed views about a proposal because of unfamiliarity with the technical terms or processes involved: they may not know what a hydroproject is, much less its implications for them. Therefore, much of the challenge is in developing effective communication in order to apprise people fairly about their role in decisions that will affect them.

16. Ensuring that the EA OD mandate is met requires new expertise in both the Bank and the project agencies. It also requires significant effort and the budgeting necessary within the Bank and project agencies to support it.

17. Consultations with affected people and local NGOs can take several forms and involve different approaches and methods. Suitability will vary with the social and cultural context. Where public officials and ordinary citizens are accustomed to interacting freely and having their statements and opinions challenged and debated, the process of consultation can take place in open public meetings. However, in many of the Bank's member countries, public meetings of this kind are unfamiliar or uncomfortable for both citizens and public officials. In such settings, public meetings may produce counterproductive results, such as passive hostility, or the appearance of unanimity where none exists.

18. Moreover, even in countries with democratic political processes, there may be social groups that are not free to participate in public meetings on sensitive issues. For example, ethnic, religious and racial boundaries may make it difficult, if not impossible, for members of traditionally antagonistic social groups to interact in public. Members of political, racial or religious minorities may be restricted in opportunities to express their views publicly. In some countries, women are powerless and excluded from participation. Indigenous, tribal and lower caste people may lack the necessary language skills and knowledge of the dominant culture to express themselves publicly without feeling shame or guilt. Finally, in some countries, NGOs or local social groups which express opinions that are at odds with those of government officials may arouse suspicions of disloyalty or subversion, sometimes with severe consequences.

19. Informed views of diverse segments of the affected population are critically important to the EA process because different groups use and are familiar with different parts of the environment and will be affected to different degrees by the project. For example, men are usually ignorant of environmental resources women use for income or domestic purposes. The rich are usually ignorant of the environmental resources upon which the poor and powerless depend for their livelihood. Shopkeepers, farmers and traders in contact with indigenous people may appear knowledgeable to an outsider, but only the indigenous people themselves have accurate information about social changes which affect them and the natural resources they use.

20. Where open public meetings are not appropriate, participant-observation study, open-ended interviews with key persons, and structured small-group discussions can be used to obtain the views of affected groups. All these methods generally require an experienced anthropologist or sociologist who speaks the language of the group whose views are sought. Also, each requires investment of several months of field work to ensure that accurate and representative information is gathered throughout a broad area of project impact. Scheduling months for their completion, rather than weeks, is critically important to allow time for the anthropologists or sociologists to establish rapport with different social groups and NGOs who may be initially reticent to share their opinions and knowledge with unfamiliar outsiders. In general, the more sensitive the environmental and social issues in a region or community, the greater the time needed for fieldwork.

21. Social scientists (anthropologists, sociologists, social workers, etc.) from the borrowing country, have a great deal of expertise regarding their own people, languages, and cultures. These professionals should be consulted in their areas of expertise on how best to involve people. In countries where social science may not be sufficiently developed to play this kind of expert role, the EA team may need internationally experienced anthropologists or sociologists with knowledge of the affected cultures. In the unlikely event that neither indigenous nor international expert social scientists can be found, the informed views of the affected people may be impossible to ascertain.

22. Questionnaires can be useful instruments in orienting an EA team to demographic and social variables (Table 7.2). They are less useful for eliciting in-depth views of diverse groups. Questionnaire surveys have most practical use if they are conducted after the interviews with key persons, structured small-group discussions and/or participant-observation studies have elicited how local people define the issues and have identified their general social context.

Consultation at the Community Level

23. A community may be large or small. It could be defined by easily recognized geographical boundaries in either an urban or rural area, or it may encompass scores of villages over a large area. The people of an affected area may be homogeneous, that is, they may speak the same language, be at roughly the same economic level, share the same customs and values and make their living in similar ways. Conversely, they may be highly differentiated in language, culture, occupation and income levels. If the community is far-flung and the people heterogeneous, the consultative process will be particularly demanding.

24. Public consultation is now accepted as an essential part of the EA process in industrial countries, but the EAs performed there provide little guidance for involving local communities in developing countries. The premise of public consultation in most industrial countries is: (a) if the citizens are informed about a project and the opportunity to discuss its environmental implications, those citizens most interested will respond; (b) most citizens have access to newspapers, radio and television and can read and understand notices; and (c) citizens who participate are accustomed to the frank give-and-take of democratic discussions, and do not run major personal or political risk in questioning proposed government actions. In many developing countries, an EA team cannot operate on these premises. Therefore, it cannot function in the reactive, responsive stance suitable to industrial countries, but must take a proactive, initiatory approach to encourage and to promote citizen participation. This means sharing whatever information is available about the project so that informed views can be obtained.

Table 7.2. Checklist on Community Involvement in Environmental Assessment**Basic Information****1. From within Bank.**

- Have you checked Bank sources (Country Officer, Regional Environmental Division, SPRIE) for available information on NGOs and for any history of Bank involvement with them?
- Have you explored with the Resident Mission what information it has and what facts regarding NGOs and the community it may be willing to gather before the start of EA process?

2. From other agencies:

- Have you checked with UNDP Resident Mission?
- Have you checked with other UN and bilateral agencies in country (especially with UNICEF, ILO, and IFAD) that might have contacts with grassroots organizations in affected area?

3. From other sources:

- Have you identified NGOs with knowledge of and experience in the affected area?
- Do you know the environmental NGOs in the country and their technical capacity to assist in the EA process?
- Do you know the present state of government/NGO relations?
- Has a member of the team explored the country's laws on the subject of environment and other public participation?
- Do you know the structure of regional and local government, traditional and tribal structures, the degree of decentralization, and the role of political parties?
- Do you know how the responsibilities of other ministries and agencies impinge on the subject?

Community Consultation

- Do you know if the people of the potentially affected area are aware of the project and of any problems that might be associated with it?
- Is the EA team in contact with selected in-country researchers, social workers, or extension workers who might help the social scientist in the community-level consultation?
- Has the task manager been personally involved in at least some visits with the people of the potentially affected area?
- Are the social scientists on the EA team prepared to live for a period of time in the affected communities?
- Are you confident that the EA team understands relevant social and cultural values of the people?
- Has the participant/observer approach been considered?
- Does whatever approach being used at the community level ensure that the issues foremost in the minds of the people are being articulated and recorded?
- Are you confident that the informed views of affected groups and local NGOs are being taken fully into account?

General Public Consultation

- Do you have enough basic facts for an initial inter-agency meeting?
- Do you know who from outside the government should be invited?
- Has a sociological member of the EA team had one-to-one meetings with key participants before the meeting?
- Has an adept facilitator been chosen?
- Are you satisfied that the facilitator is capable of handling conflict in an open, constructive way?
- Do you find the social science data on the affected people equally reliable?

Follow-up

- Are you satisfied with plans for feedback to the community during the EA process?
- As the EA OD requires, is there a record of people interviewed, invited to all public meetings, and of those who attended?
- For the education of the Bank and for the use of future EA teams, have you recorded your team's experiences for obtaining community involvement and what your team learned from your pioneer work on this new and difficult process?

25. In the urban areas of many Bank member countries, such as India, Thailand, and Eastern Europe, the print and electronic media are important in providing effective information and influencing opinion. Even in rural areas of many developing countries, people have access to radios. The EA team should use whatever media are available. The team and the implementing agency can, in many cases, form working relationships with the media throughout the EA process.

26. Although the extent of consultation should be commensurate with the expected degree of impacts of a project on different communities, it should be initiated no later than the end of the identification phase. For a major infrastructure project, for example, there needs to be intensive consultation with communities which may be affected by resettlement -- particularly how to avoid or minimize the necessity for relocation. The Operational Directive on "Involuntary Resettlement" (OD 4.30, June 1990) specifically reminds TMs that moving the dam or lowering its height may be essential in this regard. After consultation with the affected people, where relocation has been determined to be necessary and is fully justified, their views should also be sought on how to minimize the numbers of people affected, how to carry out the resettlement, and how to prevent, mitigate or compensate for impacts.

27. A primary objective of consultation with a community is to encourage people to air all issues and concerns. To this end, the challenge is to provide means that are congruent with local cultures and customs and that provide safe and comfortable settings for them to voice the issues as they see them. If the sociologists or anthropologists attached to a multi-disciplinary team are expatriates, the team will need members from the country who are very familiar with the people and language of the affected area. In many cultures, women specifically will be needed to talk with the women involved.

28. Selecting team members in this way, who speak the language and are culturally acceptable to the communities is crucial to the project's success. Advice on recruitment can be sought from local staff of development agencies or from NGOs with long experience in the area. The recruits may be researchers from colleges and universities, staff of local NGOs, or social workers or extension workers with ties both to government ministries and to the communities.

29. Exploration at the community level should not be rushed. The TM should be involved at various stages, including the early step when the official and informal leadership of the communities -- all the key figures in the authority structure -- are briefed on the project and invited to participate and express their views (see para 39). The sociological members of the EA team should live in the area while gathering information. Often, this is the only way to achieve reliable consultation.

30. Large meetings are sometimes inappropriate forums for public consultation at the community level. A number of small meetings and some individual interviews could be more useful, although it is important to avoid the appearance of "divide and conquer." All communities have social groups through which they normally organize activities, such as work groups, savings societies, schools or cooperatives, or small enterprise groups. Groups that primarily involve women should be sought out. Religious groups may also provide useful forums. The structure of the small meetings will vary according to country and culture; but in general, new organizational forms with which people are unfamiliar (e.g., committees) should be avoided in preference for existing social groups within which people feel comfortable.

31. A major difficulty in consulting with people who may be affected is the inability of many either to understand how their world can be different from what it is, or to envisage realistically what their real needs might be when the project materializes. Where feasible, graphic illustrations should be used to clarify the issues; scale models of the area showing villages and the project are generally better understood than speeches alone. Videotape can be useful in presenting this sort of information. Posters, illustrated pamphlets and cartoons also have proved effective in literate communities; they can be displayed at schools, religious buildings, shops, clinics, cooperatives and other centers of community activity.

32. Directly involving the public means being responsive to local values. For example, one society may place great value on a sacred or historical site, while another may not; one community may be socially cohesive, while another is not. In these examples, costs and benefits are functions of the social and cultural values of the people affected (Ahmad and Sammy 1988). Clearly, it is important for the EA team to understand relevant social and cultural values. The procedure used to learn the views of the community must be developed within that context in order for the resulting data to reflect them adequately.

33. Involving affected people, especially the poor, often requires additional expenditures. The costs include travel and subsistence for attendance at meetings, translations, expert advice the community needs to help in formulating a response to the proposal, etc. Such costs should be systematically budgeted. The EA team must be sure that issues raised in affected communities are communicated to the other participants in the EA process, including various public agencies and NGOs that may be involved in the larger process of public consultation (para 34-37).

34. As the EA proceeds, the people in the affected area should be kept informed routinely and systematically. Written material must be translated into local languages. Where many are unable to read, oral discussion and visual presentations sessions (often, by the resident social promoters or facilitators) should be used. Throughout the EA process, the project agency should continue seeking views from and providing feedback to the affected community.

35. Should involuntary resettlement be required by the project, the Bank's operational directive on involuntary resettlement (OD 4.30) will apply. Resettlement requires extensive and long-term investment of time and effort by both the Bank and the government. The Bank's Sociological Advisor (AGR) is a major resource in this regard.

36. The answers to the questions listed in Table 7.3 provide basic information useful for both the community-level consultation discussed above and for the broader public consultation in the EA process discussed in Annex 7-1. These questions have to do with the national setting for an EA process.

Table 7.3. Other Basic Facts Needed

- (a) What are the country's national and regional laws regarding the environment and public participation? From both a legal and public administration viewpoint, how will current government organization and legislative authority affect the EA and its public participation aspects?
- (b) How decentralized is the country's public administration and how will this affect the EA process?
- (c) What is the structure of regional and local governments?
- (d) How do government ministries communicate with villagers in rural areas and with the urban poor?
- (e) How are the interests of traditional social structures (e.g., tribal) communicated and taken into account in the administration of programs?
- (f) What role do political parties play?
- (g) How effective are the print and electronic media likely to be in informing the public about the project?
- (h) What is the capacity of government or party structures to participate in the EA process?
- (i) What is the relevant experience and technical capacity of the government agency that will be involved in the consultation process?
- (j) What national and international NGOs in the country are involved with environmental issues and/or environmental advocacy? Have they had any direct experience with the people in the affected area? What are the technical capacities of the NGOs that are likely to be involved in the EA? What is the current state of government/NGO relations in the country?

37. The Bank's Regional Environmental Divisions (REDs), supported by the Environment Department (ENV), and by the office of the Sociological Advisor (AGR), may be able to provide information about the current government organization and legislative authority and how they may affect environmental review and its public consultation aspect. These units may also know of work that has already been done with NGOs active on environmental issues. The country officer and resident representative often are familiar with others. The Bank's International Economic Relations Division of the External Affairs Department (EXTIE) has overall responsibility for the Bank's relations with NGOs and maintains a library of NGO directories, and a database on NGOs around the world.

38. Some resident missions of the United Nations Development Programme (UNDP) collect information on NGOs. The government, NGO coalitions (national, international and regional), and other UN agencies and bilateral agencies are also sources of information on NGOs and community groups. Aid agencies such as the United Nations Children's Fund (UNICEF), the International Labour Organization (ILO) and the International Fund for Agricultural Development (IFAD), whose programs bring them into frequent contact with villagers are useful sources for both information and counsel.

39. Public participation should be as systematic as possible. Experience shows that participation between identification and final EA decreases tension and grievances later. A firm schedule, linked to the project cycle, is necessary (Table 7.4). Five key participation events in the EA process have been found to be useful in many projects: information sharing before identification ends; the scoping session as the EA process begins; public comments on the draft background EA studies; a comprehensive outreach process to obtain comments (written and oral) on the draft EA itself (both on its adequacy and on the project design); and hearings and comments to be included in the final EA. The results of such public participation should be routinely transmitted to the Bank. TMs should attend enough key events to ensure that the process has been reliably followed, and to become familiar with the contents of the EA, so as not to be faced with evaluating voluminous final EA reports in a rush just before appraisal.

40. The early interagency meeting recommended in the EA OD should normally be held in the affected community, but some meetings may be arranged in the capital city where the relevant ministries are located. In such cases, there should be later meetings in provincial centers and towns in the affected area. About five general public meetings during the EA process have been found to be effective in many cases. These are usefully synchronized with the five key events noted above. Some details of the process of consultation in affected communities are outlined in Annex 7-1.

41. Financial and institutional support should be provided for in the EA budget in order to facilitate the process. Public participation needs resources if it is to be meaningful, and should be budgeted for in advance. In some cases, the proponent has successfully set up a modest fund for such purposes. For example, in Canada, "intervenor costs" are mandated by federal legislation and paid by proponents. Most countries are less formal in this regard. Grievance resolution mechanisms should be built in from the start, and not added when the first grievance occurs. Proponents are responsible for facilitating due process – which of course varies from country to country. The right to appeal to an impartial third party should be available.

42. The consultation process should remain open throughout project preparation and implementation. It should include continued feedback to those consulted, with particular attention to discussing choices and tentative conclusions of studies and EA drafts, explaining how they are being incorporated into project feasibility design and implementation plans. The first six months or so after IEPS is the best time for community inputs. Any "no-go" conclusions from the EA team need to be communicated as early as possible, and certainly no later than three months or so after EA begins. The next year or more, until the completion of the EA and feasibility study, is mainly for the necessary studies, mitigatory designs and iterative checking that public views have indeed been accommodated. Individuals and groups who have involved themselves in the EA need to see that they are being heard, that their participation is making a difference. Generally, feedback to those consulted is best accomplished by systematic distribution of

Table 7.4. Timing of Project Cycles with Community Participation

<u>Bank's Project Cycle</u>	<u>Approximate Duration (years)</u>	<u>Borrower's Project Cycle</u>	<u>Public Participation Events</u>
	3	Master Plans Sectoral Investment Plans	
Identification EA Categorization	0.5		Dissemination of information Seek views on concept
Preparation	2-3	Pre-feasibility Feasibility study begins EA study begins	Scoping begins Selection of EA studies
		EA study ends Draft EA	Review draft EA studies Review draft EA
Pre-Appraisal	0.1	Feasibility study complete EA study complete	Review final feasibility and EA studies
Appraisal	0.2		Appraisal team meets people affected
Implementation	5	Construction	Community input into implementing EA findings
Operation	30	Operation	Community input into monitoring
Completion - Soon after last disbursement	0.2	Project completion Report (PCR)	Post-hoc evaluations

the list of background studies and then their drafts, and the latest EA drafts. In addition, the project planning and design process may provide mechanisms for ongoing consultation (for example, a standing review committee that includes local NGOs and community representatives). The most effective role for

local NGOs in some countries is to intermediate between the proponents and the affected communities. In other countries, the NGOs should be consulted for their special knowledge such as expertise in social organization, indigenous technology etc. The Bank resident mission should be involved in continuing discussions.

43. Over time, project EAs should help to develop a network of institutions, governmental and nongovernmental, that can interact with increasing ease and effectiveness to raise and resolve environmental issues and facilitate consultation with affected communities. For example, the Bank maintains country lists of experiences with community involvement in previous projects to increase government awareness and encourage other communities to participate (especially the office of the Sociological Advisor; see also Cernea 1988, 1991). UNDP intends to provide technical assistance to help develop such networks. Just as project EAs should generate and be supported by sectoral EAs and national environmental plans, the public consultation process for individual projects should encourage the development of institutions to maintain public consultation routinely and on a widening scale.

MAXIMS AND CAVEATS

44. There is danger in applying this policy so zealously that conflict is created where none existed before, or in assuming that the authoritarian nature of a given country makes it impossible to listen to certain groups or to adopt an open process.

45. TMs should be aware that if community participation was not part of the earliest conceptualization and design phase of a project, the EA will be more difficult. It is one thing to ask people to comment on the environmental effects of a proposed large infrastructure project; it is quite another to ask if they think there should be such a project in the first place. The less participatory the government of the country involved, the less likely it will be that the public has been consulted early and, therefore, the greater will be the importance of consultations during the EA. Conversely, the more participatory the country, the more likely it will be that the press and public are aware of plans for the project, and the easier it will be to maintain open participation and communication throughout the EA process.

46. However useful the input of national and international NGOs may be -- and indeed, of various public and private voices in a country's capital -- none of these should substitute for time and effort in eliciting the fully informed views of people in the areas affected and integrating these views into project design.

47. Some NGOs in the industrial countries have strong ties to local NGOs, and may be effective as outside advocates for the poor, and for people who cannot speak freely within their own countries. However, some actions by international NGOs may not be beneficial to local NGOs; governments may hold the local NGOs accountable, and penalize them, for views expressed by their international colleagues. Although some NGOs take a negative view of the Bank, TMs will find that many NGOs are neither negative nor positive. Most have never been asked to comment on a proposed development project.

48. International NGOs with projects in the country also can be useful sources of information and advice. Environmental NGOs in industrial countries should be respectfully heard. In addition, they may be utilized in preparing EAs and in monitoring projects. The Bank operational directive on NGOs states that "staff should be responsive, and encourage governments to be responsive, to NGOs that request information or raise questions about Bank-supported activities...."

49. In some countries, NGOs are going to involve themselves in EAs whether or not they have been invited to participate. TMs are advised to take an inclusive, open stance and establish good relationships with all who express interest. It should be kept in mind that the Bank has declared the doors of its headquarters and its resident missions open to NGOs. "We hope new partners for development, new allies against poverty, will come to see us.... The Bank and NGOs must work together."^{2/}

50. During the EA process, proponents should not in the interim undertake any major action which could prejudice the ultimate decision of the EA or the feasibility study.

^{2/} Moeen A. Qureshi, Senior Vice President for Operations, "The World Bank and NGOs: New Approaches," (Speech, 22 April 1988).

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ANNEX 7-1**Public Consultation in the
Environmental Assessment Process**

1. In the literature and practice of EAs, the term "scoping" is used worldwide to describe a quick and cost efficient way to identify the range and magnitude of environmental topics that need to be addressed in the EA. The main aim of scoping is to agree upon the issues and alternatives that will be examined in detail and, simultaneously, those that will receive less time and attention. The expectation that scoping will be open to the public has become an important part of the term's definition. The EA OD suggests that an initial interagency meeting be expanded into a "forum" or "scoping session" with representatives of affected groups and relevant NGOs. If the basic facts have been gathered, the EA team will know whom to invite to this session.

2. The "right-to-know" of any community that may be affected by a project should be respected. The overall objective of the proposed project is the first item to be clearly stated. For example, the projected national electricity demand will exceed supply in six years time, and measures have been taken to reduce demand. The objective of the project is to help meet that demand. Coal, gas, nuclear and hydro are alternatives. The government has concluded that hydro is the least environmentally and financially costly, and that the next hydro site is somewhere on river X, but neither the site nor the dam height have been ascertained. The feasibility study and the EA are designed to determine the dam site, height etc. in consultation with the people.

3. People likely to be affected also need information on the project cycle (Table 7-4), on the decision-making process, and on national and other laws. They need to know how and when they may intervene, and how they can influence the project cycle. Everyone invited – whether government officials, community representatives, affected people or local NGOs – should all receive the same basic information about the project. This has to be received well in advance (30 days or so) in order to be able to participate effectively. Because the project has only just been identified, such information may be scanty. However, this is greatly preferable to providing final designs too far advanced to be influenced by the people who will be affected by them. Normally, a team member will hold individual conversations with many key participants before the first session, to brief them on the process and to get a preliminary idea of their views.

4. It is not always easy to share whatever information is available. Publication in the Federal Gazette or equivalent, while mandatory, is inadequate. Some projects have found that widely disseminating a detailed poster for all schools, clinics, post offices, community centers, religious buildings, shops, bus stops, utility poles, cooperatives, etc. is effective. This is often usefully reinforced with an invitation letter providing details of the scoping meeting schedules and asking if the recipient is concerned, and if not, requesting that the letter and poster be passed along to all interested parties, and stating that additional copies of letter and poster will be provided free. Normally, the social participation specialists of the EA team will hold individual conversations with many key participants before the first session to brief them on the process and to get a preliminary idea of their views. The usefulness of scale models and videos has been stressed.

5. Properly conducted, such public meetings help to lay a firm foundation of openness, agreement and trust for all the deliberations that follow. The meetings are crucial to building public confidence in a fair environmental analysis and ultimately, in a fair decision-making process. The design of a new project always involves much uncertainty. Excessive secrecy makes people fear the worst; openness and admission of uncertainty engenders cooperation. Public consultation and the whole scoping exercise should be a continuous process in which new issues are allowed to emerge and insignificant ones are set aside. The whole process usually involves a series of meetings, including discussions with small groups, personal interviews and written comments from interested parties. With public participation, the main lesson learned is that the meaningfulness of the exercise is proportional to the scope for influencing decisions which may affect the participants. The affected people cannot discuss specific site issues in the absence of details. The underlying theme is participatory decision-making. Participation in EA design, ranking of alternatives, (including the "no-go" option), and the selection of studies are ways of accomplishing this underlying objective.

6. The scoping session itself should be designed with respect to local customs, procedures, etc. As practiced in industrial countries, the session is usually chaired by an impartial hearing officer whose role it is to solicit views and transmit them frankly. The chair sets the ground rules and promotes civic responsibilities. The jeopardy of degenerating into a public relations exercise should be avoided. Evening and weekend meetings are needed, in addition to weekday meetings, if comprehensiveness is to be achieved. Sign up sheets are useful and transcripts essential. A preliminary list of issues is normally extracted from the transcripts and then consolidated and prioritized. Scoping should be provided for written comments. The scoping session can include questions, clarifications and statements, as well as objections. The main purpose of the scoping session is to obtain feedback. While project proponent agencies should attend and respond if necessary, they should not be major players. Proponents should avoid propagandizing, and should never dispute with contenders. The community is the major player. It should be encouraged to dialog amongst itself, to hear what community members have to say. The session is less for information and more to record views. While consensus is not the main objective, a working relationship should start to be created at this stage, and some steps achieved towards a convergence of views.

7. It is important to the success of the EA process that from the beginning public consultation be conducted systematically and according to sound principles of research. The leaders of the EA process should be able to say to all the people involved (other government agencies, the affected community, municipal government, NGOs, tribal peoples, etc.) that the data provided is reliable for making informed decisions. If non-Bank researchers provide the data and analysis, the TM must determine whether they warrant Bank approval.

8. The social science elements of an EA process must be similarly rigorous and credible. For example, interviews should be conducted with representative samples of key population groups of the area of concern, and the sample size should be large enough to be considered significant by decision-makers. In this way, social science assists the EA team to understand the people to be affected by the process: i.e., their community, how differentiated the community is, where the authority structures and formal and informal leadership lie, and with whom communication should occur. Cultural aspects of the EA process must also be examined. The role of women in a community deserves special attention, as does the presence of any minorities, including indigenous or tribal ethnicities.

9. The EA OD mandates public consultation soon after a decision is made at the IEPS stage to prepare an EA. Community representatives and NGOs may be invited to an initial interagency meeting to help identify issues, types of analysis required, sources of relevant expertise, responsibilities and the schedule for the EA. The meeting can identify other governmental or nongovernmental agencies that should be invited to help design the EA consultative process. People may feel alienated and deceived if important decisions already have been made before consultation is initiated, and it will be much more difficult to achieve meaningful and constructive public involvement once negative interactions have begun. Although, in some cases, a coherent picture of the project and the environmental issues it poses can be presented at the initial meeting, in many others the project will not yet be fully defined. Areas of uncertainty should be acknowledged openly.

10. The literature on public participation listed at the end of this chapter describes the facilitator skills necessary for successful public meetings. The person chosen to run public meetings for the EA should possess those skills and might well be from the permitting or licensing agency or another national agency (other than the project agency itself), or from a university or other institution outside the government. Generally, the facilitator should be guided by the rules for any good meeting: for example, creating an open atmosphere.

11. One variant found useful on occasion is the mobile commission or hearing panel. This panel of impartial experienced citizens travels throughout the project region to obtain views. In one very successful case, the panel consisted of a single well-respected individual, who spent a couple of days in a hundred or so villages (Berger 1977).

12. Other suggestions are more specific to the EA process. For example, the goal of initial meetings should be to ensure that there will be a thorough EA in the course of an environmental review process. The first part of an initial meeting should be devoted to a discussion of the project in general, covering its purpose, funding, proposed location and any other aspects that can be presented orally with the aid of maps and other visual aids. The EA process, the mechanisms whereby community views will be taken into account in decision-making, and the avenues that exist for appeals by those who feel their views have not been adequately attended to should also be explained. A question-and-answer period should follow. Then the meeting can break into small discussion groups. (Always, constraints of the culture [paras 13-17] should be honored.)

13. The object of the initial meeting is not to resolve issues but to ensure that major issues surface early so that they can be addressed in the course of the EA process. The task of each small group is to discuss the project and prepare a list of what its members feel are the issues of significance to the communities involved. An agency official or a member of the EA team may join each group, as a resource person, to listen to participants' concerns and to answer questions. Groups may choose their own discussion leaders or they may be pre-selected, provided they are not proponents. A project official might be perceived as unduly influencing the opinions of the others.

14. It is often useful in both the small group discussions and in the plenary meetings to have the issues recorded on a large pad or blackboard. Thus, all can see that the views expressed have been heard and understood. Special efforts always should be made to include the illiterate and reticent elements of the society, especially if they are numerous. The group may be asked to discuss the relative merits and

importance of each listed item and assign priority to them; discussion groups then return to the large meeting to report on the results of their ranking. In other situations, the sole purpose of the first meeting may be to make sure that all concerns are noted.

15. After the meeting the EA team must evaluate comments from the cooperating agencies and the affected community, and decide which ones to pursue further. However, every issue someone names as a priority during general meetings or in community consultations should be addressed in some manner in the EA: by an in-depth analysis, or by a justification of why the issue was considered but not explored further.

16. The meeting facilitator or hearing officer should be prepared to handle the conflict which nearly always will be present to some degree. Conflict often revolves around power: who has it, who wants it, and who needs even a little of it in order to participate in an EA process with those who already have it. People will naturally have different views about their own interests and what they perceive to be the interests of their community. Conflict arises, for example, when one group believes that the net benefit of a project comes at its expense while another gains. Some will see themselves as "losers," others as "winners."

17. It is the task of the meeting facilitator not to avoid conflict, nor cover it up, nor minimize it, but rather to articulate clearly the varying positions and interests – to bring them out into the open. A useful, positive function of conflict is as a safety valve where the interests of different groups are in opposition. It is usually mismanaged conflict that becomes a destructive force. Behind every violent protest is a group which feels that its views are being suppressed and ignored. The main purpose of the first EA meeting is to ensure that participants have a chance to express their views.

18. A helpful reference for the EA process is Fisher and Ury's book, Getting to Yes: Negotiating Agreement Without Giving In. The authors usefully distinguish between "positions" and "interests". Positions are people's prepared answers; interests are the reasons people take particular positions. Frequently, during conflict, many people express their differences with positions that are mutually exclusive. Fisher and Ury, and now others in the field, urge the facilitator/negotiator to focus on interests, to keep asking the question, "Why?" EA professionals specializing in consultations with affected communities may want to participate in Fisher/Ury or other negotiation training beforehand.

19. During the discussion phase, differences in perception, feelings of frustration and anger and difficulties in communication are expected and should be acknowledged and addressed. Each side should come to understand the interests of the other. Both can then generate options that are mutually advantageous and can begin to seek objective standards for resolving opposed interests. If EA leaders clearly understand the interests (as distinct from the positions) of the opposing sides, they can enlist the advice of technical experts to propose approaches that address the differences and possibly resolve them.

ABBREVIATIONS/ACRONYMS

ADB	African Development Bank (see AfDB) and Asian Development Bank (see AsDB)
AfDB	African Development Bank (see ADB)
AGR	Sociological Advisor
AID	(United States) Agency for International Development (see USAID)
AsDB	Asian Development Bank (see ADB)
ASEAN	Association of Southeast Asian Nations
BOD	Biochemical Oxygen Demand
BOD₅	Biochemical Oxygen Demand Over Five Days
BTO	Back-To-Office Report
C	Carbon
°C	(Centigrade) Celsius
CBA	Cost-Benefit Analysis
CD	Country Department
CECC	Credit Extension Coordinating Committee
CFC	Chlorofluorocarbons
CGIAR	Consultative Group on International Agricultural Research
CH₄	Methane
CIDA	Canadian International Development Agency
CITES	(UN) Convention on International Trade in Wild Flora and Fauna
CO₂	Carbon Dioxide
COD	Chemical Oxygen Demand
	Country Operations Division
CSP	Country Strategy Paper
DANIDA	Danish International Development Agency
DCCI	Development Commission for Cement Industry (India)
DFI	Development Finance Institution
DMG	Drylands Management Guidelines
DNA	Deoxyribonucleic Acid
EA	Environmental Assessment
EAR	Environmental Assessment Report
EA OD	Environmental Assessment Operational Directive
EAPs	Environmental Action Plans
EBRD	European Bank for Reconstruction and Development
EC	European Communities
ECU	European currency unit
EDF	European Development Fund
EDI	Economic Development Institute of the World Bank
EDP	Environmentally-adjusted Net Domestic Product
EEC	European Economic Community
EIB	European Investment Bank

EPA	(United States) Environmental Protection Agency (see USEPA)
EPD	Environmental Protection Department
EPS	Executive Project Summary
ERL	Emergency Recovery Loan
	Emergency Reconstruction Loan
ER	Environmental Review
ERR	Economic Rate of Return
ESCAP	Economic and Social Commission for Asia and the Pacific
ESMAP	Energy Sector Management Assistance Program
EXTIE	International Economic Relations Division of the External Affairs Department
FAO	Food and Agricultural Organization of the United Nations
FEPa	(Nigerian) Federal Environmental Protection Agency
FEPS	Final Executive Project Summary
FI	Financial Intermediary
FIL	Financial Intermediary Loan
FINNIDA	Finnish Department of International Development Cooperation
FMWH	Federal Ministry of Works and Housing
FY	Fiscal Year
GATT	(UN) General Agreement on Tariffs and Trade
GDP	Gross Domestic Product
GEF	Global Environment Facility
GNP	Gross National Product
GOI	Government of India
GOR	Government of Rwanda
GTZ	German Agency for Technical Cooperation
ha	hectare
HABITAT	United Nations Centre for Human Settlements
IADB	Inter-American Development Bank
IBRD	International Bank for Reconstruction and Development
ICICI	Industrial Credit and Investment Corporation of India Limited
ICCROM	International Centre for the Study of the Preservation and the Restoration of Cultural Property
ICOMOS	International Committee of Monuments and Sites
IDA	International Development Association
IDB	Inter-American Development Bank
IDBI	Industrial Development Bank of India
IEPS	Initial Executive Project Summary
IFAD	(UN) International Fund for Agricultural Development
IFC	International Finance Corporation of the World Bank
IIED	International Institute for Economic Development
ILO	(UN) International Labour Organization
IMF	International Monetary Fund
IPCC	Intergovernmental Panel on Climate Change
IPM	Integrated Pest Management
IRR	Internal Rate of Return
ITTO	International Tropical Timber Organization

IUCN	International Union for Conservation of Nature and Natural Resources
km	kilometer
km²	square kilometer
mm	millimeter
MIGA	Multilateral Investment Guarantee Agency of the World Bank
Miniplan	Ministry of Plan
MOE	Ministry of Environmental Protection
MOP	Memorandum of the President
MOS	Monthly Operational Summary
NEAP	National Environmental Action Plan
NEC	National Environment Commission
NGO	Nongovernmental Organization
NORAD	Norwegian Agency for International Development
NO_x	Oxides of Nitrogen
NPV	Net Present Value
N₂O	Nitrous Oxide
O, O₂, O₃	Oxygen
OD	Operational Directive
ODA	Overseas Development Administration (United Kingdom)
OECD	Organization for Economic Cooperation and Development
OED	Operations Evaluation Department
O/G	Oil and Grease
OMS	Operational Manual Statement
OPN	Operations Policy Note
OPNSV	Senior Vice President, Operations
PCR	Project Completion Report
pH	measurement of acidity and alkalinity (on log. scale 0-14, 7 = neutral, ≤ 7 = increasing acidity, ≥ 7 = increasing alkalinity)
PB	Project Brief
PEPA	Pakistan Environmental Protection Agency
PIDs	Provincial Irrigation Departments
PI/ER	Public Investment/Expenditure Review
PIP	Public Investment Program
PIR	Project Implementation Review
POPTR	Personnel Operations Department, Training Division
PPF	Project Preparation Facility
PPR	Project Performance Report
PR	President's Report
PRE	Policy, Research, and External Affairs
RED	Regional Environment Division
ROW	Right-of-Way
RVP	Regional Vice President
SAL	Structural Adjustment Lending
	Structural Adjustment Loan
SAR	Staff Appraisal Report

SCBA	Social Cost Benefit Analysis
SDC	Swiss Development Corporation
SECAL	Sector Adjustment Loan
SIDA	Swedish International Development Authority
SNA	System of National Accounts
SOD	Sector Operations Division
SO₂	Sulfur Dioxide
SPPF	Special Project Preparation Facility
SPRIE	International Economic Relations Division of the Strategic Planning Department
TAL	Technical Assistance Loan
TFAP	Tropical Forest Action Plan
TM	Task Manager
TOR	Terms of Reference
TSS	Total Suspended Solids
UNDP	United Nations Development Programme
UNDRO	United Nations Disaster Relief Organization
UNEP	United Nations Environment Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNICEF	United Nations Children's Fund
UNIDO	United Nations Industrial Development Organization
UNSO	United Nations Statistical Office
USACE	United States Army Corps of Engineers
USAID	United States Agency for International Development (see AID)
USEPA	United States Environmental Protection Agency (see EPA)
WAPDA	Water and Power Development Authority
WHO	World Health Organization
WMA	Wildlands Management Area
WUAs	Water User Associations

ENVIRONMENTAL ASSESSMENT

– A Guide To Further Reading –

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