

The attainment of sustainable economic development requires due consideration of how human actions affect environmental and natural resources, upon which we depend for material and cultural existence. The conscious alteration of bio-physical surroundings through investment projects carries with it the implicit obligation that the present generation's welfare be maximized. It is also necessary that investment projects, programs, and policies be formulated such that current activities do not jeopardize the possible well-being of future generations. In that sense, the augmentation of a nation's rate of economic growth through explicit projects, or through growth-oriented policies, must be carefully crafted so that the long-run social benefits are greater than the long-run social costs. It is this recognition of the need for a broad evaluation of projects and policies that has driven the interest in the environmental evaluation of various development-assistance activities (see Appendix 1).

Traditionally, cost-benefit analysis of projects gave little attention to many environmental implications of development projects. As a result, the economic internal rate of return (EIRR) represented an incomplete picture of the true environmental and consequently, economic implications of such projects. Over the past three decades, pressure from various sources in the region has led to the requirement for environmental assessment of development projects, specifically those which are publicly funded or internationally supported (see Box 1). Advancements in environmental economics now make it possible for a more comprehensive economic evaluation of environmental impacts of development projects to be undertaken, although such analysis is far from perfect. Equally important, the development of these new methods creates an induced demand for new data, information, and methodologies that will further enhance the completeness of future evaluation procedures. The feasibility of more complete environmental evaluation of development projects means that project formu-

Box 1. Environmental Assessment

Environmental assessments are undertaken to identify social and environmental consequences of economic activities prior to implementation. The aim is to provide information regarding the environmental implication of proposed actions to aid decision making.

Initial environmental examination (IEE). Ideally, all projects should have an IEE. This examination, which is less detailed than an environmental impact assessment (EIA), is conducted during project preparation. An IEE precedes an EIA and is required for projects with significant adverse environmental impacts. In certain cases, it is recommended even for those projects with adverse environmental impacts of a lesser degree and/or significance, but which may involve controversial issues. The results of an IEE may indicate that an EIA is required. Inputs from the IEE can be used in the economic evaluation of environmental impacts. A typical IEE includes the following major elements:

- (i) description of the project,*
- (ii) description of the environment,*
- (iii) potential environmental impacts and mitigation measures,*
- (iv) institutional requirement and environmental monitoring program,*
- (v) findings and recommendations, and*
- (vi) conclusions.*

A good IEE should conclude whether an in-depth EIA will be required of the proposed project.

lation and design can be improved to minimize the adverse environmental impacts of such projects.

I. The Book and its Objectives

The current era of development projects calls for a more complete evaluation of a full range of benefits and costs of such projects. These include

Environmental impact assessment (EIA). This assessment, which is more detailed than the IEE, is required for all projects with significant adverse environmental impacts (predicted by the IEE) and is also advisable even for those with a lesser degree of impact, if it involves controversial issues. It is conducted by project proponents before the project undergoes the final design stage. Inputs from the EIA can be used in quantifying and valuing environmental impacts. A typical EIA report includes the following major elements:

- (i) description of the project,*
- (ii) description of the environment,*
- (iii) anticipated environmental impacts and mitigation measures,*
- (iv) project alternatives,*
- (v) economic analysis,*
- (vi) institutional requirement and environmental monitoring program,*
- (vii) public involvement, and*
- (viii) conclusion.*

Views of affected groups and nongovernment organizations are also taken into account when preparing an EIA through public participation and consultation. For prudent analysis, it is suggested that transboundary issues as well as global impacts related to the project should be included.

Source: ADB, 1998. Environmental Assessment Requirements of the ADB (Environment Division).

Although the environmental assessment tools discussed focus on IEE and EIA, there are other types of environmental assessment tools such as strategic environmental assessment for sector and policy-related development intervention.

not only environmental impacts of a project, but also social aspects such as poverty, resettlement, indigenous people, gender concerns, governance, and other issues. Traditional projects often overlook such issues including environmental implications. New types of projects offer important opportunities to enhance environmental quality and social well-being in rural and urban areas of the developing world.

Since ADB's inception, concern for environmental impacts have been reflected in its operations. For more than two decades, it has been making

consistent attempts at systematizing its approach to address environmental concerns in the region. Its Medium-Term Strategic Framework, introduced in 1992, identified environmental improvement as one of ADB's major thrusts. Aside from the formulation of EIAs and the introduction of environmental guidelines for various investment activities, in 1986 the ADB published *Economic Analysis of Environmental Impacts of Development Projects*, where for the first time, a systematic approach to integrate environmental impacts in the economic analysis of projects was proposed. This book was again published in 1994, in association with the World Bank. In 1996, ADB published the *Economic Evaluation of Environmental Impacts: A Workbook*, which presents a step-by-step procedure to guide project managers in conducting economic evaluation of environmental impacts using direct inputs from environmental assessments and benchmark values from the literature. The Workbook emphasizes projects and their evaluation and not the nuances of environmental economic analysis.

This book complements the efforts of the Workbook by covering more issues on environmental economic analysis. It includes more discussions on the rationale for undertaking environmental economic analysis, the alternative methods for environmental economic evaluation, and the framework for the economic evaluation of environmental impacts. The book describes ten cases where environmental economics was used to evaluate development projects. These ten cases demonstrate to users practical approaches to environmental economic analysis given a situation where information and time availability for evaluation is limited and costly. The book is neither an economic analysis methodology text nor a valuation methodology guide. It is a sourcebook that can assist in enhancing environmental improvements in development projects despite time, budget, and skill constraints.

It is interesting to note that the evolution of market-based instruments (MBIs), and their prescription for environmental management in developing countries, occurred at the same time as improvements in the environmental evaluation of projects. Together these parallel developments can make lasting improvements in formulating development and environmental policies throughout Asia.

The case studies included here illustrate the beneficial effects of the complementarities between enhanced environmental evaluation of projects

and the use of MBIs. These synergistic effects are present in both rural and urban project settings, though the relative emphasis will differ between these two areas. The cases also show that traditional reforestation projects can now be evaluated with the knowledge that positive contributions will be made to the improvement of global climate through carbon sequestration. Mechanisms now exist—and have been demonstrated in these case studies—to assign benefits to these contributions.

Environmental valuation not only helps capture unaccounted benefits, but also urges the incorporation of environmental costs in project analysis. Sensitivity to the environment now permits design changes in traditional projects so that negative environmental impacts are mitigated, prevented, or eliminated. This aspect is illustrated in these case studies with reference to power generation, fisheries, watershed management, and water quality.

Sensitivity to the environmental implications of projects has made it possible to pay greater attention to the public health and safety aspects of development projects. It is now more apparent that many environmental problems—like the deterioration of water and air quality—become manifest in human health problems. Paying greater attention to the environment and natural resources also means paying greater attention to human resources.

There is now promising feedback between the incorporation of environmental impacts in project analysis, and the availability of methods and data to carry out that evaluation. As data improve, and as methods improve, the economic evaluation of environmental impacts of development projects will also improve.

The case studies included here illustrate the great promise for the local management of biodiversity. By formulating and designing projects in a way that local environmental considerations are accounted for, development planners learn how to involve indigenous people in project discussions, formulation, design, implementation, and operation.

At no other time in the history of Asia has a more comprehensive approach to economic development been needed. A comprehensive approach to economic recovery requires good governance, environmental management, poverty reduction, and regional cooperation. The Medium-Term Strategic Framework set forth by ADB in 1992 highlights the importance of addressing social and environmental concerns in preparing an economic

development agenda.¹ Even in extremely large development programs, projects play a crucial role. It is no longer possible to promote “hardware” projects without due consideration to their environmental impacts. This book provides case-specific examples of bringing environmental concerns to focus in many sectors. It provides guidance, based on real world examples, to project designers and evaluation experts on how to use environmental valuation for project design.

II. Methods, Applications, and Target Audience

The methods used in the ten cases follow the Workbook, and will fall under the general category of rapid analytic methods, including benefits transfer. These methods accommodate the data, time, and budget constraints typically faced in field economic analysis during project preparation. The approach directs analysis toward decision-based applications. It facilitates the decision-making process by providing more information that can enhance the environmental quality of projects. It should be noted however, that analysts had access to data from feasibility studies for all ten cases.

Although the cases are project-based, the methodology can also be used for sectoral applications, as shown in the Bangladesh Forestry Sector Project. Policy-based analysis can also be performed, but it is a more tedious and time-consuming process. This book, through the cases, will show users the various applications of environmental economic analysis. It will guide users in undertaking environmental economic analysis for development projects.

The book can be used by both economists and noneconomists—development project design team members, as well as team leaders. The first few chapters document issues, and the general framework for, economic evaluation of environmental impacts of development projects. These chapters clarify the rationale for undertaking environmental economic analysis, for the user to have a better appreciation of the applications as shown in the ten cases. The book contains appendixes (which includes ADB’s

¹ *The reduction of poverty is ADB’s overarching goal.*

efforts in the field, selected environmental assessments for more background on the cases, and selected relevant materials), boxes and notes that highlight related areas for the environmental economic analysis of development projects. Project managers, project economists, and others who wish to provide a more comprehensive accounting of environment-related benefits and costs when analyzing projects and policies may find this document useful and informative.

III. Organization

The main text is divided into three broad parts. Part I, consisting of Chapters 2 and 3, show the rationale for undertaking environmental economic analysis and the framework for undertaking such analysis. Specifically, Chapter 2 identifies the important issues in the economic assessment of environmental impacts, and describes the various methods for undertaking evaluation of environmental projects. This is followed by a discussion on how these methods are used in the project setting (Chapter 3).

Part II, which is marked as Chapter 4, contains ten case studies where environmental economic analysis was undertaken. These cases fall under three general classifications, namely: (i) agriculture and natural resources; (ii) water resources; and (iii) infrastructure, energy, and industry. Each case gives a background of the project inclusive of project details, the environmental economic analysis and its results, and notable aspects highlighting the essential aspects of the analysis.

Part III integrates the first two parts. Chapter 5 highlights the promotion of environmental improvement through projects. This chapter provides guidelines for designing a wide array of projects to avoid environmentally unacceptable components, including suggestions on the incorporation of environmentally benign components. Chapter 6 serves as the concluding chapter. Throughout the book, boxes, notes, and appendixes provide information related to the subject matter.