

## **Appendix 1: Scoping Techniques**

## 1 Scoping Techniques

### 【Checklist technique】

Checklist technique is used for identifying the project impacts. Such lists usually cover all possible impacts of the project. In the earlier days of EIAs, simple checklists containing only the environmental indices were extensively used. The detailed description of the impacts of each environmental aspect was later added to the selected environmental indices. It was usually in the form of a questionnaire to elicit the necessary information. This type of checklist is usually called as descriptive checklist. It is also possible to use checklists which include not only the list of environmental aspects but also rank the impacts and alternatives according to their significance. More comprehensive checklists indicate relative importance of individual environmental aspects as well as total ranking calculated for all versions of the project.

### 【Matrix technique】

A matrix serves as a checklist and a summary of the impact assessment. The matrices are very suitable for EIAs as they link a particular environmental aspect to a specific action of the development project and in a way explain the nature of the impact. Leopold and his associates in the late 1960s designed a precise evaluation procedure for landscape aesthetic (Leopold, 1969; Leopold and Marchand, 1968) and produced one of the first systematic methodologies for the entire field of EIA. The procedure is centered around a large matrix containing 8800 cells; the horizontal axis has 100 columns for development characteristics representing activities that might cause positive or negative environmental impacts. The vertical axis consists of 88 rows of environmental aspects representing environmental quality variables such as physical and chemical; biological; cultural; and ecological. The identified effects are then evaluated according to their magnitude and importance on scales 1-10 where 10 being the maximum. Each cell is divided by a diagonal line, and magnitude and importance of the impact are entered in the relevant half of the cell (one in each half of the cell). This type of matrix is usually called as an interaction matrix.

The following characteristics of Leopold matrix are extremely useful:

- As a basic tool, it is excellent.
- The matrix provides the assessor with the entire picture of the environmental impacts of the project highlighting the particular part of the project with the major impact.
- It allows the application of only the relevant part of the matrix for a particular project.
- It indicates both beneficial as well as adverse impacts by writing a plus or minus sign to the entries in the cells.

Modified versions of the Leopold matrix have also been used by many agencies. Modifications of the matrix include redesigning or condensing the matrix, or describing its impact rating in codes. The

purpose of modification is to summarize the nature of the impact and also indicate whether the negative impacts can be mitigated (Canter,1996 ).

There are other types of matrices. A stepped interaction matrix is used to examine changes, which are caused to other aspects of the environment. A development step affecting a particular aspect can show its effect on other aspects as well due to the interdependence of the environmental aspects. The impact assessor of the project may find it necessary to either modify one of the standard matrices (e.g. the Leopold matrix) or write a new one to better suit the local conditions.

#### **【 Network technique 】**

Networks are used to show interrelationships among the different aspects of the environment of the area and also indicate the flow of energy or impact throughout the environment such as in the case of upland ecosystem or a drainage basin. These networks are similar to those used in ecological studies. There are different types of networks such as sequence diagrams, directed diagrams or impact trees. The networks can be used to show both temporal and spatial flows of impacts.

#### **【 Overlay technique 】**

Overlay techniques were previously used in planning before they were adopted in designing formal EIAs. Individual impacts such as the effects on soil, water, settlements and noise are individually summarized and clearly highlighted by mapping over the area using chloropleths (shaded zones) to indicate the relative intensity of the impact. By this technique, the individual maps are transferred on to transparencies which are then laid over one another to produce a composite effect. Thus, the individual effects are summed up to show the total impact of the project. Of course only a limited number of impacts can be shown by this method. However, it is possible to summarize a large amount of information on each transparency. The physical constraint on this method has been eased with the advent of new modern computer technology and the Geographic Information System (GIS). It is now easy to carry out temporal changes or projected environmental modifications by revising the raw data directly in the files and perform the repeated overlays.

## **Appendix 2: A Brief History of World Bank Environmental Policy**

## 1 A Brief History of World Bank Environmental Policy

Environmental concerns became an explicit part of Bank policies / activities in 1970, when the position of environmental adviser was established in World Bank. The environmental policies and assessment procedures of the Bank evolved slowly during the following fifteen years, and rapidly during the past decade, reflecting the changes in thinking that took place in the international development community. The first internal instructions to Bank staff on the environment concerned with how to approach social issues associated with involuntary resettlement. Operational Manual Statement, OMS 2.33, was released in February 1980. This was followed by a statement on tribal people in Bank operations issued in February 1982 (OMS 2.34, later updated by Operational Directive 4.40 in September 1991).

The first operational policy statement on environmental aspects of the Bank's work (OMS 2.36) was issued in May 1984. This policy required that environmental considerations be introduced at the time of project identification and preparation. It also categorically recognized that such modifications could also occur at the time of appraisal, negotiation, and implementation of the project. With this, the Bank became the first multilateral development agency to screen projects for their environmental consequences and to adopt environmental guidelines for the evaluation of future lending operations. Moreover, by the mid-1980s, the Bank was already financing projects containing specific environmental components, even including several projects of primarily pure environmental nature.

Since 1984, and particularly from 1989, Bank policies in relation to the environmental effects of the projects have become more and more concerned, expanding to include many relevant areas such as agricultural pest management (1985), management of wild lands (1986), protection of cultural property (1986), collaboration with NGOs (1988), and environmental policy for dam and reservoir projects (1989). See (1) for a list of environment-related Bank policies.

### **(1) World Bank Environmental Policies**

- **Environmental Assessment**

All Bank projects are screened for their potential environmental impacts. The projects categorized in class A are subject to a full EA.

- **Environmental Action Plan**

This policy outlines the Bank support for the preparation of the environmental action plans submitted by the governments of the borrowing countries.

- **Agricultural Pest Management**

This particular Bank's policy promotes the effective and environmentally sound pest

management practices and advocates the use of integrated pest management techniques in the agricultural development projects.

- **Water Resources Management**

This policy outlines the involvement of World Bank in water resources management to support for the provision of water, sanitation facilities, flood control, and water for productive activities in a manner that is economically viable, environmentally sustainable, and socially equitable.

- **Indigenous Human Resources**

This directive recognizes that special action is required where Bank-supported investments affect indigenous peoples, tribes, ethnic minorities, or other groups whose social and economic status restricts their capacity to assert their interests and rights to land and other productive resources.

- **Involuntary Resettlement**

This directive recognizes that involuntary resettlement may cause severe long-term hardships, impoverishment, and environmental damage unless some appropriate measures are properly planned and carried out carefully to avert the untoward incidents.

- **Forestry**

World Bank involvement aims to reduce the deforestation, improve the environmental quality of the forested areas, promote the afforestation measures, reduce the poverty, and encourage the regional economic development.

All these policy matters have been, or, are in the process of being updated and strengthened continuously. More recent directives include policy matters on indigenous people (1991), water resources management (1993), and forestry (1993). The revised policy for protecting and managing cultural property will soon be released.

In 1993, all existing ODs were subsequently revised and incorporated into a new system of operational policies and Bank procedures. The new system comprises three categories of directives: operational policies (OP), Bank procedures (BP), and good practice (GP).

## **(2) Using EAs to Direct Environmental Lending**

Since 1989, and particularly after the Rio Earth Summit in 1992, the governments of various countries and the developmental institutions have established EA policies and procedures with the active participation of the NGOs and the private sector. They are strictly implemented with the application to a wider range of the development projects. Now most of the major investment decisions are made only after taking the potential environmental consequences into account.

The ultimate purpose of EA is to safeguard and uphold the ecological quality and ensure the responsible use of natural resources. However, the ensuing results can only be fully evaluated after a project has been completed. Many of the Bank-funded investment projects that have undergone EAs are still being implemented, therefore, the effectiveness of these EAs can only be assessed by looking at their influence on project design, preparation, and implementation. According to the Bank's experience, the EAs are contributing significantly to the environmental and social sustainability of the Bank-supported development initiatives.

### **(3) Assessing the EA Portfolio**

Between 1989 and 1995, more than 1,000 World Bank projects were screened for their potential environmental impacts. About 600 of these projects have been screened by UNCED, and 228 were screened in the fiscal year 1995 alone (see table 1). Among the investment projects approved by the Bank's Board of Directors in the fiscal year 1995, 23 projects (10 percent) were classified as category A, which require a full environmental assessment. However, 81 projects (36 percent) were classified as category B, which require some sort of the environmental analysis, and the remaining 124 projects (54 percent) were classified as category C, which require no EA. In the fiscal year 1995, category A projects were generally concerned with the agriculture, energy and power, transport, urban, and water and sanitation sectors, reflecting a fairly consistent sectoral distribution over the past three years (see table 2).

**Table 1. Projects with EA Category Screened after the Rio Earth Summit, Fiscal 1993-95**

<b>Project category</b>	<b>Number of projects</b>	<b>Percentage of total</b>
A	67	11
B	242	40
C	289	48
Total	598	100

*Note: percentages may not add to 100 due to rounding.*

### **(4) Making EA Effective**

To improve the EA effectiveness, the Bank has undertaken two reviews of EAs. Many good points learnt from the past experiences have been faithfully incorporated to update the EA practice. In addition, the Bank's Operations Evaluation Department is continuously reviewing the effectiveness of the environmental assessments and environmental action programs (EAPs). The purpose of this review is to evaluate (a) the impact of EAs and EAPs on the Bank operations and the borrower's

capacity both before and during the project implementation, (b) the efficacy of the review process furnished by the EAs/EAPs in meeting the Bank's environmental objectives as reflected in the ODs, and (c) the limit to which the Bank furnishes the support to build the capacity for emerging environmental initiatives. However, the review covers only the period of the past five years after the OD 4.00 was issued. The evaluation process of the preparation of the case studies of eight countries have been completed in the fiscal year 1996. The second review had enabled the assessment of the EA process in a more systematic and detailed fashion. The improvements in the institutional and operational strength of EAs were the result of the constructive efforts to link EA recommendations with the project preparation and implementation. The review therefore, concluded that the EA process was now firmly rooted in the Bank's normal business activity. The EA's effectiveness in improving the performance of the environmental assessment of a project largely depends on two factors: its quality in technical terms and the magnitude of its influence on a project's conceptualization, design, and implementation.

**Table 2 Distribution of Category A Projects, by Sector, for Fiscal Years 1993-95**

Sector	1993	1994	1995
Agriculture	3	7	4
Energy and power	10	9	7
Industry	0	0	0
Mining	0	1	0
Tourism	1	0	0
Transport	3	4	5
Urban	0	4	4
Water and Sanitation	2	0	3
Total number of projects	19	25	23

#### **(5) Quality of EAs**

The results of the second EA review showed that the Bank and borrower countries are improving the quality of EAs. This has been especially true in the past three years. Direct and site-specific impacts have been identified and evaluated better in EAs for the Bank-financed projects for a broader range of sectors and geographical locations. EAs have more consistently identified and discussed fully the most relevant environmental issues and impacts by providing a good basis for developing the sound mitigation measures and monitoring plans. For example, analysis of environmental impacts was an integral part of Swaziland's Urban Development Project, where alternative locations were evaluated for the water supply, sewerage treatment, and solid waste disposal component. As a result, changes were made in the design criteria and certain options were eliminated because they were environmentally untenable. Further alternatives were accepted.