

## 1.0 The Need for EIA

Every anthropogenic activity has some impact on the environment. More often it is harmful to the environment than benign. However, mankind as it is developed today cannot live without taking up these activities for his food, security and other needs. Consequently, there is a need to harmonise developmental activities with the environmental concerns. Environmental impact assessment (EIA) is one of the tools available with the planners to achieve the above-mentioned goal.

It is desirable to ensure that the development options under consideration are sustainable. In doing so, environmental consequences must be characterised early in the project cycle and accounted for in the project design.

The objective of EIA is to foresee the potential environmental problems that would arise out of a proposed development and address them in the project's planning and design stage. The EIA process should then allow for the communication of this information to:

- (a) the project proponent;
- (b) the regulatory agencies; and,
- (c) all stakeholders and interest groups.

EIA integrates the environmental concerns in the developmental activities right at the time of initiating for preparing the feasibility report. In doing so it can enable the integration of environmental concerns and mitigation measures in project development. EIA can often prevent future liabilities or expensive alterations in project design.

## 1.1 Indian Policies Requiring EIA

The environmental impact assessment in India was started in 1976-77 when the Planning Commission asked the then Department of Science and Technology to examine the river-valley projects from environmental angle. This was subsequently extended to cover those projects, which required approval of the Public Investment Board. These were administrative decisions, and lacked the legislative support. The Government of India enacted the Environment (Protection) Act on 23<sup>rd</sup> May 1986. To achieve the objectives of the Act, one of the decisions that were taken is to make environmental impact assessment statutory. After following the legal procedure, a notification was issued on 27<sup>th</sup> January 1994 and subsequently amended on 4<sup>th</sup> May 1994, 10<sup>th</sup> April 1997 and 27<sup>th</sup> January 2000 (**Annex 1**) making environmental impact assessment statutory for 30 activities. This is the principal piece of legislation governing environmental impact assessment.

Besides this the Government of India under Environment (Protection) Act 1986 issued a number of other notifications, which are related to environmental impact assessment. These are limited to specific geographical areas. These are listed in Box 1.1.

### Box 1.1

- } Prohibiting location of industries except those related to Tourism in a belt of 1 km from high tide mark from the Revdanda Creek up to Devgarh Point (near Shrivardhan) as well as in 1 km belt along the banks of Rajpuri Creek in Murud Janjira area in the Raigarh district of Maharashtra (6th January 1989)
- } Restricting location of industries, mining operations and regulating other activities in Doon Valley (1<sup>st</sup> February 1989)
- } Regulating activities in the coastal stretches of the country by classifying them as coastal regulation zone and prohibiting certain activities (19<sup>th</sup> February 1991)
- } Restricting location of industries and regulating other activities in Dahanu Taluka in Maharashtra (6<sup>th</sup> June 91)
- } Restricting certain activities in specified areas of Aravalli Range in the Gurgaon district of Haryana and Alwar district of Rajasthan (7<sup>th</sup> May 1992)
- } Regulating industrial and other activities, which could lead to pollution and congestion in an area north west of Numaligarh in Assam (5<sup>th</sup> July 1996)

## 1.2 The EIA Cycle and Procedures

The EIA process in India is made up of the following phases:

- } Screening
- } Scoping and consideration of alternatives
- } Baseline data collection
- } Impact prediction
- } Assessment of alternatives, delineation of mitigation measures and environmental impact statement
- } Public hearing
- } Environment Management Plan
- } Decision making
- } Monitoring the clearance conditions

### 1.2. Screening

**Screening is done to see whether a project requires environmental clearance as per the statutory notifications. Screening Criteria are based upon:**

- } Scales of investment;
- } Type of development; and,
- } Location of development.

A Project requires statutory environmental clearance only if the provisions of EIA notification and/or one or more statutory notification mentioned in **Box 1.1** cover it

### **1.2.2 Scoping**

Scoping is a process of detailing the terms of reference of EIA. It has to be done by the consultant in consultation with the project proponent and guidance, if need be, from Impact Assessment Agency.

The Ministry of Environment and Forests has published guidelines for different sectors, which outline the significant issues to be addressed in the EIA studies. Quantifiable impacts are to be assessed on the basis of magnitude, prevalence, frequency and duration and non-quantifiable impacts (such as aesthetic or recreational value), significance is commonly determined through the socio-economic criteria. After the areas, where the project could have significant impact, are identified, the baseline status of these should be monitored and then the likely changes in these on account of the construction and operation of the proposed project should be predicted.

### **1.2.3 Baseline Data**

Baseline data describes the existing environmental status of the identified study area. The site-specific primary data should be monitored for the identified parameters and supplemented by secondary data if available.

### **1.2.4 Impact Prediction**

Impact prediction is a way of mapping the environmental consequences of the significant aspects of the project and its alternatives. Environmental impact can never be predicted with absolute certainty and this is all the more reason to consider all possible factors and take all possible precautions for reducing the degree of uncertainty.

The following impacts of the project should be assessed:

} Air

- changes in ambient levels and ground level concentrations due to total emissions from point, line and area sources
- effects on soils, materials, vegetation, and human health

} Noise

- changes in ambient levels due to noise generated from equipment and movement of vehicles
- effect on fauna and human health

} Water

- availability to competing users
- changes in quality
- sediment transport
- ingress of saline water

} Land

- changes in land use and drainage pattern
- changes in land quality including effects of waste disposal
- changes in shoreline/riverbank and their stability

} Biological

- deforestation/tree-cutting and shrinkage of animal habitat.
- impact on fauna and flora (including aquatic species if any) due to contaminants/pollutants
- impact on rare and endangered species, endemic species, and migratory path/route of animals.
- Impact on breeding and nesting grounds

} Socio-Economic

- impact on the local community including demographic changes.
- Impact on economic status
- impact on human health.
- impact of increased traffic

**1.2.5 Assessment of Alternatives, Delineation of Mitigation Measures and Environmental Impact Assessment Report**

For every project, possible alternatives should be identified and environmental attributes compared. Alternatives should cover both project location and process technologies. Alternatives should consider no project option also. Alternatives should then be ranked for selection of the best environmental option for optimum economic benefits to the community at large.

Once alternatives have been reviewed, a mitigation plan should be drawn up for the selected option and is supplemented with an Environmental Management Plan (EMP) to guide the proponent towards environmental improvements. The EMP is a crucial input to monitoring the clearance conditions and therefore details of monitoring should be included in the EMP.

An EIA report should provide clear information to the decision-maker on the different environmental scenarios without the project, with the project and with project alternatives. Uncertainties should be clearly reflected in the EIA report.

### **1.2.6 Public Hearing**

Law requires that the public must be informed and consulted on a proposed development after the completion of EIA report.

Any one likely to be affected by the proposed project is entitled to have access to the Executive Summary of the EIA. The affected persons may include:

- } bonafide local residents;
- } local associations;
- } environmental groups: active in the area
- } any other person located at the project site / sites of displacement

They are to be given an opportunity to make oral/written suggestions to the State Pollution Control Board as per Schedule IV of **Annex I**.

### **1.2.7 Decision Making**

Decision making process involve consultation between the project proponent (assisted by a consultant) and the impact assessment authority (assisted by an expert group if necessary)

The decision on environmental clearance is arrived at through a number of steps including evaluation of EIA and EMP.

### **1.2.8 Monitoring the Clearance Conditions**

Monitoring should be done during both construction and operation phases of a project. This is not only to ensure that the commitments made are complied with but also to observe whether the predictions made in the EIA reports were correct or not. Where the impacts exceed the predicted levels, corrective action should be taken. Monitoring will enable the regulatory agency to review the validity of predictions and the conditions of implementation of the Environmental Management Plan (EMP).

### 1.3 Components of EIA

The difference between **Comprehensive** EIA and **Rapid** EIA is in the time-scale of the data supplied. Rapid EIA is for speedier appraisal process. While both types of EIA require inclusion/coverage of all significant environmental impacts and their mitigation, Rapid EIA achieves this through the collection of one season (other than monsoon) data only to reduce the time required. This is acceptable if it does not compromise on the quality of decision-making. The review of Rapid EIA submissions will show whether a comprehensive EIA is warranted or not.

It is, therefore, clear that the submission of a professionally prepared Comprehensive EIA in the first instance would generally be the more efficient approach. Depending on nature, location and scale of the project EIA report should contain all or some of the following components.

#### **Air Environment**

- Determination of impact zone (through a screening model) and developing a monitoring network
- Monitoring the existing status of ambient air quality within the impacted region (7-10 km from the periphery) of the proposed project site
- Monitoring the site-specific meteorological data, viz. wind speed and direction, humidity, ambient temperature and environmental lapse rate
- Estimation of quantities of air emissions including fugitive emissions from the proposed project
- Identification, quantification and evaluation of other potential emissions (including those of vehicular traffic) within the impact zone and estimation of cumulative of all the emissions/impacts
- Prediction of changes in the ambient air quality due to point, line and areas source emissions through appropriate air quality models
- Evaluation of the adequacy of the proposed pollution control devices to meet gaseous emission and ambient air quality standards
- Delineation of mitigation measures at source, path ways and receptor

## **Noise Environment**

- Monitoring the present status of noise levels within the impact zone, and prediction of future noise levels resulting from the proposed project and related activities including increase in vehicular movement
- Identification of impacts due to any anticipated rise in noise levels on the surrounding environment
- Recommendations on mitigation measures for noise pollution

## **Water Environment**

- Study of existing ground and surface water resources with respect to quantity and quality within the impact zone of the proposed project
- Prediction of impacts on water resources due to the proposed water use/pumping on account of the project
- Quantification and characterisation of waste water including toxic organic, from the proposed activity
- Evaluation of the proposed pollution prevention and wastewater treatment system and suggestions on modification, if required
- Prediction of impacts of effluent discharge on the quality of the receiving water body using appropriate mathematical/simulation models
- Assessment of the feasibility of water recycling and reuse and delineation of detailed plan in this regard

## **Biological Environment**

- Survey of flora and fauna clearly delineating season and duration.
- Assessment of flora and fauna present within the impact zone of the project
- Assessment of potential damage to terrestrial and aquatic flora and fauna due to discharge of effluents and gaseous emissions from the project
- Assessment of damage to terrestrial flora and fauna due to air pollution, and land use and landscape changes
- Assessment of damage to aquatic and marine flora and fauna (including commercial fishing) due to physical disturbances and alterations
- Prediction of biological stresses within the impact zone of the proposed project
- Delineation of mitigation measures to prevent and / or reduce the damage.

### **Land Environment**

- Studies on soil characteristics, existing land use and topography, landscape and drainage patterns within the impact zone
- Estimation of impacts of project on land use, landscape, topography, drainage and hydrology
- Identification of potential utility of treated effluent in land application and subsequent impacts
- Estimation and Characterisation of solid wastes and delineation of management options for minimisation of waste and environmentally compatible disposal

### **Socio-economic and Health Environment**

- Collection of demographic and related socio-economic data
- Collection of epidemiological data, including studies on prominent endemic diseases (e.g. fluorosis, malaria, filaria, malnutrition) and morbidity rates among the population within the impact zone
- Projection of anticipated changes in the socio-economic and health due to the project and related activities including traffic congestion and delineation of measures to minimise adverse impacts
- Assessment of impact on significant historical, cultural and archaeological sites/places in the area
- Assessment of economic benefits arising out of the project
- Assessment of rehabilitation requirements with special emphasis on scheduled areas, if any.

### **Risk Assessment**

- Hazard identification taking recourse to hazard indices, inventory analysis, dam break probability, Natural Hazard Probability etc.
- Maximum Credible Accident (MCA) analysis to identify potential hazardous scenarios
- Consequence analysis of failures and accidents resulting in fire, explosion, hazardous releases and dam breaks etc.
- Hazard & Operability (HAZOP) studies
- Assessment of risk on the basis of the above evaluations
- Preparation of an onsite and off site (project affected area) Disaster Management Plan

### **Environment Management Plan**

- Delineation of mitigation measures including prevention and control for each environmental component and rehabilitation and resettlement plan.
- Delineation of monitoring scheme for compliance of conditions
- Delineation of implementation plan including scheduling and resource allocation

## **1.4 Roles in the EIA Process**

IA involves many parties, grouped by their role definition within the process. The following section outlines the basic responsibilities of various bodies:

- The Project Proponent
- The Environmental Consultants
- The State Pollution Control Board / Pollution Control Committees (PCCs)
- The Public
- The Impact Assessment Agency

### **The Role of the Project Proponent**

The project proponent during the project planning stage decides the type of projects i.e. new establishment, expansion or modernisation. Later the project proponent needs to prepare the Detailed Project Report/Feasibility Report and submits the Executive Summary, which shall incorporate the project details, and findings of EIA study, which is to be made available to concerned public.

The proponent has to approach the concerned SPCB for NOC and holding the public hearing. After the public hearing the proponent submits application to IAA for environmental clearance.

### **Role of Environment Consultant**

Environmental consultant should be conversant with the existing legal and procedural requirements of obtaining environmental clearance for proposed project. The consultant should guide the proponent through initial screening of the project and establish whether EIA studies are required to be conducted and if so finalise the scope of such study. The consultant should also be fully equipped with required instruments and infrastructure for conducting EIA studies. The environmental consultant is responsible for supplying all the environment-related information required by the SPCB and IAA through the proponent. The consultant is also required to justify the findings in the EIA and EMP during the meeting with the expert groups at IAA.

### **The Role of the State Pollution Control Board (PCB) /Pollution Control Committee (PCC)**

The State PCBs/PCCs are responsible for assessing the compatibility of a proposed development with current operational and prescribed standards. If the development is in compliance, the PCB will then issue its NOC. They shall also hold the public hearing as per the provisions of EIA notification. The details of public hearing shall be forwarded to IAA.

### **The Role of the Public**

The public also has an important role to play in EIA. The concerned persons will be invited through press advertisement to review information and provide their views on the proposed development requiring environmental clearance.

### **The Role of the Impact Assessment Agency (IAA)**

Where a proponent is required to obtain environmental clearance, the IAA will evaluate and assess the EIA report. In this process the project proponent will be given a chance to present his proposal. If a project is accepted the IAA will also prepare a set of recommendations and conditions for its implementation based on this assessment. Environmental clearance conditions and recommendations of IAA are made available to the public on request through SPCB and through web site at <http://envfor.nic.in>. During the implementation and operation of the project, the IAA will also be responsible for the environmental monitoring process.

## **1.5 How to use this Manual?**

This Manual provides guidance for EIA appraisal and is mainly addressed to EIA reviewer in the Impact Assessment Agency.

Subsequent chapters outline what should be done in an EIA and how the pathways to conclusions are to be verified. The answer to the first question is provided in the form of sequence of analytical steps within EIA and this is designed to help the reviewer in judging the completeness and adequacy of EIA. The answer to the second question is provided in the form of good practices of EIA and its presentation. It is hoped that good practices of measurement and analysis delineated in the manual would help the reviewer in verifying the reliability of the results presented. The good practices of presentation outlined in this manual should be insisted upon by the reviewer and this would aid the transparency of EIA and ease of its verification. There could be many instances where the manual would not provide the desired guidance to the reviewer and in such cases the reviewer may like to consult the expert group. However, the manual would aid the reviewer in formulation of specific questions that the expert group needs to answer.

This manual also indirectly provides guidance to the project proponent in preparation and presentation of an EIA. This manual can also be used for preparation of Terms of Reference for an EIA and also to review an EIA prepared by a consultant / proponents team. The manual provides an answer to the reviewer What to look for in an EIA? and to the proponent What would the reviewer be looking for in an EIA? and thereby could improve the effectiveness of EIA process.