

HOSE

Gajbhiye

3

SUMMER SCHOOL

ON

**Environmental Impact Assessment
and Management of Coastal Zone:
An Integrated Approach**

7 – 27 August, 2001

Central Institute of Fisheries Education
(Deemed University-ICAR)
Versova, Mumbai

ENVIRONMENTAL IMPACT ASSESSMENT : A MANAGEMENT TOOL TO SAFEGUARD ENVIRONMENT AND CASE STUDIES

S. N. Gajbhiye

1. Introduction

Even in the absence of man, the natural environment undergoes continual changes. Some of these natural changes are irreversible (e.g. eutrophication of lake), while others are cyclic (e.g. the annual climatic cycle) or transient (i.e. droughts). Man increasing, control of his environment often creates conflicts between human goals and natural processes. In order to achieve greater yields or for other purposes, man deflects the natural flows of energy, by-passes natural processes, changes in food chains, simplifies ecosystems and uses large energy subsidies to maintain delicate artificial equilibria.

Human activities inevitably and increasingly bring about a redistribution of materials and energy in the environment. When such redistribution, initiated by human or other activities endangers or is likely to endanger human health or well being or human resources. We termed on pollution.

Pollutants are introduced by natural phenomena such as forest fires, volcanic eruptions, floods, collapsing river banks, or dams, as well as by nearly all human activities, exacerbated by urbanization and industrialization.

Environmental pollution is not an occurrence of recent past or the period since the onset of industrialization in the middle of the ninetieth century. Whatever measures we may introduce to safeguard the environment, the focus should be human being and their need. Therefore Stockholm conference on the Human Environment in 1972 truly said that "The major environmental problems of developing countries are essentially of a different kind".

They are predominantly problems that reflects the poverty and very lack of development of their societies. In their context, development becomes essentially a cure for their major environmental problems. For these reasons, concern for the environment must not and cannot detail from the commitment of the world

community, developing more industrial nation alike to the overriding task of development of the developing regions of the world.

Therefore, it would be appropriate that each country could have to strike its own balance between environmental and other interests in its development programmes.

2. Environmental Impact Assessment

Environmental Impact Assessment (EIA) which is defined as an activity designed to identify and predict the impact on the bio-geophysical environment and on man's health and well being of legislative proposals, policies, programmes, projects and operational procedures, and to interpret and communicate information about the impacts. In short EIA is an anticipatory mechanism which establishes quantitative values for parameters indicating the quality of environment and natural systems before, during and after the proposed developmental activity, thus allowing measures that ensure environmental compatibility and economic in decision making. EIA essentially involves five steps :

- (i) Project information.
- (ii) Baseline data collection.
- (iii) Identification of potential impacts and prediction of significant impacts.
- (iv) Suggest mitigation measures, and
- (v) Evaluation of impacts on a commensurate scale leading to the delineation of an Environmental Management Plan (EMP).

3. Background

The need for environmental assessment was clearly recognized at the Stockholm conference on the Human Environment in 1972. Thus UNEP was given that task and has been engaged in developing methodologies and modalities for sound environmental management.

The formal process that we know today as Environmental Impact Assessment or EIA resulted from the raising of environmental awareness during the 1950 and 1960. During this period it became increasingly evident that many industrial and development projects were producing undesirable environmental

consequences. In response to these problems the U.S.A. Government decided that mechanism was needed to ensure that all major Government development proposals were subjected to some sort of examination of the total environmental consequences. Therefore in January 1970, the U.S.A. congress enacted the National Environment Policy Act (NEPA) which was both the first comprehensive piece of environmental legislation and the first use of the concept of environmental impact assessment in the U.S., Essentially they were to be systematic and interdisciplinary evaluations of the potential environmental effects of all major federal actions. Since the enactment of NEPA, EIA legislation has been increased worldwide and even certain countries lacking environmental legislation produce environmental impact assessments selectively.

Since 1978, the government of India insisting that all new dams be assessed for their environmental impacts and that they obtain environmental clearance prior to construction. This was introduced to prevent, minimise or mitigate most of the adverse impacts. The guidelines for conducting environmental impact assessments of river valley projects were developed, in 1978, by the Department of Science and Technology (DST) and published, in 1985 by the Ministry of Environment and Forest (MoEF). These guidelines were very sketchy and did not prescribe a comprehensive assessment. Consequently in exercise of the power conferred by the Environment (Protection) Act, 1986, the Central Government through Ministry of Environment and Forest (MoEF) issued notification on 27th January, 1994 with detail procedure for EIA of development projects. Accordingly MoEF imposed restrictions and prohibitions on the expansion and modernization of any activity or new projects being undertaken in any part of India unless environmental clearance has been accorded by the Central Government or the State Government in accordance with the procedure specified in that notification was published as S.O.No. 80(E) dated 28th January, 1993. The provisions were amended in May, 1994 and later supplemented in April, 1997. As per modification now it require a public hearing for all projects subjected to EIA.

Certain types of development project require environmental clearance from the Ministry of Environment and Forests (MoEF). Clearance will be required for a stated capacity of the project. Expansion, therefore, would require further clearance. The clearance is valid for a period of five years within which

construction, operation or mining, as appropriate, should commence. The projects which require environmental clearance are listed in schedule I, an annexure to the Notification. There is a need to submit a report along with the application for environmental clearance. The EIA is one component of this submission. A Rapid EIA may be produced in the first instance. This will be based on data related to only one season. Often this is completed without going into field to collect new data, by using existing published and other data. Normally, developers do not produce their own EIA, but give contract work to commercial consultants in both the public and private sector. Clearance may be given on the basis of a Rapid EIA, or further information may be requested, in the form of a Comprehensive EIA, before clearance is considered. It contains a set of separate reports listed in the Notification. Special attention should be drawn to the Proforma, the EIA and the Environment Management Plan - EMP. Other reports that are, or may be required, depending upon the specific project, are - (a) Risk Analysis (RA) and (b) Disaster Management Plan (DMP).

A Risk Analysis is required for hazardous installation and should indicate the likelihood of hazardous events (such as explosions or other accidents) and the consequences that would arise especially the likely death rate.

A Disaster Management Plan (DMP) which would detail the procedures to be adopted by the company in the event of a major disaster at the site, such as evacuation, or emergency service procedures; a Comprehensive Rehabilitation Plan if more than 1,000 people are to be displaced to implement the project.

Proforma have been developed for the various project types listed in Schedule I of the Notification.

The Notification also details the content of the EIS in terms of the type of impact that should be covered.

EIA does not apply to all projects. There are two main exemptions. First if there is a modification to an existing project, EIA is not required as long as there is no net increase in pollution load. Often modernisation involves reductions in pollution load Secondly, EIA is not required for projects which are unlikely to cause

significant environmental impacts. In such cases, the project authority has to provide a justification as to why no EIA was required.

Review within EIA in India is undertaken, formally, by the MoEF in its present role as the Impact Assessment Agency (IAA). The IAA is fully supported by a committee of experts, which is set up specifically to consider the technical aspects of a particular project. One of their main functions is to prepare a recommendation as to whether the project should be approved by the ministry. Special attention should be drawn to the opportunity for the views of the public to be sought through a public hearing, based upon summary reports made available for the purpose.

The ministry of Environment and Forest has published a number of EIA guidelines detailing how EIA should be considered for particular sectors.

4. Basic Concepts and Applications

The actual working definition varies between countries. In general, an EIA is the process of identifying, predicting, interpreting and communicating the potential impacts that the proposed major project or plan will have on the environment.

An EIA process is often described as an assessment of how negatively or positively - a project affects various impact indicators.

An impact indicator is an element or parameter that provides some sort of measure of the magnitude of an environmental impact.

Examples of different indicators are :

- ◆ Level of employment,
- ◆ Loss of forest and vegetation,
- ◆ Changes in water quality parameters, flora and fauna and other ecological parameters.

The measurement may be either qualitative or quantitative depending on the parameter and the means of evaluating future changes. The assessment of the potential effects on a cross section of these impact indicators is the backbone of EIA.

5. General Aspects of EIA

In order to incorporate environmental amenities into a decision making process it is necessary to develop a complete understanding of the possible and probable consequences of a proposed action of the environment.

The word environment means different things to different people. Actually the word "environment" includes not only the areas of air, water, plants and animals but also other natural and man-modified features which constitute the totality of our surroundings.

Thus, the term environment means the whole complex of physical, chemical, social, cultural, economic and aesthetic factors which affect the individuals and communities and ultimately determine their form, character relationship and survival. The word impact means change - any change, positive or negative from desirability view point. An environmental impact analysis is therefore a study of the probable changes in the various socio-economic and biophysical characteristics of the environment which may result from a proposed or impending action. The EIA may be defined as the documentation of an environmental audit which includes identification, interpretation, prediction and mitigation of impacts caused by a proposed action or project.

6. Identification of Impacts

The environmental resources usually affected by various developments can be categorized as :

Physical Resources -

- ⇒ Physical processes
- ⇒ Water quality
- ⇒ Air quality
- ⇒ Soils

Ecological Resources -

- ⇒ Forestry
- ⇒ Flora and Fauna
- ⇒ Wildlife

Human Use Values -

- ⇒ Water Supply
- ⇒ Land use
- ⇒ Movement

Quality of Life Value -

- ⇒ Socio-economic
- ⇒ Archaeological/historical
- ⇒ Aesthetics
- ⇒ Human health

7. Environmental Management Plan (EMP)

EMP is an implementation plan for mitigation protection and / or enhancement measures which are recommended in the EIS. The EMP presents in detail how these measures should be operated, the resources required and the schedule for implementation. It is intended that in EMP, the implementation status of protection measures will be elevated to a level suitable for product. The protection measures which require formation of detailed implementation plans and therefore inclusion in EMP will be selected on basis of review of the EIS.

The EMP document should contain an implementation plan for each of the selected mitigative protection and enhancement measures. The EMP may consist of one or several implementation plans. Each of these should include the following :

- ❖ Objective
- ❖ Work Plan or Design criteria
- ❖ Implementation Schedule
- ❖ Manpower requirements and
- ❖ Monitoring

8. Environmental Impact Statement (EIS)

The EIA is to be followed by preparation of EIS. An EIS is a final analysis to an EIA. The EIS should cover the following items -

- (i) A brief description of the project.
- (ii) Description of the existing environment.
- (iii) Likely impacts of the proposed projects.
 - ❖ Adverse and beneficial
 - ❖ Reversible and irreversible : and
 - ❖ Where the impacts are likely to be short/and/or loss term
- (iv) Mitigation, protection and enhancement measures
- (v) Consideration of Alternatives
- (vi) Consideration of 'No change alternative'.
- (vii) Summary and Conclusions.
 - ❖ A review of gains versus losses.
 - ❖ Explanation of unavoidable adverse impacts have been minimised.
 - ❖ Provision for follow up surveillance and monitoring.

In the past, environmental factors were considered "free of charge". But depletion of resources and overloading the environmental carrying capacity of "Spaceship Ear" as our planet is called, led to increasing environmental costs. Environmental costs must be made part of the weighing process called decision making.

In short the purpose of EIA is to identify and evaluate the potential impacts (beneficial and adverse) of development projects on the environmental system. It is an useful aid of decision making based on understanding of the environmental implications including social, cultural and aesthetic concerns which should be integrated with the analysis of the project costs and benefits. Thus the purpose of EIA can be summarised on the presentation of environmental consequences of certain activities so that these factors can be considered intelligently and responsibly when reaching a final decision.