ENVIRONMENTAL IMPACT ASSESSMENT

Introduction

EIA can be defined as the study to predict the effect of a proposed activity/project on the environment.

EIA compares various alternatives for a project and seeks to identify the one which represents the best combination of economic and environmental costs and benefits.

EIA integrates the environmental concerns in the developmental activities right at the time of initiating for preparing the feasibility report. It enables the integration of environmental concerns and mitigation measures in project development.

EIA can often prevent future liabilities or expensive alterations in project design.

3 Core values of EIA

- Integrity: the EIA process should be fair, objective, unbiased and balanced.
- Utility: the EIA process should provide balanced, credible information for decision making.
- Sustainability: the EIA process should result in Environmental Safeguard.

Environmental Assessment has many benefits:

- Protection of Environment
- Optimum utilization of resources
- Saves overall time and cost of the project
- Promotes community participation
- Informs decision makers
- Lays base for environmentally sound projects.

EVOLUTION & HISTORY OF EIA:

Environmental Impact Assessment started as a mandatory regulatory procedure originated in the early 1970's with the implementation of the National Environmental Policy act (NEPA) 1969 in the US.

EIA process took off after the mid 1980's, after World Bank adopted EIA for major development projects, in which borrower country had to undertake the EIA under the Bank's supervision.

Now EIA is a formal process in more than 100 countries.

Environmental Clearance from central government is required for 32 categories of development projects – under industrial sectors:

- Mining
- Thermal power plants
- River valley
- Infrastructure (road, highways, ports, harbors, and airports)
- Industries including very small electroplating in foundry units

Environmental Impact Assessment – Cycle & Procedure

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

- Screening
- Scoping & consideration of alternatives
- Baseline data collection
- Impact Analysis
- Mitigation and Environmental Impact statement
- Public hearing
- Environmental Management Plan
- Decision Making
- Monitoring the Clearance Condition

Screening:

First stage of EIA, which determines whether the proposed project requires an EIA and if it requires EIA, then the level of assessment required.

Screening criteria for determining the level of review required are relatively well defined. Screening criteria are based upon:

- Scales of investment
- Type of development
- Location of development

Project Category 'A' :

Projects in this category typically require an EIA. The project type, scale and location determine this designation.

The potentially significant environmental issues for these projects may lead to changes in land-use, as well as changes to social, physical, and biological environment.

Screening:

Project Category 'B' :

Only difference between projects in this category and those in Category 'A' is the scale. Larger Power plants fall under category 'A', Medium Sized Power Plants projects are in category 'B'.

These projects are not located in environmentally sensitive area. Mitigation measures for these projects are more easily prescribed.

Project Category 'C':

This category is for projects that typically do not require an environmental assessment. These projects are unlikely to have adverse environmental impacts.

Scoping:

This stage identifies key issues and impact that should be further investigated. This stage also defines the boundary and the time limit of the study.

It is done by consultant in consultation with the project proponent and guidance by the agency.

Quantifiable impacts are to be assessed on the basis of magnitude, prevalence frequency and duration and non quantifiable impact (aesthetic or recreational value). Significance is usually 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.

Baseline Data:

Impact prediction is a way of 'mapping' the environmental consequences of the significant aspects of the projects 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 projects should be assessed:

AIR:

- Changes in the ambient level and the ground level concentrations due to emissions from point, line and area source.
- Effects on soils, materials, vegetations and human health.

NOISE:

- Changes in the ambient level due to noise generated from equipment and movement of vehicles.
- Effects on fauna and human health.

Baseline Data:

WATER

- Availability to competing users
- Changes in the quality
- Sediment transport
- Ingress of saline water

LAND

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

BIOLOGICAL

- Deforestation and shrinkage of animal habitat
- Impact on flora and fauna due to contaminants/pollutants.
- Impact on rare and endangered species, endemic species and migratory path of animals including birds.
- 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.

Assessment of Alternatives,

Delineation of Mitigation Measure and

Environmental Impact Assessment Report

For every project possible alternative should be identified and environmental attributes compared.

Alternatives for project location & process technologies

Alternative of 'no project' should also be considered.

Based on the best environmental option for optimum economic benefits to the community at large, alternatives should be ranked.

Mitigation plan for the selected option have to be drawn, and is supplemented with the Environmental Management Plan (EMP) to guide towards, Environmental Improvement.

EMP is critical for monitoring the clearance conditions, and henceforth details of monitoring should be included.

Thus the EIA Report prepared should provide the decision maker with the information on different environmental scenarios like:

- With the project
- Without the project
- With project alternatives
- Uncertainties should also be reflected in the EIA report.

Public Hearing after EIA report is made public must be informed and consulted on the proposed development.

Summary of the EIA report have to be provided to the people affected due to the proposed project:

- Bonafied local resident
- Local associations
- Environmental groups active in the area
- Any other person located at the project site/sites of displacement

Decision Making

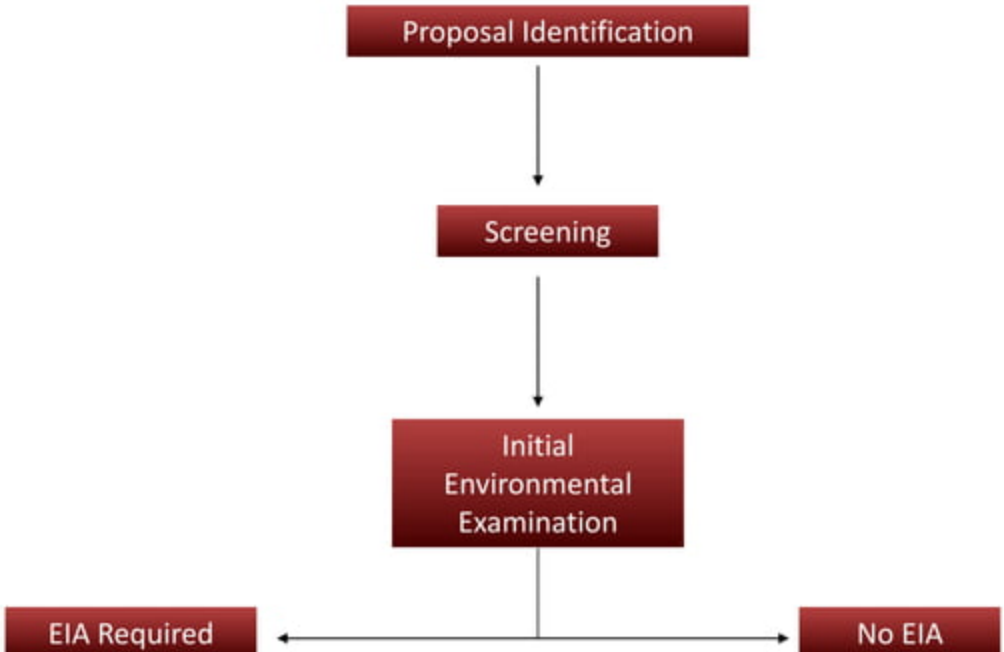
Consultation between the project proponent (assisted by a consultant) and the impact assessment authority (assisted by an expert group if necessary).

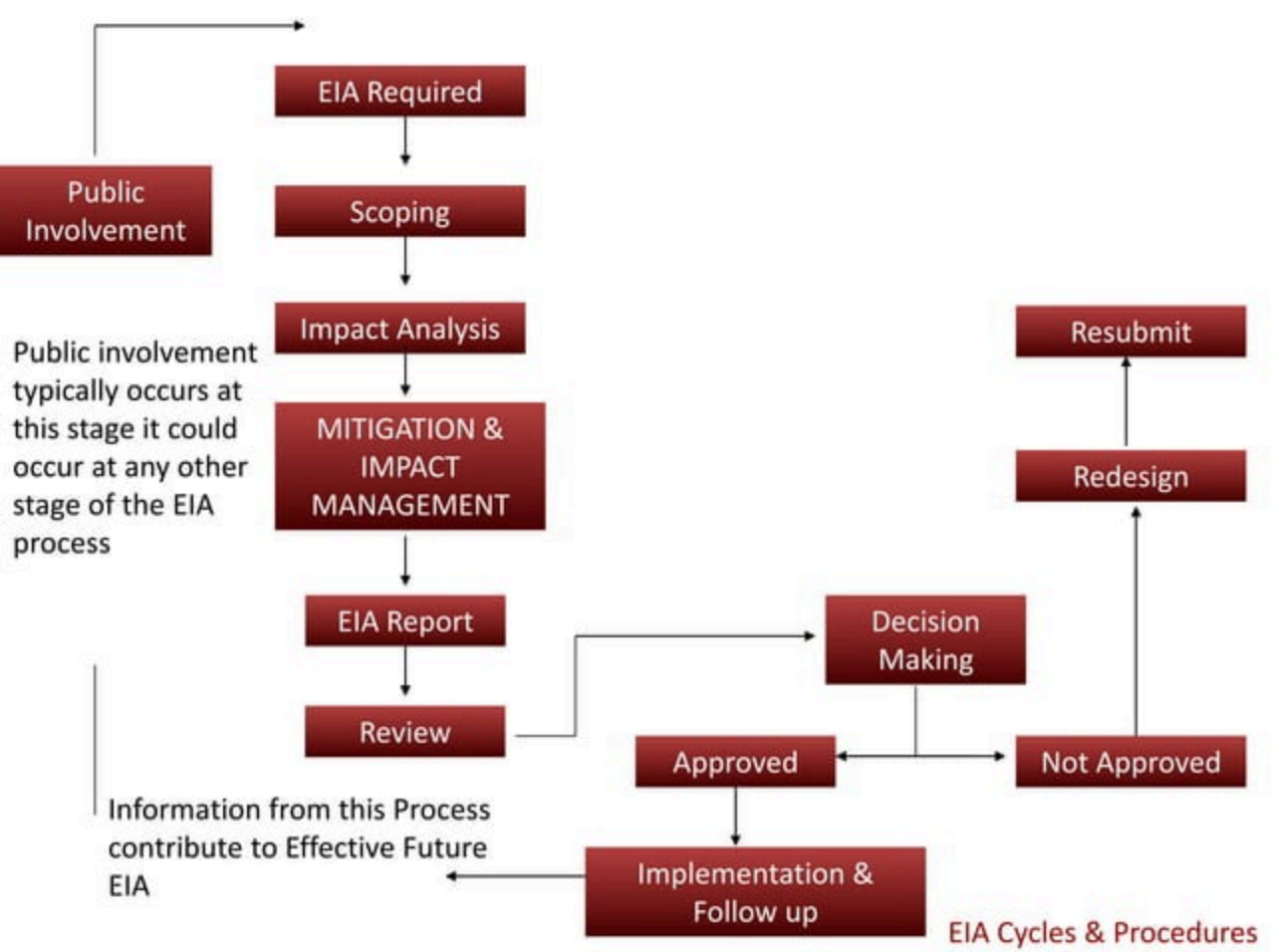
The decision on environmental clearance is arrived at through a number of steps including evaluation of EIA & EMP

Monitoring The Clearance Conditions:

- Monitoring should be done during both construction and operation phase of a project.
- This ensure that the commitments made are compiled and the if the prediction made in the EIA report are correct.
- Corrective actions should be taken if the impact exceeds the predicted levels.

EIA Process:


Proposal Identification
Screening
Initial Environmental Examination
EIA Required
No EIA


EIA Required
Public Involvement
Scoping
Impact Analysis
Public involvement typically occurs at this stage it could occur at any other stage of the EIA process
MITIGATION & IMPACT MANAGEMENT
EIA Report
Review
Decision Making
Approved
Not Approved
Resubmit
Redesign
Information from this Process contribute to Effective Future EIA
Implementation & Follow up
EIA Cycles & Procedures

Components of EIA

Comprehensive EIA and Rapid EIA vary only in the time scale of the data supplied. i.e.

- Rapid EIA is for speedier appraisal process.
- Rapid EIA achieves this through the collection of 'one season' data, which ever is stressful for the project, only to reduce the time required.
- But this is acceptable only if it does not compromise on the quality of decision making.

Depending on the nature, location and the scale of the project EIA report should contain all or some of the following components:

- AIR ENVIRONMENT
- NOISE ENVIRONMENT
- WATER ENVIRONMENT
- BIOLOGICAL ENVIRONMENT
- LAND ENVIRONMENT
- SOCIO-ECONOMIC & HEALTH ENVIRONMENT
- RISK ASSESSMENT
- ENVIRONMENT MANAGEMENT PLAN

AIR ENVIRONMENT:

- Determination of the impact zone and developing a monitoring network.
- Monitoring the existing status of ambient air quality within the impacted region (7-10 km from the periphery)
- Monitoring site specific meteorological data – wind speed, wind direction, humidity, ambient temperature and environmental lapse rate.
- Estimation of qualities of air emission from the proposed site.
- Identification and quantification and evaluation of other potential emissions within the impact zone.
- Prediction of the changes in the ambient air quality through air quality model.
- 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, pathways and receptors.

NOISE ENVIRONMENT:

- Monitoring the present status of noise levels within the impact zone.
- Predicting the future noise levels resulted from the proposed project, including the 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 quality and the quantity within the impact zone of the proposed project.
- Prediction if the impact on the water resources due to may be pumping/ use of water in the project.
- Quantification and characteristics of the waste water including toxic, organic from the proposed activity.
- Evaluation of the proposed pollution prevention and waste water treatment system if required.
- Prediction of impacts of effluents discharge on the quality of the receiving water body using appropriate 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 the flora and fauna within the impact zone of the project
- Assessment of the potential damage to terrestrial and aquatic flora and fauna due to discharge of effluent and gaseous emissions from the projects.
- 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 due to physical disturbance and alternations
- 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 pattern within the impact zone.
- Estimation of impacts of projects on land-use, landscape, topography, drainage and hydrology.
- Identification of potential utility of treated effluent in land application and subsequent impacts.
- Estimation and characterization of solid wastes and delineation of management options for minimization 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 and morbidity rates among population within the impact zone.
- Projection of anticipated changes in the socio-economic and health due to the project and related activities
- Delineation of measures to minimize adverse impacts.
- Assessment of impact on significant historical, cultural and archeological sites places in the area.
- Assessment of economic benefits arising out of the projects
- Assessment of rehabilitation requirements with special emphasis on scheduled areas.

RISK ASSESSMENT:

Hazard identification taking recourse to hazard indices, inventory analysis, dam breaking probability, natural hazard probability.

Maximum credible accidents analysis to identify potential hazardous scenarios.

Consequences analysis of failures and accidents resulting in fire, explosion, hazardous releases and dam breaks etc.

Hazard & operability studies

Assessment of risks on the basis of the above evaluations.

Preparations of an onsite and off site Disaster Management Plan

ENVIRONEMENT 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 allocations.

EIA benefits and flaws

BENEFITS:	FLAWS:
• Provides systematic method of impact assessment	Time consuming
• Estimates the cost/benefit trade-off of alternative actions.	Costly
• Facilitates the public participation	Little public participation in actual implementation
• Provides an effective mechanism for 1. Coordination 2. Environmental integration 3. Negotiations 4. Feed back	Unavailability for reliable data (mostly in developing countries
• Top- level decision making	Too focused to scientific analysis (sometime)
• Achieves a balance between the impact of development and environmental concern	Compliance monitoring after EIA is seldom carried out.