Chapter 1: Introduction to EIA

Contents: Definition and Importance; Evolution; Planning and Management of Impact studies

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Definitions:

- **Environment:** defined as a system having inter-relationship between biophysical and socio-economic components.
- **Impact:** defined as changes, beneficial or non-beneficial, brought about by an activity in the environment.
- **Assessment**: defined as the quantification of the changes/effects by research works/evaluation.

Environmental Impact Assessment: Defined as the systematic approach for identification, prediction and evaluation of the effect on the environment due to any activity.

Why EIA?

EIA is intended to prevent or minimize potential adverse impacts and enhance the overall quality of a project.

The main benefits of EIA are:

- Lower project cost in long term
- Increased project acceptance
- Improved project design

Scope of Environmental Impact Assessment:

- Apply to all projects that are expected to have a significant environmental impact and address all the impacts that have significance.
- Compute all alternatives to a proposed project using management techniques and mitigation measures.
- Result in a clear EIS which conveys the importance of the likely impacts and their specific characteristics to non-experts as well as experts in that field.
- Include broad public participation and stringent administration review procedures.

- Be timed so as to provide information for decision making.
- Be enforceable
- Include monitoring and feedback procedures**.**

Evolution of EIA Worldwide (source: T.V.Ramachandra, Prof, IISc)

United States of America was the first country to assign mandatory status to EIA through its National Environmental Protection Act (NEPA) of 1969. EIA became an integral part of World Bank policy in 1987 which states that environmental issues must be addressed as part of overall economic policy. In 1989, the World Bank issued the Operational Directive on Environmental Assessment (O.D. 4.00), which was revised and updated in October 1991 (O.D. 4.01). Asian Development Bank in 1990 published guidelines for EIA (ADB, 1990). Evolution of EIA worldwide is given in table 1.

Table 1

Evolution of EIA Worldwide

Australia	Environmental Protection (Impact of Proposals) Act 1974, Commonwealth of Australia
Bangladesh	No specific EIA legislation, however there was a Declaration that Environmental Impact Assessments should be carried out for all major development projects, 1995
China	Environmental Protection Law, 1979
USA (California)	California Environmental Quality Act (CEQA) of 1971
Canada	Federal Environmental Assessment and Review Process Guidelines Order 1984, Canada
France	Law on Protection de la Nature, 1978
India	Notifications dated May 5, 1994 under the Environment Protection Act, 1986
Japan	Principles for Implementing EIA by Environmental Agency, 1984
Malaysia	Environmental Quality (Prescribed Activity) (EIA) Order, 1987
New Zealand	Resource Management Act 1991, New Zealand
Philippines	Presidential Decree (PD) 1151 Philippines Environment Policy, 1975 PD 1586 Establishing the Environmental Impact Statement (EIS), 1978 Rules and Regulations to Implement the EIS System, 1987
Sri Lanka	National Environmental Act 1980, amended in 1986
Thailand	Improvement and Conservation of National Environmental Quality Act 1975, amended in 1978
The Netherlands	EIA Policy, 1986
United States	US Environmental Policy Act, 1969
Vietnam	Environmental Protection Law, 1994
Western Australia	Environmental Protection Act 1986
West Germany	Cabinet Resolution, 1975

Evolution of EIA in INDIA

On 27 January 1994, the Union Ministry of Environment and Forests (MEF), Government of India, under the Environmental Protection Act 1986, promulgated an EIA notification making Environmental Clearance (EC) mandatory for expansion or modernization of any activity or for setting up new projects.

2006-mandatory for various projects such as mining, thermal power plants, river valley, infrastructure (road, highway, ports, harbours and airports) and industries including very small electroplating or foundry units to get environment clearance.

Objectives of EIA

- To predict environmental impacts at an early stage in project planning and design.
- Fulfill the responsibilities of each generation as a transfer of the environment for succeeding generation.
- Assure all citizens safe, healthful, productive and aesthetically & culturally pleasing surrounding.
- Attain the widest range of beneficial uses of the environment without degradation, risk to health or other undesirable and uninterested consequences.
- Preserve important cultural, historical and natural aspects of our national heritage and maintain where possible an environment that supports diversity and variety of individual choice.
- To achieve a balance between population and resource use that will permit high standard of living.
- Enhance the quality of renewable sources and approach the maximum attainable recycling of depletable resources.
- Preparing a detailed statement that covers five areas
    i. The environmental impact of proposed action.
    ii. Any adverse environmental effects that cannot be avoided if project came up.
    iii. Alternatives to proposed action.
    iv. The relationship between local short term uses of human environment and the maintenance and enhancement of long term productivity.

v. Any irreversible and irretrievable commitments of resources that would be involved in the proposed action when implemented

Important terminologies

1. **Environmental Impact Statement (EIS)** The environmental impact statement (EIS) provides documentation of the information and estimates derived from the various steps in the EIA process. The information contained in a EIS provides the decision-makers/regulators with valuable information that could ultimately contribute to either the abandonment or substantial modification of a proposed development action.
   A typical EIS contains the following three parts:

   Part 1 – Methods and key issues: This part deals with the statement of methods used and a summary of key issues.

   Part 2 – Background to the proposed development: This part deals with preliminary studies (i.e., need, planning, alternatives, site selection, etc.), site description/baseline conditions, description of proposed development and construction activities and programmes.

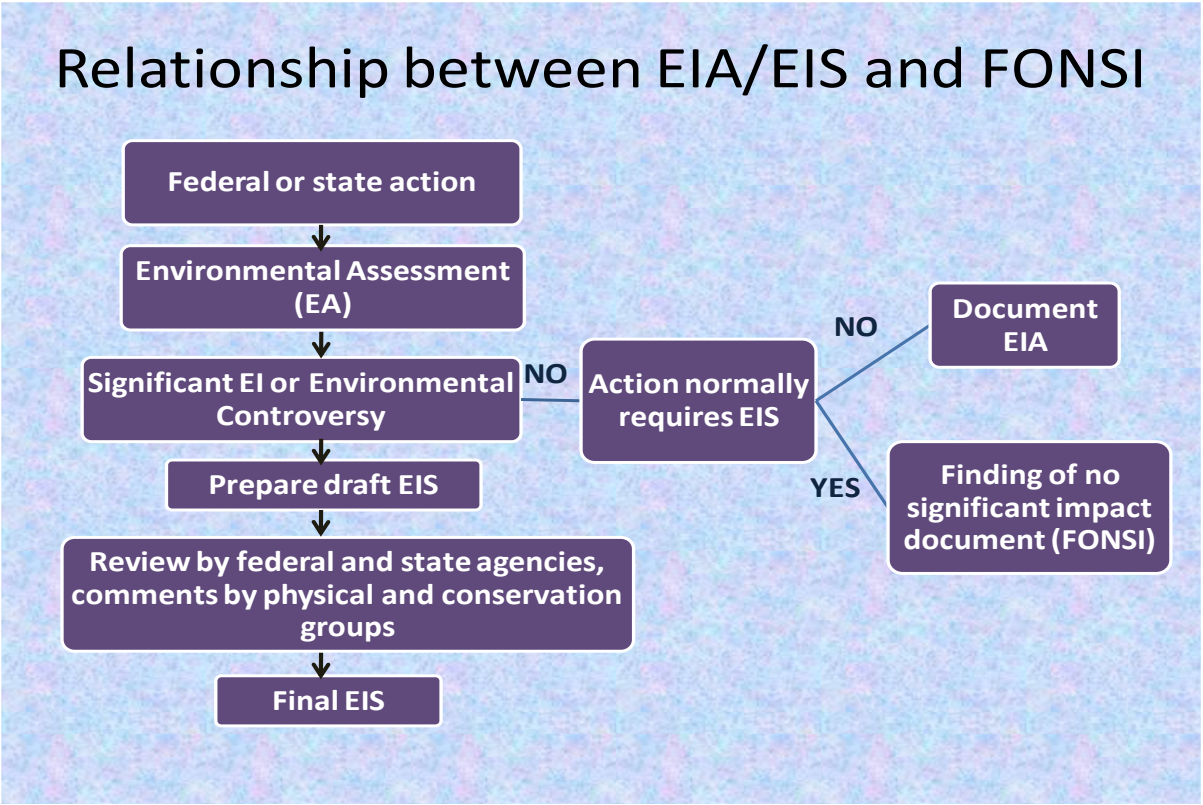
   Part 3 – Environmental impact assessments on topic areas: This part deals with land use, landscape and visual quality, geology, topography and soils, hydrology and water quality, air quality and climate, terrestrial and aquatic ecology, noise, transport, socio-economic and interrelationships between effects.

2. Initial Environmental Examination (IEE)

- IEE is a means of reviewing the environmental integrity of projects to help determine whether or not the EIA level studies can be undertaken
- Used for project screening to determine which projects require a full scale EIA.
- Can be carried out within a limited budget
- Professional judgment or recorded information

3. **Finding Of No Significant Impact (FONSI)**

- In those projects which normally requires an EIS, if an assessment concludes that the environmental impact is not significant, then a FONSI document can be prepared. However, this document should include either environmental assessment or its summary and other documents related to it.



The EIS document should follow the format and content as provided by government regulations and proponent agency requirements. The first step in the development of this document is the preparation of a draft EIS. After inter-agency and public review, a final EIS is prepared, which addresses opposing responsible views expresses by other agencies and public. Between those actions having obvious and significant environment impact requiring an EIS, and those having nearly none, there are a large variety of actions where it is difficult to determine, offhand, the extent of their impacts. To prevent a decision maker from resorting to snap judgments in such instances, an EIA should be prepared. This is an analysis much like an EIS, but it is not prepared in the same depth, nor need it include all the elements of an EIS.

A properly prepare EIA should enable the decision maker to conclude whether the environment impact is or is not significant, and if the action could be environmental controversial. Whenever it is concluded that environment impact will result from proposed action, a draft EIS must be prepared.

Those projects which normally require an EIS, if an assessment concludes that the environment impact is not significant, then a Finding Of No Significant Impact (FONSI) document can be prepared. This document should include either the environmental assessment or its summary and other environmental documents related to it.

EIA process

Steps

- Project Screening
- Scoping
- Consideration of alternatives
- Establishing the Environmental baseline
- Impact Identification
- Impact Prediction
- Evaluation
- Mitigation
- Public Participation
- EIS
- Monitoring
- Auditing

Project Screening

- ✓ This entails the application of EIA to those projects that may have significant environmental impacts.
- ✓ A screening mechanism seeks to focus on those projects with potentially significant screening environmental impacts or where the impacts are not fully known.

Scoping

- The scope of the EIA depends on the impacts and issues that it addresses.
- The process of scoping is to determine the key impacts of the project.
- Scoping should begin with the identification of individuals, communities, local authorities and statutory consultees likely to be affected by the project.
- The end result of this process of information collection and negotiation should be the identification of key issues and impacts, an explanation of why other issues are not considered significant and, for each key impact, a defined temporal and spatial boundary within which the impact will be measured.

Consideration of Alternatives

By considering alternatives, the worth of the option is determined with other credible alternatives, in environmental, functional, economic and social terms.

The rigorous comparison of viable alternatives:

- Strengthens decision-making;
- Strengthens public credibility;
- Improves the methodology of the EIA and the integration of the techniques used for relative comparisons.

Establishing the Environmental Baseline

- ❖ The establishment of environmental baseline includes both the present and likely future state of the environment, assuming that the project is not undertaken, taking into account changes resulting from natural events and from other human activities.
- ❖ For Example, the population of a species of fish in a lake may already be declining even before the potential introduction of an industrial project on the lakeshore.
- ❖ The studies should focus as quickly as possible on those aspects of the environment that may be significantly affected by the project, either directly or indirectly.

Documentation

- ✓ A description of the environmental components that may be significantly affected by the project.
- ✓ An explanation of the derivation of environmental indicators chosen to represent environmental components.
- ✓ Base maps for spatial data.

Baseline values, or some other appropriate form of quantitative and qualitative information, for environmental components or resources that may be affected either directly or indirectly by project activities.

Impact Identification

- Impact Identification brings together project characteristics and baseline environmental characteristics with the aim of ensuring that all potentially significant environmental impacts are identified and taken into account in the EIA process.

- A wide range of methods has been developed for the purpose. In selecting the most appropriate tools, the following key considerations may be useful:
    - Use, alternatives, public involvement, resources, familiarity, issue significance, administrative constraints, etc,.
- The various methodologies examined can be divided into the following five types based on the way impacts are identified:
    - Ad hoc
    - Overlays
    - Checklists
    - Matrices
    - Networks

Environmental Impact

- The Impact depends on the nature, scale and location of the proposed activity, and it includes the effect on the natural resource base and socio-economic components of the environment which determine the cost of environmental management.
- Identification phase of study:
    - Compile the list of key impacts such as changes in air quality, noise levels, wildlife habitats, species diversity, landscape views, social and cultural systems, settlement patterns and employment levels.
    - Name all the project's sources of impacts (e.g., smoke emissions, water consumption, etc.,) using checklists or questionnaires and then list possible receptors in the environment (e.g., crops, communities using the same water for drinking, etc.,) by surveying the existing environment and consulting with interested parties.

Impact Prediction

- ✓ The next logical step is Impact Prediction, which answers the question:

What will be the extent of the changes..?????

- ✓ Prediction draws on the physical, biological, socio-economic and anthropological data and techniques. In quantifying impacts, it may employ various tools such as

mathematical models, photomontages, physical models, socio-cultural models, economic models, experiments, expert judgments, etc.

Impact Evaluation

- ✓ This step evaluates the predicted adverse impacts to determine whether they are significant enough to warrant mitigation, which answers the question:

Do the changes matter……..?????

- ✓ The judgment of significance can be based on one or more of the following:
    - Comparison with laws, regulations or accepted standards.
    - Consultation with the relevant decision-makers.
    - Reference to pre-set criteria such as protected sites, features, or species.
    - Consistence with government policy objectives.
    - Acceptability to the local community or the general public.

Prediction/Assessment of Impacts

- ✓ A description of major issues
- ✓ Documentation of the cause and effect relationships between planned project activities and the environmental components.
- ✓ Identification of secondary or higher order effects with clearly defines pathways of impacts from higher order effects.
- ✓ No. of stated assumptions, their probability of occurrence and degree of impact
- ✓ Methods used to predict impacts
- ✓ An assessment of the significance of predicted impacts, methods or approaches to assigning impact significance
- ✓ Justification for the choice of methods used to predict environmental impacts

Mitigation

- If the answer to the evaluate question is in the affirmative, i.e., the changes do matter, then the EIA proceeds to find an answer to the question:
    - What can be done about them……..?????

- The possible mitigation measures include:
  - ✓ Changing project sites, routes, locations, designs, etc.
  - ✓ Introducing pollution controls, waste treatment, monitoring, landscaping, etc.
  - ✓ Offering Compensation
- The mitigation plan should be supplemented with an environmental management plan (EMP) to guide the proponent towards environmental improvements.

Development of Mitigation Measures

- ✓ A description of measures considered to mitigate or offset damaging impacts from project activities.
- ✓ A description of the costs and benefits for each recommended environmental protection option developed, as well as a comparison of each option
- ✓ Appropriateness and cost effectiveness of measures
- ✓ A description of technology used in measures and level of skill required to operate and maintain it
- ✓ A time schedule for implementation of measures
- ✓ A drawing or table that illustrates how mitigation measures address the significant environmental issues.

Public participation

Projects or programmes have significant impacts on the local population. Whilst the aim is to improve the well being of the population, a lack of understanding of the people and their society may result in development that has considerable negative consequences. To allow for this, public participation in the planning process is essential. The EIA provides an ideal forum for checking that the affected public have been adequately consulted and their views taken into account in project preparation.

There are no clear rules about how to involve the public and it is important that the process remains innovative and flexible. In practice, the views of people affected by the plan are likely to be heard through some form of representation rather than directly. It is therefore important to understand how decisions are made locally and what are the methods of communication, including available government extension services. The range of groups outside the formal structure with relevant information are likely to

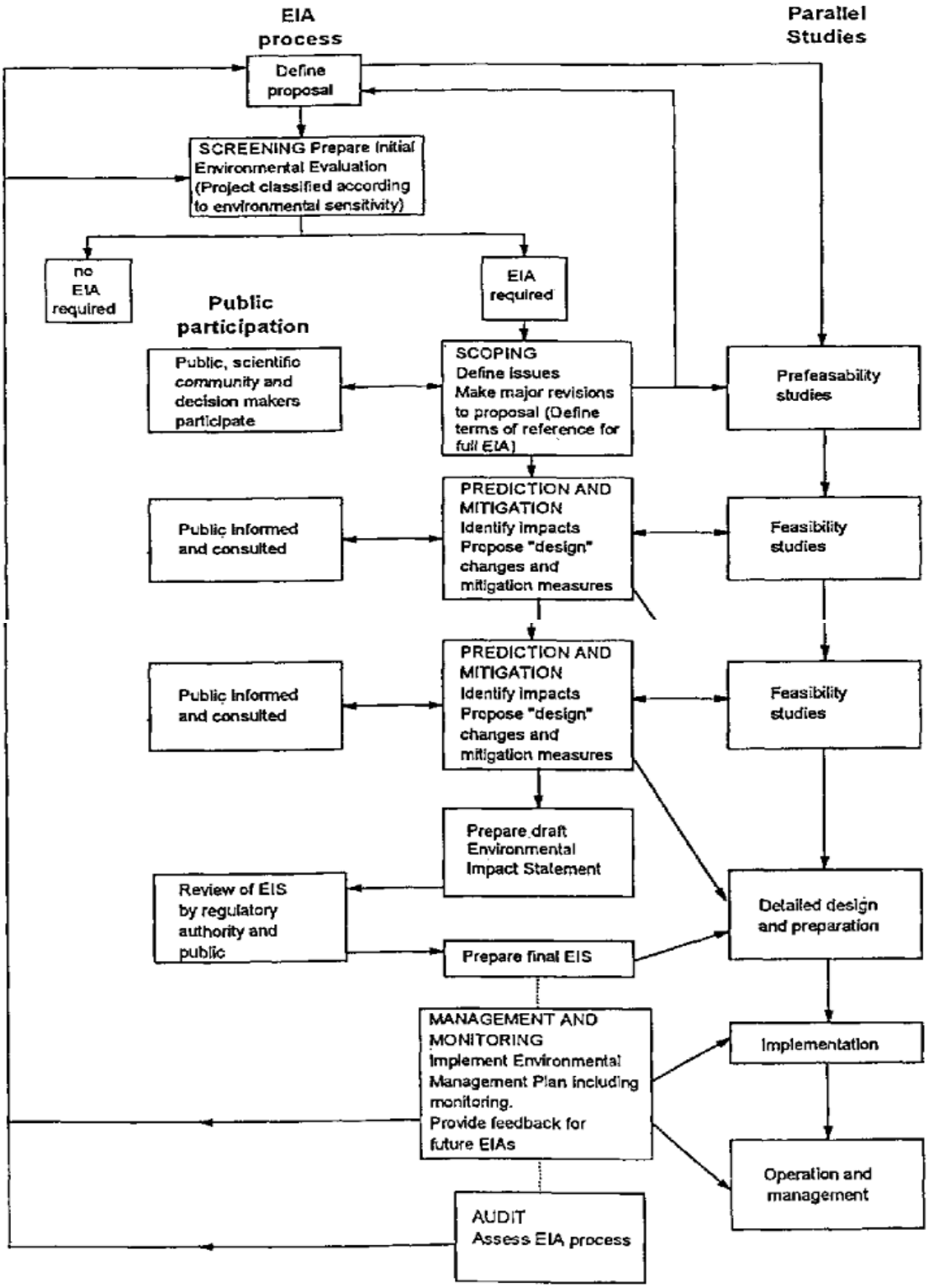
include: technical and scientific societies; Water User Groups; NGOs; experts on local culture; and religious groups. However, it is important to find out which groups are under-represented and which ones are responsible for access to natural resources, namely: grazing, water, fishing and forest products. The views of racial minorities, women, religious minorities, political minorities and lower cast groups are commonly overlooked.

Information dissemination can be achieved using a number of mechanisms including the broadcasting media, in particular newspapers and radio. Posters and leaflets are also useful and need to be distributed widely to such locations as schools, clinics, post offices, community centres, religious buildings, bus stops, shops etc. The EIA process must be seen to be fair.

The public participation/consultation and information dissemination activities need to be planned and budgeted. The social scientist team member should define how and when activities take place and also the strategy: extensive field work is expensive. It is important to note that public participation activities are often reported as a separate section of the final EIA. Where experience of managing community involvement is limited, training is highly recommended.

Auditing

In order to capitalise on the experience and knowledge gained, the last stage of an EIA is to carry out an **Environmental Audit** some time after completion of the project or implementation of a programme. It will therefore usually be done by a separate team of specialists to that working on the bulk of the EIA. The audit should include an analysis of the technical, procedural and decision-making aspects of the EIA. Technical aspects include: the adequacy of the baseline studies, the accuracy of predictions and the suitability of mitigation measures. Procedural aspects include: the efficiency of the procedure, the fairness of the public involvement measures and the degree of coordination of roles and responsibilities. Decision-making aspects include: the utility of the process for decision making and the implications for development. The audit will determine whether recommendations and requirements made by the earlier EIA steps were incorporated successfully into project implementation. Lessons learnt and formally described in an audit can greatly assist in future EIAs and build up the expertise and efficiency of the concerned institutions.


EIA process
Parallel Studies
Define proposal
SCREENING Prepare Initial Environmental Evaluation (Project classified according to environmental sensitivity)
no EIA required
EIA required
Public participation
Public, scientific community and decision makers participate
SCOPING
Define issues
Make major revisions to proposal (Define terms of reference for full EIA)
Prefeasability studies
Public informed and consulted
PREDICTION AND MITIGATION
Identify impacts
Propose "design" changes and mitigation measures
Feasibility studies
Public informed and consulted
PREDICTION AND MITIGATION
Identify impacts
Propose "design" changes and mitigation measures
Feasibility studies
Prepare draft Environmental Impact Statement
Review of EIS by regulatory authority and public
Detailed design and preparation
Prepare final EIS
MANAGEMENT AND MONITORING
Implement Environmental Management Plan including monitoring.
Provide feedback for future EIAs
Implementation
Operation and management
AUDIT
Assess EIA process

HOME WORK for students

1. What is NEPA? Explain its role?
2. Write a short note on CEQ, its regulations and Clauses.
3. Write a short note on Environmental Act 1986 of India.