

Introduction to Environment Impact Assessment

1. Introduction

Environment Impact Assessment or EIA can be defined as the study to predict the effect of a proposed activity/project on the environment.¹ A decision making tool, 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 systematically examines both beneficial and adverse consequences of the project and ensures that these effects are taken into account during project design. It helps to identify possible environmental effects of the proposed project, proposes measures to mitigate adverse effects and predicts whether there will be significant adverse environmental effects, even after the mitigation is implemented. By considering environmental effects and mitigation early in the project planning cycle, environmental assessment has many benefits, such as protection of environment, optimum utilisation of resources and saves overall time and cost of the project. Properly conducted EIA also lessens conflicts by promoting community participation, informs decision makers, and helps lay the base for environmentally sound projects. Benefits of integrating EIA have been observed in all stages of a project, from exploration and planning, through construction, operations, decommissioning, and beyond site closure.

EIA – Three core values

- **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 safeguards

Source: The manual in perspective, EIA Training Resource Manual, United Nations Environment Programme. 2002. p 110

2. Evolution and history of EIA

EIA is one of the successful policy innovations of the 20th Century for environmental conservation. Thirty-seven years ago, there was no EIA but today, it is a formal process in many countries and is currently practiced in more than 100 countries.² EIA as a mandatory regulatory procedure originated in the early 1970s, with the implementation of the National Environment Policy Act (NEPA) 1969 in the US. Much of the initial development was in a small number of high-income countries, like Canada, Australia, and New Zealand (1973-74). However, there were some developing countries as well, which introduced EIA relatively early - Columbia (1974), Philippines (1978).

The EIA process really took off after the mid-1980s. In 1989, the World Bank adopted EIA for major development project, in which borrower country had to undertake the EIA under the Bank's supervision (see table 1: *Evaluation and history of EIA*).

¹Some other definitions of EIA:

A study of probable changes in various socio-economic and biophysical characteristics and the environment, which may result from a proposed or impending action' (Jain, Urban, Stacey, 1977).

An activity that aims at establishing quantitative values for selected parameters, which indicate the quality of environment before, during, and after the proposed activities' Heer, Hagerty (1977).

An instrument to identify and assess the potential environmental impacts of a proposed project, evaluate alternatives, and design appropriate mitigation, management, and monitoring measures (World Bank)

² Christopher Wood; *Environmental Impact Assessment in Developing countries: An Overview; Conference on New Directions in Impact Assessment for Development: Methods and Practice (24-25 November 2003); EIA Centre, University of Manchester*

Table 1 Evolution and history of EIA

| | Development of EIA |
|----------------------------|---|
| Pre-1970 | <ul style="list-style-type: none"> ▪ Project review based on the technical/engineering and economic analysis. ▪ Limited consideration given to environmental consequences. |
| Early/mid – 1970s | <ul style="list-style-type: none"> ▪ EIA introduced by NEPA in 1970 in US. ▪ Basic principle: Guidelines, procedures including public participation requirement instituted. ▪ Standard methodologies for impact analysis developed (e.g. matrix, checklist and network). ▪ Canada, Australia and New Zealand became first countries to follow NEPA in 1973-1974. Unlike Australia, which legislated EIA, Canada and New Zealand established administrative procedures. ▪ Major public inquiries help to shape the process development. |
| Late 1970 and early 1980s | <ul style="list-style-type: none"> ▪ More formalised guidance. ▪ Other industrial and developing countries introduced formal EIA requirements (France, 1976; Philippines, 1977) began to use the process informally or experimentally (Netherlands, 1978) or adopted elements, such as impact statements or reports, as part of development applications for planning permission (German states [lander], Ireland). ▪ Use of EA by developing countries (Brazil, Philippines, China, Indonesia) ▪ Strategic Environment Assessment³ (SEA), risk analysis included in EA processes⁴. ▪ Greater emphasis on ecological modelling, prediction and evaluation methods. ▪ Provision for public involvement. ▪ Coordination of EA with land use planning processes. |
| Mid 1980s to end of decade | <ul style="list-style-type: none"> ▪ In Europe, EC Directive on EIA establishes basic principle and procedural requirements for all member states. ▪ Increasing efforts to address cumulative effects. ▪ World bank and other leading international aid agencies establish EA requirements. ▪ Spread of EIA process in Asia. |
| 1990s | <ul style="list-style-type: none"> ▪ Requirement to consider trans-boundary effects under Espoo convention. ▪ Increase use of GIS and other information technologies. ▪ Sustainability principal and global issues receive increased attention. ▪ India also adopted the EIA formally. ▪ Formulation of EA legislation by many developing countries. ▪ Rapid growth in EA training. |

Source: *International Study of the Effectiveness of Environmental Assessment, final report, Environmental assessment in a changing world*, Prepared by Barry Sadler, June 1996.

³ Definition of SEA: Policy tool to assess the environmental consequences of development policies, plans and programmes

⁴ Definition of risk assessment: An instrument for estimating the probability of harm occurring from the presence of dangerous conditions or materials at a project site. Risk represents the likelihood and significance of a potential hazard being realized

3. History of EIA in India

The Indian experience with Environmental Impact Assessment began over 20 years back. It started in 1976-77 when the Planning Commission asked the 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. Till 1994, environmental clearance from the central government was an administrative decision and lacked the legislative support.

On 27 January 1994, the Union ministry of environment and forests (MoEF), government of India, under the Environmental (Protection) Act 1986, promulgated EIA notification making Environmental Clearance (EC) mandatory for expansion or modernisation of any activity or for setting up new projects listed in Schedule 1 of the notification. Since then there have been 12 amendments made in EIA notification of 1994.

Today environmental clearance from the central government is required for 32 categories of developmental projects broadly categorized under the following industrial sectors: mining, thermal power plants, river valley, infrastructure (road, highway, ports, harbours and airports) and industries including very small electroplating or foundry units. Although for many other projects, EIA is not needed. Certain activities permissible under the Coastal Regulation Zone Act, 1991 also require similar clearance. Additionally, donor agencies operating in India like the World Bank and the ADB have a different set of requirements for giving environmental clearance to projects that are funded by them.

4. The EIA process

The stages of an EIA process will depend upon the requirements of the country or donor. However, most EIA processes have a common structure and the application of the main stages is a basic standard of good practice.

The environment impact assessment consists of eight steps with each step equally important in determining the overall performance of the project. Typically, the EIA process begins with screening to ensure time and resources are directed at the proposals that matter environmentally and ends with some form of follow up on the implementation of the decisions and actions taken as a result of an EIA report. The eight steps of the EIA process is briefly presented below:

- **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.
- **Scoping:** This stage identifies the key issues and impact that should be further investigated. This stage also defines the boundary and time limit of the study.
- **Impact analysis:** This stage of EIA identifies and predicts likely environmental and social impact of the proposed project and evaluates the significance.
- **Mitigation:** This step in EIA recommends the actions to reduce and avoid the potential adverse environmental consequences of development activities.
- **Reporting:** This stage presents the result of EIA in a form of a report to the decision-making body and other interested parties.
- **Review of EIA:** It examines the adequacy and effectiveness of the EIA report and provides information necessary for the decision-making.

Different names for the same report

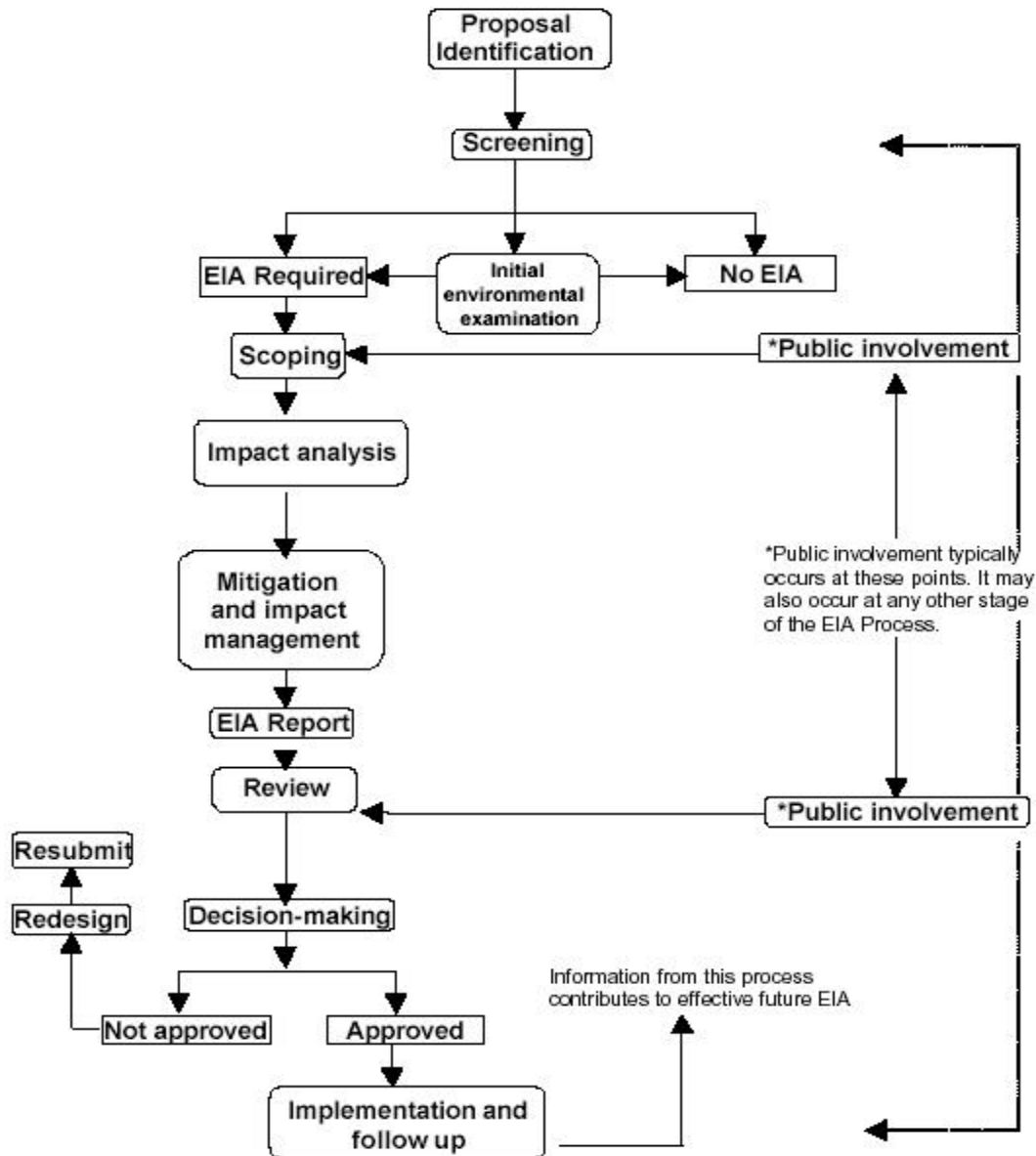
An EIA report may be known by several other names such as:

- Environmental impact assessment (EIA)
- Environment impact statement (EIS)
- Environmental statement (ES)
- Environmental assessment report (EA report)
- Environmental effects statement (EES)

- **Decision-making:** It decides whether the project is rejected, approved or needs further change.
- **Post monitoring:** This stage comes into play once the project is commissioned. It checks whether the impacts of the project do not exceed the legal standards and implementation of the mitigation measures are in the manner as described in the EIA report.

Each stage of the EIA process has been described in detail subsequently. The overview of the EIA process is represented in figure 1.

Figure 1: Generalised process flow sheet of the EIA process



Source: *The manual in perspective, EIA Training Resource Manual, United Nations Environment Programme, 2002, p 114*

5. Forms of impact assessment

There are various forms of impact assessment such as health impact assessment (HIA) and social impact assessment (SIA) that are used to assess the health and social consequences of development so that they are taken into consideration along with the environmental assessment. One of the forms of impact assessment is strategic environment assessment, which is briefly discussed below:

i. Strategic environment assessment

Strategic environment assessment (SEA) refers to systematic analysis of the environmental effects of development policies, plans, programmes and other proposed strategic actions. This process extends the aims and principles of EIA upstream in the decision-making process, beyond the project level and when major alternatives are still open. SEA represents a proactive approach to integrating environmental considerations into the higher levels of decision-making.

Despite its wide use and acceptance, EIA has certain shortcomings as a tool for minimising environmental effects of development proposals. It takes place relatively late at the downstream end of the decision making process, after major alternatives and directions have been chosen (see table 3: *Difference in EIA and SEA*).

Table 3: Difference in EIA and SEA

| Environment impact assessment | Strategic environment assessment |
|---|--|
| <ul style="list-style-type: none"> ▪ Takes place at end of decision-making cycle ▪ Reactive approach to development proposal ▪ Identifies specific impacts on the environment ▪ Considers limited number of feasible alternatives ▪ Limited review of cumulative effects ▪ Emphasis on mitigating and minimizing impacts ▪ Narrow perspective, high level of detail ▪ Well-defined process, clear beginning and end ▪ Focuses on standard agenda, treats symptoms of environmental deterioration | <ul style="list-style-type: none"> ▪ Takes place at earlier stages of decision making cycle ▪ Pro-active approach to development proposals ▪ Also identifies environmental implications, issues of sustainable development ▪ Considers broad range of potential alternatives ▪ Early warning of cumulative effects ▪ Emphasis on meeting environmental objectives, maintaining natural systems ▪ Broad perspective, lower level of detail to provide a vision and overall framework ▪ Multi-stage process, overlapping components, policy level is continuing, iterative ▪ Focuses on sustainability agenda, gets at sources of environmental deterioration |

Source: EIA Training Resource Manual, 2nd edition, 2002, United Nations Development Programme

SEA had limited development and implementation till 1990. However, after 1990, a number of countries in developed economies adopted SEA. Some countries such as Canada and Denmark have made provision for SEA of policy, plans and programmes separately from EIA legislation and procedure. Other countries such as Czech Republic, Slovakia, etc have introduced SEA requirements through reforms in EIA legislation and in case of United Kingdom through environmental appraisal. While in New Zealand and Australia, it is a part of resource management or biodiversity conservation regimes. The adoption of SEA is likely to grow significantly in the coming years especially with directives by European Union and Protocol to the UNECE Convention on Transboundary EIA by signatory countries (with a provisional date of May 2003 for completion).

6. Comparative review of EIA procedures and practices

| Developed countries | EIA in developing countries | EIA in India |
|---|--|--|
| Well-framed EIA legislation in place. For instance, in Canada, Canadian Environmental Assessment Act regulates EIA while EU countries are guided by Directive on EIA (1985). | Lack of formal EIA legislation in many developing countries. For instance, EIA is not mandatory in many African countries | Formal legislation for EIA. It has been enacted by making an amendment in the Environment Protection Act 1986. |
| In developed countries, active involvement of all participants including competent authority, government agencies and affected people at early stages of the EIA. This makes the process more robust and gives a fair idea of issues, which needs to be addressed at the initial phase of EIA. | Limited involvement of public and government agencies in the initial phases. This often results in poor representation of the issues and impacts in the report, adversely affecting the quality of the report. | Limited involvement of public and government agencies in the initial phases. |
| Integrated approach to EIA followed. All aspects including social and health taken into account. | Mainly environmental aspects considered. Poor on social or health aspects. | No provision in place to cover landscape and visual impacts in the Indian EIA regulations |
| Proper considerations of alternatives in EIA | The consideration of alternatives in developing country is more or less absent. | Same as developing country |
| The process of screening is well defined. For instance, in EU countries competent authorities decide whether EIA is required after seeking advice from developer, NGO and statutory consultees. In Japan, screening decision is made by the authorizing agency with respect to certain criteria. In Canada, federal authority determines whether an environmental assessment is required or not. | In developing countries, screening practice in EIA is weak. In most cases, there is a list of activities that require EIA but without any threshold values. | Screening done on the basis of a list. Threshold environment, social or health values not defined. |
| Scoping process is comprehensive and involves consultation with all the stakeholders. In many countries like US, Netherlands, Canada and Europe, the involvement of public and their concern are addressed in scoping exercise. Besides this, funding organisation such as World Bank, ADB and ERDB have provision to consult the affected people and NGOs during identification of issues in scoping exercise. | Scoping process in most developing countries is very poorly defined. In many countries including China, Pakistan, etc. there is no provision for scoping. In some countries like in Nigeria and Indonesia, a term of reference is followed for scoping while in some countries like Ghana, Taiwan and Chile, a general checklist is followed. In countries where it is undertaken, there is no public consultation during scoping. Moreover, in most developing countries, scoping is often directed towards meeting pollution control requirements, | Done by consultant and proponent and done to suit the needs of the proponent. Public are not consulted. In India also, EIA process is often more inclined toward meeting pollution control requirements, rather than addressing the full range of potential environmental impacts from a proposed development. |

| | | |
|--|--|---|
| | rather than addressing the full range of potential environmental impacts from a proposed development. | |
| Most reports in local language | Most reports in English and not in the local language. | Most reports in English and not in the local language. In some case, executive summary is translated into local language. |
| A multi-disciplinary approach. Involvement of expert with expertise in different areas. | Lack of trained EIA professional often leads to the preparation of inadequate and irrelevant EIA reports in developing countries | Same in India. Preparation of EIA is done by consultants. Therefore, the selection criterion for the organisation is fees/cost rather than the expertise of EIA team. |
| Two tier of EIA review, One conducted after the completion of EIA to check the adequacy and effectiveness of EIA and second done before the decision-making. | Poor review or monitoring. | In India too, EIA review is not upto the marks. The review agency called Impact assessment agency (IAA) lacks inter-disciplinary capacity. No representation of NGO in IAA, which is the violation of EIA notification. |
| Expertise in EIA: The International Association for Impact Assessment (AIA) and other organisations demonstrate that there are a large number of individuals with the capability to design, conduct, review and evaluate EIAs from countries of the North. The major portion of teaching about environmental assessment also takes place in industrial countries. | The expertise in EIA is slowly developing. In most cases, students from the developing countries go to the developed countries to gain knowledge of the subject. | Expertise in this area is developing. |

Source: Compiled by Industry & Environment Unit, Centre for Science & Environment, 2006