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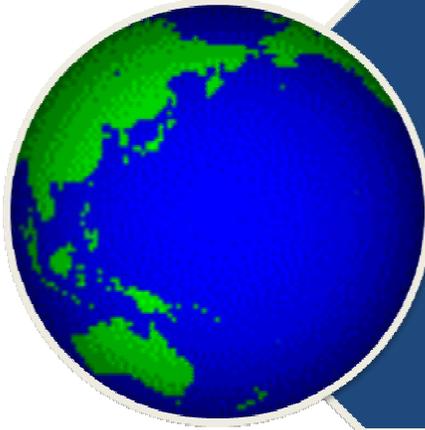
## Environmental Impact Assessment



Report Submitted by-

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# ENVIRONMENTAL IMPACT ANALYSIS

*A dissertation report submitted by*

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# Certificate

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It is certified that the work contained in  
the thesis entitled  
**“ENVIRONMENTAL IMPACT ANALYSIS”**,  
by  
**Pravin Shivaji Kolhe**  
has been carried out under my  
supervision

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Name of Supervisor.

Date:

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## SYNOPSIS



## ACKNOWLEDGEMENT



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## List of Symbols and abbreviations

MoEF	:	Ministry of Environment and Forest
EIA	:	Environmental Impact Analysis
NEPA	:	National Environmental Policy Act
IAD	:	Impact Assessment Division
EMP	:	Environmental Management Plan
PCB	:	Pollution Control Board
LNG	:	Liquefied Natural Gas
LTL	:	Low Tide Line
CRZ	:	Coastal Regulation Zone
HTL	:	High Tide Line
PH	:	Public Hearing
NOC	:	No Objection Certificate
IAA	:	Impact Assessment Agency
EIS	:	Environmental Impact Statement
IPC	:	Indian Penal Code
HC	:	High Court



# Chapter 1. Introduction

## 1.1 About EIA

Environmental Impact assessment (EIA) is a tool that seeks to ensure sustainable development through the evaluation of those impacts arising from a major activity (policy, plan, program, or project) that are likely to have significant environmental effects. It is anticipatory, participatory, and systematic in nature and relies on multidisciplinary input (Glasson et al. 1994).

## 1.2 History of EIA

The phrase Environmental Impact Assessment comes from Sec. 102 (2) of the National Environmental Policy Act (NEPA), 1969, USA. Some rudiments of EIA are implicit even in early examples of environmental legislation. Napoleon in 1910 issued a decree which divided noxious occupations into categories: those which must be far removed from habitations, those which may be permitted on the outskirts of towns, and those which can be tolerated even close to habitations, having regard to the importance of the work and the importance of the surrounding dwellings. Now the EIA has become a requirement in more than 100 countries (Canter 1996). In many European countries, it came into vogue with the introduction of the concept of sustainable development after the World Commission of Environment in 1987. In India, though EIA came into existence around 1978-79, it was made mandatory only in 1994.

## 1.3 Objectives of EIA

EIA was made mandatory in 1994 under the environmental protection Act of 1986 with the following four objectives:

- Predict environmental impact of projects;
- Find ways and means to reduce adverse impacts;
- Shape the projects to suit local environment;
- Present the predictions and options to the decision-makers.

#### **1.4 Matters covered by EIA**

Till 1994, EIA clearance was the administrative requirement for big projects undertaken by the Government or public sector undertakings. The Notification mandates a public hearing and environment itself), with further review by a committee of experts in certain cases. According to Schedule II of the notification, the EIA is expected to cover at least the following matters:

- Description of the proposed activities;
- Description of the base environmental and climatic conditions and potential affected environment including specific information necessary to identify and assess the environmental effect of the proposed activities
- Analysis of the land use and land use change, waste generation, water consumption (and the existing balance), power consumption etc. along with the social and health impacts (in terms of number of people displayed etc)
- Description of the practical activities as appropriate
- An assessment of the likely or potential environmental impacts of the proposed activity (like air pollution, noise generation) and the alternatives, including the direct or indirect, cumulative, short-term and long-term effects;
- A risk assessment report and disaster management plan to mitigate adverse environmental impacts of proposed activity and assessment of those measures;
- An indication of the likely area to be affected by the proposed activity or its alternatives;
- A detailed environmental feasibility report of all the information provided.

#### **1.5 Amendments in EIA notification**

The EIA report - which is expected to include proposed measures to be undertaken by a proponent to mitigate or ameliorate the negative environment effects - shall be submitted to the agency for approval. If approved, an environmental agency statement and certificate of approval shall be issued by the agency.

- ▶ In a move, the MoEF<sup>1</sup> also took a step in decentralizing the responsibilities of conducting EIA (notification date 10th April 1997, No. S.O. 319 E). Under the EIA, clearance for certain category of thermal plants lies with the state governments.
- ▶ The Ministry further amended the Notification in December 2000 for exempting defense related road construction projects in border areas from the purview of EIA Notification.
- ▶ The EIA Notification was further amended in November 2001 and production of bulk drugs based on genetically engineered organisms has been exempted from the purview of EIA Notification since this activity attracts the provisions of Hazardous and/or Genetically Modified Micro Organisms Rules, 1989.
- ▶ Coastal Regulation Zone (CRZ) Notification has also been amended in April, 2001 permitting certain activities in CRZ-I areas such as-
  - construction activities related to the projects of Department of Atomic Energy
  - laying of pipelines, conveying systems including transmission lines
  - Facilities that are essential for activities permissible under CRZ-I.

Under this amended notification, exploration and extraction of oil and natural gas is also permitted between Low Tide Line (LTL) and High Tide Line (HTL) in areas, which are not ecologically sensitive.

Facilities for receipt and storage of Liquefied Natural Gas (LNG) and facilities for its re-gasification can also be permitted in CRZ areas not classified as CRZ-I (i) subject to implementation of certain safety regulations. A recent amendment to the EIA requirements that was notified on 13 June 2002 exempts pipeline projects from preparation of EIA reports.

## 1.6 Legal Provision for Public Participation in India

A major amendment to EIA Notification was made in April 1997 for introduction of Public Hearing (PH) as a part of assessment procedure for ensuring participation of local people and stakeholders in various proposed development activities. Public hearings are called for in projects involving a large displacement of residents or severe environmental impacts. The

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<sup>1</sup> Ministry of Environment and Forest

decision to hold hearings has to be made within 30 days of receipt of the proposal. If the IAD<sup>1</sup> decides to hold hearings, it is required to provide notice in at least two newspapers at least 30 days prior to the hearing.

Recent Amendment in the Public hearing notifications is that hearings are now mandatory for all projects to which the EIA notification applies. In support of this new requirement, the process includes provisions for public access to information. Project proponents are required to provide the SPCB<sup>2</sup> with an executive summary of the project "containing the salient features of the project both in English and local languages". They must also provide copies of all application forms relating to the project that were submitted pursuant to other environmental approval processes and "any other document necessary for the Board to dispense with the application". Twenty copies of each of these documents must be provided to the SPCB.

Public access to executive summaries is available at District Collectors' Offices, District Industry Centers, the office of the Zila Parishad or Commissioner of the municipal corporation/local body, and SPCB state and Regional offices. The hearing process also contains provisions for public notice. SPCBs are required to give notice in at least two newspapers widely circulated in the region around the project, mentioning the date, time and place of public hearings. Suggestions, views, comments and objections of the Public shall be invited within thirty days from the date of publication. Local residents, environmental groups and others located at the project site likely to be affected can participate in the hearings or submit oral or written briefs to the SPCB. The new hearing process also contains requirements regarding the composition of hearing panels. Panels also include a representative of the SPCB, the District Collector, a state government representative for the relevant sector under investigation, a representative of the central Ministry of the Environment and Forests, not more than three representatives of local bodies such as municipalities or panchayats, and not more than three senior citizens nominated by the District Collector. For time bound processing of proposals for public hearing submitted to various State Pollution Control Boards, the EIA Notification was amended in November, 2001 and a time limit of 60 days has been laid down for completion of public hearing.

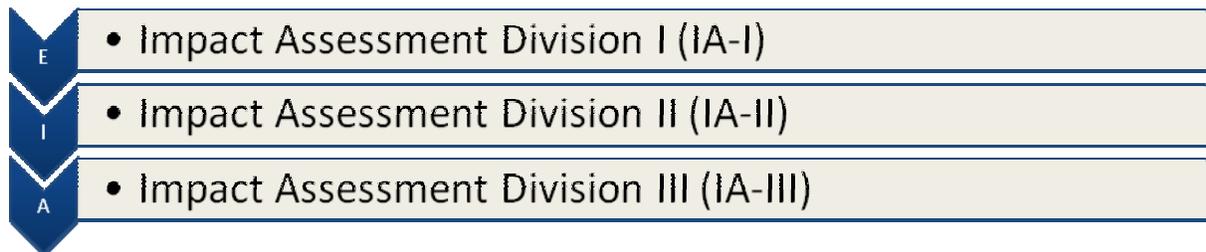
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<sup>1</sup> Impact Assessment Division

<sup>2</sup> State Pollution Control Board

### 1.7 Administrative Arrangements of EIA

The Impact Assessment Agency has the overall responsibility to administer, and enforce the provisions related to EIA. The IAA would be the Union Ministry of Environment and Forests. To deal with projects of different sectors, three impact assessment divisions were constituted.



**Figure 1: Impact Assessment Divisions**

IA-I is responsible for river valley projects; major irrigation projects and hydel power projects. IA-II is responsible for industrial projects, thermal power projects and mining projects and IA-III takes charge of ports and harbour projects; tourism projects; human settlements; projects in ecologically fragile areas; and communication projects.

The Forest Conservation Division in the ministry examines projects that involve diversion of forestland for non-forest uses along with the IA divisions.

It is however, envisaged that various other government supervising and approving agencies would assist by ensuring that prescribed activities falling within their areas of jurisdiction undergo EIA prior to approval and implementation. The IAA if deemed necessary may consult a committee of Experts (Environmental Appraisal Committee) having a composition (constituted by the Impact Assessment Agency or such other body under the Central Government authorized by the Impact Assessment Agency in this regard) as specified in Table 2 (Schedule II of the notification) for some sectors like river valley, multipurpose irrigation and hydel power projects, industrial projects, mining projects, thermal power projects, and infrastructure projects. The appraisal committees consist of experts from varied disciplines like water resource management, pollution control, forestry, ecology, landscape planning. These specific groups and task force also appraise other major projects referred to the ministry. The Committee of Experts has the full right of entry and inspection of the site or, as the case

may be, factory premises at any time prior to, during or after the commencement of the operations relating to the project.

### **1.8 Expert committee for administering EIA**

The composition of the Expert Committee for Environment Impact Assessment is as follows-

**Eco-system Management**

**Air/Water Pollution Control**

**Water Resource Management**

**Flora/Fauna conservation and management**

**Land Use Planning**

**Social Sciences/Rehabilitation**

**Project Appraisal**

**Ecology**

**Environmental Health**

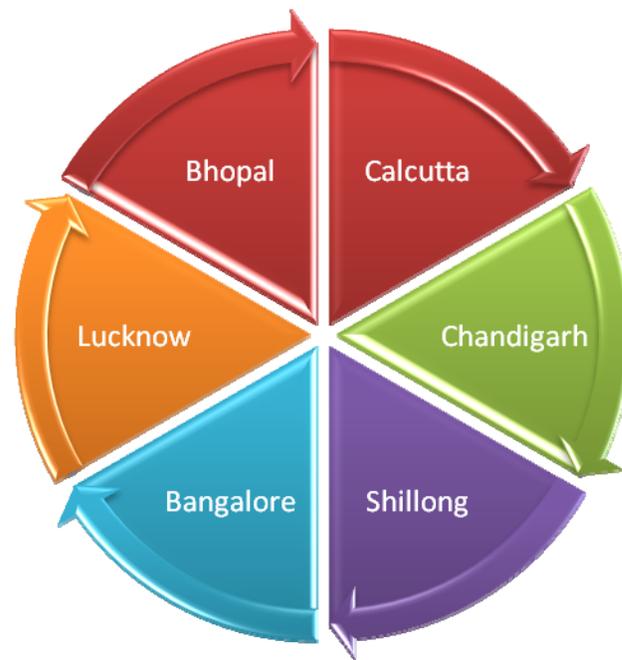
**Subject Area Specialists**

**Representatives of NGOs/persons concerned with environmental issues.**

**Figure 2: Composition of the Expert Committee**

### 1.9 Regional Offices

The ministry has also set up six regional offices for Post Project Monitoring of Environment to monitor and interact with authorities of different regions.



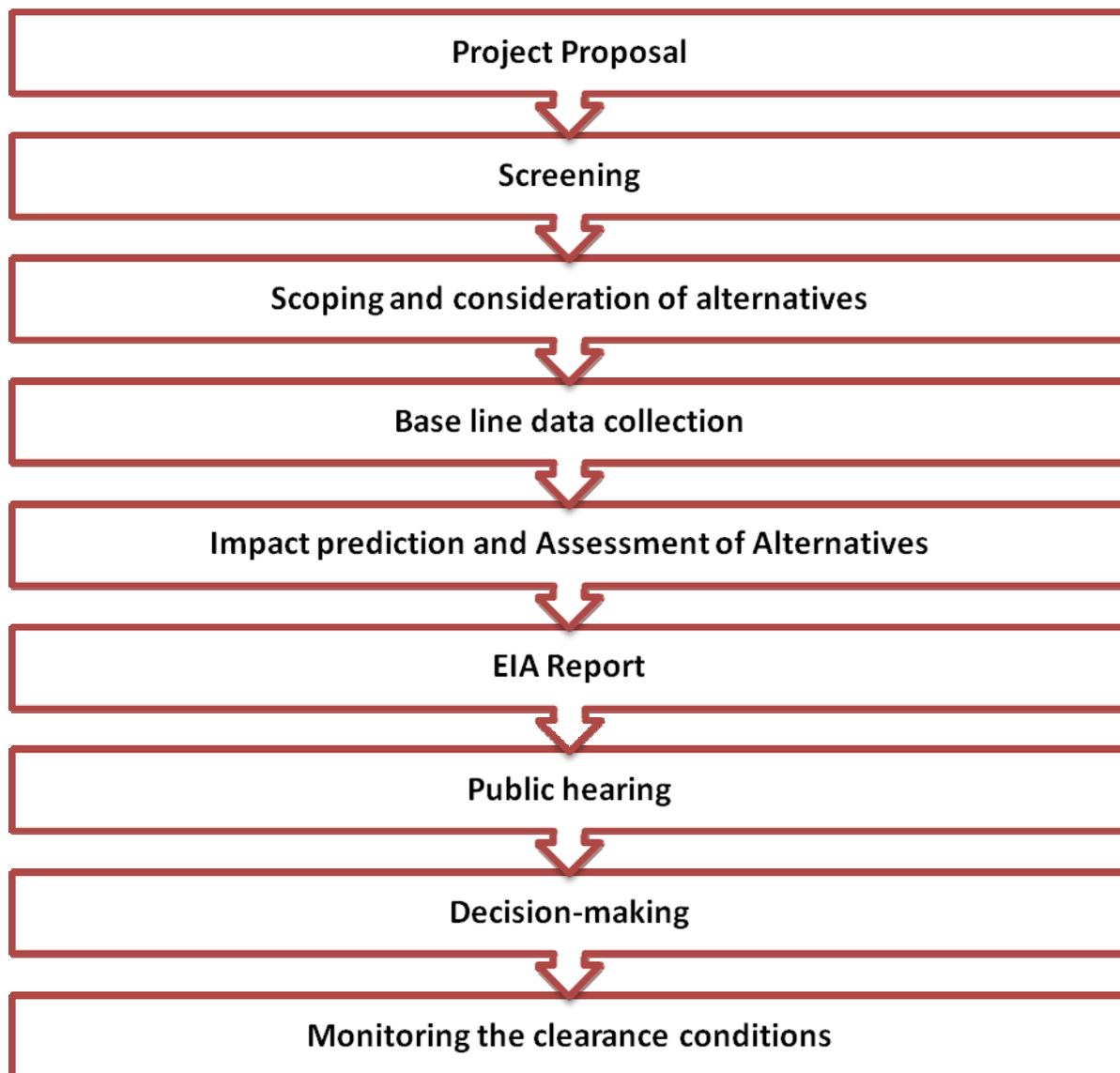
**Figure 3 Regional Offices**

The project authorities report to these regional centers every six months to confirm the implementation of the stipulated safeguards. In case of poor performance, the reasons are discussed with the state government concerned and recommendations are made.



## Chapter 2. The EIA Procedure

The EIA process in India consists the following phases-



**Figure 4 Phases of EIA Process in India**

## **2.1 Project Proposal**

Any proponent embarking on any major development project shall notify IAA in writing by the submission of a project proposal. The project proposal shall include all relevant information available including a land-use map in order for it to move to the next stage which is screening. The submission of a project proposal signifies the commencement of the EIA process.

## **2.2 Screening**

Screening is done to see whether a project requires environmental clearance as per the statutory notifications. At this stage, the project proponent decides the type of project and also about requirement of Environmental Clearance. If required, the proponent may consult IAA.

## **2.3 Scoping and consideration of alternatives**

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 (see next sub section), which outlines 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

## **2.4 Base line data collection**

Base line 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.

## **2.5 Impact prediction and Assessment of Alternatives**

Impact prediction is a way of mapping the environmental consequences of the significant aspects of the project and its alternatives. For every project, possible alternatives should be identified and environmental attributes compared. Alternatives should cover both project location and process technologies. Alternatives should then be ranked for selection of the best environmental 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.

## **2.6 EIA Report**

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. The proponent prepares detailed Project report and provides information in logical and transparent manner. The IAA examines if procedures have been followed as per MoEF notifications

## **2.7 Public hearing**

After the completion of EIA report the law requires that the public must be informed and consulted on a proposed development after the completion of EIA report. The State Pollution Control Boards will conduct the public hearing before the proposals are sent to MoEF for obtaining environmental clearance. 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:



**Figure 5 Affected Persons**

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

## **2.8 Decision-making**

Decision making process involves 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.

## **2.9 Monitoring the clearance conditions**

Monitoring has to be done during both construction and operation phases of a project. It is done not just to ensure that the commitments made are complied with but also to observe whether the predictions made in the EIA reports are correct or not. Where the impacts exceed the predicted levels, corrective action should be taken. Monitoring also enables the regulatory agency to review the validity of predictions and the conditions of implementation of the EMP. The Project Proponent, IAA and Pollution Control Boards should monitor the implementation of conditions. The proponent is required to file once in six months a report demonstrating the compliance to IAA.



## Chapter 3. EIA Guidelines for Project Proponents

### 3.1 Introduction

The MoEF has prepared Environmental Guidelines, to help the project proponents to work out an EIA. Guidelines have been prepared to bring out specific information on the environment required for environmental clearance. The agencies, which are primarily responsible for the respective sectors are closely involved in preparing the guidelines. River valley projects, thermal power projects, mining projects and industries, ports and harbors, development of beaches, highway/ railroad projects are the sectors for which guidelines have already been prepared. These guidelines basically consist of aspects regarding planning and implementation of development projects. The majority of projects in India, which require EIA's, are large developmental projects like nuclear power, river valley, thermal power plants etc, where government plays an important role.

### 3.2 Critical Issues

The critical issues focused in all these guidelines are:

- ▶ Can the local environment cope with the additional waste and pollution that the project will produce?
- ▶ Will the project location conflict with the nearby land use or preclude later developments in surrounding areas?
- ▶ Can the project operate safely without serious risk of accidents or long- term health hazards?
- ▶ How will the project affect economic activities that are based on natural resources?
- ▶ Is there sufficient infrastructure to support the project?
- ▶ How much of the resources (such as water, energy etc) will the project consume, and are adequate supplies of these resources available?

- ▶ What kind of human resources will it require or replace and what will be its social impacts in the short/long-run?
- ▶ What damages will it inadvertently cause to the national/regional assets such as natural resources, tourist areas, or historic or cultural sites, etc? (UNEP 1988).

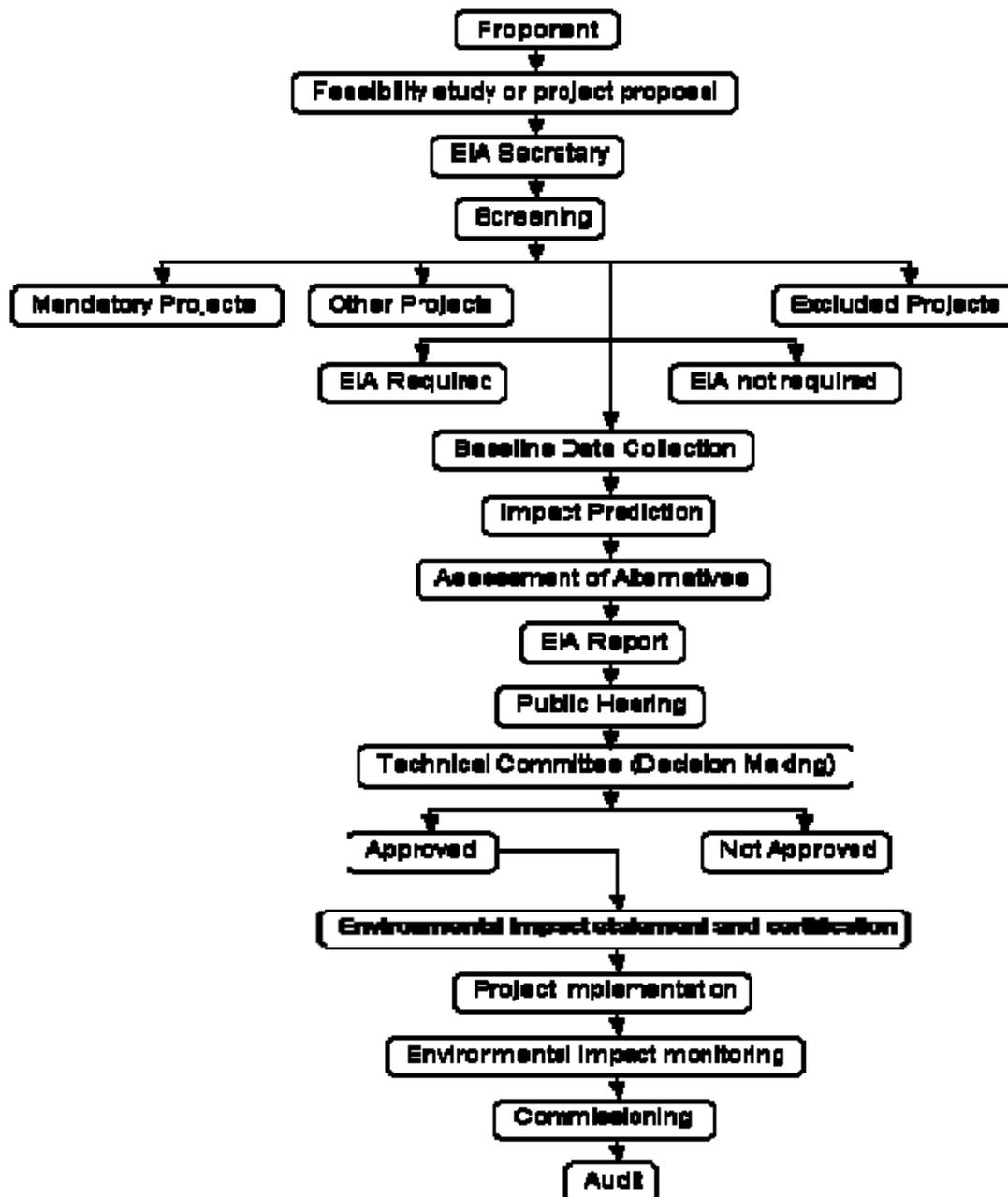


Figure 6. EIA Guidelines for Project Proponents



## Chapter 4. Role of different actors in EIA Process

EIA involves many parties, grouped by their role definition within the process. This section outlines the basic responsibilities of various bodies.

### 4.1 Project Proponent

The project proponent during the project planning stage decides the type of projects i.e. new establishment, expansion or modernization. Later the project proponent needs to prepare the detailed project report/feasibility report and submit 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 No Objection Certificate (NOC) and holding the public hearing. After the public hearing the proponent submits application to IAA for environmental clearance.

### 4.2 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 finalize 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.

#### **4.3 State Pollution Control Board /Pollution Control Committee**

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.

#### **4.4 Public Law**

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

#### **4.5 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.

#### 4.6 Responsibilities of different agencies during EIA Process

	Project proponent	IAA	Environment Consultant	Reviewer	Public	Administrative Body <sup>1</sup>
<b>Screening</b>	Decides the type of project and also about requirement of Environmental Clearance		Guides the proponent in the initial screening stage.	Determines if the initial project description submitted is adequate.		
<b>Scoping</b>	Provide TOR	Guidance is provided to the proponent, if needed	Establish if an EIA study is required and if so, finalize the scope of the study.			
<b>EIA Report</b>	Prepares detailed project report and provide information in logical and transparent manner	Examines if procedures have been followed as per MoEF notifications, assesses the report.		Has to go through the EIA Report very carefully.	After the completion of EIA report, the law requires that the public must be informed and consulted.	
<b>Baseline</b>	/Adhere to		Should be			Responsible

<sup>1</sup>(Govt., CPCB, SPCB, BIS, MOEF)

<b>e Condi tions</b>	the attributes, recommended by the BIS, CPCB, and MoEF.		conversa nt with the existing legal and procedura l requirem ents for the project.			e for assessing the compatibili ty of the proposed developme nt with prescribed standards.
<b>Public Hearing</b>	Approach the SPCB for holding the public hearing. Obligated to respond to issues raised during the hearing	SPCB forward the details of Public hearing to IAA.				SPCB's hold the public hearing as per the provisions of EIA Notification and forward the details to IAA.
<b>Decisio n Making</b>		IAA assists administrative authority in the decision making process	Justify the findings in the EIA during meetings with the expert group.			Makes decision along with IAA
<b>Monitor ing clearan ce conditio ns</b>	Should be done in the construction and operation phase.	Plays a role in the monitoring process by examining reports and taking further action				Should monitor the implementation of conditions



## Chapter 5. Projects subjected to EIA

The projects can be classified into three categories based on whether EIA is required or not and who is responsible for the clearance.

### 5.1 Category 1

Projects where EIA is mandatory and requires clearance from Central government. As of now, EIA clearance is required for 30 categories of industries from the central government which can be broadly categorized under sectors of industries, mining, thermal power plants, river valley, ports, harbors and airports, communication, atomic energy, transport (rail, road, highway), tourism (including hotels, beach resorts)

### 5.2 Category 2

Projects where EIA is mandatory and requires clearance from State Governments (full EIA may not be required). The Central Government has notified (dated 10 April 1997, No. S. O.319. E) that certain category of thermal power plants namely all capacity cogeneration plants, captive coal and gas/naphtha based power plants up to 250 MW, coal based power plants up to 250 MW using conventional technologies, coal based plants up to 500 MW using fluidized bed technology and gas/naphtha based plants up to 500 MW require environmental clearance from the state government. In case of pithead thermal power plants, the applicant shall intimate the location of the project site to the state government while initiating any investigation and surveys. Proposals where forestland is a part of the project site need prior forestry clearance before forwarding to MoEF for environmental clearance. In the environmental clearance process, the documents to be submitted to MoEF are project report, public hearing report, site clearance for site specific projects, no objection certificate from SPCB, environmental appraisal questionnaire, EIA/EMP report, risk analysis for projects involving hazardous substance and rehabilitation plans, if more than 1000 people are likely to be displaced.

### 5.3 Category 3

For these projects EIA is not necessary: Some of the projects that come under this category include defense related road construction projects in border areas, production of production of bulk drugs based on genetically engineered organisms: Construction activities related to the projects of Department of Atomic Energy (b) laying of pipelines, conveying systems including transmission lines; (c) facilities that are essential for activities permissible under CRZ-I; Exploration and extraction of oil and natural gas is also permitted between Low Tide Line (LTL) and High Tide Line (HTL) in areas, which are not ecologically sensitive, pipeline projects; Facilities for receipt and storage of Liquefied Natural Gas (LNG) and facilities for its re-gasification.

### 5.4 List of Projects requiring EC<sup>1</sup> from Central Government

#### Category - 1

- **Nuclear Power and related projects e.g. Heavy Water Plants, nuclear fuel complex, Rare Earths.**
- **River Valley Projects (Ex: Hydel Power, major Irrigation and their combination including flood control)**
- **Ports, Harbors, Airports**
- **Petroleum Refineries including crude and product pipelines**
- **Chemical fertilizers, nitrogenous and phosphatic other than single super phosphate**
- **Pesticides (Technical)**
- **Petrochemical Complexes (both olefinic and aromatic) and petrochemical intermediates such as DMT, caprolactam, LAB etc. and production of basic plastics such as LLDPE, HDPE, PP and PVC**
- **Bulk drugs and pharmaceuticals**
- **Exploration for oil and gas and their production, transportation and storage.**
- **Synthetic Rubber**
- **Asbestos and Asbestos products.**
- **Hydrocyanic acid and its derivatives.**
- **Primary metallurgical industries (such as production of Iron and Steel, Aluminum, Copper, Zinc, Lead and Ferro Alloys).**
- **Electric arc furnaces (Mini Steel Plants).**
- **Chloro alkali industry.**

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<sup>1</sup> Environmental Clearance

- **Integrated paint complex including manufacture of resins and basic raw materials required in the manufacture of paints.**
- **Viscose Staple fiber and filament yarn**
- **Storage batteries integrated with manufacture of oxides of lead and lead antimony alloys.**
- **All tourism projects**
- **Thermal Power Plants.**
- **Mining projects**
- **Highway Projects**
- **Tarred Roads in the Himalayas and or Forest areas.**
- **Distilleries.**
- **Raw Skins and Hides**
- **Pulp, paper and newsprint**
- **Dyes.**
- **Cement.**
- **Foundries**
- **Electroplating**
- **Meta amino phenol**

### **Category - 2**

#### **Thermal Based Power Plants**

- **All capacity cogeneration plants**
- **Captive coal and gas/naphtha based power plants up to 250 MW**
- **Coal based power plants up to 250 MW using conventional technologies,**
- **Coal based plants up to 500 MW using fluidized bed technology**
- **Gas/naphtha based plants up to 500 MW**

### **Category - 3**

- **Defense related road construction projects in border areas**
- **Production of bulk drugs based on genetically engineered organisms**
- **Construction activities related to the projects of Department of Atomic Energy**
- **Laying of pipelines, conveying systems including transmission lines;**
- **Facilities that are essential for activities permissible under CRZ-I; Exploration and extraction of oil and natural gas**

between Low Tide Line (LTL) and High Tide Line (HTL) in areas, which are not ecologically sensitive,

- Pipeline projects;
- Facilities for receipt and storage of Liquefied Natural Gas (LNG)
- Facilities for LNG re-gasification.
- Others not elsewhere listed like Health programmes, education programmes, environmental awareness, nutritional programs etc.

## 5.5 Environmentally Sensitive Areas

### Environmentally Sensitive Areas

- Religious and historic places
- Archaeological monuments/sites
- Scenic areas
- Hill resorts/mountains/ hills
- Beach resorts
- Health resorts
- Coastal areas rich in corals, mangroves, breeding grounds of specific species
- Estuaries rich in mangroves, breeding ground of specific species
- Gulf areas
- Biosphere reserves
- National park and wildlife sanctuaries
- Natural lakes, swamps, Seismic zones tribal Settlements
- Areas of scientific and geological interests
- Defense installations, specially those of security importance and sensitive to pollution
- Border areas (international)
- Airport
- Tiger reserves/elephant reserve/turtle nestling grounds
- Habitat for migratory birds
- Lakes, reservoirs, dams
- Streams/rivers/estuary/seas
- Railway lines
- Highways
- Urban agglomeration



## Chapter 6. EIA in India

### 6.1 Environmental Justice in India

The earth is the only planet that supports a vast diversity of life. The evolution of human being influenced the balance of biosphere. From the early periods, they fed on plants and animal, though in early days their need was so small that the earth maintained natural balance. However, man's ambition for ever-lasting enjoyment and comfort had led him to exploit natural resources. Consequently, it caused ecological imbalance, environment degradation, a rapid depletion of flora and fauna and the deterioration in human health. Frank Rauschel, Director of the National Cancer Institute, warned, "Given today's environment we are living with a time bomb that is going to explode in 20 to 30 years from now in the form of more persons being sicken with cancer."<sup>1</sup>

Pollution of environment is a global phenomenon; therefore, attention has to be paid to make rules and regulations in this regard. The United Nations in the first two decades of 20<sup>th</sup> century has also been painfully slow in dealing with the topic of environment. However in the decade of seventy, for the first time the attention of the world was drawn towards environment in the true sense. In the year 1972, from June 5 to 16 under the auspices of UN, a conference was held at Stockholm Conference on Environment and Development, 1972.

India participated in this conference and late Mrs. Indira Gandhi, the then Prime Minister of India, while speaking in the conference emphasized that "for the development might be the cause of destruction of environment. For a country like India, it was a primary means for improving the standard of living to make available the food product, water, cleanliness, shelter, to bring about greenery in deserts and to make hills and mountains worth living."<sup>2</sup> From India's point of view, just as the pollution of air and water, the accumulation of waste, urban blight, the loss of wild life and depletion of forests are examples of environmental degradation, so are the various companions of poverty such as disease, malnutrition, hunger and squalor.

The close relationship between development and conservation of environment was acknowledged in 192 Stockholm conference and the

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<sup>1</sup> B.P. Singh Sehgal "Human Rights problem and perspectives", 1995, p 436.

<sup>2</sup> S.K. Kapoor, "International Law" 2002, p 390.

emphasis was given to what is called 'sustainable development'. Consequently, for India's leaders the top priority was to secure the necessities of human life. At the same time, there was a necessity to minimize the adverse impact of agro industrial activity on environment. 'Co-existence' became the watchword for India's planners and administrator.<sup>1</sup>

India being the signatory to this conference took the step towards the protection of environment by amending the constitution in the year 1976 (42<sup>nd</sup> Amendment Act, 1976) and inserted Article 48(A) as a Directive Principle of State Policy requiring the State to protect and improve the environment and to safeguard the forests and wild life of the country. Simultaneously Article 21A(g) was inserted to make a fundamental duty of every citizen to act likewise. Beside these, the entries in the three legislative lists in the constitution empower the Union and the State Government or both to make laws related to environment.

Apart from constitutional safeguard, there are about two hundred central and state legislations according to Tiwari committee report, which have a direct and indirect bearing on the environment. However, provisions contained therein are not more than a piecemeal legislations pertaining to environment. It is true that these scattered provisions are enacted keeping in mind something different from environment. However, after 1972, emphasis was laid on the question of environment and new legislation came into existence.

## **6.2 Acts related to Environment**

The following Acts, Rules and Notifications deal with environment.

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<sup>1</sup> O.P. Dwivedi, "Indian Environmental Policies, programmes and Stewardship", 1997, p. 52

**The environment Protection Act, 1986**

- Passed after the Bhopal Industrail Tragedy

**Water (Prevention and Control of Pollution) Act, 1974**

- Amended in 1988

**Air (Prevention and Control of Pollution) Act, 1981**

- Amended in 1988

**The Wild Life Protection Act, 1972**

- Amended in 1982, 1986 & 1991

**The Forest Conservation Act, 1982**

- Amended in 1988

**The Public Liability Insurance Act, 1991****The Water (Prevention and Control of Pollution)****The National Environment Tribunal Act, 1995****The National Environment Appellate Authority Act, 1997****The Biological Diversity Act, 2002**

**Figure 7 Acts related to Environment**

### **6.3 Court cases related to Environment**

These are the existing enactment and legislations covering the several aspects pertaining to environment. This list is not exhaustive but; illustrative as there are several other legislations as there are several other legislations, which directly and indirectly and indirectly relate to protection of environment. Apart form this the provisions are also enshrined under the other laws such as Indian Penal Code and Criminal Procedure Code- Section

268, 269, 27, 278, 433, 435, 436 of IPC and Sections 133 to 145 of Cr. P.C., deal with the protection of environment.

It is clear that our country has a huge range of legislations, ranging from acts on health, insecticides, explosive substances, drugs and cosmetics, food adulteration, preservation of forest, wild life, to protect water and air pollution etc. In India, development in the field of environment law is more through judicial dynamism than legislation. Judicial dynamism/activism in matters of environment pollution started with the decision of the Supreme Court in *Ratlam Municipality Vs. Virdhi Chand*<sup>1</sup>. In this case, Justice Krishna Iyer observed, "Decency and dignity are non-negotiable facts of human rights and the first charge on local governing bodies". The SC made it clear that the fundamental rights under Part III of the Constitutions cannot be ignored.

The expansive interpretation of Article 21 of the Constitution of India has led to the statutory development of environment jurisprudence in India. On the question of nexus between ecology and Article 21, the thinking of court is that since the right to life connotes quality of life as interpreted by American SC in case of *Munn Vs. People of Illinois* and by Indian SC in *Kharak Singh Vs. State of Uttar Pradesh*. and *Frances Coralie Vs. Union Territory of Delhi*, a person has a right to the enjoyment of pollution free water and air for full enjoyment of life.<sup>2</sup>

In *Andhra Pradesh PCB Vs. M.V. Nayadu* the Apex Court has explained interrelation between ecological issues and Fundamental rights as follows: "Environmental concerns arising in this Court under Article 32 or under Article 136 or under Article 226 in the HC in our view, are of equal importance as human rights concerns. In fact both are to be treated to Article 21, which deals with fundamental right to life and liberty. While environmental aspects concern 'life' human rights aspects concern 'liberty'."

The interpretation of Article 21 of the Constitution has facilitated the emergence of environmental jurisprudence in India while also strengthening the human rights jurisprudence. The SC observed that, "Public interest litigation is maintainable for ensuring rights of enjoyment of pollution free water and air for full enjoyment of life in derogation of laws, a citizens has a right to have resources to Article 32 of the Constitution..."<sup>3</sup>

The SC in case of *Indian Council of Enviro-legal Action V UOI*<sup>4</sup> has applied the "Pollution pays Principle" based on the principle of strict liability. It has applied the "precautionary principle" and define it to mean that environment measures adopted by the Government and Statutory authorities, must anticipate, prevent and attack the cause of Environmental

<sup>1</sup> AIR 1980 S.C. 1622

<sup>2</sup> M.P. Jain "Indian Constitutional Law" 2003, p.1330.

<sup>3</sup> Subhash Kumar Vs. State of Bihar, AIR 1991 SC 420

<sup>4</sup> AIR 1996, SC 1446

degradation. The Court has also evolved the special burden of proof in environment cases. The onus of proof is on the actor or the developer/industrialist to show that the action is environmentally benign.<sup>1</sup>

In Vellore's case,<sup>2</sup> Justice Kuldip Singh delivering the Judgment on behalf the Court observed that while such industries are of vital importance for the country's progress; they generate foreign exchange and provide employment avenues. However, having regards to pollution caused by them, principle of sustainable development has to be adopted and implemented as a balancing concept between ecology and development.

#### 6.4 Remarks

The SC has performed laudable and remarkable service by taking cognizance in a number of cases of various environment problems and giving necessary direction to the administration. Thus, the Indian Environment Jurisprudence exists in the judicial interpretation of laws and Constitution and skirts several internationally recognized principles, thereby providing some semblance of consistency between domestic and global environment standards. However, there are plethora of legislations, which deals with the Environment, and an active judiciary directing the protection of environment. Yet the problem of environmental degradation becoming grave, complex and unmanageable. It is also because environmental laws differ from other types of laws. It is not like labour laws that are restricted to factories or work related to disputes and injuries, not like criminal laws, as it does not concern itself solely with personal injuries and damage to property. Instead, it encompasses the entire range of societal activities, and goes beyond human society into the natural environment. What here is needed, apart from legislation of environment laws and its interpretation in the public consciousness and public awareness? No law howsoever well intentioned and conceived can succeed in attaining its objectives unless it is understood and supported by the people for whom it is meant. In other words, public participation both at the stages of formulation and stage of implementation is necessary for the achievement of the object of the environment laws in India.

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<sup>1</sup> Vellore Citizen Forum Vs. UOI, 1996, 5 SCC 647

<sup>2</sup> Ibid

## 6.5 Effectiveness of Public Participation in India

The purpose of EIA should not be just to assess impacts and complete an Environmental Impact Statement (EIS); it is to improve the quality of decisions. Through informing the public the project proponent can make environmentally sensitive decision by being aware of a project's potential adverse impacts on the environment. Another purpose of EIA is to inform the public of the proposed project and its impacts. In this context public participation provides crucial information. Through their participation the project proponent will be able to take advantage of the information that citizens contribute concerning values, impacts, innovative solutions and alternatives. There are other reasons why public should be involved in EIA. The literature puts forth four basic positions (Shepherd and Bowler, 1997). First, public participation is regarded as proper, fair conduct of democratic government in public decision-making activities (Gelhorn, 1971; Fox, 1979). Second, public participation is widely accepted as a way to ensure that projects meet citizens' needs and are suitable to the affected public (Pearce et al., 1979; Forester 1989; Tauxe, 1995). Third, the project carries more legitimacy, and less hostility, if potentially affected parties can influence the decision-making process (Chapin & Deneau, 1978; Susskind & Cruikshank 1987). Finally, the final decision is 'better' when local knowledge and values are included and when expert knowledge is publicly examined (Parenteau, 1988; Webler et al., 1995).

Some argue that it is better not to include the public in EIA as it will be quicker and most cost-effective to exclude the public in EIA. Project proponents eager to implement their project may fear that citizen involvement will delay their schedule or force them to revise the project (Portney, 1991). Public participation may be regarded as unnecessary because citizens lack project-specific expertise and it is just necessary to educate citizens about the merits of the project (Fischhoff et al., 1981; Krimsky & Plough, 1988). To the project proponent, it may look more prudent to push the project through quietly rather than run the risk of a public process. However, excluding the public does not ensure expediency either. Alienated citizens tend to delay the implementation of the project through time consuming legal action if they feel that their rights are curbed

through project implementation (example see the case studies on Silent Valley, Tehri Dam, Dahanu in this section). Therefore, the project proponent needs to consider not only the risks of including versus avoiding citizen input, but also the potential benefits of establishing a long term co-operative relationship with citizens.

## **6.6 Scope for public participation in India**

Table 3 gives the role of different actors in different stages of EIA. It can be seen from Table 3 that public participation in India occurs too late in the decision-making process and at this stage it is not possible to influence any of the characteristics of the project (like type, size or location). Though the public is involved at the hearing stage, here it is merely a formality as by this time the project proponent more or less has decided to go ahead with the project. The objective of public involvement at this stage may be just to defend a decision that has already been made. So far, citizen involvement in India has been limited to public hearing stage, legal action to halt the project or to force the inclusion of mitigation measures (see the case studies). Grima (1985) notes that the later that public participation occurs in the EIA process, the higher the risk that public comments will only minimally influence the final decision. Secondly, public participation is extremely limited and takes place before project implementation. But the project planning and implementation requires continuous involvement of the public during various stages. Several studies have revealed serious deficiencies in the hearing process too (Sinclair and Diduck, 1999). To add to this problem, information available on the EIA process could assist people in understanding the purpose and objectives of EIA is scant and not user friendly because the summary documents are written in technical language without providing a glossary of key terms.

Even for projects that have already received their no objection certificates the public does not have access to EIA project reports and environmental management plans (Sinclair and Diduck, 1999). In regard to the hearings themselves, there is no indication prior to the hearings of what procedure was going to be followed or how the hearing panel was chosen. Assistance for members of the public on how to participate, e.g., how to prepare a brief report or how to make a presentation is also not made available. There is no

background information too provided on what an environmental impact study should contain or how to critique such a document. Obtaining expert assistance was not promoted in any way and funding is also not available to public participants. Members of the public have to cover their own "traveling and incidental costs" (Sinclair and Diduck, 1999). Finally, there is no indication of how public input provided at the hearings is going to be used in the decision making process.



## Chapter 7. Conclusion

The literature reveals that the EIA Notification contains many of the key elements found in most processes throughout the world including screening, scoping, comprehensive study, progress reports, review, decision and follow-up. However, from the lack of reference to project need, purposes and alternatives, a reasonable inference is that the process reflects a narrowly focused, technical approach, rather than the more broad, open and anticipatory approach called for in some quarters and found in some countries (Gibson 1993; Wood 1995). In addition, reviews of the implementation of the notification are somewhat mixed. Banham and Brew (1996) indicated in their assessment that there is reason to be optimistic about the use of EA in India. While others, such as Dwivedi (1997) and Thakur (1997), suggested that the process is still in its early stages of development and that India lacks many of the institutions and knowledgeable government officials necessary to make the process work properly. An important aspect of the 1994 EIA notification is its relation to other policy instruments in India's environmental management system.

However, a close look at the EIA in India reveals that some improvement is needed in the following aspects. EIA's are controversial in India because of little participatory democracy in the formulation and implementation of environmental legislation. There have been cases where, more than one EIA for the project has been approved by an authorized agency and subsequently revoked by judicial action initiated by public interest litigations (The Hindu Survey of Environment). A fresh outlook at the EIA requirement is essential, especially a public review, which would help in the development of a sound normative framework for guiding the entire process. It is also unclear as to how an EIA is to be prepared, what norms it must satisfy how it is to be approved. The requirements for EIA in India are generally comprehensive and include information on land use pollution sources in air, water and solid waste quality. But the problem arises here because of no

proper set of guidelines for project types covered by the rule. With the promoter's own assessment, the regulatory authority is to make a judgment if EIA is complete and if the project meets the environmental standard. It is quite essential that the regulatory authority periodically review the norm with scientists, NGOs and industry. Measurement techniques and location where the standard is to be met are not specified, leaving it for interpretation from both, the plant engineer and government inspector. This makes the project promoter to adopt the lenient interpretation of the norms during EIA preparation. The EIA and environmental clearances fall within the power of the Center but the implementation of pollution control is with the states. This leads to a scenario where multiple agencies sharing similar responsibilities without well defined roles. Some cases of plagiarized reports by the consultants have been reported in India (The Hindu Survey of Environment).

Another major improvement required is in the area of public involvement. There has been dilution of previous notifications especially regarding public participation. For instance, a recent amendment to the EIA requirements that was notified on 13 June 2002 exempts pipeline projects from preparation of EIA reports. This has further weakened the process of environmental clearance. It also violates the basic premise of authority granted by the Environment Protection Act, 1986. Yet, public hearings need to be conducted in all the districts from where the pipeline will pass. This poses two problems: firstly, it is not clear how an EMP (Environment Management Plan) and Risk Mitigation measures can be formulated when the developers have not studied the potential impacts of a proposed pipeline through preparation of an EIA report. Secondly, on what basis would persons attending a Public Hearing relating to a pipeline project voice their concerns? Both the routing and the construction of pipelines can have severe consequences on people and their environment. Pipeline projects may create unnecessary hardship to local people due to construction work, and pipeline leaks are a potential hazard. Both routing and construction can cause unnecessary and severe damage to sensitive ecosystems. But if these projects are exempted from the EIA process, no other mechanism ensures adequate review of these potential consequences. Curiously, the June 2002 amendment reconstitutes the requirement that EIA reports must be made available to the public prior to the Public Hearings, a requirement that was done away with earlier.

There are other examples. The 1994 notification, made it mandatory for the Impact Assessment Agency (IAA), i.e. the Ministry of Environment and Forests to consult a Committee of Experts before granting environmental clearance to a particular project. In its present amended form the notification states that the IAA may consult the Committee of experts if deemed necessary. The 1994 notification made it mandatory for half-yearly compliance reports prepared by the project authorities to be made publicly available. The notification now leaves it to the discretion of the IAA to make complaint reports publicly available, "subject to public interest". Clearly, the recent amendments are resulting in the dilution of the law on environmental impact assessments. However, for pipeline project, Environmental Impact Assessment report will not be required. But Environmental Management Plan including risk mitigation measures are required."

The case studies coupled with our earlier analyses, demonstrate that substantive, early investments (during the scoping phase itself) in public participation can benefit the project proponent, the public and the final plan. An effective public participation programme does not happen by accident; it must be carefully planned. As the case studies show, a proactive effort will lead to a more effective process and outcome than a reactive, minimalist approach to public involvement. We draw upon the results of the case studies to provide suggestions for improving public participation programmes in EIA. First, public involvement needs to begin before project planning and decision-making are too far along to be influenced. The decision to participate must be genuine. Otherwise, public participation becomes a procedural exercise rather than a substantive democratic process. Second, public involvement can be used to create a project that is more suitable to, and accepted by, the public. Suitability should depend on public opinions and needs (rather than the technical feasibility of the project). Third, public input can be a crucial and valuable source of expertise before, during and after project planning and decision-making. Moreover, based on the case study experiences it can be seen that the EIA legislation must be more explicit in defining the affected area according to potential socio-economic impacts. Only the authority competent in evaluating socio-economic effects should be given the responsibility



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[http://directory.google.com/Top/Science/Environment/Impact\\_Assessment](http://directory.google.com/Top/Science/Environment/Impact_Assessment)

[www.art.man.ac.uk/EIA/link.htm](http://www.art.man.ac.uk/EIA/link.htm)

[http://classes.aces.uiuc.edu/EnvSt298/Environmental\\_impact.html](http://classes.aces.uiuc.edu/EnvSt298/Environmental_impact.html)

<http://www.ids.ac.uk/eldis/envimp/eia.htm>

<http://www.envfor.nic.in/divisions/iass/eia/Cover.htm>

[http://www-wds.worldbank.org/servlet/WDS\\_IBank\\_Servlet](http://www-wds.worldbank.org/servlet/WDS_IBank_Servlet) (for document and reports)

<http://www.unep.org/unep/products/eeu/eeupub.htm>

<http://www.europa.eu.int/comm/environment/eia/home.htm>

<http://www.ceaa.gc.ca>

<http://earth1.epa.gov/Access> - An Environmental Directory

<http://www.enrin.gov.au/net/eianet.html>

<http://iisd1.iisd.ca/>

### C. **Journals on EIA**

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## Appendix I: River Valley Project Questionnaire

MoEF has developed guidelines for the preparation of EIA reports along with questionnaires and check lists for the following sectors. In addition the MOEF has delineated several siting criteria.

Industry Projects

Mining Projects

Thermal Power Projects

River Valley Projects

New Railways Projects

Road and Highways Projects

Ports and Harbours

Airports

Communication Projects

New Towns

**QUESTIONNAIRE FOR ENVIRONMENTAL APPRAISAL**

***(FOR RIVER VALLEY AND HYDROELECTRIC PROJECTS)***

Note 1 : All information given in the form of annexures should be part of this file itself. Annexures as separate files will not be accepted.

Note2 : Please enter x in appropriate box where answer is Yes/No

**I. General Information**

A. Site Information

B. Geographical Location

Village/s	District/s	Tehsil/s	State/s

C. Latitude

D. Longitude

E. Elevation above Mean Sea Level

F. Total Area proposed for the Project (in ha.)

G. Nature of Terrain

H. Technical Classification of  
Soil (loam, sandy etc./aerial extent (ha)

**II. Existing land usage of the proposed project site area (in hectares)**

	Main Structure	Submergence	Canal network	Township	Resettlement	Others	Total
i)Agriculture							
a) Irrigated							
b) Unirrigated							
ii)Homestead							
iii)Forest							
iv)Grazing							
v)Fallow							
vi)Water bodies							
vii) Marshes							
viii)Others(Pl. specify)							
Total							

**III. Alternate sites considered from the environment angle.**

- A. \_\_\_\_\_
- B. \_\_\_\_\_
- C. \_\_\_\_\_
- D. \_\_\_\_\_

**IV. Reason for selecting the proposed site from the environment angle**

**V. Details of site**

A. Seismicity

- 1. Whether the proposed dam site fall in seismically active area

Yes  No

*If yes*

- 2. What is the estimate of of seismic hazard?
- 3. What models used for estimate ?
  - (a) Determistic seismotectonic approach
  - (b) Combined seismotectonic probabilistic approach
- 4. Result of prediction

B. Landslide prone zone

- 1. Is the proposed project in the landslide prone zone

- 2. If yes
  - (a) Geomorphological condition
  - (b) Degree of susceptibility to mass movement
- 3. Whether any major landslide occurred in the past?

4. If yes,
- (a) Frequency of occurrence/decade
- (b) Area affected (ha)
- (c) Population affected (nos)

C. Flood/Cyclone/Droughts

1. Is the area prone to flash flood?
- Yes  No

2. If yes
- (a) Frequency of occurrence/decade
- (b) Area affected (ha)
- (c) Population affected (nos.)

3. Is the area prone to cyclone?
- Yes  No

4. If yes
- (a) Frequency of occurrence /decade
- (b) Area affected (ha)
- (c) Population affected (nos)

5. Whether there is any relation between cyclone occurrence and flash floods ?
- Yes  No

6. If yes, provide details

7. Is the area prone to droughts

Yes

No

8. If yes,

(a) Frequency of occurrence per decade

(b) Area affected (ha)

(c) Population affected

D. Sites likely to be submerged

1. Mineral bearing

S.No.	Name of the mineral	Reserves (million tonnes)	
		Indicated	Proven

2. Archaeological sites/monuments

S.No.	Sites/monuments	Antiquity

3. Place of worship

S.No.	Place	Period of construction

4. Agricultural land

5. Population likely to be affected

**VI. Objective of the project**

A. Irrigation (hectares)

- B. Power generation (MW)
- C. Drinking water supply (cumecs)
- D. Industrial water supply (cu.m./day)
- E. Flood control (area to be protected, in hec)
- F. Others (pl. specify)

**VII. Project profile**

- A. Height of the dam/reservoir (in meters)
  - 1. Above mean sea level
  - 2. From existing ground level
  - 3. From deepest foundation level
  
- B. Gross storage capacity (M cum)
- C. Catchment area (Sq. Km)
- D. Submergence area (hectares)
- E. Command area (hectares )
- F. No. of turbines
- G. Capacity of each turbine (MW)
- H. Length of the main canal (Km)
  - 1. Lined
  - 2. Unlined
- I. Length of distributories (Km)
  - 1. Lined
  - 2. Unlined

J.. Cropping pattern

1. Existing pattern

S.No.	Crop	Existing area (ha)	Productivity (tonnes/hect)

2. Proposed pattern

S.No.	Crop	Addl. area proposed to be brought under cultivation	Productivity	Production	Water Requirement

K. Rationale for adopting the projected crop pattern

L. Irrigation intensity (%)

M. Water logging (ha)

1. Area already under water log

2. Area expected to be under water logging after the completion of project

3. Cropping area likely to be affected by waterlogging due to the project

(a) within the project area

(b) outside the project area

4. Infiltration rate (cms/hour)

(At least for two locations in each of the major soil groups identified)

Major Soil Group			

Infiltration Rate						
-------------------	--	--	--	--	--	--

5. Saturated hydraulic conductivity for major soil groups (m/day) using in-situ auger hole / inverse auger hole method depending on depth of water table from the ground level within 2 meter or above 2 meters

N. Sedimentation (hectare meter/sq.km/year)

1. Present rate

2. Rate expected after catchment after treatment

3. Empirical estimates

4. Historical observation

O. Length of river course which is likely

to dry up due to impoundment (km)

P. In case of project where flow of water will be reduced due to withdrawal of water in between head race tunnel and tail race tunnel

1. Length (metre)

2. Flow rate in river (cumecs)

**VIII. Please indicate the area earmarked for each of the following (in ha)**

A. Dam structure

B. Penstocks

Forebay / surgeshaft

C. Power house

D. Township

E. Submergence

F. Main canals

G. Distributary canal	<input type="text"/>
H. Approach road	<input type="text"/>
I. Green belt	<input type="text"/>
J. Recreation facilities for tourist activities	<input type="text"/>
K. Botanical garden for conservation of rare and endangered species of flora	<input type="text"/>
L. Others (Please specify)	<input type="text"/>
Total	<input type="text"/>

**IX. Whether any of the following exist within 7 km. of the project site. If so, please indicate aerial distance from the periphery of submergence of the site and the name of the site**

S.No.	Name	Arial Distance ( in Km)
1	National Park	
2	Sanctuary/Tiger Reserve/Elephant Reserve	
3	Core Zone & Buffer Zone of Biosphere Reserve	
4	Habitat for migratory birds	
5	Lakes/Reservoir/Dams	
6	Stream/Rivers	
7	Estuary/Sea	
8	Mountains/Hills	
9	Archaeological sites	
10	Archaeological sites listed in notification	
11	Defence Installation	
12	Industries/Thermal Power Plants	
13	Municipal Corporation/Municipal Council/Nagarpanchayat (by whatever name it is known in the state)	

14	Mangroves		
15	Airports		
16	Railway lines		
17	National Highways		

**X. Description of the vegetation (a) within project site (b) within 7 Km from the periphery of project site under following headings**

- A. Agricultural crops\_\_\_\_\_
- B. Commercial crops\_\_\_\_\_
- C. Plantation\_\_\_\_\_
- D. Natural Vegetation/Forest Type\_\_\_\_\_
- E. Grass lands \_\_\_\_\_
- F. Endangered species\_\_\_\_\_
- G. Endemic species\_\_\_\_\_
- H. Others (Please specify)\_\_\_\_\_

**XI. Description of fauna within 7 km under following headings.**

- A. Rare and endangered species
- B. Species which require management
- C. Species of economic significance
- D. Species of special interest to local population or tourists
- E. Aquatic fauna of commercial/recreational value and migratory fish species along with their spawning ground

**XII. Raw materials used during construction**

S. No.	List of construction materials to be used at all stages of construction	Quantity (tonnes /month)		Source of material	Means of transportation ( Source to storage site) with justification
		Peak	Average		
1	Cement				
2	Stone				
3	Steel				
4	Sand				
5	Others (Pl. specify)				

**XIII. In case of stone quarries details of site & surroundings be provided.**

**XIV. Meteorological data ( Annual Average to be obtained from IMD )**

*(Seasonal – Monitored Data)*

A. Temperature (in °C)

1. Maximum\_\_\_\_\_ 2. Minimum\_\_\_\_\_ 3. Mean\_\_\_\_\_

B. Mean Rain fall (in mm)\_\_\_\_\_

C. Wind Speed (Km/hr)

1. Maximum\_\_\_\_\_ 2. Minimum\_\_\_\_\_ 3. Mean\_\_\_\_\_

D. Humidity\_\_\_\_\_

E. Cloud Cover\_\_\_\_\_

**XV. Water Balance.**

**A. Lean season flow (cumec)**

- 1. at the dam/reservoir site
- 2. at the periphery of submergence   
(major streams only)
- 3. one km. downstream of dam/reservoir

**B. Water required (cumec)**

- 1. Power generation
- 2. Irrigation
- 3. Drinking water
- 4. Industrial water
- 5. Others (please specify)

**C. Ground water potential in command area.**

Season	Availability yield in (kl/day)	Slope % Area(ha)	Location A	Location B
Pre-monsoon		0-0.5 %		
		0.5-1 %		
		1-2 %		
		2-5 %		
		>5 %		
Post-monsoon		0-0.5 %		
		0-05-1 %		
		1-2 %		
		2-5 %		
		>5 %		

D. Ground Water Quality

(Water samples may be taken 10 minutes after the starting of pumping for the tubewells in each of the soil groups.

Parameters

1. Electrical conductivity (deci Simons/meter : d S/m )
2. pH
3. Residual Sodium Carbonate (Millie equivalent / liter : me/l)
4. Heavy metals (Only if industrial effluent is discharged in project area)

E. Groundwater withdrawal rate/recharge rate

F. Provide the average value of the following based on analysis of pumping test (at least two tests for each of identified lithological zone) data

1. Transmissivity (Sq.meter/day)
2. Storage coefficient
3. Lithology of the testing site

**XVI . Competing Water use downstream. (Cubic metre/day)**

S.No.	Usage	Present Consumption		Addition Proposed		Total	
		Surface	Ground	Surface	Ground	Surface	Ground
1	Irrigation						
2	Industry						
3	Drinking						
4	Others (Please specify)						

Total					
-------	--	--	--	--	--

**XVII. Physico chemical analysis of Raw Water to be used at project township at intake point.**

**XVIII. Physico chemical analysis of treated water to be used in the Project/Transship.**

**XIX. Waste Water Management**

A. Waste water treatment plan

B. Composition/characteristics of discharge before and after treatment

Items	Units	Composition	
		Before	After

C. Daily discharge (cum./day) form different sources

1. Domestic

2. Other

Total

D. Quantity of water recycled

(in %)

(in cu.m./day)

E. Details of recycling mechanism

F. Mode of final discharge/disposal

S.No.	Mode	Length (in m.)	Quantity (in cu m./day)
1	Open Channel		
2	Pipeline		

3	Others (Please specify)	
Total		

G. Point of final discharge :

S.No.	Final Point	Quantity discharged (in cu m.)/day
1	Agricultural land	
2	Fallow Land	
3	Forest Land	
4	River	
5	Lake	
6	Estuary	
7	Sea	
Total		

H. Lean season flow rate in case of river/stream

(cu m./sec)

I. Downstream users of water

1. Human

2. Irrigation

3. Industry

4. Others (Please Specify)

Total

J. Analysis of river water 100 meters upstream of discharge point and 100 meters downstream of discharge point

**XX. Solid Waste**

**Quantity**

- A. Debris (tonnes)
- Arising out of construction
- B. Sewage (tonnes)
- C. What are the possibilities of recovery and  
Recycling of waste
- D.. Possible uses of Solid Wastes
- E. Method of disposal of solid waste

	Method	Qty (TPM)
1.	Landfill	<input type="text"/>
2.	Recovery	<input type="text"/>
3.	Downstream users	<input type="text"/>

**XXI. Noise level during construction**

- A. Source
- B. Level at source
- C. Level at project boundary (dB)
- D. If the source is within forest area/sanctuaries etc,
- E. Impact of noise on wildlife habitat
- F. Abatement measures

**XXII. Pollution sources**

S. No	Source	Around the periphery of submergence	At a distance of 7 km from the periphery of submergence zone	In the catchment area	Within 7 Km in the stretch in which the river is likely to dry up
1	Industry				

2	Municipal Waste /Sewage				
3	Mining				
4.	Beneficiation Plants				
5	Tail pond dams				
6	Run off from Ash ponds				
7	Others (Pl. specify)				

**XXIII. Atmospheric Emissions in case of DG sets**

A. Flue gas characteristics

S.No.	Gas	Characteristics (in g/Nm <sup>3</sup> )
1	SPM	
2	SO <sub>2</sub>	
3	Nox	
4	CO	

**XXIV. Storage (of inflammable/explosive/hazardous/toxic substances)**

S. No.	Name	Number Of Storages	Height	Diameter	Physical and chemical Composition	Consumption (in TPD)	Maximum Quantity at any point of time (TPD)	Source of Supply	Means of transportation

**XXV. Occupational Health**

- A. What are the major occupational health and safety hazards anticipated
- B. What provisions have been made/proposed to be made to conform to health/safety requirements
- C. Details of personal protective equipment provided/to be provided to the workers
- D. Is the area prone to disease like malaria/fileria etc.

**XXVI. Catchment area**

A. Total catchment area (ha)

B. Monuments in the catchment area

1.

2.

C. Sites of cultural importance in the catchment area

1.

2.

D. Sites of religious importance in the catchment area

1.

2.

E. Other river valley projects in the catchment area

1.

2.

F. Major development projects located in the catchment area

1. Industry

2. Mining

3. Roads

4. Railways

5. Thermal power plant

6. Others (Pl. Specify)

G. Catchment area treatment plan

S.No	Year	Area to be treated (ha)				Outlay (Rs. lakh)
		High erodability		Very high erodability		
		Direct	Indirect	Direct	Indirect	

**XXVII. Green Belt (other than catchment area)**

A. Total area of project / township (in ha)

B. Area already afforested (for existing projects), in ha.

C. Area proposed to be afforested (in ha.)

- D. Width of green belt (minimum, in m.)
- |                               |  |
|-------------------------------|--|
| 1. Periphery of the reservoir |  |
| 2. Canal bank                 |  |
| 3. Township                   |  |

- E. Trees planted & proposed **Nos.**
- |                    |  |
|--------------------|--|
| 1. Planted         |  |
| 2. Survival Rate   |  |
| 3. Proposed        |  |
| 4. List of Species |  |

**XXVIII. Construction Phase**

- A. Estimated duration of construction (in months)

- B. Number of persons to be employed for construction
- |            | Total | From affected population | Others |
|------------|-------|--------------------------|--------|
| 1. Peak    |       |                          |        |
| 2. Average |       |                          |        |

- C. Details of site and area where migrated labourers will be temporarily settled
- D. What provision has been made for the sewage treatment for the construction workers?
- E. How the fuel (Kerosene/wood, etc.) requirement of labour force will be met to avoid cutting of trees from the adjoining areas
- F. Measures of Health care with emphasis on protection from endemic diseases.

**XXIX. Human Settlement**

	Aerial distance from the periphery of the reservoir		
	Upto 2000m From periphery Of the reservoir	2000m to 5000 m from periphery of the reservoir	5000m to 10000m from the periphery of the reservoir
Population			
Number of Houses			
Present Occupational Pattern			

**XXX. Rehabilitation & Resettlement Plan**

A. Village(s) affected by the project

S. No.	Villages			Population		Occupation		Average Income per annum	
	Tribal	Mixed	Others	Tribals	Others	Tribals	Others	Tribals	Others

B. Population to be displaced

S.No.	Name of Village	Population					
		Land oustees only		Homestead oustees only		Land and Homestead only	
		Tribal	Others	Tribal	Others	Tribal	Others

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- C. Rehabilitation Plan for oustees
- D. Details of site where the people are proposed to be resettled
- E. Compensation package with full details(tribals and others, separately)
- F. Agency/Authority responsible for their resettlement
- G. Whether the cost of Rehabilitation measure is included in the project cost ?  
 Yes  No
- H. If not, How the expenditure on rehabilitation measure is to be met ?

**XXXI. Expenditure on Environmental Measures**

- A. Capital cost of the project (as proposed to the funding agency/financial institutions  
 (Rs Lakhs)
- B. Cost of environmental protection measures (Rs. lakhs)

S.No		Recurring Cost per annum	Capital Cost
1	Catchment area treatment		
2	Restoration of project site		
3	Restoration of canal site		
4	Cost of rehabilitation		
5	Health delivery system		
6	Conservation of flora & fauna		
7	Drainage		

8	Pollution Monitoring		
9	Solid Waste Management		
10	Green Belt of main project site		
11	Reclamation of borrow/Mined area		
12	Others (Pl. Specify)		
Total			

**XXXII. Public Hearing**

A. Date of Advertisement

B. Newspapers in which the advertisement appeared

C. Date of Hearing

D. Panel Present

E. List of persons present along with addresses and occupation

F. Summary/details of public hearing

S.No.	Issues raised	Recommendation of panel	Response of Project Proponents

The data and the information given in this Performa are true to the best of my knowledge and belief

**Date:**

Signature of the Applicant with full name & address.

**Place:**

Given under the seal of organisation on behalf of whom the applicant is signing.

**LIST OF DOCUMENTS TO BE ATTACHED WITH THE QUESTIONNAIRE IN RESPECT OF RIVER VALLEY AND HYDROELECTRIC PROJECTS.**

1	Topographic map of the main project site indicating contours (1: 2500 scale), location of structures, roads etc.
2	Topographic map covering 7 Kms. Radius indicating main features, ecologically sensitive areas, area to be submerged, main canal net work (in case of irrigation projects only).
3	Location map indicating areas for dumping of excavated material.
4	Comments/observations/Recommendations of Chief Wildlife Warden in case Wildlife habitat/migratory path exists within 7 Kilometers of project site
5	Copy of the application submitted to the State Government for forest clearance in case of diversion of forestland is involved.
6	Copy of advertisement issued in report of public hearing
7	Details of public hearing.
8	Ecological study.
9	Conservation plan for affected flora/fauna.

10	Index map of catchment areas indicating year wise target (Physical & financial).
11	Action plan for control of water logging
12	Action plan for command area development in respect of irrigation potential.
13	Action plan for health delivery systems.
14	Action plan for rehabilitation & resettlement.
15	Plan for restoration of quarry areas/burrow areas and areas for dumping excavated material.
16	Plan for green belt (other than catchment area).

## Appendix II: Siting Criteria Delineated by MOEF

I. As far as possible prime agricultural land/forest land may not be converted into an industrial site

II. Land acquired should be minimum but sufficient to provide for a green belt wherein the treated wastewater, if possible/suitable, could be utilized from wastewater treatment systems

III. Enough space may be provided for storing solid wastes. The space and the waste can be made available for possible reuse in future

IV. Layout and form of the project must conform to the landscape of the area without unduly affecting the scenic features of that place

V. Associated township of the project if any to be created must provide for space for phyto- graphic barrier between the project and the township and should take into account predominant wind direction

VI. Coastal Areas: at least 1/2 km from the high tide line (within 0.5 km of High Tide Line (HTL), specified activities as per CRZ notification, 1991 are permitted)(The HTL is to be delineated by the authorized agency only.)

VII. Estuaries: At least 200 meters from the estuary boundaries

VIII. Flood Plains of the Riverine systems: at least 500 meters from flood plain or modified flood plain or by flood control systems

IX. Transport/Communication System: at least 500 meters from highway and railway

X. Major Settlements (3,00,000 population) at least 25 km from the projected growth boundary of the settlement

## Appendix III: Checklist for Ecological IA

While verifying the Impacts on ecology delineated in the Impact Assessment statement, the reviewer may consider such of the following matters that are relevant to the proposed development:

- The general character of the existing site in terms of fauna and flora; landscape and geological features, lakes, creeks, marsh, mangroves, coral, forest and bush, sand dunes, mud flats, breeding and spawning grounds, habitats, flight paths, migratory paths and aesthetics.
- The consistency of the proposed development with any relevant statutory instruments, planning policies, heritage orders, measures under tribal or native people legislation, or international conventions (protecting, say, wetlands and migratory birds, or threatened or endangered species).
- Alternative sites for the proposed development, or alternative designs or techniques, which might pose reduced ecological risks. Reasons why this site is clearly preferable to all others.
- In that event, an ecological inventory of at least the most endemic and endangered species with major plant and animal habitats, particularly habitats critical to the preservation of threatened or endangered species. The geographical relationship of species on the site.
- Artificial features of the site as existing, such as roads, railways, buildings and other facilities relating current uses to the local ecology: agricultural activities.
- A history of tribal activity on the site, with reference to archaeological, cultural, and heritage items.
- Outstanding individuals such as the oldest or largest of the trees; rare or uncommon species, races, variants, and populations; unique or scarce habitats. Communities threatened or endangered.
- Plants or animals that could affect public health or safety: allergenic plants, poisonous and venomous species, pest or nuisance population; populations that might expand dramatically if the immediate environment were changed.
- The possible effects of the proposed development on terrestrial species (plants and animals); on aquatic species (fauna, fish, coral); on habitats; on the aesthetics of the site; on natural resources such as soil, geological formations, dunes, beaches, lakes, forest (including rain forest), coral reefs, mangroves, swamps, outcrops, and the atmosphere; including the possible effects of noise.
- The implications of clear felling or selective logging for timber and other forest products; the effects of road-building, drainage of wet areas, and the skidding, hauling of logs; the possibility of replacement by mono culture plantations; the danger of forest fragmentation causing genetic isolation of animal populations.