Uttar Pradesh Rajarshi Tandon
Open University

SBSEVS-02

Environmental Impact Assessment and Legislation

Block- 1

EIA Components and Data Collections

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SBSEVS-02N Environmental Impact Assessment and Legislation

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COURSE INTRODUCTION

This course is to provide knowledge of environmental impact assessment and legislation. Environmental impact assessment (EIA) is a crucial tool for managing and mitigating the environmental effects of development projects. It involves identifying and evaluating the potential environmental consequences of proposed actions before they are implemented. The aim is to minimize negative impacts and promote sustainable development. Effective management of environmental impact requires a comprehensive approach that considers various factors and engages stakeholders. The course is organized into following blocks:

Block 1discuss the EIA components and data collections

Block 2 describe the EIA policies and life cycle assessment (LCA)

Block 3 covers the environmental management, act and polices

Introduction

This first block of environmental impact assessment and legislation, this consists of following three units:

Unit-1: This unit covers basic concept of EIA like definition, principle and objectives of EIA and needs for EIA. The types of EIA, hierarchy in EIA, advantages of EIA, application form of EIA, and composition of expert committee for EIA process also cover in this unit.

Unit-2: This unit describes the components of EIA, the EIA process, screening, scoping, baseline data, impact prediction, assessment of alternatives, delineation of mitigation measure and EIA report. The public hearing, decision making, monitoring and environmental clearance conditions also discussed.

Unit-3: This unit covers the concept of impact Assessment and Data Collections in which the environmental impact, social impact, impact identification and prediction, baseline data collection, construction stage impacts and post project impacts etc.

Unit-1: Basic Concept of EIA

Contents

1.1.Introduction

Environment can be defined as a sum total of all the living and non living elements and their effects that influence human life, while all living or biotic elements are animals, plants, forest, fisheries and birds, non living or abiotic elements include water, land, sunlight, rocks and air. The environment gives us countless benefits, that we cannot reply our entire life. As they are connected with the forest, trees animals water and air. The forest and trees filter the air and absorb harmful gases. Plant purifies water; reduce the chance of food contamination, nature balance and many others. The environment is our basic support system. The basis for environmentalism is the belief that environmental influence on a person's behavior and growth. It is a process which is concerned about the

protection from the adverse effects of all kinds of pollution and other human activities. The term environment means all complex of physical, chemical, biological and aesthetic factors which are interlinked individually as well as collectively in various way and effects individual and communities and ultimately determine their form, character, relationship and survival. Man and environment relationship is as old as the evolution of mankind. With the growth in social and economic activities advancement in technologies, man expounded his own environment through design and skill for better food, shelter access and comfort or luxuries. A complete description of environment by considering all such factors is denoted by the term environmental inventory. The different dimension of environment have number of categories, factor or elements such as physical environment, social environment, economic environment, aesthetic environment, land and climate, vegetation, wildlife and natural area, infrastructure and pollution levels. These factors influence other factor gives slightly change in natural condition of environment or introduce net set of condition that will affect ecology including human life. Nature or environment sustains life. As conscious and relation being man needs to know the importance of environment and help keep the environment as healthy and productive as it can be. The effect normally defines environmental impacts. The impacts of the conditions are assessed through the environmental impact assessment is called environment impact analysis in scientific terminology. The environmental impact assessment is defined by Lee and Walsh (1992) as the strategic environmental assessment (SEA) which is applied to polices, plan and programmers.

1.2.EIA

1.2.1. Definition of EIA

Environmental impact assessment (EIA) means the assessment of impact on environment or ecology during any activity or plan. Environmental impact assessment process involves evaluation of environmental implication and incorporation of necessary safeguard. Evaluation of beneficial and adverse effects of development project on the ecosystem both qualitative as well as quantitatively. Thus EIA is activity designed to identify and predict the impacts on bio-geographical environment and human health. EIA a systematic process for indentifying future consequences of a proposed action. EIA is defined as an

activity designed to identify and predict the impact of legislative proposal, polices program, project and operation on the bio-geographical environment. Impact assessment designs way to render development and protection of the environment compatible in the complex and interdependent world of today.

In other world the environmental impact analysis is the study of impact on environment of proposed action, plan and project. It is the process of anticipating or establishing the charges in physical, biological, ecological and socio-economic component of environment before, during and after an impending developmental project so that undesirable effects, if any, can be mitigated. Thus EIA has been recognized as the most valuable, interdisplinary and objective decision making tools with respect to alternate routes for development process technology and project sites. It formulates comprehensive policies for preparative action to avoid environmental damage before it occurs.

Through EIA, all such aspects of the projects, plans, programmers, and legislative actions relatives to the physical chemical, biological, cultural and socioeconomic components of the total environment are considered. EIA applied at the higher levels of decision making hierarchy i.e. regional, state and national level. EIA applied from local level mainly, deals the project and other analogies, of the policy making to consider at the national level to formulate action plans at national, state or regional levels. Environmental impact has become a promising instrument to prepare for public decision –making and development action. Impact assessment has to be taken up at the project inception stage so that the section of appropriate layout and building materials can be done to ensure environmental compatibility. Making environmental parameters are integral part of the project, it also ensure necessary safeguard, monitoring mechanism for feedback and mild course, correction, both in short and long term. Whenever, rehabilitation is involved it also needs to ensure quality of life for the affected people after the introduction of a development project to avoid misery.

Environmental impact may be primary or secondary. Primary impacts are associated with projects, programmers and other activity of man such as pollution or displacement of people or business. Environmental impact may be classified as short term or long term. The cutoff period of short term or long term can be determined it totally depend on the nature of project or plan. However, the

ecologist have their own time prospective of impacts such as for duration 5 to 10 years may be considered short terms and time period 50 years or more than it, is considered long term impact. The consideration of nature of short-term and long time environmental impact decides the future changes of surrounding environment. The short term impact might be counteracted by the opposite consequences in the long term.

The environmental impact assessment has to try to answer the following set of sequences such as:

1 What are the environmental issues associated with the project?
2 What is the extent or degree of changes?
3 Whether the target of benefits derived from the project is worth the environmental changes sustained?
4 What can be done about adverse impacts on environment?

1.2.2. Principles of EIA:

There are eight quilting principles that govern the entire process of EIA and they are as followings.

1. **Participation:** The participation is the main activity for the analysis of data. An appropriate and timely access to the process for all interested parties.
2. **Transparency**: all assessment decision and their basic should be open and accessible.
3. **Certainty:** the purpose and timing of the assessment should be agreed in advanced and followed by all participants.
4. **Accountability:** the decision making should be bonding to all parties for their action and decision assessment process.
5. **Credibility:** assessment is undertaken involving professional with objectives.
6. **Cost effectiveness:** the assessment process and its outcomes will ensure environmental process at the low cost to the society.
7. **Flexibility**: the assessment process should be able to adopt to deal efficiently with any proposal and decision making situation.
8. **Practicality**: the information and output should be provided by the assessment for usable decision making and planning.

We know the EIA is a tool to indentify the impact of proposed activities on natural environment such as:

- ❖ Identification of potential environmental impacts
- ❖ Assessment and evaluation of the significant of environmental implications
- ❖ Assess whether impact can be mitigated/ removed.
- ❖ Recommended preventive and corrective mitigating measure.
- ❖ Adverse impact of development where it should go ahead.
- ❖ The main objectives were to ensure that public safety and health were adequately protected.

1.2.3. Objectives of EIA

EIA has lots of objectives such as

- Identifying, predicting, and evaluating economic, environmental and social impacts of proposed activity or plan.
- It is a useful tool for providing information on the environmental consequences for decision making and implementation.
- It's also applied for access to whether impact can be mitigated.
- Promoting environmental sound and suitable development by identifying appropriate alternative mitigation measure.

1.2.4. Advantage of EIA:

EIA is process with several important purposes which can be categorized as following

- **To facilitate decision making:**

The decision making for the local authority, it provides the systematic examination of environmental impact implication of a proposed action and some time alternative before a decision is taken. It also informs the decision makers about every update of the proposed project.

- **To aid in the formation of development:**

EIA can provide great benefit because it suggests a framework for considering location and design issues and environmental issues in parallel. The consideration of environmental impacts before early the planning is like a development, which can lead to environmentally sensitive development to improved relation between the developer, the planning authority and local communities.

- **To be helpful in cost and time management:**

EIA helps in reducing the cost and time of the proposed project and it also improves the design of the proposed project. It is being utilized in different types of treatment to reduce cost which could be give less impact on the nature and improved integration of projects into their environment and social setting.

- **To be create awareness about environmental legislation**

EIA also spread awareness the environmental legislation which reduces the number of violations of environmental related issues that also improve the protection of environment. EIA also make sure that the people who are going to get affected by the proposed project are aware of all the consequences of that project and its polices and regulation.

- **To be an instrument for sustainable development**:

The sustainable development with future prospective characterizes sustainable development, including maintenance of overall quality of life and mentions access to natural resources to avoid environmental damage. EIA helps the project proponent in a complete and optimum utilization of available resources. It creates a balance between development and environmental protection. It also helps in making connection between environment and development which helps in completing the goal of sustainable development. It is useful in making Healthier local environment (forests, water sources, agricultural potential, recreational potential, aesthetic values, and clean living in urban areas) and also reduced environmental damage.

1.3.Types of EIA

On the basis of purpose and theme of development EIA can be categories into following types. It may be: i) climate impact assessment, ii) demographic impact assessment, iii) developmental impact assessment, iv) ecological impact assessment, v) health and social impact assessment, vi) strategic impact assessment and vii) technological impact assessment etc. Apart from this, the EIA is systematic process of analysis which works on set of environmental parameters so that it can be categorized as into four parameters: I. Strategic EIA, II. Regional EIA, II. Sectoral EIA, IV, project level EIA and life cycle assessment.

I. Strategic EIA:

It refers to systematic analysis of the environmental effects of developmental polices. Plans, programs and other proposed strategic actions. Strategic EIA represent a proactive approaches to mitigate impact and also helpful for higher level of decision making. The purpose of SEA is to assist for sound environmental decision making improvement over the Environmental Impact Assessment (EIA). SEA represents a proactive approach for integrating socioeconomic values with the environmentally viable development for higher levels of decision-making.

II. Regional EIA:

This type of EIA focuses on the regional level of proposed project plan and activities that integrates to environmental concerns. This approach is referred to as the economic-cum-environmental development planning. Is also facilitates adequate integration of economic development with measurement of renewable natural resources within its carrying capacity. In addition, if environmental effects are considered at regional level, the cumulative environmental effects of all the projects within the region can be accounted.

III. Sectoral EIA:

It refers to EIA in specific sectors like mining, airports, townships, nuclear power plants, thermal power etc. It helps in addressing specific environmental problems encountered in planning and implementing sectoral development projects. Apart from project level, the sectoral level planning can be carried out in integrated sectoral environmental concerns. Sectoral level EIA helps to address specific environmental problems that may be encountered in planning and implementing sectoral developing projects. In India, the Ministry of Environment and Forests (MOEF) has prepared 37 EIA Manuals on major sectors of developmental projects which are listed in the Schedule to the Environmental Impact Assessment (EIA) Notification 2006. These Manuals have been prepared to serve as Environmental Sciences Paper 12 Environmental Management Module 06 Introduction to EIA Technical Guidance Manuals (TGMs) to various stakeholders involved that are in the environmental clearance (EC) process.

IV. Project level EIA:

It refers to the developmental activity in isolation and impacts that it exerts on receiving environment. It specifically targets only one developmental activity and does not effectively integrate the cumulative effects of development in the region.

1.4. Hierarchy in EIA:

Hierarchy offers a framework for effective management of environmental risk and potential impact on nature. It provides systematic approach to manage every possible step in environmental management. It is help full in mitigation measure and decision making for environmental impact statement. The EIA study broadly categories as:

1. Site selection studies:

This study involves an evolution of the alternative sites to report the environment of project and attributes as proximity to raw material, infrastructure facility etc. In site selection study, the best environmentally and technically practicable site is used to evaluate in EIA phase. In this site selection study, numbers of parameters or processes are involved using of physical, biological and social criteria. Specialist selects alternative sites on the basis of following order observation.

- Investigate the study area;
- Gather baseline environmental (biophysical and social) information of the sites;
- Assess the status quo conditions, and
- Identify any potential environmental impacts.

In order to nominate the preferred site for further assessment in the EIA phase, the identified site alternatives were given weightage against one another using a ranking matrix to calculate a comparative score.

Rapid or compressive studies

Rapid studies refer to the assessment based on one session monitoring (i.e. one 3 month period) is called rapid EIA. Rapid EIA is conducted when a fair amount of knowledge is available about the proposed site or the impacts of the proposed development. The rapid EIA also makes a base for the comprehensive EIA. However, the compressive studies related to the assessment based on the tree

section of base line data (i.e. 9 month period). Rapid and compressive studies differ with respect to time frame is required for baseline data collection

Regional Studies:

Regional study is related to the development of region based seasonal data collection, assimilative capacity of component of air water and land environment. In other words, the regional study of EIA, integrate environment concern and is involved to make useful access to information at regional level.

Carrying capacity studies

In biology and environmental science, the carrying capacity of a biological species in a particular habitat refers to the maximum number of individuals (of that species) that environment can carry and sustain, considering its geography or physical features. In archeology, carrying capacity pertains to the size and density of ancient populations as supported by a given region. The scope of carrying capacity studies extends to the analysis of supportive capacity in the region with respect to resource availibity or utilization or supply or demand. Carrying capacity studies are conducted to analyze the resource availability/ utilization, infrastructure/congestion, supply/demand ratio and assimilative capacity/residuals. It has often been observed that one or more natural resource(s) becomes a limiting resource in a given region thereby restricting the developmental activity. Govt. of India has also sponsored Carrying Capacity Studies for different regions. The studies involve:

- Inventorisation of the natural resources available
- Preparation of the existing environmental settings
- Perspective plans and their impact on natural resources through creation of "Business
- As Usual Scenario”

1.5.Environmental Consultant

An environmental consultant is an individual or organization who provides knowledge on a range of environmental issues, offering expert advisory and assessment services to project proponents to ensure possible damaging effects of the proposed project that are managed or eliminated. The environmental consultant is supposed to be aware of all govt. rules and regulations regarding environmental issues. As per new rules under EIA notification, the environmental

consultants should be accredited by Quality Council of India. Environmental consultants cover a range of disciplines such as:

- Air, water, soil and Noise Pollution
- Renewable energy and resource management
- Waste management and recycling and reuse

Environmental consultant is the most important part of EIA process and is responsible for following:

- To Look the prefeasibility and suitability of the project
- To Find the category of the project as per schedule and determine whether the project requires environmental clearance or not.
- To screen and scope the project as per guidelines of the govt.
- To develop conceptual plans to identify and consideration of potential environmental contaminants.
- Presentation of the scoping of project to the relevant statutory committees.
- To conduct field surveys and collecting primary/baseline data about soil, water, air or noise at and around proposed project site.
- To undertake field work to identify socio economic and other environmental impacts of the proposed project including impacts on native biodiversity, change of land use pattern etc.
- To interpret the collected data in terms of existing pollution levels at site, socioeconomic, demographic impacts etc.

1.6. Statutory bodies and Regulatory

The government of India has established the Environment clearance committees in order to assist the government on environmental clearance issues. The three level of authority such as centre level, state level and district level has been established as per EIA notification 2006, responsible for the EIA clearance. The member secretaries of the committees which are registered at the online portal generally act as processing authority. They are generally senior members of pollution control board or members of Ministry of Environment, Forest and Climate Change.

1.7. Process of Environmental Clearance/Appraisal

The environmental clearances for different project obtained by proper channel are decided by ministry of environment forest and climate change. Several steps are involved in environmental clearances which are following:

Determination of project Category:

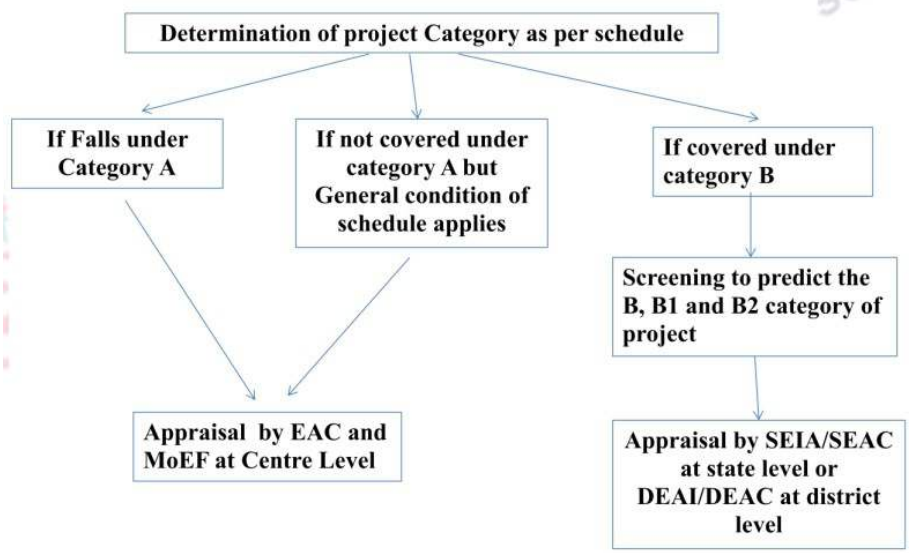
The first step of the EIA is to screen the project to determine in which category of the schedule project lays because the further steps and rules will depend on the category of the project. The project proponent with the help of environmental consultant decides to determine the category the project proposed. For this, Schedule is available in the EIA notification 2006 and its amendments are referred. The schedule has 2 main categories:

Category A: It dealt at Centre level. All the projects require EIA report for appraisal and also have to undergo public consultation process.

Category B: The category 'B' is further divided into category 'B1' and 'B2'except township and area development projects category 8a of schedule.

Category B1: this category of project required EIA report for appraisal and also has to undergo public consultation process. This category of project deals at State level. All Category 'B' projects/activities listed under the Schedule of EIA Notification, 2006 and its amendments shall be considered as Category 'B1' projects and appraised as per the guidelines.

Category B2: This is dealt at state level or District level. It is based on the application accompanied with pre-feasibility report and other relevant documents at state level except the projects of mining of minor minerals at district level.



Stages in the Prior Environmental Clearance (EC) Process for Category 'A' Projects:-

The category A projects of schedule as per EIA Notification 2006 and amendments there off has to pass mainly through the following 3 steps:

Scoping:

Scoping" refers to the process to determine detailed and comprehensive Terms of Reference (TOR) addressing all relevant environmental concerns for the preparation of an Environment Impact Assessment (EIA) Report in respect of the project or activity for which prior environmental clearance is sought.

Public Consultation:

Process by which the concerns of local affected persons and others who have plausible stake in the environmental impacts of the project or activity are ascertained with a view to taking into account all the material concerns in the project or activity design as appropriate.

Appraisal:

Appraisal means the detailed scrutiny of the application and other documents including the Final EIA report, public consultations report etc. by the Expert Appraisal Committee. (EAC) The proponent or authorized representative is generally called for the detailed presentation. The appraisal of an application is completed by the Expert Appraisal Committee concerned within sixty days of the receipt of the final Environment Impact Assessment EIA report and other documents.

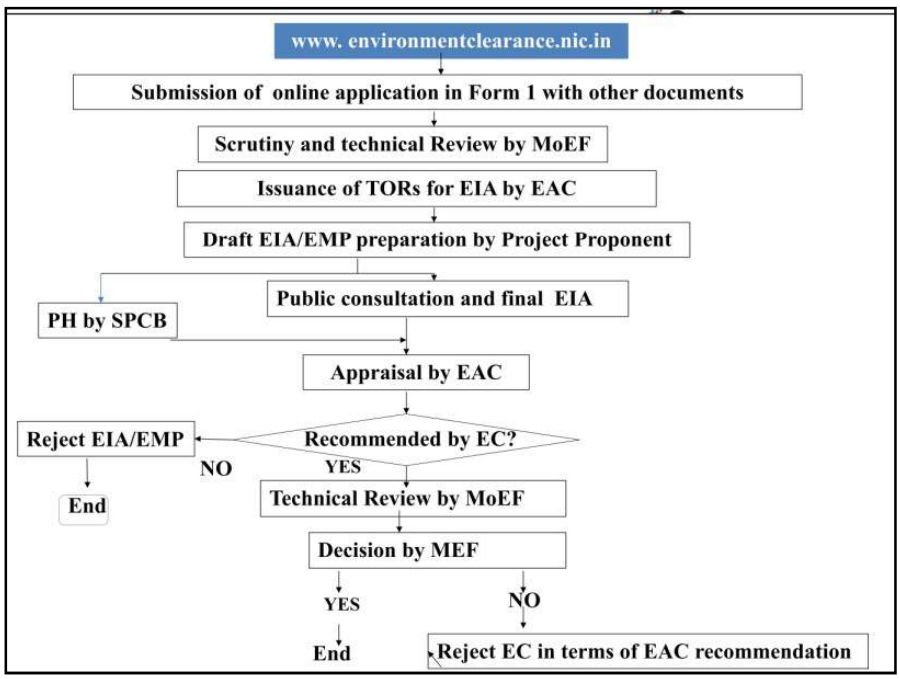
The stage I Screening of EIA Notification 2006 is not applicable for the category A projects.

Step-1: Online Application for Prior Environmental Clearance:

That project comes under category A are applied online for environmental clearance through website www.environmentclearance.nic.in and getting Term of Reference (TOR) by project proponent with the help of environmental consultant. The following documents are uploaded along with the online application generally by environmental consultant on behalf of project proponent/developer.

- Cover letter dully stamped and signed by the project proponent/developer
- Form-I (Appendix A)

- Prefeasibility report
- Environmental Management plan
- Proof of ownership of land
- Approved layout plan along with relevant annexure
- Topographic sheet



If the processing authority finds the application in order as per the checklist, the application is further processed for consideration of the respective Expert Appraisal Committee. (EAC) Otherwise, the proponent is asked for the remaining/missing documents and additional information. For the projects of category 'A', there are many sector specific committees. Currently (March 2018), there are following committees for category 'A' Projects.

- Coal Mining
- Industrial Projects
- Industrial Projects
- Infrastructure and Miscellaneous Projects + CRZ
- Non-Coal Mining
- River valley and Hydroelectric Projects
- Thermal Projects

The timelines prescribed in the Notification for various stages of clearance are:

Terms of Reference	30 days specified (After 30 days the standard

(TORs)	ToRs generated by the system are issued automatically)
Public consultation (wherever applicable)	45 days
Appraisal	60 days
Communicating the decision to project proponent	45 days

Step-2: Consideration of application by EAC:

The committee scrutinizes the application and the documents thereof. The environmental consultant and the project proponent appear before the committee for presentation of the proposed project/activity. The committee if satisfied issues the Terms of Reference (TOR) for the further EIA study. The TORs address sector specific issues relating to environmental impact assessment studies.

Step – 3 Preparation of EIA report and Public Consultations: After issue of the TOR, project proponent gets the permission to conduct EIA. EIA is carried in detail as per the TOR and additional terms if any. The generic structure of Environmental Impact Assessment document is described in APPENDIX III of EIA notification 2006. Further the contents of summary of the EIA report is described in APPENDIX III A. The EIA report so prepared is placed on the website of proponent. Public hearing is conducted as per procedure prescribed in APPENDIX IV of the EIA notification 2006.

1.8.Application form of EIA

The application form for EIA comprises the following details such as

FORM 1

(I). Basic Information

Sr. No.	Item	Details
1	Name of the project/s	
2	S. No. in the Schedule	
3	Proposed capacity / area / length / tonnage to be handled / command area / lease area / number ofwells to be drilled	
4	New / Expansion / Modernization	
5	Existing Capacity/ Areaetc.	
6	Category of project i.e. Aor B	

7	Does it attract the general condition? if yes, pleasespecify	
8	Does it attract the specific condition? If yes, pleasespecify	
9	Location	
	Plot/Survey/ Khasra No.	
	Village	
	Tehsil	
	District	
	State	
10	Nearest railway station/port along with distance in kms.	
11	Nearest Town, city, District Headquarters along with distance in kms.	
12	Village Panchayat, Zilla Parishad, Municipal Corporation, Local body(complete postal addresses with telephone nos. to be given)	
13	Name of the applicant	
14	Registered address	
15	Address for correspondence:	
	Name	
	Designation (Owner/ Partner/ CEO)	
	Address	
	Pin code	
	E-mail	
	Telephone No.	
	Fax No.	
16	Details of alternative sites examined, if any. Location of these sites should be shown on a toposheet	
17	Interlinked projects	
18	Whether separate application of interlinked project has been submitted	
19	If yes, date of submission	
20	If No, Reason	
21	Whether the proposal involves approval/clearance under: if ,yes details of the same and their status to be given a. The Forest (Conservation) Act, 1980? b. The wildlife (protection) Act,	

	1972? c. The CRZ Notification, 1991?	
22	Whether there is any Government Order/policy relevant/relating to the site?	
23	Forest land involved (hectares)	
24	Whether there is any litigation pending against the project and/or land in which the project is propose to be set up? a) Name of the court b) Case No. c) Orders/ Directions of the court if any and its relevance with the proposed project.	

(II). Activity

Construction, operation or decommissioning of the Project involving actions, which will cause physical changes in the locality (topography, landuse, changes in water bodies, etc.)

Sr.No.	Information/Checklist confirmation	Yes/No	Details thereof (with approximate quantities /rates, wherever possible)with source of information data
1.1	Permanent or temporary change in land use, land cover or topography including increase in intensity of land use (with respect to local land use plan)		
1.2	Clearance of existing land, vegetation andbuildings?		
1.3	Creation of land newuses?		
1.4	Pre-construction investigations e.g. bore houses, soil testing?		
1.5	Construction works?		
1.6	Demolition works?		

1.7	Temporary sites used for construction works or Housing of construction workers?		
1.8	Above ground buildings, structures or earthworks including linear structures, cut and fill or excavations		
1.9	Underground works Including mining or tunneling?		
1.10	Reclamation works?		
1.11	Dredging?		
1.12	Offshore structures?		
1.13	Production and manufacturing processes?		
1.14	Facilities for storage of goods or materials?		
1.15	Facilities for treatment or disposal of solid waste or liquid effluents?		
1.16	Facilities for long term housing of operational workers?		
1.17	New road, rail or seatraffic during construction or operation?		
1.18	New road, rail, air waterborne or other transport infrastructure including new or altered routes and stations, ports, airports etc?		
1.19	Closure or diversion of existing transport routes or infrastructure leading to changes in traffic movements?		
1.20	New or diverted lines or transmission pipelines?		
1.21	Impoundment, damming, culverting, realignment or other changes to thehydrology of Water courses or aquifers?		
1.22	Stream crossings?		

1.23	Abstraction or transfers of water from ground or surface waters?		
1.24	Changes in water bodies or the land surface affecting drainage or run-off?		
1.25	Transport of personnel or materials for construction, operation or decommissioning?		
1.26	Long-term dismantling or decommissioning or restoration works?		
1.27	Ongoing activity during decommissioning which could have an impact on the environment?		
1.28	Influx of people to an area in either temporarily or permanently?		
1.29	Introduction of alien species?		
1.30	Loss of native species or genetic diversity?		
1.31	Any other actions?		

2 Use of Natural resources for construction or operation of the Project (such as land, water, materials or energy, especially any resources which are non-renewable or in short supply):

Sr.No.	Information/checklist confirmation	Yes/No	Details thereof (with approximate quantities / rates, wherever possible) with source of information data
2.1	Land especially undeveloped or agricultural land (ha)	No	
2.2	Water (expected source & competing users) unit: KLD	Yes	
2.3	Minerals (MT)	No	
2.4	construction material – stone, aggregates, sand /soil (expected source – MT)	Yes	
2.5	Forests and timber(source-MT)	Yes	

2.6	Energy including electricity and fuels (source, competing users)Unit: fuel (MT), energy (MW)	Yes	
2.7	Any other natural resources (use appropriate standard units)	No	

3. Use, storage, transport, handling or production of substances or materials,which could be harmful to human health or the environment or raise concerns about actual or perceived risks to human health.

Sr. No.	Information/Checklist confirmation	Yes/No	Detailsthereof(with approximate quantities/rates, wherever possible)with source of information data
3.1	Use of substances or materials, which are hazardous (as per MSIHC rules) to human health or the environment (flora, fauna, and water supplies)		
3.2	Changes in occurrence of disease or affect disease vectors (e.g. insect or water borne diseases)		
3.3	Affect the welfare of people e.g. by changing living conditions?		
3.4	Vulnerable groups of people who could be affected by the project e.g. hospital patients, children, the elderly etc.,		
3.5	Any other causes		

4. Production of solid wastes during construction or operation ordecommissioning (MT/month)

Sr.No.	Information/Checklist confirmation	Yes/No	Details thereof (with approximate quantities/rates, wherever possible) with source of information data
4.1	Spoil, overburden or mine wastes	No	
4.2	Municipal waste (domestic and or commercial wastes)	Yes	
4.3	Hazardous wastes (as per Hazardous Waste Management Rules)	No	
4.4	Other industrial process wastes	No	
4.5	Surplus product	No	
4.6	Sewage sludge or other sludge from effluent treatment	Yes	
4.7	Construction or demolition wastes	No	
4.8	Redundant machinery or equipment	No	
4.9	Contaminated soils or other materials	No	
4.10	Agricultural wastes	No	
4.11	Other solid wastes	No	

5. Release of pollutants or any hazardous, toxic or noxious substances to air(Kg/hr)

Sr. No.	Information/Checklist confirmation	Yes/No	Details there of (with approximate quantities/rates, wherever possible)with source of information data
5.1	Emissions from combustion of fossil fuelsfrom stationary or mobile sources	No	
5.2	Emissions from production processes	No	
5.3	Emissions from materials handling including storage or transport	Yes	
5.4	Emissions fromconstruction activitiesincluding plant and equipment	Yes	
5.5	Dust or odours from handling of materials including construction materials, sewage and waste	Yes	
5.6	Emissions from incineration of waste	No	
5.7	Emissions from burning of waste in open air (e.g. slash materials, construction debris)	No	
5.8	Emissions from anyother sources	No	

6. Generation of Noise and Vibration, and Emissions of Light and Heat:

Sr. No.	Information/Checklist confirmation	Yes/No	Details thereof (with approximate quantities/rates, wherever possible) with source of information data with source of information data
6.1	From operation of equipment e.g. engines, ventilation plant, crushers		
6.2	From industrial orsimilar processes		
6.3	From construction or demolition		
6.4	From blasting or piling		
6.5	From construction or operational traffic		
6.6	From lighting or cooling systems		
6.7	From any other sources		

7. Risks of contamination of land or water from releases of pollutants into the ground or into sewers, surface waters, groundwater, coastal waters or the sea:

Sr. No.	Information/Checklist confirmation	Yes/NO	Details thereof (with approximate quantities/rates, wherever possible)with source of information data
7.1	From handling, storage,use or spillage of hazardous materials		
7.2	From discharge of sewage or other effluents to water or the land (expected mode and place of discharge)		
7.3	By deposition of pollutants emitted to air into the land or into water		
7.4	From any other sources		
7.5	Is there a risk of long term build up of pollutants in the environment from these sources?		

8. Risk of accidents during construction or operation of the Project, which could affect human health or the environment

Sr. No.	Information/Checklist confirmation	Yes/No	Details thereof (with approximate quantities/rates, wherever possible) with source of information data
8.1	From explosions, spillages, fires etc from storage, handling, use or production of hazardous substances		
8.2	From any other causes		

8.3	Could the project be affected by natural disasters causing environmental damage (e.g. floods, earthquakes, landslides, cloudburst etc)?		

9. Factors which should be considered (such as consequential development) which could lead to environmental effects or the potential for cumulative impacts with other existing or planned activities in the locality.

Sr. No.	Information/Checklist confirmation	Yes/No	Details thereof (with approximate quantities/rates, wherever possible) with source of information data
9.1	Lead to development of supporting. facilities, ancillary development or development stimulated by the project which could have impact on the environment e.g.: • Supporting infrastructure (roads, power supply, waste or waste water treatment, etc.) •Housing development •extractive industries • supply industries • other		
9.2	Lead to after-use of the site, which could have an impact on the environment		
9.3	Set a precedent for later developments		
9.4	Have cumulative effects due to proximity to other existing or planned projects with similar effects		

(III) Environmental Sensitivity

Sr. No.	Areas	Name/ Identity	Aerial distance (within 15 km.) Proposed project location boundary
1	Areas protected under international conventions, national or local legislation fortheir ecological, landscape, cultural or other related value		
2	Areas which are important or sensitive for ecological reasons -Wetlands, watercourses or other water bodies, coastal zone, biospheres, mountains, forests		
3	Areas used by protected, important or sensitive species of flora or fauna for breeding, nesting, foraging, resting, over wintering, migration		
4	Inland, coastal, marineor underground waters		
5	State, National boundaries		
6	Routes or facilities used by the public foraccess to recreation orother tourist, pilgrim areas		
7	Defence installations		
8	Densely populated or built-up area		
9	Areas occupied by sensitive man-made land uses (hospitals, schools, places of worship, community facilities)		

10	Areas containing important, high quality or scarce resources (ground water resources, surface resources, forestry, agriculture, fisheries, tourism, minerals)		
11	Areas already subjected to pollution or environmental damage. (those where existing legal environmental standards are exceeded)		
12	Areas susceptible to natural hazard which could cause the project to present environmental problems		

(IV) **Proposed Terms of Reference for EIA studies**

I hereby given undertaking that the data & information given in the application & enclosures are true to the best of my knowledge & belief & I am aware that if any part of the data and information submitted is found to be false or misleading at any stage, the project will be rejected and clearance give, if any to the project will be revoked at our risk and cost.

Date: Signature of the applicant

Place: With name and full address

(Project Proponent / Authorized Signature

1.9. Composition of expert committee for EIA process

In order to complete multi-displinary inputs for appraisal of projects, ministry of forest and climate change has flagged for preparation of environmental appraisal committee that is also known as expert appraisal committee. This committee works on union or state level (state expert appraisal committee or

SEAC) to advise the government on environmental clearance of development projects. The EAC has experts for different task. EAC/SEAC is involved in various capacities in all the stages, except for public hearing. Recommendations of EACs, expert committees appointed by the Environment Ministry (currently there are 8 such committees), play a crucial role in the Ministry's decision to clear a developmental/infrastructure project, and hence this latest decision raises slew of questions, especially from the perspective of the civil society participation in the environmental clearance process. For the completing the task of impact analysis the expert committee is formed for different work. The experts of different field are well experienced in their subject. The composition of the Expert Committee for Environment Impact Assessment is as follows.

Ecosystem management

Air/Water pollution control

Water resource management

Flora and fauna conservation and management

Land use planning

Social science/Rehabilitation

Ecology

Environmental health

Subject area specialist

Representative of NGOs

The project authority has to finish the following documents for environmental appraisal of a development project.

- Detailed project report
- Filed in questioners
- Environmental impact statement along with environmental management plan

1.10. Summary

The process of EIA formally started in India with EIA Notification 1994 which continued in force till 2006. In year 2006, new notification was notified and immediately came into force for the new projects. For the already existing projects, the previous notification continued for next 24 months. As per new rules

under EIA notification, the environmental consultants should be accredited by Quality Council of India. EIA is systematic process of analysis that works on set environmental parameters so that it can be categorized as strategic EIA, regional EIA, sectoral EIA, project level EIA and life cycle assessment EAC/SEAC is involved in various capacities in all the stages, except for public hearing. Recommendations of EACs, expert committees appointed by the Environment Ministry (currently there are 8 such committees), play a crucial role in the Ministry's decision to clear a developmental/infrastructure project, and hence this latest decision raises a slew of questions, especially from the perspective of the civil society participation in the environmental clearance process.

1.11. Terminal questions

Q.1. What do you mean about EIA?

Answer:----------

Q.2. Write the principle and objectives of EIA

Answer:----------

Q.3. How many types of EIA are carried out?

Answer:----------

Q.4. Discuss the role of environmental appraisal committee in EIA.

Answer:----------

Q.5. Discuss the role of environmental consultant in EIA.

Answer:----------

Q.6. Discuss about composition of expert committee for EIA process

Answer:----------

1.12. Further suggested readings

1. S.R. Khandeshwar, N.S. Raman and A.R. Gajbhiye , Environmental Impact Assessment, Dreamtech Press-2019.
2. Anjaneyulu Yerramilli, Environmental Impact Assessment Methodologies, BS Publications-2020.
3. George Alex, Environmental Impact Assessment (EIA), Blue Rose Publishers-2020. Teacher_manual_master_EIA.pdf (iitr.ac.in)
4. N. Maheshwara Swamy, Text Book on Environmental Law, Asia Law House-2022

Unit-2: Components of EIA

2.1. Introduction

The Environment (Protection) Act was enacted on 23rd May 1986 by Government of India. One of the main objectives of the Act was to make environmental impact assessment statutory. The act covers all forms of pollution air, water, soil and noise. It provides the safe standards for the presence of various pollutants in the environment. It prohibits the use of hazardous materials unless prior permission is taken from the control government. The following are the some of the benefits of having the act.

1. Protection of public health
2. Promotes sustainable development.
3. Positively empowers the central government to take concert steps to protect the environment.

4. Strict panel provisions
5. Protecting ecological integrity

The act defines various terms used in its provisions. These definitions are as follows:

a) **Environment:** It has been defined to include air, water and land, and the inter-relationship among and between air, water, land and human beings, other living creatures, microorganisms, plant and properties.
b) **Environmental pollutants:** A pollutant is any substances in a solid, liquid or gaseous state which when present in a certain concentration can be injurious to the environment. Environmental pollution: the presence of environmental pollutant in the environment is called environmental pollution.
c) **Handling:** Handling in respect of any substance is deemed to imply its manufacture processing treatment, package, storage, and transportation use collection destruction, conversion offering for sale or its transfer.
d) **Hazardous substances:** It refers to any substance or preparation which can cause harm to human, plants, and other living creatures or the environment due to its chemical or physico-chemical properties or handling.
e) **Occupier:** in respect to any factory or premises, it refers to the person who is in control over the affairs of the factory or premises, and in respect of any substances, it refers to the person who is in possession of that substance.

The MoEF under Rule 5 of the Environment (Protection) Rules, 1986 notified mandatory EIA's for 29 designated projects. The EIA is usually conducted in three stages which optimize the resource and increase the effectiveness of assessment. The process of environmental impact assessment has to be integrated with development. The effect of development authority should be examined at early stage in the planning of project and not after the decisions reading designs and location at an early stage in the planning of the project. The EIA notification from MoEF is made it compulsory to conduct and submit an EIA study report to an Impact Assessment Agency. As per the notification, it required to consult

a multi-disciplinary committee of experts. The EIA provision was hence made a mandatory requirement under the Environment Protection Act, 1986 with the following objectives i) Predict the environmental impact of projects in advance, ii) To conduct baseline environmental data of the area where project has been proposed, iii) To find ways to manage and mitigate the expected adverse environmental impacts the project, iv) Shape the projects as per local environmental conditions and v) Public participation and opinion of the experts for the decision-makers.

Objectives

- To briefly introduce EIA to minimize unfavorable impact and mitigate adverse effects
- To discus EIA process and implementation and identify other environmental effects
- To discuss mitigation measure and systematically examine both negative and positive impacts of developmental project and address the issue during the project design stage.
- To discuss EIA in India and to minimize conflict by encouraging the participation of the community, notifying the decision-makers and helping to prepare the layout of environmental sound project

2.2. EIA process

The EIA present a systematic processing that examines the environmental consequences of the development action. In advanced the emphasis of an EIA is the prevention and control and therefore is more proactive than reactive in nature. The main aim of EIA is to conserve the environment and bring out the best combination of economic and environmental costs and benefits. To predict environmental impacts early in project planning and design and find way to minimize unfavorable impacts. To mitigate adverse effects and indentify other environmental effects, even after the mitigation is implemented. EIA can

1. Modify and improve design
2. Ensure efficient resource use
3. Enhance social aspects
4. Indentify key impacts and measures for mitigating them

5. Inform decision making and condition setting
6. Avoid serious and irreversible dame to the environment
7. Protect human health and safety

The EIA process involved a number of steps such as

2.3.1. Screening:

It is the first step of EIA the project plan is screened for scale of investment, location and type of development and if the project needs statutory clearance. Screening help to clear the type project which are not likely to cause serious environmental damage. Development project have biophysical as well as social and economic impacts. Sufficient understanding of these factors is necessary for the initial screening decision. The screening mechanism seeks to focus on the project with potentially significant adverse environmental impact on where the impact is not fully known. Screening process divides the project proposal under following category.

a) Whether the project required for EIA clearance
b) Whether the project does not require EIA clearance
c) The proposed project have suspense whether EIA is require or not

2.2.2. Scoping:

Under this head the project potential impacts, zone of impact, mitigation possibility and needed for monitoring. The scope EIA depends on the impact and issue that it address. The process determines the key impact of the project. It's also help in developing and selecting alternatives for the proposed action and indentifying the issue to consider in EIA.

Scoping should be an open and participatory exercise

Scoping should be considered out at an early stage of project planning

Scoping is carried out generally in discussion among the developer the component authority and other relevant agencies.

Scoping should begin with the identification of individual, community, local authorities that may be affected by the project.

Aim of scoping

- To identify concerns and issue for consideration in a EIA
- Ensure a relevant EIA

- Determine the assessment methods to be used
- Identify all affected interests
- Save money and time

2.2.3. Baseline Data Collection

It is the environmental status of the study area. Baseline information or data collection is important reference point for conducting EIA. The term baseline refers to the collection of background information on the biophysical social and economic setting proposed at project area.

Normally information is obtained from secondary sources when facility of data base exists or the acquisition of new information through field sampling.

The task of collecting baseline data starts right from the period of project inception. The baseline data are collected for two main purposes.

To provide a description of the status and trends of environmental factor for examples air pollution

To provide an actual chance by monitoring once a project has been identify. The collection of baseline should be designed to satisfy information requirement and should be relevant to EIA analysis.

2.2.4. Impact Identification

The impact identification is very useful process for EIA to resolve answer of different questions. The important impacts are changes in ambient air, water and soil quality, wildlife habitat, species diversity and social and cultural system. The impact identification start at the early stage of scoping when data on both the project and surrounding environment are made available. As the EIA study process, more data becomes available on the environment and socio-economic condition. The important source of impact like smock emission, consumption of water, discharge of effluents etc are indentified.

2.2.5. Impact prediction:

The impact prediction examine the extend of change which occurs in the system due to the project activity temporary and permanent impact need to be predicted, understanding of the project by the assessment agency. Prediction

should be based on the available environmental baseline of the project data such as prediction is considered in quantitative or qualitative terms.

The impact is closely studied and evaluated for its subsequent effects on the components of environment. For example, the discharge of effluents in the local water shed cause detritions of water quality. Its secondary effects are degeneration of fisheries which is followed by detrimental economic effect on the fisherman of the locality. Consideration for the impact prediction is based on-

- Magnitude of impact
- Extent of impact
- Duration of impact

Magnitude of impact is defined by the severity of each potential impact and indicated whether the impact is irreversible or reversible of estimated potential. Whereas the social impact should always be determined on site specific or limited to project area. Even impact have temporal dimension and need to be considered for EIA. Impact can be short for only three to nine year since project completion. It may be classified as short following-

Short terms (ST)- 3 to 9 year

Medium terms (MT) - 10 to 20 years

Large terms (LT)-20 to above

2.2.6. Impact alternative

The role of alternatives to find the most effective way of meeting the need and purpose of the proposal, either through enhancing the environmental benefits of the proposed activity, or through reducing or avoiding potentially significant negative impacts. Consideration of potential alternatives in the EIA process is one of the most critical elements of the scoping phase. Due consideration of alternatives ensures that the EIA is not reduced to defence of a single project proposal as the desire of the proponent. Rather, it provides the opportunity for an unbiased, proactive consideration of options, to determine the most optimal course of action.

2.2.7. Mitigation measure

If changed causes by the developmental activities are significant. Then the process of environmental impact assessment proceeds to examine mitigate the adverse effects. The mitigation measures are recommended to reduce, and avoid the potential adverse environmental challenges of developmental activities. The objectives of mitigation measure are to maximize project benefits and minimize undesirable impacts. The measure is critically examined for their effectiveness. The possible mitigation measure may be

- Introduction to pollution control measure, waste treatment, strict monitoring etc to mitigate the adverse effects to caused by the development activity.
- Change project sites, routs of development, processes, raw materials, operating methods, disposal routes or location or waste and engineering design.

The measures most relevant to relevant to development projects

- **Preventive measure:**

Prevent or reduce potential adverse impact before occurrences. Examples health, educational program and public awareness program etc.

- **Compensatory measure:**

Action that compensate unavoidable, adverse impact example restoration of damage resources, creation of similar resources or habitats and compensate to effective person etc.

- **Corrective measure**

Applied to reduce the adverse impact to the acceptable level for example installation of pollution control devices, contraction of fish loader etc.

2.2.8. Public hearing

Public hearing is also part of EIA in some type of projects. The purpose of public participation is to inform the public about the proposed project and its impacts on the local area. The public views or objections are integral part of the decision making process. Documentation and communication of the findings of

the environmental impact assessment to the relevant people also constitutes an important step in the impact assessment. The consultation of public hearing require by law. The involvement of the public or often referred to as stockholder is a vital component in successful EIA. Public and stockholder are following :

Local people

-Individual

-Communities/ Villages

-Traditional authority

Projects Beneficiary

-Not necessarily have to be local

NGOS;

Those who are active in local or have interest on natural resources or social welfare

Interested parties in the country of any external financial agency

Voluntary organization

-Local community

-Developer or user groups

-Kinship society

-Recreational groups

-Labour union

-Gender group

-Ethical organization

Private sector

-Business interest groups

-Trade association

-Professional society

National and local government

Responsibility for measurement of natural resources along with people welfare those likely to be affected by the development projects.

Scientist/ Expert

Those who focus on the technical aspect of the project such as

-Land use planning

-Natural resource management

-Social infrastructure etc.

2.2.9. Environmental monitoring

Environmental monitoring defined as an activity undertaken to provide specific information on the characteristics and function of environmental and social variable in space and time. Criteria principle of EIA monitoring should not be overlooked. The EIA monitoring processing generate meaningful information and improve implementation of mitigation measure. It include followings steps.

- Determine the indicator to be use in monitoring
- Collection of meaningful and relevant information
- Application of measurable criteria
- Reviewing objective judgment on the information collected
- Making rotational decision based on the conclusion down
- Recommendation of improved mitigation measure to be undertaken

The environmental monitoring is therefore is one of the most important components of an EIA, which is essential for

- Ensuring that impact do not exceed the legal standard
- Checking the implementation of mitigation measures in the manner described in the EIA report.
- Providing early warning of potential environmental damage

2.2.10. Environmental Auditing:

Auditing refers to the examination and assessment of certain types of performance for the cause of EIA and audit assessment of actual environmental impact mitigation and enhancement measures and function of monitoring

mechanism. The auditing is recommended under following types such as decision point auditing and project impact auditing. Through decision making tools the effectiveness of EIA is examined and approved conditions are met also examine. The response concerned of agencies also examined with project management. In project auditing, the environmental changes arising project implementation are examined with accuracy and utility.

2.2.11. Decision-making

The report submitted by the environment consultant on behalf of the project proponent is scrutinized for various documents as per EIA manuals/ laws. Any document deficiency is completed before submitting the report to regulatory/designated authorities for the purpose. The facts of the project starting for the screening to public hearing are presented before the experts. The experts may suggest additional measures to minimize the impacts. At this stage decisions are made by the relevant authority, whether to accept, defer or reject the project.

2.3. EIA in India

EIA in India was first introduced in 1976-77 for river valley project by department of science and technology as per direction of planning commission for the protection of environment. The first consolidated step for EIA was EIA notification 1994 by Union Ministry of Environment and Forests (MoEF), Government of India, under EPA Act 1986. The notification made the Environmental Clearance (EC) mandatory for any modernization activity or setting up new projects. Further, depending on the need and to strengthen the EIA process, EIA notification 1994 was amended almost 13 times in 11 years. The EIA notification has been amended several times and latest notification was published in 2006. The EIA notification 2006 has been again amended several times.

EIA report:

The Executive summary of the EIA/EMP report was prepared, incorporating the information on following points:

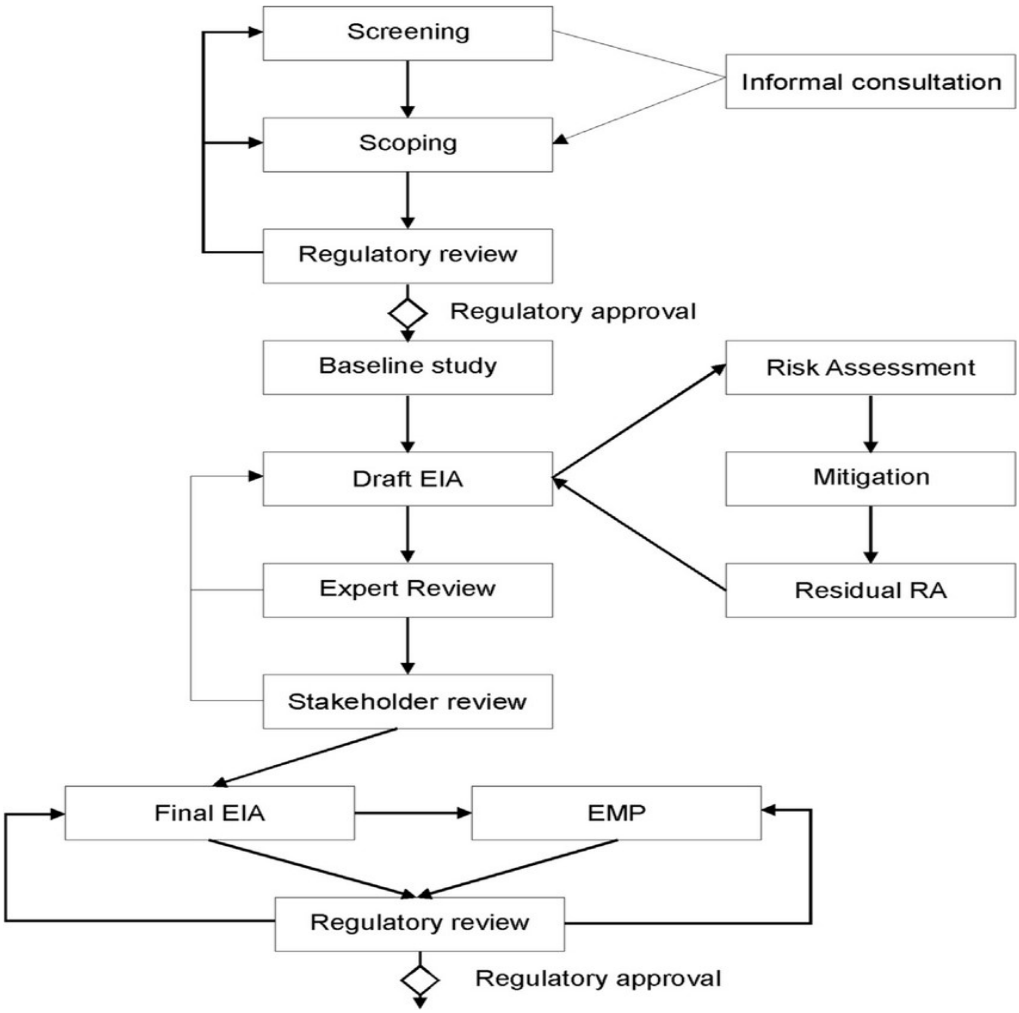
1. Project name and location (Village, District, State, Industrial Estate (if applicable).

2. Products and capacities. If expansion proposal then existing products with capacities and reference to earlier EC.
3. Requirement of land, raw material, water, power, fuel, with source of supply (Quantitative)
4. Process description in brief, specifically indicating the gaseous emission, liquid effluent and solid and hazardous wastes.
5. Measures for mitigating the impact on the environment and mode of discharge or disposal.
6. Capital cost of the project, estimated time of completion.
7. Site selected for the project - Nature of land - Agricultural (single/double crop), barren, Govt/ private land, status of is acquisition, nearby (in 2-3 km.) water body, population, with in 10km other industries, forest , eco-sensitive zones, accessibility, (note - in case of industrial estate this information may not be necessary)
8. Baseline environmental data - air quality, surface and ground water quality, soil characteristic, flora and fauna, socio-economic condition of the nearby population
9. Identification of hazards in handling, processing and storage of hazardous material and safety system provided to mitigate the risk.
10. Likely impact of the project on air, water, land, flora-fauna and nearby population
11. Emergency preparedness plan in case of natural or in plant emergencies
12. Issues raised during public hearing (if applicable) and response given
13. CSR plan with proposed expenditure.
14. Occupational Health Measures
15. Post project monitoring plan

2.4. Environmental Clearance

The environmental clearance is the most important process for proposed project and industry. However, currently about 39 types of proposed projects require EIA before going to start or establish. These project get environmental clearance at set pattern of EIA process as mentioned above in this units such as screening, scoping, baseline data collection, public hearing and monitory etc. an evaluation of the upcoming project. The main purpose of environmental clearance

is to assess impact of the planned project on the environment and people and to try to abate/minimize the same. Project proponent identifies the location of proposed plant after ensuring compliance with existing sitting guidelines. If project site does not agree with the sitting guideline, the proponent has to identify other alternative site for the project. The project proponent then assesses if the proposed activity/project falls under the purview of environmental clearance. The EIA study is carried out by as per EIA notification of MOEF, either directly or through a consultant. EIA is only carried out whose projects comes in categories B, those project goes to state government for clearance which further categories into B1 and B2 projects. Even B2 projects do not require preparation of EIA reports. When EIA report got ready than investor approached the concern concerned the investor State Pollution Control Board (SPCB). Where these agencies evaluate and assess the quality and quantity of different set of environmental parameters.



For certain project assessment the public hearing is mandatory. During public hearing, different issues will be covered or solved by legal way. After that, project proponent submits an application for environmental clearance with the MoEF if it falls under Project A category or the state government if it falls under project B category. The application form is submitted with EIA report, EMP, details of public hearing and NOC granted by the state regulators.

Environmental appraisal: The documents submitted by an investor are first scrutinized by a multi-disciplinary staff functioning, at the Ministry of Environment and Forests who may also undertake site-visits wherever required, interact with the investors and hold consultations with experts on specific issues as and when necessary.

Issues of clearance or rejection letter: When a project requires both environmental clearance as well as approval under the Forest (Conservation) Act, 1980. Proposals for both are required to be given simultaneously to the concerned divisions of the ministry. The processing is done simultaneously for clearance/rejection, although separate letters may be issued. If the project does not involve diversion of forest land, the case is processed only for environmental clearance. Once all the requisite documents and data from the project authorities are received and public hearings (where required) have been held, assessment and evaluation of the project from the environment angle is completed within 90 days and the decision of the ministry shall be conveyed within 30 days thereafter. The clearance granted shall be valid for a period of five years for commencements of the construction or operation of the project.

2.5. Summary

The Ministry of Environment, Forest and Climate Change has notified the Environmental Impact Assessment (EIA) Notification, 2006 under the provisions of the Environment (Protection) Act, 1986, which regulates development and their expansion/modernization of 39 sectors/activities listed in the Schedule to the EIA Notification, 2006. There are two Categories of the projects viz. Category 'A' projects are handled at the level of MoEF and climate change (CC) and the category

'B' projects are handled by the respective State Environment Impact Assessment Authority (SEIAA) following the procedure prescribed under the EIA Notification, 2006.

As per "General Condition" under the EIA notification, 2006, "Any project or activity specified in Category 'B' is treated as Category 'A', if located in whole or in part within 5 km from the boundary of:

i. Protected Areas notified under the Wild Life (Protection) Act, 1972,
ii. Critically Polluted areas as notified by the Central Pollution Control Board from time to time,
iii. Notified Eco-sensitive areas,
iv. Inter-State boundaries and international boundaries".

In EIA context, 'effect' and 'impact' can often be used interchangeably. However, 'impact' is considered as a value judgment of the significance of an effect.

2.6. Terminal Questions

Q.1: What is EIA? Discuss the objectives of EIA in India

Answer:----------

Q.2: What do you understand about screening and scoping of EIA ?

Answer:----------

Q.3: What is baseline data, how it is useful in EIA ?

Answer:----------

Q.4: What do you understand about public hearing, discuss it role in environmental clearance?

Answer:----------

Q.5: Discuss the EIA report and its applications

Answer:----------

Q.6: Draw flow diagram of EIA Process in India.

Answer:----------

2.7. Further Suggested Readings

1. S.R. Khandeshwar, N.S. Raman and A.R. Gajbhiye , Environmental Impact Assessment, Dreamtech Press-2019.
2. Anjaneyulu Yerramilli, Environmental Impact Assessment Methodologies, BS Publications-2020.
3. George Alex, Environmental Impact Assessment (EIA), Blue Rose Publishers-2020.
4. Teacher_manual_master_EIA.pdf (iitr.ac.in)
5. N. Maheshwara Swamy, Text Book on Environmental Law, Asia Law House-2022

Unit-3: Impact Assessment and Data Collections

3.1. Introduction

Environmental impact assess is a tool used to assess the significant affects of a project or developmental proposal on the environment. EIAs make sure that project decision maker's thing about the likely effects on environmental at the earliest possible time and aim to avoid reduce or offset those effects. The main EIA techniques require used in scoping are baseline studies, check lists, matrices and network diagram. These techniques collect and presence knowledge and information in a straightforward way so that logical decisions can be made of about which impacts are most significant. The production and consumption of products and services is a major source of environmental impacts. One the life cycle environmental impact date has been gathered, companies have an opportunity to evaluate the results and take action to reduce impact. Impact prediction is a process designed to identify the magnitude of potential impacts, and provides the basis for the significant assessment. Impact evaluation is a process that helps to assess the relative

significance of impacts. A number of 'tools' are available to assist impact identification. Environmental Impact Identification is to identify potential environmental problems ensuring from a planned development / scope and acceptable practice measures to make sure that throughout the generation of the event it ends up in negligible damage to the environment. The success of an environmental impact assessment depends on the adequate identification of the potential impacts of the project on the environment. The objective of environmental impact assessment is to offer information to decision makers concerning matters that may be brought about as a result of decisions relating to a new project program, plan or packaging. However, the main objectives are:

Objectives

- To identify the environmental impact of proposed activity
- To identify the social impact of environmental changes or project activity
- Discuss the data prediction
- Discuss the data and data collections

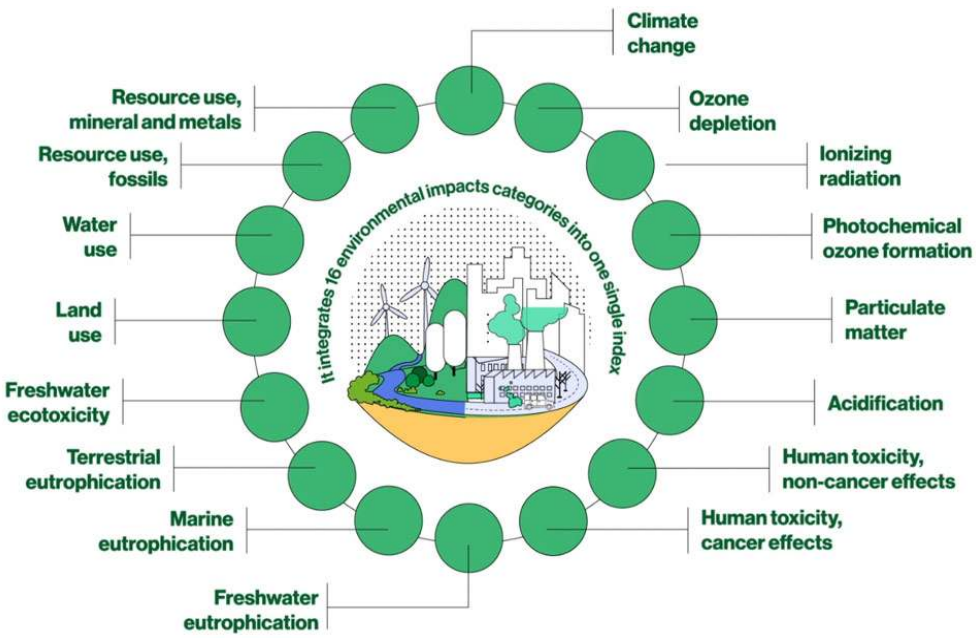
3.2. Environmental impact:

It is the affect of human activity on the environment in the form of creating environmental imbalance. Some of the most common environmental impacts are air pollution, water pollution, sea, river, ground water etc. The environmental impact is the change in natural or build environment due to processing of natural and anthropogenic activities, that can have adverse effects on the air, land, water, fish, and wildlife or the inhabitants of the ecosystem. There are lots of changes such as pollution, contamination and other destruction that occurs frequently and have direct or indirect impact on ambient environmental condition. This impact may be long or short term effects on nature and human beings. The most adverse environmental impact also have direct link to health and quality of life issues. Currently, transportation, and manufacturing industry have direct impact on our natural system and public health. It is the effect of human activity on the environment in the form of creating environmental imbalance. Major environmental impacts from subway train operations are noise and

vibration, water discharge, and passenger refuse removal. Legacy mass transit infrastructure used historic building material and electrical equipment, which were found to be harmful and hazardous to the environment, which when damaged over time, can lead to unhealthy impacts. Moreover, as the human population grows, natural resources are being depleted. Improving the sustainability of human development becoming increasing urgent, and it is essential to measure, minimize and compensate for impacts. Environmental impact assessment is carried out for any project that may highly impact the ecosystem. Some of common environmental impacts are

- Air pollution
- Soil pollution waste production
- Water pollution
- Noise pollution
- Damage to ecosystem
- Loss of biodiversity
- Loss of forest cover etc

Environmental impact can be defined as the study of impact on environment of proposed action or plan for developmental activities. It the process of anticipation or establishment the changes in physical, ecological and socio economic components of environment before, during and after implementing developmental project it is undesirable effects. This can be mitigated.



Why is it necessary to measure the environmental impact of human activity?

Human well-being depends directly on biodiversity and ecosystems. It is therefore vital to try and measure, plan and minimize any activity that might alter the ecological balance. All activities carried out by humans have an impact on ecosystems. Some cause irreversible effects on the environment, such as environmental pollution, extinction of species, depletion of resources and habitat destruction.

Humans impact the physical environment in many ways, overpopulation, pollution, burning fossil fuels, and deforestation. These changes like these have triggered climate change, soil erosion, poor air quality, and undrinkable water. These negative impacts can affect human behavior and can prompt mass migrations or battles over clean water.

Energy and environmental problems are closely related, since it is nearly impossible to produce, transport, or consume energy without significant environmental impact. The environmental problems directly related to energy production and consumption includes air pollution, climate change, water pollution, thermal pollution, and solid waste disposal. The emission of air pollutants from fossil fuel combustion is the major cause of urban air pollution. Burning fossil fuels is also the main contributor to the emission of greenhouse gases. Solid waste is also a by-product of some forms of energy usage. Coal mining requires the removal of large quantities of earth as well as coal.

The environmental impact of buildings is mostly dominated by the use phase, i.e. the energy demand for operation. However, construction material impact moves into focus due to the strict legislation and the efforts of governments and house owners to construct increasingly energy efficient buildings. The choice of constructional material influences the operational energy demand of buildings. The influence of thermal mass on the heat balance depends on several factors, such as the climatic conditions at the building location.

How is environmental impact measured?

Today, more than 100 countries have legislation that requires an Environmental Impact Assessment to be carried out for any project that may highly impact the ecosystems where it is due to take place. The Environmental Impact Assessment was created to evaluate such effects on ecosystems and was

designed according to sustainable development indicators. In addition, there is an international Natural Capital Coalition that works to enable business organizations to integrate their environmental dependencies and impacts on ecosystems and biodiversity into their finances.

Assessing Impacts

The environmental impact is a specific action that may have can be analyzed using a life cycle assessment, which is the process of observing a product from its "cradle to grave" and determining the impacts associated with it at each step. These methods are somewhat subjective and resource intensive. Emission inventories for example may quantify the emission of pollutants, while risk assessments can analyze the effects of these pollutants which have effect on the health on those living within the that environment.

3.3. Social impact

Our society is directly and indirectly associated with large number of environmental factors. These numbers of environmental factors or elements related to social and cultural life of people influence on their activities. Population and its density, community composition, social cohesion, educational factors, religion, norms, values, sanctions governing the people, family structure, polities etc will be quite predominating factors which defines social environment. The social environment is consequently changing their patterns of living hood for their daily needs and greed. Due to increase in population density, community structure and demographical dimension it disturbs their local as well as global environment. Thus we can say that social consequences will be diverse and dangerous for ecological system. Currently the number of environmental challenges arises that are directly associated with our society and culture. Air, water, soil pollution, global warming and climate change are main environmental challenges that have impact on our social structure and function. Energy that is main pavement of social development is also affected by lack of natural resources depletion and consumption day by day. The climate change and global warming have dangerous effects on society. As the impacts of climate change mount, millions of vulnerable people face disproportionate challenges in terms of extreme events, health effects, food, water, and livelihood security, migration and forced displacement, loss of

cultural identity, and other related risks. The climate change is not only responsible for any changes and is related with existing problems and challenges that make people vulnerable. These include poverty, limited accesses to clean water and electricity, and agricultural land degradation etc. There are lots of people who are vulnerable to effects of climate change including the spread of malaria and other diseases. More frequently droughts and rising ocean levels.

In big cities climate change is considered as one of the most important health risk factors, alongside air and water pollution, smoking, and drug use. According to a WHO assessment, climate change is currently causing up to 150 thousand deaths a year globally. Global warming increases the number of abnormally hot and cold days, which are felt most by the elderly, and affects the death rate. Sustained hot weather is increasing the number of deaths and heart diseases. Hot days exacerbate some symptoms of heart diseases, like chest and thorax pains, headaches, dizziness, sickness, and exhaustion. The high-risk groups include children, the elderly, outdoor workers, and people with low-income group. In big cities risk groups include people living or working in “heat islands.”

Global warming is one of the risk factors for spreading intestinal diseases. Over the last years in some countries the rise in average temperature has already increased the number of such diseases as bacterial dysentery, salmonella and others.

An Environmental and Social Impact Assessment (ESIA) predicts the environmental and social consequences that a future project/intervention might entail. It is carried out before project implementation and proposes measures to mitigate potential negative impacts. Environmental protection laws may compel you to perform an ESIA. An ESIA has two aims:

1) to minimize or avoid adverse environmental and social effects before they occur;

2) to integrate environmental and social concerns into decision-making. Therefore, ESIAs are evaluated by whether and they manage to meet these goals. Usually, the information required for an ESIA is directly related to project components such as community engagement and acceptance, technical design, construction, and operation. The ESIA process involves public participation and

external consultation as well as the development and comparative assessment of alternative approaches.

3.4. Impact identification

The environmental impact identification is to measure the potential environmental problems that are arise during developmental activity or planning. Here we assess the environmental effects and it impacts within the understanding of the causes, consequences and significance of environmental impacts. It has to identify the effectiveness management and mitigation to eliminate or reduce impact from environmental aspects. Thus, the environmental impact assessment depends on the adequate identification of the potential impacts of the project on the environment. The impact identification start at the early stage of scoping when data on both the project and surrounding environment are made available. As the EIA study process, more data becomes available on the environment and socioeconomic condition. The important source of impact like smock emission, consumption of water, discharge of effluents etc are indentified. Types of impact and their consideration are such as

Biological and physiological impact:

A biological effect is generally defined as the response of an organism, a population, or a community that changes its environment. Thus the biological and physiochemical impact is related to effects on biological resources, such as human beings, animals and vegetation resources. Examples include injuries and fatalities from extreme events and respiratory stress from poor air quality. Indicators of the impacts of climate change on human health show the vector-borne pathogen transmission and disease. Warming temperatures, declining snowpack, and earlier spring snowmelt runoff can create stresses on vegetation. A measure of plant stress, climatic water deficit, reflects the demand plants to have water relative to the availability of water in the soil. Increase in climatic water deficit is associated with a warming climate.

a. **Social Impact**:

This impact would examine project action on existing social and economic condition. As the impacts of climate change mounts, millions of vulnerable people

face disproportionate challenges in terms of extreme events, health effects, food, water, and livelihood security, migration and forced displacement, loss of cultural identity, and other related risks.

b. Cultural impact:

Project impact on cultural heritage includes historical sides, religious areas and traditional practices etc.

c. Health impact:

The link between health and social impact are apparent, often not always health impacts depends on environmental impact.

d. Economic impact:

The focus on economic impact assessment is estimation of the change in economic variable caused by project acidity or plan. However, the economic impact assessment is the consideration of multiplier effects borne out of projects, especially relating to employment and expenditure. The economic impact is a financial effect, especially something new, on a situation or person: Increased tourism has had a significant economic impact on the resort community. The accumulated knowledge of the findings of the environmental investigations form the basis for the prediction of impacts. Economic impact assessments are a specific form of analysis technique which calculates (1) direct, (2) indirect and (3) induced benefits from projects.

3.5. Methods of Impact Identification

The impact in There is five main classes of quantitative impact identification techniques, which exist in following heads-

a) Checklist
b) Matrices
c) Networks
d) Map Overlay
e) Ad hoc method

3.5.1. Checklist:

Checklists are comprehensive lists of environmental effects and impact indicators designed to stimulate the analyst to think broadly about possible consequences of contemplated actions. The simplest types of checklists provide lists of potential impacts. These are designed to help practitioners to avoid overlooking potential impacts. This methodology is requires minimum guidance to impact identification beyond suggesting broad area of possible impact such as impact on flora and fauna, impact due to on lack of forest rather than defining specific parameters to investigate. There are four types of checklist:

a) **Simple:** A list of environmental parameters with no guidelines on measures and interpretation.
b) **Descriptive:** Includes identification of environmental parameters and guidelines on how to measure data on particular parameters.
c) **Questionnaire**: These are based on a set of questions to be answered. Some of the questions may concern indirect impacts and possible mitigation measures.
d) **Threshold concern:** Consist of a list of environmental components and, for each component, a threshold at which those assessing proposal should become concerned with an impact.
e) **Scaling Checklist:** similar to a descriptive checklist, but with additional information on subjective scaling of the parameters.

3.5.2.Matrix

Matrix is two-dimensional tables which facilitate the identification of impacts arising from the interaction between project activities and specific environmental components. These matrix present specific lists of environmental parameters to be investigated for possible impact but do not require the establishment of direct cause effect link to project activities. Matrix includes the different component of development project for examples construction, operation, decommissioning, buildings, access to road etc. This also present types of impact typically associated with particular categories of projects. Matrices are useful for the following reasons:

- they visually describe the relationship between two sets of factors;

- they can be expanded or contracted to meet the needs of the proposal being assessed;
- they can help to identify the impacts of different phases of a project, such as during construction, operation and after abandonment; and
- they can help to separate site-specific impacts from impacts affecting the region as a whole; however, it is generally advisable to describe different aspects of a proposal using separate matrices.

There are different types of matrix used in impact identification such as

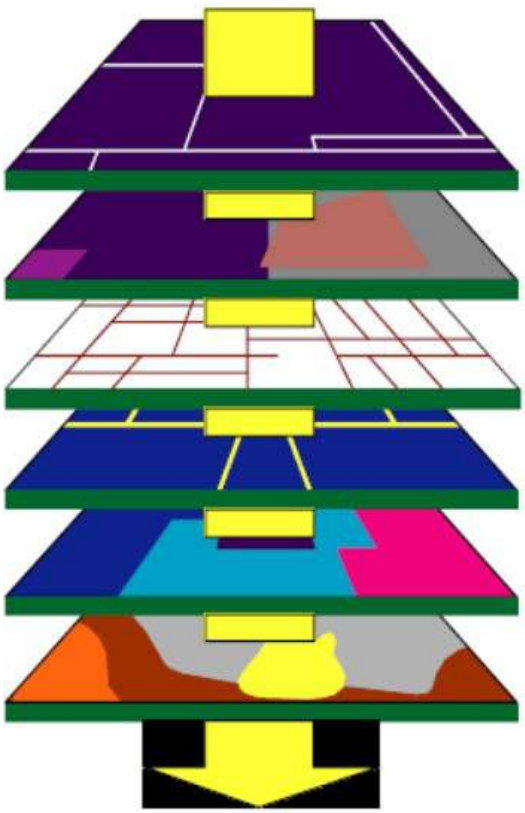
a) **Simple Matrix:** it is totally simple types of matrix
b) **Time dependent matrix:** Includes a number sequence to represent the time scale (e.g one figure per year) of the impacts
c) **Magnitude Matrix**: it is useful for mere identification of impacts according to their magnitude, importance on time frame
d) **Quantified Matrix (Leopold Matrix):** this matrix is known as Leopold matrix is based on a horizontal list of 100 project action and a vertical list of 88 environmental components. The Leopold matrix is very simple and use in identification of wide range of development, may also be useful for first order and direct impact. It can't reveal indirect effects of development.
e) **Weighted Matrix:** the weighted matrix is developed in an attempt to respond to some of the problems. Its importance weighting are assigned to environmental components, and sometimes to project components.

3.5.3. Network diagram

Network is an alternative for illustrating the secondary and subsequent effects of action on environmental elements to construct a network tracing effects. The network is based on linkages system that are associated with project and that can be related to both direct and indirect impact. Impact on environmental factor may affect another environmental or socio-economic factor and such interactions are indentified and listed on network diagram. A network diagram visually describes the linkages between pairs of environmental factors, providing some indication of how an ecosystem functions. These types of methods are referred to in several ways within the EIA practice; for example, as impact trees, impact chains, cause effect diagrams, or consequence diagrams.

3.5.4. Map Overlay

It is based on the set of maps of environmental characteristic for project (physical social economic aesthetic) area. Also useful in documentation of environmental conditions existing before project implementation. These maps are overlaid to produce a composite characteristic on the regional environment. It based on the use of a series of overlay maps depicting environmental factors. It may describe both biophysical and social aspects of area under study. Map overlays provide an effective visual aid, and are useful for describing existing physical, social and economic conditions and displaying the potential changes resulting from a proposed development. The method uses maps on transparencies, showing environmental and social characteristics and impacts.



The overlay method is effective in considering sensitive lands, requiring protection human activity (e.g Shorelines, wetlands etc) and hazard land, requiring protection from the environment (e.g flood plains, unstable slopes, volcanic slopes, etc)

3.5.5. Ad hoc method:

This provide minimum guidance for impact identification. This method involves assembling of team of specialist to identify the impact in their area of expertise. In this methods, we identify the broad areas of possible impacts by listing composite environmental parameters (e.g.: flora and fauna) likely to be affected by the proposed activity or any development. Ad hoc testing is done randomly and it is usually an unplanned activity which does not follow any documentation and test design techniques to create test cases.

Geographical Information Systems (GIS):

In the strictest sense, any organized system for the management and manipulation of spatial information may be regarded as constituting a GIS. However, the term GIS is generally used to refer to a computer-based system incorporating the collection, storage, retrieval, transformation and display of spatial data. GIS applications can bring the following benefits to impact assessment practice:

- they offer the potential for storing and accessing large data sets
- they can consolidate data from many different sources for use in geographic analysis
- GIS is efficient at performing multiple map overlays
- GIS can be used to generate maps for output to hard copy as well as display map information on screen.

Table: Summary of the advantages and disadvantages of impact identification methods

Method	Advantages	Disadvantages
Simple checklist	Simple to understand and use	Do not distinguish between direct and indirect impacts
Matrices	Link action to impact Good method for displaying EIA results	Difficult to distinguish between direct and indirect impacts Significant potential for double counting of impacts

Networks	Link action to impact Useful in simplified form for checking for second order impacts Handles direct and indirect impacts	Can become very complex if used beyond simplified version
Overlays	Easy to understand Good display method Good sitting tool	Address only direct impacts Do not address impact duration or probability
GIS	Excellent for impact identification and analysis Good for experimenting	Heavy reliance on knowledge and data Often complex and expensive

3.6.Impact prediction

Impact prediction is a process designed to identify the magnitude of potential impacts, and provides the basis for the assessment of significance. Impact evaluation is a process that helps to assess the relative significance of impacts. The impact prediction examines the extent of change which occurs in the system due to the project activity. Prediction should be based on the available environmental baseline of the project data such as prediction is considered in quantitative or qualitative terms. An environmental impact prediction should, at minimum, perform the following:

- determine the initial reference or baseline state (i.e. conditions/levels prior to project);
- forecast the future state/conditions with and without the project; and,
- compare with environmental standards and guidelines where appropriate.

The impact is closely studied and evaluated for its subsequent effects on the components of environment. For example, the discharge of effluents in the local water shed cause detritions of water quality. Its secondary effects are degeneration of fisheries which is followed by detrimental to economic effect on the fisherman of the locality. Consideration for the impact prediction is

- **Magnitude of impact**: Impact magnitude relates to the severity of the impact, whether the impact is irreversible or reversible, and the potential rate of recovery from the impact. For instance, the magnitude of the impact is considered high if a major adverse impact cannot be mitigated.

- **Extent of impact**: The spatial extent or the zone of influence of the impact should always be determined. For example site-specific or limited to the project area; a locally occurring impact within the watershed of the proposed project. The social impact is extend of impacts should always be determined an impact can be site specific or limited to project area.
- **Duration of impact:**

Environmental impacts have a temporal dimension that needs to be considered in an EIA. Impacts occur at different phases of the project cycle may need to be considered. Impact can be short for only three to nine year after project completion may be classified as short terms

Short terms (ST) - 3 to 9 year

Medium terms (MT) - 10 to 20 years

Large terms (LT) - 20 to above

There are many potential methods to predict impacts used in practices. One of the most obvious, useful and effective means of prediction is simply by drawing upon expert knowledge. In additon, the mathematical models are frequently used in impact identifications. In most cases, these models are used to describe and/or forecast changes in properties of the system over a period of time. Mathematical modelling is particularly used in predicting impacts related to water and air pollution. For example, in the case of water, the types of mathematical models available include:

- Downstream dispersion of pollutants
- Heated effluents
- Water quality
- Dissolved Oxygen Demand (DOD)
- Biological Oxygen Demand (BOD)
- Reservoir quality

3.7. Baseline data collection

Baseline information or data collection is important reference point for conducting EIA. The term baseline refers to the collection of background information on the biophysical social and economic setting proposed project area.

Normally information is obtained from secondary sources when there exists a facility of data base or the acquisition of new information through field sampling.

The task of collecting baseline data starts right from the period of project inception. The baseline data are collected for two main purposes.

To provide a description of the status and trends of environmental factor for examples air pollution

To provide a means of detecting actual chance by monitoring once a project has been identify. The collection of baseline should be designed to satisfy information requirement and should be relevant to EIA analysis.

3.8. Construction stage impacts

The construction sector is one of the largest exploiters of resources, its activities impact on the environment throughout the life cycle of development. Impacts occur from initial work on-site through the construction period, operational period and to the final demolition when a building comes to an end of its life. Even though the construction period is comparatively shorter in relation to the other stages of a building's life, it has diverse significant impacts on the environment. Due to construction work several types of impact directly and indirectly arises. Sources of pollution and hazards from construction activities can be divided into seven major types: dust, harmful gases, noises, solid and liquid wastes, fallen objects, ground movements and others. In addition, some other scientist considered construction impacts under eight categories such as soil and ground contamination, underground water contamination, construction and demolition waste, noise and vibration, dust, hazardous emissions and odours, wildlife and natural features impacts and archaeology impacts. According to Cardoso, typical negative impacts of the construction activities include waste production, mud, dust, soil and water contamination and damage to public drainage systems, destruction of plants, visual impact, noise, traffic increase and

parking space shortage and damage to public space. From the review above, it is apparent that there is no single approach regarding the environmental impacts associated with the construction process. Apart from that some impact during construction phase is identified as:

Topography:

When contraction activity is performed in any plain area the large scale excavation is involved. It has significant impact on topography in particular area.

Soil:

The project area is a plain terrain with paved road structure. Soil erosion and contamination may occur on roadside due to excavation of earth/cutting operations, clearing of vegetation and land leveling etc. Activities can destabilize the surrounding land surface, particularly if the excavated area is left unfilled for long, which may lead to rainfall induced soil erosion.

Occupational Health and Safety:

Health risks and work safety problems may result at the workplace if the working conditions provide unsafe and/or unfavorable working environment and due to storage, handling and transport of hazardous construction material.

Air Quality:

Air quality will be affected by fugitive dust emissions from construction machinery; dust from the unpaved surface and construction vehicles. Emissions may be carried over longer distances depending upon the wind speed, direction, temperature of surrounding air and atmospheric stability.

Noise and Vibrations:

Noise is a by-product of human activity, and area of exposure increases as function of mobility and construction activities. Noise generated by construction machinery is likely to affect sensitive receptors located within 50 meter of the proposed Project. This impact is temporary and moderate negative in nature.

Solid Waste (Construction Waste and Hazardous Waste):

Due to construction activities waste will be generated at construction and contractors camp site. The construction waste will include wastewater, oil spillage from machinery, domestic waste and solid waste etc.

Surface and Groundwater: There is no significant surface water resource of the project area so there will be no impact on surface water quality during the construction of the project area. There is a possibility that various materials like fuel, lubricant oil and other oily products, which are used during the construction phase may contaminate groundwater.

Ecological balance

Flora Trees are vital ecosystem, which perform variety of functions for the improvement of environment such as reduction in air pollution, noise abatement, cooling effect on earth, supply of oxygen etc. but the cutting of these trees will cause a negative impact on the flora of the tract. During construction period dust laden polluted air will form a dust film. Blocking sunshine and stomata of the leaves which consequently hindering photosynthesis processes causing detrimental effect on the plant health. The construction activities also Impacts on mammals, reptiles, birds and aquatic animals like vegetation. Apart from that, the construction activity also effects on Existing Public Utilities/ Infrastructure and life style and culture.

3.9. Summary:

- The social environment is consequently changing their patterns of liveli hood for their daily needs and greed. Due to increase in population density, community structure and demographical dimension disturb the local as well as global environment.
- The environmental impact assessment depends on the adequate identification of the potential impacts of the project on the environment. The impact identification starts at the early stage of scoping when data on both the project and surrounding environment are made available.
- Checklists are comprehensive lists of environmental effects and impact indicators designed to stimulate the analyst to think broadly about possible consequences of contemplated actions.

- Matrix includes the different component of development project for examples construction, operation, decommissioning, buildings, access road etc.
- Map overlays provide an effective visual aid, and are useful for describing existing physical, social and economic conditions and displaying the potential changes resulting from a proposed development.
- Typical negative impacts of the construction activities include waste production, mud, dust, soil and water contamination and damage to public drainage systems, destruction of plants, visual impact, noise, traffic increase and parking space shortage and damage to public space

3.10. Terminal questions

Q.1: What is the impact? Discuss social and environmental impact.

Answer:----------

Q.2: Explain the impact identification and prediction.

Answer:----------

Q.3: Explain the concept of environmental evaluation system and threshold checklist for impact identification.

Answer:----------

Q.4: What are the limitations of quantified matrix? How can weighted matrix be used′ to eliminate the limitations of quantified matrix? Explain your answer with an example.

Answer:----------

Q.5: Discuss the construction impact on nature and its measurement.

Answer:----------

3.11. Further suggested readings

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SBSEVS-02

Environmental Impact Assessment and Legislation

Block- 2

EIA Policies and Life Cycle Assessment (LCA)

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Introduction

This second block of environmental impact assessment and legislation, this consists of following three units:

Unit-3: This unit covers the EIA notifications, Government of India Ministry of Environment and Forest Notification (2000), and list of projects requiring, environmental clearance.

Unit-4: This unit describes the Status of EIA in India, current issues in EIA, case study of hydropower projects/ thermal projects and also covers the salient features of 2006 amendments to EIA notification.

Unit-5: This unit covers the concept of Life cycle analysis, methodology, management, flow of materials-cost criteria-case studies and introduction to ISO 14000.

Unit-4: EIA policies

4.1. Introduction

EIA is the tool used to assess the positive and negative environmental, economic and social impacts of a project. This is used to predict the environmental, economic and social impacts of a project. This is used to predict the environmental impacts of a project in the preplanning stage itself so that decision can be taken to reduce impacts. EIA is termed as one on of the best policy innovations in the 1900s. The main aim of EIA is to conserve the environment and bring out the best combination of economic and environmental costs and benefits. EIA started in India, in 1976-77 when the planning commission directed the Department of Science and Technology to assess the river valley projects form the point of view of the environment. This was extended for all these projects that required approval from the public investment Board. The Environment (Protection) Act was enacted on 23rd May 1986 by Government of India. One of the objectives of the Act was to make environmental impact assessment statutory. The MoEF under Rule 5 of the Environment (Protection) Rules, 1986 notified mandatory EIA's for 29 designated projects. The notification came on 27th January 1994. This was the principal piece of legislation governing environmental impact assessment. The notification made it compulsory to conduct and submit an EIA study report to an Impact Assessment Agency. As per the notification, it required to consult a multi-disciplinary committee of experts.

In India, environmental impact assessment (EIA) policies are an integral part of the country's environmental governance framework. The EIA process in India aims to assess and mitigate the potential environmental, social, and economic impacts of developmental projects, such as industrial plants, mining operations, infrastructure projects, and other activities that may have significant environmental consequences. The key legislation governing EIA in India is the Environmental Impact Assessment Notification, 2006, issued under the Environment (Protection) Act, 1986. This notification outlines the procedural requirements and guidelines for conducting EIA studies for various projects and activities. The EIA provision was hence made a mandatory requirement under the Environment Protection Act, 1986.

Objectives:

- Predict the environmental impact of projects in advance
- To conduct baseline environmental data of the area where project has been proposed
- To find ways to manage and mitigate the expected adverse environmental impacts of
- the project
- Shape the projects as per local environmental conditions
- Public participation and opinion of the experts for the decision-makers

4.2. The EIA notification

EIA can be defined as the study to predict the effect of a proposed activity/project on the environment. A design making tool EIA compares various alternatives for project and seeking to identify the one which represent the best combination of economic and environmental costs and benefits. It is the one of the successful policy innovations of the 20^{th} century for environmental conservation. The stages of an EIA process will most EIA process have a common structure and the application of main stages is a basic standard of good practice. The EIA consists of eight steps with each steps equally important in determining the overall performance of the project. The Notification paved the way which made developmental projects (industries and infrastructure like dams, mines, refineries, large commercial complexes, highways, power projects, etc.) responsible for ensuring their environmental impacts as part of their planning and

design processes. The notification specified the step by step process of obtaining Environmental Clearance (EC) for various projects enlisted in the notification. This also ensured public participation in the decision making so that communities that live in the project area are not threatened. The Notification paved the way which made developmental projects (industries and infrastructure like dams, mines, refineries, large commercial complexes, highways, power projects, etc.) responsible for ensuring their environmental impacts as part of their planning and design processes. The notification specified the step by step process of obtaining Environmental Clearance (EC) for various projects enlisted in the notification. This also ensured public participation in the decision making so that communities that live in the project area are not threatened.

- Description of the proposed activities like area of project, its location, other projects
- In surrounding area, architectural and technical design etc.
- Details of the base line environmental data in terms of air quality, water quality, soil
- Quality, noise, flora and fauna, geological and geographical conditions etc.
- To predict the environmental parameters this will be affected by the proposed activity etc.
- To predict the waste generation, water requirement (and the existing balance), power requirement.
- To predict the social, economical and health impacts
- Description of the practical activities as appropriate
- A risk assessment report and disaster management plan to mitigate adverse environmental impacts of proposed activity and assessment of those measures;
- A detailed environmental feasibility report of all the information provided.

The EIA notification has come a long way with nearly 23 amendment till 2017 but a Unified Notification with amendments is not available. Keeping in view of the large number of amendments, attempt has been made to update the EIA notification 2006 with all amendments till December 18, 2017.

S.O. 1533 Whereas, a draft notification under sub-rule (3) of Rule 5 of the Environment (Protection) Rules, 1986 for imposing certain restrictions and prohibitions on new projects or activities, or on the expansion or modernization of existing projects or activities based on their potential environmental impacts as indicated in the schedule to the notification, being undertaken in any part of India, unless prior environmental clearance has been accorded in accordance with the objectives of National Environment Policy as approved by the Union Cabinet on 18th May, 2006 and the procedure specified in the notification, by the Central Government or the State or Union territory Level Environment Impact Assessment Authority (SEIAA), to be constituted by the Central Government in consultation with the State Government or the Union territory Administration concerned under sub-section (3) of section 3 of the Environment (Protection) Act, 1986 for the purpose of this notification, was published in the Gazette of India, Extraordinary, Part II, section 3, sub-section (ii) vide number S.O. 1324 (E) dated the 15th September, 2005 inviting objections and suggestions from all persons likely to be affected thereby within a period of sixty days from the date on which copies of Gazette containing the said notification were made available to the public; And whereas, copies of the said notification were made available to the public on 15th September, 2005; And whereas, all objections and suggestions received in response to the above mentioned draft notification have been duly considered by the Central Government; Now, therefore, in exercise of the powers conferred by sub-section (1) and clause (v) of sub-section (2) of section 3 of the Environment (Protection) Act, 1986, read with clause (d) of sub-rule (3) of rule 5 of the Environment (Protection) Rules, 1986 and in supersession of the notification number S.O. 60 (E) dated the 27th January, 1994, except in respect of things done or omitted to be done before such supersession, the Central Government hereby directs that on and from the date of its publication the required construction of new projects or activities or the expansion or modernization of existing projects or activities listed in the Schedule to this notification entailing capacity addition with change in process and or technology shall be undertaken in any part of India only after the prior environmental clearance from the Central Government or as the case may be, by the State Level Environment Impact Assessment Authority, duly constituted by the Central

Government under sub-section (3) of section 3 of the said Act, in accordance with the procedure specified hereinafter in this notification.

4.3. List of project requiring environmental clearance

In India, the Environmental Impact Assessment (EIA) notification categorizes projects into two categories, each with different requirements for environmental clearance.

i. All projects and activities are broadly categorized in to two categories - Category A and Category B, based on the spatial extent of potential impacts and potential impacts on human health and natural and manmade resources. The classification for River Valley projects as given in the Schedule to the Notification is as under:

- Category A (a) ≥ 50 MW hydroelectric power generation;

(b) ≥ 10,000 ha. of culturable command area under irrigation projects

- Category B (a) < 50 MW ≥ 25 MW hydroelectric power generation;

(b) < 10,000 ha. of culturable command area under irrigation projects

ii. All projects or activities included as Category 'A' in the Schedule, including expansion and modernization of existing projects or activities and change in product mix, shall require prior environmental clearance from the the Ministry of Environment and Forests (MoEF) on the recommendations of an Expert Appraisal Committee (EAC) to be constituted by the Central Government for the purposes of this Notification;

iii. All projects or activities included as Category 'B' in the Schedule, including expansion and modernization of existing projects or activities as specified in sub paragraph (ii) of paragraph 2, or change in product mix as specified in sub paragraph (iii) of paragraph 2, but excluding those which fulfill the General Conditions (GC) stipulated in the Schedule, *will* require prior environmental clearance from the State/Union territory Environment Impact Assessment Authority (SEIAA). The SEIAA shall base its decision on the recommendations of a State or Union territory level Expert Appraisal Committee (SEAC) as to be

constituted for in this notification. In the absence of a duly constituted SEIAA or SEAC, a Category 'B' project shall be treated as a Category 'A' project.

As per Schedule- I (EIA Notification-1994) there are number of projects that require environmental clearances

List of Category Projects:

- Mining (major minerals) and quarrying
- Thermal power plants
- Nuclear power projects and processing of nuclear fuel
- Petroleum refineries, including crude oil and natural gas
- Petrochemical complexes (Both Olefinic and Aromatic) and Petro-chemical intermediates such as DMT, Caprolactam, LAB etc. and production of basic plastics such as LLDPE, HDPE, PP, PVC.
- Chemical fertilizers (Nitrogenous and Phosphatic other than single superphosphate).
- Certain industries such as asbestos, cement, pulp, paper, and metallurgical industries
- Major infrastructure projects like airports, ports, and harbors
- Highways and expressways with four or more lanes
- Irrigation projects with a command area greater than 10,000 hectares
- Tourism projects, including hotels, beach resorts, and amusement parks in ecologically sensitive areas
- Primary metallurgical industries (such as production of Iron and Steel, Aluminium, Copper, Zinc, Lead and Ferro Alloys) and electric arc furnaces (Mini Steel Plants).

List of Category B Projects:

- Thermal power plants (less than 500 MW capacity)
- Mining (minor minerals) and quarrying
- Highway projects (less than four lanes and less than 10 km length)
- Irrigation projects with a command area between 2,000 and 10,000 hectares
- Industrial estates/parks/zones for specific types of industries
- Distilleries, breweries, and malt manufacturing

- Building and construction projects, including townships and area development projects
- Small-scale manufacturing units such as automobile manufacturing and repair shops, foundries, and electroplating
- Oil and gas exploration, development, and production projects

It's important to note that this is a general list, and the specific categorization and requirements may vary, based on updates to the EIA notification and the guidelines issued by the MoEFCC. Additionally, certain projects may require additional clearances and permits from other regulatory bodies or agencies.

4.4. Ministry of environment and forest notification

The Ministry of Environment, Forest and Climate Change (MoEFCC) in India has issued several notifications related to the Environmental Impact Assessment (EIA) process. The EIA notifications outline the procedures, guidelines, and requirements for conducting EIA studies and obtaining environmental clearance for various projects. The MoEF recently notified new EIA legislation in September 2006. The notification makes it mandatory for various projects such as mining, thermal power plants, river valley, infrastructure (road, highway, ports, harbours and airports) and industries including very small electroplating or foundry units to get environment clearance. However, unlike the EIA Notification of 1994, the new legislation has put the onus of clearing projects on the state government depending on the size/capacity of the project. On 27 January 1994, the Union Ministry of Environment and Forests (MEF), Government of India, under the Environmental (Protection) Act 1986, promulgated an EIA notification making Environmental Clearance (EC) mandatory for expansion or 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 the EIA notification of 1994.

The most recent notification cutoff in September 2021 is the Environmental Impact Assessment Notification, 2006. The Environmental Impact Assessment Notification, 2006, governs the EIA process in India and provides guidelines for different categories of projects, public consultation, EIA report preparation, expert appraisal, and granting of environmental clearance. The

notification categorizes projects into two categories: Category A and Category B, based on their potential environmental impact.

Category A projects are considered highly significant in terms of potential environmental impact and require a mandatory EIA study and clearance from the MoEF and CC at the national level. Category B projects are assessed by the respective State Environmental Impact Assessment Authority (SEIAA) or Union Territory Environmental Impact Assessment Authority (UTSEIAA).

The EIA notification and its provisions may be subject to periodic updates and revisions by the MoEFCC. It is important to refer to the latest notification and consult with the relevant authorities or visit the official website of the MoEF and CC for the most up-to-date and accurate information regarding the EIA process and related notifications in India.

4.5. EIA, Notification 1994

THE ENVIRONMENTAL IMPACT ASSESSMENT NOTIFICATION, 1994
Government of India
Ministry of Environment & Forest
New Delhi
NOTIFICATION
ON
Environmental Impact Assessment of Development Projects

New Delhi, the 27th January, 1994

1. S.O.60(E) Whereas a notification under clause (a) of sub-rule (3) of rule 5 of the Environment (Protection) Rules, 1986 inviting objections from the public within sixty days from the date of publication of the said notification, against the intention of the Central Government to impose restrictions and prohibitions on the expansion and modernization of any activity or new projects being undertaken in any part of India unless environmental clearance has been accorded by the Central Government or the State Government in accordance with the procedure specified in that notification was published as S.O.No. 80(E) dated 28th January, 1993;

And whereas all objections received have been duly considered;

Now, therefore, in exercise of the powers conferred by sub-section (1) and clause (v) of sub-section (2) of section 3 of the Environment (Protection) Act, 1986 (29

of 1986) read with clause (d) of sub-rule (3) of rule 5 of the Environment (Protection) Rules, 1986, the Central Government hereby directs that on and from the date of publication of this notification in the Official Gazette expansion or modernization of any activity (if pollution load is to exceed the existing one) or a new project listed in Schedule I of this notification shall not be undertaken in any part of India unless it has been accorded environmental clearance by the Central Government in accordance with the procedure hereinafter specified in this notification.

2. Requirements and procedure for seeking environmental clearance of projects:

I.(a) Any person who desires to undertake any new project or the expansion or modernization of any existing industry or project listed in Schedule I shall submit an application to the Secretary, Ministry of Environment and Forests, New Delhi.

The application shall be made in the proforma specified in Schedule II of this notification and shall be accompanied by a project report which shall, inter alia, include an Environmental Impact Assessment Report/Environment Management Plan and details of public hearing as specified in Schedule IV prepared in accordance with the guidelines issued by the Central Government in the Ministry of Environment and Forests from time to time.

(b) Cases rejected due to submission of insufficient or inadequate data and plans may be reviewed as and when submitted with complete data and plans. Submission of incomplete data or plans for the second time would itself be a sufficient reason for the Impact Assessment Agency to reject the case summarily.

II. In case of the following site specific projects :

(a) mining;

(b) pit-head thermal power stations;

(c) hydro-power, major irrigation projects and/or their combination including flood control;

(d) ports and harbours (excluding minor ports);

(e) prospecting and exploration of major minerals in areas above 500 ha.,

The project authorities will intimate the location of the project site to the Central Government in the Ministry of Environment and Forests while initiating any investigation and surveys. The Central Government in the Ministry of Environment and Forests will convey a decision regarding suitability or otherwise of the proposed site within a maximum period of thirty days. The said site clearance shall be granted for a sanctioned capacity and shall be valid for a period of five years for commencing the construction, operation or mining.

III.(a) The reports submitted with the application shall be evaluated and assessed by the Impact Assessment Agency and if deemed necessary it may consult a Committee of Experts, having a composition as specified in Schedule-III of this Notification. The Impact Assessment Agency (IAA) would be the Union Ministry of Environment and Forests. The Committee of Experts mentioned above shall be constituted by the IAA or such other body under the Central Government authorised by the IAA in this regard.

(b) The said Committee of Experts shall have 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.

(c) The Impact Assessment Agency shall prepare a set of recommendations based on the technical assessment of documents and data furnished by the project authorities and supplemented by data collected during visits of sites of factories, if undertaken and details of public hearing.

The assessment shall be completed within a period of ninety days from receipt of the requisite documents and data from the project authorities and completion of public hearing and decision conveyed within thirty days thereafter.

The clearance granted shall be valid for a period of five years from commencement of the construction or operation of the project.

No construction work, preliminary or otherwise, relating to the setting up of the project may be undertaken till the environmental and/or site clearance is obtained.

IV. In order to enable the Impact Assessment Agency to monitor effectively the implementation of the recommendations and conditions subject to which the environmental clearance has been given, the project authorities concerned shall

submit a half-yearly report to the Impact Assessment Agency. Subject to the public interest, the Impact Assessment Agency, shall make compliance reports publicly available.

V. If no comments from the Impact Assessment Agency are received within the time limit, the project would be deemed to have been approved as proposed by project authorities.

3. Nothing contained in this Notification shall apply to :

(a) any item falling under entry nos. 3, 18 and 20 of the Schedule-I to be located or proposed to be located in the areas covered by the Notifications S.O. No.102(E) dated 1st February, 1989; S.O. 114(E) dated 20th February, 1991 S.O. No.416(E) dated 20th June, 1991 and S.O. No.319(E) dated 7th May, 1992.

(b) any item falling under entry Nos. 1, 2, 3, 4, 5, 7, 9, 10, 12, 13, 14, 16, 17, 19, 21, 25 and 27 of Schedule-I if the investment is less that Rs.50 crores.

(c) Any item reserved for small scale Industrial sector with investments less than Rs.1 crore.

4. Concealing factual data or submission of false, misleading data/reports, decisions or recommendations would lead to the project being rejected. Approval, if granted earlier on the basis of false data would also be revoked. Misleading and wrong information will cover the following:

- False information.
- False data.
- Engineered reports.
- Concealing of factual data.
- False recommendations or decisions.

(No. Z-12013/4/89-IA-I)

R. RAJAMANI, Secy.

4.6. Environmental clearance

The process for obtaining Government approval for the installation and modification (amendment) of specific projects is known as environmental

clearance. It is required for imitative that may may result in significant environmental pollution. Government has complete list of projects. These require environmental approval, such as mining, thermal power plants and infrastructure. Environmental clearance is a regulatory process that evaluates the potential environmental impacts of proposed developmental projects and grants approval or clearance based on compliance with environmental norms and mitigation measures. It ensures that projects are undertaken in a manner that minimizes adverse environmental consequences and promotes sustainable development. In India, environmental clearance is granted under the provisions of the Environmental Impact Assessment (EIA) notification issued by the Ministry of Environment, Forest and Climate Change (MoEFCC). The EIA notification categorizes projects into two categories: Category A and Category B, based on their potential environmental impact. The clearance process differs for each category:

Category A Projects: Category A projects are considered to have significant environmental impacts. They require a mandatory EIA study and clearance from the MoEFCC at the national level. The process involves the following steps:

a. Scoping: The project proponent submits a detailed project proposal, including an Initial Environment Examination (IEE) report, to the MoEFCC. The authority evaluates the project's potential environmental impact and decides the scope of the EIA study.

b. Public Consultation: Public consultation is an essential part of the process. The project proponent is required to conduct public hearings in the project-affected areas, allowing local communities and stakeholders to provide their opinions, concerns, and suggestions.

c. EIA Report: Based on the scoping exercise and public consultation, the project proponent prepares a comprehensive EIA report that assesses the potential environmental impacts, proposed mitigation measures, and an environmental management plan.

d. Expert Appraisal Committee (EAC) Review: The EIA report is submitted to the EAC, a committee of experts appointed by the MoEFCC. The EAC

reviews the report, conducts site visits, and provides recommendations to the MoEFCC.

e. Environmental Clearance: The MoEFCC considers the EAC's recommendations and makes a decision on granting environmental clearance. Clearance may be granted with specific conditions, modifications, or rejection if the project is deemed unacceptable from an environmental perspective.

Category B Projects: Category B projects are assessed by the respective State Environmental Impact Assessment Authority (SEIAA) or Union Territory Environmental Impact Assessment Authority (UTSEIAA) at the state or union territory level. The process involves similar steps as Category A projects but with the authority at the state or union territory level.

Environmental clearance is a crucial requirement for commencing construction or operation of a project. It ensures that projects are in compliance with environmental regulations, take necessary mitigation measures, and fulfill social and environmental obligations. The clearance conditions are legally binding, and project proponents are required to monitor and report their compliance regularly.

The following projects or activities shall require prior environmental clearance from the concerned regulatory authority, which shall hereinafter referred to be as the Central Government in the Ministry of Environment and Forests for matters falling under Category ‘A’ in the Schedule. A State level, the State Environment Impact Assessment Authority (SEIAA) for matters falling under Category ‘B’ in the said Schedule, the District Environment Impact Assessment Authority (DEIAA) for matters falling under Category ‘B2’ for mining of minor minerals in the said Schedule, before any construction work, or preparation of land by the project management except for securing the land, is started on the project or activity:

(i) All new projects or activities listed in the Schedule to notification;

(ii) Expansion and modernization of existing projects or activities listed in the Schedule to this notification with addition of capacity beyond the limits specified for the concerned sector, that is, projects or activities which cross the threshold limits given in the Schedule, after expansion or modernization,

(iii) Any change in product - mix in an existing manufacturing unit included in Schedule beyond the specified range.

It is important to note that the EIA notification and the environmental clearance process may be subject to periodic updates and revisions by the MoEFCC to strengthen environmental safeguards and address emerging environmental concerns. Therefore, it is advisable to refer to the latest notification and consult with the relevant authorities for the most accurate and up-to-date information regarding environmental clearance in India.

Procedure for seeking environment clearance of projects

I.

1. Any person who desires to establish a thermal power plant of any category mentioned n Schedule-I, shall submit an application to the Department of the State Government dealing with the subject of environment.
2. The application shall be made in the Form 'A' specified in Schedule-II annexed to this notification and shall be accompanied by a detailed project report which shall, inter alia, include an Environmental Impact Assessment Report and an Environment Management plant prepared in accordance with the guidelines issued by the State Department of Environment from time to time.
3. Cases rejected due to submission of insufficient or inadequate data and Action Plans may be reviewed as and when submitted with complete data and Action Plans. Submission of incomplete data for the second time would itself be a sufficient reason for the State Government to reject the case summarily.
4. In case of the pit-head thermal power plants, the applicant shall intimate the location of the project site to the State Government while initiating any investigation and surveys. The State Government will convey a decision regarding suitability or otherwise of the proposed site within a maximum period of thirty days. The said site clearance will be granted for a sanctioned capacity and it will be valid for a period of five years for commencing the construction or operation of the project.

II

1. The applicant shall obtain No Objection Certificate from the concerned Pollution Control Board. The State Pollution Control Board shall issue No Objection Certificate to establish only after completing public hearing as specified in Schedule-IV annexed to this notification.
2. The reports submitted with the application and No Objection Certificate from the State Pollution Control Board shall be evaluated and assessed by the State Government, in consultation with a Committee of experts which shall be constituted by the State Government as specified in Schedule-III appended to this notification.
3. The said Committee of experts shall have 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 preparations relating to the plant.
4. The State Government Department dealing with the subject of Environment shall prepare a set of recommendations based on technical assessment of documents and data furnished by the applicant supplemented by data collected during visits to sites, if undertaken and interaction with affected population and environment groups, if necessary.
5. The assessment shall be completed within a period of ninety days from receipt of the requisite documents and data from the applicant and decision conveyed within thirty days thereafter. (6) The environmental clearance granted shall be valid for a period of five years from commencement of the construction or operation of the project.

III Concealing factual data or submission of false, misleading data reports, decisions of recommendations would lead to the project being rejected. Approval, if granted, earlier on the basis of false data, can also be revoked.

Application for Prior Environmental Clearance (EC)

An application seeking prior environmental clearance in all cases shall be made in the prescribed Form 1 annexed to the Notification (Appendix), after the identification of prospective site(s) for the project and/or activities to which the application relates, before commencing any construction activity, or preparation of land, at the site by the applicant. The applicant shall furnish, along with the application, a copy of the pre-feasibility project report. A Pre-Feasibility Report (PFR) may, on the basis of analysis of secondary information, establish the

adequacy of natural resources for the project and viability of the project if Environmental Clearance were to be accorded.

SCHEDULE-II

(See Sub-para 1(a) of Para 2)

APPLICATION FORM

1.(a) Name and Address of the project proposed :

(b)

Location of the project :
Name of the place :
District, Tehsil :
Latitude/Longitude :
Nearest Airport/Railway Station :

(c) Alternate sites examined and the reasons for selecting the proposed site :

(d) Does the site conform to stipulated land use as per local land use plan :

2. Objectives of the project :

3.(a)

Land Requirement :
Agriculture Land :
Forest land and Density of vegetation :
Other (specify) :

(b) (i) Land use in the Catchment/ within 10 kms. radius of the proposed site :

(ii) Topography of the area indicating gradient, aspects and altitude:

(iii) Erodability classification of the proposed land:

(c) Pollution sources existing in 10 km. Radius and their impact on quality of air, water & land :

(d) Distance of the nearest National Park/Sanctuary Biosphere Reserve/ Monuments/heritage site/Reserve Forest :

(e) Rehabilitation plan for quarries/borrow areas :

(f) Green belt plan :

(g) Compensatory afforestation plan :

4. Climate and Air Quality :

(a) Windrose at site :
(b) Max./Min./Mean annual temperature :
(c) Frequency of inversion :
(d) Frequency of cyclones/tornadoes/cloud burst :
(e) Ambient air quality data :
(f) Nature & concentration of emission of SPM, Gas (CO, CO2, Nox,CHn etc.) from the project :

5. Water balance :

(a) Water balance at site :
(b) Lean season water availability :
(c) Source to be tapped with competing users (River, Lake, Ground, Public supply) :
(d) Water quality :
(e) Changes observed in quality and quantity of ground water in the last 15 years and present charging and extraction details :
(f) (i) Quantum of waste water to be released with treatment details :
(ii) Quantum of quality of water in the receiving body before and after disposal of solid waste :
(iii) Quantum of waste water to be released on land and type of land :
(g) (i) Details of reservoir water quality with necessary Catchment Treatment Plan :
(ii) Command Area Development Plan :

6. Solid wastes :

(a) Nature and quantity of solid wastes generated :
(b) Solid waste disposal method :

7. Noise and Vibrations :

(a) Sources of noise and vibrations :
(b) Ambient noise level :
(c) Noise and Vibration control measures proposed :
(c) Subsidence problem if any with control measures :

8. Power requirement indicating source of supply : Complete environmental details to be furnished separately, if captive power unit proposed :

9. Peak labour force to be deployed giving details of :

- Endemic health problems in the area due to waste water/air/soil borne diseases:
- Health care system existing and proposed :

10. (a) Number of village and population to be displaced :

(b) Rehabilitation Master Plan :

11. Risk Assessment Report and Disaster Management Plan :

12. (a) Environmental Impact Assessment } Report prepared as per
(b) Environment Management Plan } guidelines of MOEF
(c) Detailed Feasibility Report } issued from time to time
(d) Duly filled in questionnaire }

13. Details of Environmental Management Cell :

I hereby give an undertaking that the data and information given above are true to the best of my knowledge and belief and I am aware that if any part of the data/information submitted is found to be false or misleading at any stage, the project be rejected and the clearance given, if any, to the project is likely to be revoked at our risk and cost.

Signature of the applicant
with name and full address
Date :
Place :
Given under the seal of
organisation on behalf of
whom the applicant is signing

In respect to item for which data are not required or is not available as per the declaration of project proponent, the project would be considered on that basis.

4.7.EIA Notification 2006

In suppuration of the EIA notification 1994, another EIA notification was introduced by the Ministry of Environment and Forest (MoEF) on 14th September, 2006. The objective of EIA Notification 2006 was to address the limitations of EIA Notification (1994). The process for the notification started in 2005. The draft notification was placed on the MoEF website for nearly 1 year and comments were sought from the Public. In this response, comments from several groups and organizations were received. After taking into account the feedback from the different stakeholders, various modifications were made. The EIA Notification 2006 was an outcome of i) the recommendations made by the Govindarajan Committee ii) the Environmental Management Capacity Building Technical Assistance project of world bank. Govindarajan Committee was setup by the Central Government for Reforming Investment Approvals and Implementation Procedures and not for EIA. The purpose of the Committee was to develop strategies for attracting direct foreign investment in to the country. The

committee observed Environmental Clearance process as one of the major hurdle in investment projects. The committee recommended that to attract investment in the various sectors, hurdles related to clearance processes need to be eased. The second component, MoEF in 2001 was given the task to conduct a comprehensive review of the Environment Clearance process of World Bank's Environmental Management Technical Capacity Building Project. The main objective of technical assistance project was to re-look into the entire process of EIA and to find out the suitable changes which can be brought to sub serve the interests of everyone. The studies recommended the need for reforms to bring an effective system of decision making to achieve the target of sustainable development. The recommendations were consistent with the recommendations of Govindarajan Committee.

Objectives of EIA Notification 2006

The objectives of EIA Notification 2006 is to address the limitation in the old EIA notification (1994) . therefore various modification have been incorporated in the old notification, which the mimistry claims have been done after taking into account the feedback from the difference in the NEW EIA notification 2006 from earlier one (1994) is its attempt to decentralize power to state Government. Earlier all the projects under schedule 1 went to the central Government for environmental clearance. To remove the constraints of EIA notification 1994, EIA notification 2006 was published with following objectives:

- To formulate a transparent, decentralized and efficient regulatory mechanism
- To incorporate necessary environmental safeguards at planning stage
- To involve stakeholders in the public consultation process

Salient features of EIA notification 2006

- More number of projects within the purview of the environmental clearance process
- Attempt to decentralize power to the State Government
- No categorization of projects based on investment,
- Size or capacity of the project determines whether it is cleared by the central or state

- Government Provision to form an expert panel, the Environment Appraisal Committees (SEAC) at the State level.
- Introduction about 'Scoping', which was missing in earlier notification
- Introduction of "The Terms of Reference (ToR)" of the project as decided by the expert committees.
- Powers of expert committees (SEACs and EACs) to visit the site, hold public consultation and meet experts to decide the ToR
- Clear mention of appraisal process
- The consultation process has been divided into public hearing for local people and submission in writing from other interested parties.
- Reduction in time required for the entire environment clearance process.

(Published in the Gazette of India, Extraordinary, Part-II, and Section 3, Sub-section (ii)MINISTRY OF ENVIRONMENT AND FORESTS

New Delhi 14th Septembe r, 2006 Notificat ion

1. S.O. 1533(E). - Whereas, a draft notification under sub-rule (3) of Rule 5 of the Environment (Protection) Rules, 1986 for imposing certain restrictions and prohibitions on new projects or activities, or on the expansion or modernization of existing projects or activities based on their potential environmental impacts as indicated in the Schedule to the notification, being undertaken in any part of India1, unless prior environmental clearance has been accorded in accordance with the objectives of National Environment Policy as approvedby the Union Cabinet on 18th May, 2006 and the procedure specified in the notification, by the Central Government or the State or Union territory Level Environment Impact Assessment Authority (SEIAA), to be constituted by the Central Government in consultation with the State Government or the Union territory Administration concerned under sub-section (3) of section 3 of the Environment

(Protection) Act, 1986 for the purpose of this notification, was published in the Gazette of India,Extraordinary, Part II, section 3, sub-section (ii) vide number S.O. 1324 (E) dated the 15th September ,2005 inviting objections and suggestions from all persons likely to be affected thereby within a period of sixty days from the date on which copies of Gazette containing the said notification were made available to the public; And whereas, copies of the said notification were made available to the public on 15th September, 2005; And whereas, all objections and suggestions received in response to the above mentioned draft notification have been duly considered by the Central Government;

Now, therefore, in exercise of the powers conferred by sub-section (1) and clause (v) ofsub-section (2) of section 3 of the Environment (Protection) Act, 1986, read with clause (d) ofsub-rule (3) of rule 5 of the Environment (Protection) Rules, 1986 and in supersession of the notification number S.O. 60 (E) dated the 27th January, 1994, except in respect of things done or omitted to be done before such supersession, the Central Government hereby directs thaton and from the date of its publication the required construction of new projects or activities or the expansion or modernization of existing projects or activities listed in the Schedule to this notification entailing capacity addition with change in process and or technology shall be undertaken in any part of India only after the prior environmental clearance from the CentralGovernment or as the case may be, by the State Level Environment Impact Assessment Authority, duly constituted by the Central Government under sub-section. (3) of section 3 of the said Act, in accordance with the procedure specified hereinafter in thisnotification.

2. Requirements of prior Environmental Clearance (EC):- The following projects or activities shall require prior environmental clearance from the concerned regulatory authority, which shall hereinafter referred to be as the Central Government in the Ministry

of Environment and Forests for matters falling under Category 'A' in the Schedule and at State level the State Environment Impact Assessment Authority (SEIAA) for matters falling under Category 'B' in the said Schedule, before any construction work, or preparation of land by the project management except for securing the land, is started on the project or activity:

i. All new projects or activities listed in the Schedule to this notification;

ii. Expansion and modernization of existing projects or activities listed in the Scheduleto this notification with addition of capacity beyond the limits specified for the concerned sector, that is, projects or activities which cross the threshold limits given in the Schedule, after expansion or modernization;

iii. Any change in product - mix in an existing manufacturing unit included in Schedulebeyond the specified range.

3. State Level Environment Impact Assessment Authority:- (1) A State Level Environment Impact Assessment Authority hereinafter referred to as the SEIAA shall be constituted by the Central Government under sub-section (3) of section 3 of the Environment (Protection) Act, 1986 comprising of three Members including a Chairman and a Member – Secretary to be nominated by the State Government or the Union territory Administration concerned.

(2) The Member-Secretary shall be a serving officer of the concerned State Government orUnion territory administration familiar with environmental laws.

(3) The other two Members shall be either a professional or expert fulfilling the eligibility criteria given in Appendix VI to this notification. One of the specified Members in sub-paragraph (3) above who is an expert in the Environmental Impact Assessment process shall be the Chairman of the SEIAA.

(4) The State Government or Union territory Administration

shall forward the names of the Members and the Chairman referred in sub- paragraph 3 to 4 above to the Central Government and the Central Government shall constitute the SEIAA as an authority for the purposes of this notification within thirty days of the date of receipt of the names.

(5) The non-official Member and the Chairman shall have a fixed term of three years (from the date of the publication of the notification by the Central Government constituting the authority).

[I] **"(7) All decisions of the SEIAA shall be taken in a meeting and shall ordinarily be unanimous:**

Provided that, in case a decision is taken by majority, the details of views, for and againstit, shall be clearly recorded in the minutes and copy thereof sent to MoEF."

4. Categorization of projects and activities:-

(i) All projects and activities are broadly categorized in to two categories - Category A and Category B, based on the spatial extent of potential impacts and potential impacts on human health and natural and man made resources.

(ii) All projects or activities included as Category 'A' in the Schedule, including expansion and modernization of existing projects or activities and change in product mix, shall require prior environmental clearance from the Central Government in the Ministry of Environment and Forests (MoEF) on the recommendations of an Expert Appraisal Committee (EAC) to be constituted by the Central Government for the purposes of this notification;

(iii) All projects or activities included as Category 'B' in the Schedule, including expansion and modernization of existing projects or activities as specified in sub paragraph (ii) of paragraph 2, or change in product mix as specified in sub paragraph (iii) of paragraph 2, but excluding those which

fulfill the General Conditions (GC) stipulated in the Schedule, *will* require prior environmental clearance from the State/Union territory Environment Impact Assessment Authority (SEIAA). The SEIAA shall base its decision on the recommendations of a State or Union territory level Expert Appraisal Committee (SEAC) as to be constituted for in this notification. [II] "In the absence of a duly constituted SEIAA or SEAC, a Category 'B' project shall be considered at Central Level as a Category 'B' project;"

5. Screening, Scoping and Appraisal Committees:-

The same Expert Appraisal Committees (EACs) at the Central Government and SEACs (hereinafter referred to as the (EAC) and (SEAC) at the State or the Union territory level shall screen, scope and appraise projects or activities in Category 'A' and Category 'B' respectively. EAC and SEAC's shall meet at least once every month.

(a) The composition of the EAC shall be as given in Appendix VI. The SEAC at the State orthe Union territory level shall be constituted by the Central Government in consultation with the concerned State Government or the Union territory Administration with identicalcomposition;

(b) The Central Government may, with the prior concurrence of the concerned State Governments or the Union territory Administrations, constitutes one SEAC for more than one State or Union territory for reasons of administrative convenience and cost;

(c) The EAC and SEAC shall be reconstituted after every three years;

(d) The authorised members of the EAC and SEAC, concerned, may inspect any site(s) connected with the project or activity in respect of which the prior environmental clearance is sought, for the purposes of screening or scoping or appraisal, with prior notice of at least seven days to the applicant, who

shall provide necessary facilities for the inspection;

(e) The EAC and SEACs shall function on the principle of collective responsibility. The Chairperson shall endeavour to reach a consensus in each case, and if consensus cannot be reached, the view of the majority shall prevail.

6. Application for Prior Environmental Clearance (EC):-

An application seeking prior environmental clearance in all cases shall be made in the prescribed Form 1 annexed herewith and Supplementary Form 1A, if applicable, as given in Appendix II, after the identification of prospective site(s) for the project and/or activities to which the application relates, before commencing any construction activity, or preparation of land, at the site by the applicant. The applicant shall furnish, along with the application, a copy of the pre-feasibility project report except that, in case of construction projects or activities (item 8 of the Schedule) in addition to Form 1 and the Supplementary Form 1A, a copy of theconceptual plan shall be provided, instead of the pre-feasibility report.

7. Stages in the Prior Environmental Clearance (EC) Process for New Projects:-

7(i) The environmental clearance process for new projects will comprise of a maximum of four stages, all of which may not apply to particular cases as set forth below in this notification. These four stages in sequential order are:-

- Stage (1) Screening (Only for Category 'B' projects and activities)
- Stage (2) Scoping
- Stage (3) Public Consultation
- Stage (4) Appraisal

I. **Stage (1) - Screening**:

In case of Category 'B' projects or activities, this stage will entail the scrutiny of an application seeking prior environmental clearance made in Form 1 by the concerned State level Expert Appraisal Committee (SEAC) for determining

whether or not the project or activity requires further environmental studies for preparation of an Environmental Impact Assessment (EIA) for its appraisal prior to the grant of environmental clearance depending up on the nature and location specificity of the project . The projects requiring an Environmental Impact Assessment report shall be termed Category 'B1' and remaining projects shall be termed Category 'B2' and will not require an Environment Impact Assessment report. For categorization of projects into B1 or B2 except item 8 (b), the Ministry of Environment and Forests shall issue appropriate guidelines from time to time.

II. **Stage (2) - Scoping**:

(i) "Scoping": refers to the process by which the Expert Appraisal Committee in the case of Category 'A' projects or activities, and State level Expert Appraisal Committee in the case of Category 'B1' projects or activities, including applications for expansion and/or modernization and/or change in product mix of existing projects or activities, determine detailed and comprehensive Terms Of Reference (TOR) addressing all relevant environmental concerns for the preparation of an Environment Impact Assessment (EIA) Report in respect of the project or activity for which prior environmental clearance is sought. The Expert Appraisal Committee or State level Expert Appraisal Committee concerned shall determine the Terms of Reference on the basis of the information furnished in the prescribed application Form1/Form 1A including Terns of Reference proposed by the applicant, a site visit by a sub- group of Expert Appraisal Committee or State level Expert Appraisal Committee concerned only if considered necessary by the Expert Appraisal Committee or State Level Expert Appraisal Committee concerned, Terms of Reference suggested by the applicant if furnished and other information that may be available with the

Expert Appraisal Committee or State Level Expert Appraisal Committee concerned. All projects and activities listed as Category 'B' in Item 8 of the Schedule (Construction/Township/Commercial Complexes /Housing) shall not require Scoping and will be appraised on the basis of Form 1/ Form 1A and the conceptual plan.

(ii) The Terms of Reference (TOR) shall be conveyed to the applicant by the Expert Appraisal Committee or State Level Expert Appraisal Committee as concerned within sixty days of the receipt of Form 1. In the case of Category A Hydroelectric projects Item 1(c) (i) of the Schedule the Terms of Reference shall be conveyed along with the clearance for pre-construction activities .If the Terms of Reference are not finalized and conveyed to the applicant within sixty days of the receipt of Form 1, the Terms of Reference suggested by the applicant shall be deemed as the final Terms of Reference approved for the EIA studies**.** The approved Terms of Reference shall be displayed on the website of the Ministry of Environment and Forests and the concerned State Level Environment Impact Assessment Authority.

(iii) Applications for prior environmental clearance may be rejected by the regulatory authority concerned on the recommendation of the EAC or SEAC concerned at this stage itself. In case of such rejection, the decision together with reasons for the same shall be communicated to the applicant in writing within sixty days of the receipt of the application.

III. **Stage (3) - Public Consultation**:

(i) "Public Consultation" refers to the process by which the concerns of local affected personsand others who have plausible stake in the environmental impacts of the project or activity are ascertained with a view to taking into account all the material concerns in the project or activity design as appropriate. All Category 'A' and Category B1 projects or activities shall

undertake Public Consultation, except the following:-

(a) modernization of irrigation projects (item 1(c) (ii) of the Schedule).

(b) all projects or activities located within industrial estates or parks (item 7(c) of the Schedule) approved by the concerned authorities, and which are not disallowed in such approvals.

(c) expansion of Roads and Highways (item 7 (f) of the Schedule) which do not involve any further acquisition of land.

III **"(cc)** maintenance dredging provided the dredged material shall be disposed within port limits.";

III "(d) All Building or Construction projects or Area Development projects (which do not contain any category 'A' projects and activities) and Townships (item 8(a) and 8(b) in the Schedule to the notification**)."**

e) all Category 'B2' projects and activities.

f) all projects or activities concerning national defence and security or involving otherstrategic considerations as determined by the Central Government.

(ii) The Public Consultation shall ordinarily have two components comprising of:-

(a) a public hearing at the site or in its close proximity- district wise, to be carried out in the manner prescribed in Appendix IV, for ascertaining concerns of local affected persons;

(b) obtain responses in writing from other concerned persons having a plausible stake in the environmental aspects of the project or activity.

(iii) the public hearing at, or in close proximity to, the site(s) in all cases shall be conducted by the State Pollution Control Board (SPCB) or the Union territory Pollution Control Committee (UTPCC) concerned in the specified manner and forward the proceedings to the regulatory authority concerned within

45(forty five) of a request to the effect from theapplicant.

(iv) in case the State Pollution Control Board or the Union territory Pollution Control Committee concerned does not undertake and complete the public hearing within the specified period, and/or does not convey the proceedings of the public hearing within theprescribed period directly to the regulatory authority concerned as above, the regulatory authority shall engage another public agency or authority which is not subordinate to the regulatory authority, to complete the process within a further period of forty five days,.

(v) If the public agency or authority nominated under the sub paragraph (iii) above reports to the regulatory authority concerned that owing to the local situation, it is not possible to conduct the public hearing in a manner which will enable the views of the concerned local persons to be freely expressed, it shall report the facts in detail to the concerned regulatory authority, which may, after due consideration of the report and other reliable information that it may have, decide that the public consultation in the case need not include the public hearing.

(vi) For obtaining responses in writing from other concerned persons having a plausible stake in the environmental aspects of the project or activity, the concerned regulatory authority and the State Pollution Control Board (SPCB) or the Union territory Pollution Control Committee (UTPCC) shall invite responses from such concerned persons by placing on their website the Summary EIA report prepared in the format given in Appendix IIIA by the applicant along with a copy of the application in the prescribed form,within seven days of the receipt of a written request for arranging the public hearing. Confidential information including non-disclosable or legally

privileged information involving Intellectual Property Right, source specified in the application shall not be placed on the web site. The regulatory authority concerned may also use other appropriate media for ensuring wide publicity about the project or activity. The regulatory authority shall, however, make available on a written request from any concerned person the Draft EIA report for inspection at a notified place during normal office hours till the date of the public hearing. All the responses received as part of this public consultation process shall be forwarded to the applicant through the quickest available means.

(vii) After completion of the public consultation, the applicant shall address all the material environmental concerns expressed during this process, and make appropriate changes in the draft EIA and EMP. The final EIA report, so prepared, shall be submitted by the applicant to the concerned regulatory authority for appraisal. The applicant may alternatively submit a supplementary report to draft EIA and EMP addressing all the concerns expressed during the public consultation.

IV. **Stage (4) - Appraisal**:

(i) Appraisal means the detailed scrutiny by the Expert Appraisal Committee or State Level Expert Appraisal Committee of the application and other documents like the Final EIA report, outcome of the public consultations including public hearing proceedings, submitted by the applicant to the regulatory authority concerned for grant of environmental clearance. This appraisal shall be made by Expert Appraisal Committee or State Level Expert Appraisal Committee concerned in a transparent manner in a proceeding to which the applicant shall be invited for furnishing necessary clarifications in person or through an authorized representative. On conclusion

of this proceeding, the Expert Appraisal Committee or State Level Expert Appraisal Committee concerned shall make categorical recommendations to the regulatory authority concerned either for grantof prior environmental clearance on stipulated terms and conditions, or rejection of the application for prior environmental clearance, together with reasons for the same.

(ii) The appraisal of all projects or activities which are not required to undergo public consultation, or submit an Environment Impact Assessment report, shall be carried out on the basis of the prescribed application Form 1 and Form 1A as applicable, any other relevant validated information available and the site visit wherever the same is considered as necessary by the Expert Appraisal Committee or State Level Expert Appraisal Committee concerned.

(iii) The appraisal of an application shall be completed by the Expert Appraisal Committee or State Level Expert Appraisal Committee concerned within sixty days of the receipt ofthe final Environment Impact Assessment report and other documents or the receipt of Form 1 and Form 1 A, where public consultation is not necessary and the recommendations of the Expert Appraisal Committee or State Level Expert Appraisal Committee shall be placed before the competent authority for a final decision within thenext fifteen days .The prescribed procedure for appraisal is given in Appendix V ;

7(ii). **Prior Environmental Clearance (EC) process for Expansion or Modernization orChange of product mix in existing projects**:

All applications seeking prior environmental clearance for expansion with increase in the production capacity beyond the capacity for which prior environmental clearance has been granted under this notification or with increase in either lease

area or production capacityin the case of mining projects or for the modernization of an existing unit with increase in the total production capacity beyond the threshold limit prescribed in the Schedule to this notification through change in process and or technology or involving a change in the product –mix shall be made in Form I and they shall be considered by the concerned Expert Appraisal Committee or State Level Expert Appraisal Committee within sixty days,who will decide on the due diligence necessary including preparation of EIA and public consultations and the application shall be appraised accordingly for grant of environmentalclearance.

8. Grant or Rejection of Prior Environmental Clearance (EC):

(i) The regulatory authority shall consider the recommendations of the EAC or SEAC concerned and convey its decision to the applicant within forty five days of the receipt of the recommendations of the Expert Appraisal Committee or State Level Expert Appraisal Committee concerned or in other words within one hundred and five days of the receipt of the final Environment Impact Assessment Report, and where Environment Impact Assessment is not required, within one hundred and five days of the receipt of the complete application with requisite documents, except as provided below.

(ii) The regulatory authority shall normally accept the recommendations of the Expert Appraisal Committee or State Level Expert Appraisal Committee concerned. In cases where it disagrees with the recommendations of the Expert Appraisal Committee or State Level Expert Appraisal Committee concerned, the regulatory authority shall request reconsideration by the Expert Appraisal Committee or State Level Expert AppraisalCommittee concerned within forty five days of the receipt of the recommendations of the Expert

Appraisal Committee or State Level Expert Appraisal Committee concerned while stating the reasons for the disagreement. An intimation of this decision shall be simultaneously conveyed to the applicant. The Expert Appraisal Committee or State Level Expert Appraisal Committee concerned, in turn, shall consider the observations of the regulatory authority and furnish its views on the same within a further period of sixty days. The decision of the regulatory authority after considering the views of the Expert Appraisal Committee or State Level Expert Appraisal Committee concerned shall be final and conveyed to the applicant by the regulatory authority concerned within the next thirty days.

In the event that the decision of the regulatory authority is not communicated to the applicant within the period specified in sub-paragraphs (i) or (ii) above, as applicable, the applicant may proceed as if the environment clearance sought for has been granted or denied by the regulatory authority in terms of the final recommendations of the Expert Appraisal Committee or State Level Expert Appraisal Committee concerned.

(iii) On expiry of the period specified for decision by the regulatory authority under paragraph

(i) and (ii) above, as applicable, the decision of the regulatory authority, and the final recommendations of the Expert Appraisal Committee or State Level Expert Appraisal Committee concerned shall be public documents.

(iv) Clearances from other regulatory bodies or authorities shall not be required prior to receipt of applications for prior environmental clearance of projects or activities, or screening, or scoping, or appraisal, or decision by the regulatory authority concerned, unless any of these is sequentially dependent on such clearance either due to a requirement of law, or for necessary technical reasons.

(v) Deliberate concealment and/or submission of false or

misleading information or data which is material to screening or scoping or appraisal or decision on the application shall make the application liable for rejection, and cancellation of prior environmental clearance granted on that basis. Rejection of an application or cancellation of a prior environmental clearance already granted, on such ground, shall be decided by the regulatory authority, after giving a personal hearing to the applicant, and following the principles of natural justice.

9. Validity of Environmental Clearance (EC):

The "Validity of Environmental Clearance" is meant for the period from which a prior environmental clearance is granted by the regulatory authority, or may be presumed by theapplicant to have been granted under sub paragraph (iv) of paragraph 7 above, to the start of production operations by the project or activity, or completion of all construction operations in case of construction projects (item 8 of the Schedule), to which the application for prior environmental clearance refers. The prior environmental clearance granted for a project or activity shall be valid for a period of ten years in the case of River Valley projects (item 1(c) of the Schedule), project life as estimated by Expert Appraisal Committee or State Level Expert Appraisal Committee subject to a maximum of thirty years for mining projects and five years in the case of all other projects and activities.

However, in the case of Area Development projects and Townships [item 8(b)], the validity
period shall be limited only to such activities as may be the responsibility of the applicant as a developer. This period of validity may be extended by the regulatory authority concerned by a maximum period of five years provided an application is made to the regulatory authority by the applicant within the validity period, together with an updated Form 1, and Supplementary Form 1A, for Construction projects or activities

(item 8 of theSchedule). In this regard the regulatory authority may also consult the Expert Appraisal Committee or State Level Expert Appraisal Committee as the case may be.

10. Post Environmental Clearance Monitoring:

[IV] **"(i)(a)** In respect of Category 'A' project, it shall be mandatory for the project proponent to make public the environment clearance granted for their project along with the environmental conditions and safeguards at their cost by prominently advertising it at least in two local newspapers of the district or State where the project is located and in addition, this shall also be displayed in the project proponent's website permanently.

(b) In respect of Category 'B' projects, irrespective of its clearance by MoEF / SEIAA, the project proponent shall prominently advertise in the newspapers indicating that the project has been accorded environment clearance and the details of the MoEF website where it is displayed.

(c) The Ministry of Environment and Forests and the State/Union Territory Level Environmental Impact Assessment Authorities (SEIAAs), as the case may be, shall alsoplace the environmental clearance in the public domain on Governmental portal.

(d) The copies of the environmental clearance shall be submitted by the project proponents to the Heads of local bodies, Panchayats and Municipal Bodies in addition to the relevant offices of the Government who in turn has to display the same for 30 days from the date of receipt.";

[IV] **(ii)** It shall be mandatory for the project management to submit half-yearly compliance reports in respect of the stipulated prior environmental clearance terms and conditions in hard and soft copies to the regulatory authority concerned, on 1st June and 1st Decemberof each calendar year.

IV (iii) All such compliance reports submitted by the project management shall be public documents. Copies of the same shall be given to any person on application to the concerned regulatory authority. The latest such compliance report shall also be displayedon the web site of the concerned regulatory authority.

2. Transferability of Environmental Clearance (EC):

A prior environmental clearance granted for a specific project or activity to an applicant may be transferred during its validity to another legal person entitled to undertake the project or activity on application by the transferor, or by the transferee with a written "no objection" by the transferor, to, and by the regulatory authority concerned, on the same terms and conditions under which the prior environmental clearance was initially granted,and for the same validity period. No reference to the Expert Appraisal Committee or State Level Expert Appraisal Committee concerned is necessary in such cases.

3. Operation of EIA Notification, 1994, till disposal of pending cases:

From the date of final publication of this notification the Environment Impact Assessment (EIA) notification number S.O.60 (E) dated 27th January, 1994 is hereby superseded, except in suppression of the things done or omitted to be done before such suppression tothe extent that in case of all or some types of applications made for prior environmental clearance and pending on the date of final publication of this notification, the Central Government may relax any one or all provisions of this notification except the list of the projects or activities requiring prior environmental clearance in Schedule I , or continue operation of some or all provisions of the said notification, for a period not exceeding oneyear from the date of issue of this notification.

SCHED ULE

(See paragra ph 2 and 7)

LIST OF PROJECTS OR ACTIVITIES REQUIRING PRIOR ENVIRONMENTAL CLEARANCE

Project or Activity		**Category with threshold limit**		**Conditions if any**
		A	B	
1		Mining, extraction of natural resources and power generation (fora specified production capacity)		
(1)	(2)	(3)	(4)	(5)
“1(a)	(i) Mining of minerals.	□ 50 ha. of mining leasearea in respect of non- coal mine lease. > 150 ha of mining lease area in respect of coal mine lease. Asbestos mining irrespective of mining area	<50 ha □ 5 ha .of mining lease area in respect of non-coal mine lease. ≤ 150 ha □ 5 ha of mining lease area in respect of coal mine lease.	General Condition shall apply Note: Mineral prospecting Is exempted.” ;
	(ii) Slurry pipelines (coal lignite and otherores) passing throughnational parks / sanctuaries / coral reefs, ecologically sensitive areas.	All projects.		
1(b)	Offshore and onshore oil and gas exploration, development & production	All projects		Note Exploration Surveys (not involving drilling) are exempted provided the concession areas have got previous

				clearance for physical survey
1(c)	River Valley pojects	(i) □ 50 MW hydroelectric power generation; (ii) □ 10,000 ha. ofculturable command area	(i) < 50 MW □ 25 MW hydroelectric power generation; (ii) < 10,000 ha. of culturable command area	V "General Condition shall apply. Note: Irrigation projects not involving submergence or inter-state domain shall be appraised by the SEIAA as Category 'B' Projects.";
(1)	(2)	(3)	(4)	(5)
1(d)	Thermal Power	V □ □ 500 MW (coal /	< 500 MW (coal /	V "General Condition
	Plants	lignite / naphtha	lignite / naphtha &	shall apply.
		& gas based);	gas based);	Note:
		□ 50 MW (Pet coke diesel and all other fuels including	<50 MW □ 5MW (Pet coke, diesel and all other fuels including	(i) Power plant up to 15 MW, based on biomass and using auxiliary fuel
		refinery residual oil waste except biomass); □ □0 MW (based on biomass or non hazardous municipal waste as fuel).";	refinery residual oil waste except biomass); □ □0 MW > 15 MW (based on biomass or non hazardous municipal waste as fuel).";	such as coal / lignite / petroleum products up to 15% are exempt. (ii) Power plant up to 15 MW, based on non-hazardous municipal waste and using auxiliary fuel such as coal / lignite / petroleum
				products up to 15% are
				exempt.
				(iii) Power plants using
				waste heat boiler
				without any auxiliary
				fuel are exempt.";

1(e)	Nuclear power projects and processing of nuclear fuel	All projects		
2		Primary Processing		
2(a)	Coal washeries	□ 1 million ton/annum throughput of coal	<1million ton/annum throughput of coal	General Condition shallapply (If located within mining area the proposal shall be appraised together with the mining proposal)
2 (b)	Mineral beneficiation	□ 0.1million ton/annummineral throughput	< 0.1million ton/annum mineral throughput	General Condition shallapply (Mining proposal withMineral beneficiation shall be appraised togetherfor grant of clearance)
3		Materials Production		
(1)	(2)	(3)	(4)	(5)
3(a)	Metallurgical industries (ferrous & non ferrous)	a)Primary metallurgicalindustry All projects b) Sponge iron manufacturing □ 200TPD c) Secondary metallurgical processing industry	Sponge iron manufacturing <200TPD Secondary metallurgical processing industry	V "General condition shall apply. Note: **(i)** The recycling industrial units registered under the HSM Rules, are exempted. **(ii)** In case of secondary

		All toxic and heavy metal producing units 20,000 tonnes /annum	i.)All toxic and heavy metal producing units <20,000 tonnes /annum ii.)All other non –toxic secondary metallurgical processing industries >5000 tonnes/annum	metallurgical processing industrial units, those projects involving operation of furnaces only such as induction and electricalarc furnace, submergedarc furnace, and cupolawith capacity more than30,000 tonnes per annum (TPA) would require environmental clearance. **(iii)** Plant / units other than power plants (given against entry no.1(d) of the schedule), based on municipal solid waste (non-hazardous) are exempted.”
3(b)	Cement plants	1.0 million tonnes/annum production capacity	<1.0 million tonnes/annum production capacity. All Stand alone grinding units	General Condition shall apply
4		Materials Processing		
(1)	(2)	(3)	(4)	(5)
4(a)	Petroleum refining industry	All projects	-	-
4(b)	Coke oven plants	2,50,000 tonnes/annum	<2,50,000 & 25,000 tonnes/annum	˅ “General Condition shall apply.”

4(c)	Asbestos milling and asbestos based products	All projects	-	-
(1)	(2)	(3)	(4)	(5)
4(d)	Chlor-alkali industry	□300 TPD production Capacity or a unit located out side the notified industrial area/ estate	V “(i) All projects irrespective of the size, if located in a Notified Industrial Area/ Estate. (ii) <300 tonnes per day (TPD) and located outside a Notified Industrial Area/ Estate.”	V “General as well as specific condition shall apply. No new Mercury Cell based plants will be permitted and existing units converting to membrane cell technology are exempted from this notification.”
4(e)	Soda ash Industry	All projects	-	-
4(f)	Leather/skin/hide processing industry	New projects outside the industrial area or expansion of existing units out side the industrial area	All new or expansion of projects located within a notified industrial area/ estate	V “General as well as specific condition shall apply.”
5		Manufacturing / Fabrication		
5(a)	Chemical fertilizers	V “All projects except Single Super Phosphate.”	V “Single Super Phosphate.”	-
5(b)	Pesticides industry and pesticide specific intermediates (excluding formulations)	All units producing technical grade pesticides	-	-
5(c)	Petro-chemical complexes (industries based on processing of petroleum fractions & naturalgas and/or reforming to aromatics)	All projects -	-	-
5(d)	Manmade fibers manufacturing	Rayon	Others	General Condition shall apply

5(e)	Petrochemical based processing (processes other than cracking & reformation and not covered under the complexes)	Located out side the notified industrial area/estate -	Located in a notified industrial area/ estate	V "General as well as specific condition shall apply."
(1)	(2)	(3)	(4)	(5)
5(f)	Synthetic organic chemicals industry (dyes & dye intermediates; bulk drugs and intermediates excluding drug formulations; synthetic rubbers; basic organic chemicals, other synthetic organic chemicals and chemical intermediates)	Located out side the notified industrial area/ estate	Located in a notified industrial area/ estate	V "General as well as specific condition shall apply"
5(g)	Distilleries	(i) All Molasses based distilleries (ii) All Cane juice/ non-molasses based distilleries □30 KLD	All Cane juice / non-molasses based distilleries – <30 KLD	General Condition shall apply
5(h)	Integrated paint industry	-	All projects	General Condition shall apply
5(i)	Pulp & paper industry excluding manufacturing of paper from waste paper and manufacture of paper from ready pulp with out bleaching	Pulp manufacturing and Pulp& Paper manufacturing industry	Paper manufacturing industry without pulp manufacturing	General Condition shall apply

5(j)	Sugar Industry	-	□ 5000 tcd cane crushing capacity	General Condition sha apply
5(k)	ˇ Omitted			
6		Service Sectors		
6(a)	Oil & gas transportation pipe line (crude and refinery/ petrochemical products), passing through national parks / sanctuaries /coral reefs / ecologically sensitive areas including LNG Terminal	All projects		-
(1)	(2)	(3)	(4)	(5)
6(b)	Isolated storage & handling of hazardous chemicals (As per threshold planning quantity indicated in column 3 of schedule 2 & 3 of MSIHC Rules 1989 amended 2000)	-	All projects	General Condition shall apply
7		Physical Infrastructure including Environmental Services		
7(a)	Air ports	ˇ "All projects including airstrips, which are for commercial use."	-	ˇ "Note: Air strips, which do not involve bunkering/ refueling facility and or Air Traffic

				Control, are exempted.”
7(b)	All ship breaking yards including ship breaking units	All projects	-	-
7©	Industrial estates/ parks/ complexes/ areas, export processing Zones (EPZs), Special Economic Zones (SEZs), Biotech Parks, Leather Complexes.	If at least one industry in the proposed industrial estate falls under the Category A, entire industrial area shall be treated as Category A, irrespective of the area. Industrial estates with area greater than 500 ha. and housing at least one Category B industry.	Industrial estates housing at least one Category B industry and area <500 ha. Industrial estates of area> 500 ha. and not housing any industry belonging to CategoryA or B.	“Genral as well as special conditions shallapply. Note: 1. Industrial Estate of area below 500 ha. andnot housing any industry of Category ‘A’ or ‘B’ doesnot require clearance. 2. If the area is less than 500 ha. but contains building and construction projects > 20,000 Sq. mts. And or development area morethan 50 ha it will be treated as activity listed at serial no. 8(a) or 8(b) in the Schedule, as thecase may be.”
7(d)	Common hazardous waste treatment, storage and disposal facilities (TSDFs)	All integrated facilitieshaving incineration &landfill or incineration alone	All facilities havingland fill only	General Condition shallapply

(1)	(2)	(3)	(4)	(5)
7(e)	V “Ports, harbours, break waters, dredging.”	□ 5 million TPA of cargo handling capacity (excluding fishing harbours)	< 5 million TPA of cargo handling capacity and/or ports/ harbours □10,000 TPA of fish handling capacity	V “General Condition shall apply. Note: **1.** Capital dredging inside and outside the ports or harbors and channels are included; **2.** Maintenance dredging is exempt provided it formed part of the original proposal for which Environment Management Plan (EMP) was prepared and environmental clearance obtained.”
7(f)	Highways	**i)** New National High ways; and **ii)** Expansion of National High ways greater than 30 KM, involving additional right of way greater than 20m involving land acquisition and passing through more than one State.	V “ i) All State Highway Project; and ii) State Highway expansion projects in hilly terrain (above 1,000 m AMSL) and or ecologically sensitive areas.”	General Condition shall apply. Note: Highways include expressways.”

7(g)	Aerial ropeways	V(xvi)(a) "(i) All projects located at altitude of 1,000 mtr. And above. (ii) All projects located in notified ecologically sensitive areas."	V(xvi)(b) "All projects except those covered in column (3)."	General Condition shall apply
7(h)	Common Effluent Treatment Plants (CETPs)		All projects	General Condition shall apply
7(i)	Common Municipal Solid Waste Management Facility (CMSWMF)		All projects	General Condition shall apply
8		Building /Construction projects/Area Development projects and Townships		
8(a)	Building and Construction projects		≥20000 sq.mtrs and <1,50,000 sq.mtrs. of built-up area#	#(built up area for covered construction; in the case of facilitiesopen to the sky, it will be the activity area)
8(b)	Townships and Area Development projects.		Covering an area ≥ 50ha and or built up area ≥1,50,000 sq .mtrs ++	++All projects underItem 8(b) shall be appraisedas Category B1

Note:-

V(xvii) "General Condition (GC):

Any project or activity specified in Category 'B' will be treated as Category A, if located inwhole or in part within 10 km from the boundary of: (i) Protected Areas notified under the Wild Life (Protection) Act, 1972, (ii) Critically Polluted areas as identified by the Central Pollution Control Board from time to time, (iii) Eco-sensitive areas as notified under section 3 of the

Environment (Protection) Act, 1986, such as, Mahabaleshwar Panchgani, Matheran, Pachmarhi, Dahanu, Doon Valley, and (iv) inter-State boundaries and internationalboundaries:

Provided that the requirement regarding distance of 10 km of the inter-State boundaries can be reduced or completely done away with by an agreement between the respective Statesor U.Ts sharing the common boundary in case the activity does not fall within 10 kilometres ofthe areas mentioned at item (i), (ii) and (iii) above."

Specific Condition (SC):
If any Industrial Estate/Complex / Export processing Zones /Special Economic Zones/Biotech Parks / Leather Complex with homogeneous type of industries such as Items 4(d), 4(f), 5(e),5(f), or those Industrial estates with pre –defined set of activities (not necessarily homogeneous, obtains prior environmental clearance, individual industries including proposed industrial housing within such estates /complexes will not be required to take prior environmental clearance, so long as the Terms and Conditions for the industrial estate/complex are complied with (Such estates/complexes must have a clearly identified management with the legal responsibility of ensuring adherence to the Terms and Conditions of prior environmental clearance, who may be held responsible for violation of the samethroughout the life of the complex/estate).

[No. J-11013/56/2004-IA-II (I)]
(R.CHAMDRAMOHAN)

JOINT SECRETARY TO THE GOVERNMENT OF INDIA

APPENDIX VI

(See paragraph 5)

COMPOSITION OF THE SECTOR/ PROJECT SPECIFIC EXPERT APPRAISAL COMMITTEE (EAC) FOR CATEGORY A PROJECTS AND THE STATE/UT LEVEL EXPERT APPRAISAL COMMITTEES (SEACs) FOR CATEGORY B PROJECTS TO BE CONSTITUTED BY THE CENTRAL GOVERNMENT `

1. The Expert Appraisal Committees (EAC(s) and the State/UT Level Expert Appraisal Committees (SEACs) shall consist of only professionals and experts fulfilling the following eligibility criteria:

   Professional: The person should have at least (i) 5 years of formal University training in the concerned discipline leading to a MA/MSc Degree, or (ii) in case of Engineering /Technology/Architecture disciplines, 4 years formal training in a professional training coursetogether with prescribed practical training in the field leading to a B.Tech/B.E./B.Arch. Degree, or (iii) Other professional degree (e.g. Law) involving a total of 5 years of formal University training and prescribed practical training, or (iv) Prescribed apprenticeship/article ship and pass examinations conducted by the concerned professional association (e.g. Chartered Accountancy),or (v) a University degree , followed by 2 years of formal training in a University or Service Academy (e.g. MBA/IAS/IFS). In selecting the individual professionals, experience gained by them in their respective fields will be taken note of.

   Expert: A professional fulfilling the above eligibility criteria with at least 15 years of relevant experience in the field, or with an advanced degree (e.g. Ph.D.) in a concerned field and at least 10 years of relevant experience.

   Age: Below 70 years. However, in the event of the non-availability

of /paucity of experts in a given field, the maximum age of a member of the Expert Appraisal Committee may be allowedup to 75 years

2. The Members of the EAC shall be Experts with the requisite expertise and experience in the following fields /disciplines. In the event that persons fulfilling the criteria of "Experts" are not available, Professionals in the same field with sufficient experience may be considered:

- **Environment Quality Experts**: Experts in measurement/monitoring, analysis andinterpretation of data in relation to environmental quality
- **Sectoral Experts in Project Management**: Experts in Project Management orManagement of Process/Operations/Facilities in the relevant sectors.
- **Environmental Impact Assessment Process Experts**: Experts in conducting andcarrying out Environmental Impact Assessments (EIAs) and preparation of Environmental Management Plans (EMPs) and other Management plans and who have wide expertise andknowledge of predictive techniques and tools used in the EIA process
- **Risk Assessment Experts**
- **Life Science Experts in floral and faunal management**
- **Forestry and Wildlife Expert**
- **Environmental Economics Expert with experience in project appraisal**

3. The Membership of the EAC shall not exceed 15 (fifteen) regular Members. However the Chairperson may co-opt an expert as a Member in a relevant field for a particular meetingof the Committee.
4. The Chairperson shall be an outstanding and experienced environmental policy expert or expert in management or public administration with wide experience in the relevant development sector.
5. The Chairperson shall nominate one of the Members as the Vice Chairperson whoshall preside over the EAC in the absence of the Chairman /Chairperson.
6. A representative of the Ministry of Environment and Forests shall assist the Committeeas its Secretary.

7. The maximum tenure of a Member, including Chairperson, shall be for 2 (two) terms of 3 (three) years each.
8. The Chairman / Members may not be removed prior to expiry of the tenure withoutcause and proper enquiry.

4.8.Summary

Environment Impact Assessment or EIA can be defined as the study to predict the effect of a proposed activity/project on the environment. 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 as a mandatory regulatory procedure originated in the early 1970s, with the implementation of the National Environment Policy Act (NEPA) 1969 in the US. A large part of the initial development took place in a few 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 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 an environmental angle. This was subsequently extended to cover those projects, which required the approval of the public investment board. Till 1994, environmental clearance from the Central Government was an administrative decision and lacked legislative support. On 27 January 1994, the Union Ministry of Environment and Forests (MEF), Government of India, under the Environmental (Protection) Act 1986, promulgated an EIA notification making Environmental Clearance (EC) mandatory for expansion or 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 the EIA notification of 1994.

4.9. Terminal question

Q.1. What are EIA notifications? Discuss briefly.

Answer:----------

Q.2. Write the list of projects requiring environmental clearance

Answer:----------

Q.3. Write the role of ministry of environment and forest in EIA notification.

Answer:----------

Q.4. Write the EIA, Notification 1994.

Answer:----------

Q.5. Write the salient features of EIA Notification 2006.

Answer:----------

Q.6. Discuss the environmental clearance and its procedure.

Answer:----------

4.10. Further suggested readings

1. S.R. Khandeshwar, N.S. Raman and A.R. Gajbhiye , Environmental Impact Assessment, Dreamtech Press-2019.
2. Anjaneyulu Yerramilli, Environmental Impact Assessment Methodologies, BS Publications-2020.
3. George Alex, Environmental Impact Assessment (EIA), Blue Rose Publishers-2020.
4. Teacher manual master EIA.pdf (iitr.ac.in)
5. N. Maheshwara Swamy, Text Book on Environmental Law

Unit-5: EIA Regulations in India

Contents

5.1. Introduction

Environmental impact assessment process involves evaluation of environmental implications and incorporation of necessary safeguards for those activities having a bearing on environmental quality. Evaluation of the beneficial and adverse affects of development projects on the ecosystem is attempted, both qualitative as well as quantitatively. The objectives of environmental impact assessment is to achieves sustained developmental with a) minimum environmental degradation and, b) protection of long term environmental adverse effects by incorporating suitable mitigating measures. Impact assessment is a development and protection of the environment compatible in the complex and interdependent world of today. Comprehensive polices for protective action to avert environmental damage before it occurs one becoming imperative. Environmental impact assessment has become and browsing instrument to prepare for public design-making on developmental activity. Impact assessment has to be taken up at the project inception stage so that the selection of side, choice of process technology, selection of appropriate layout and building material can be done to ensure environmental compatibility. It also ensures that necessary safeguards, monitoring, mechanism require for feed-back and mid course corrections. Both in the short and long term Rehabilitation is involved, also needs

to be incorporated to ensure that quality of life for the affected project rather than bringing them more misery. The environmental assessment represents the key steps in meeting the legal requirements. Increasing, it is an attempt to evaluate the consequences of a proposed action on each of the descriptors in the environmental inventory.

Environmental Impact Assessment (EIA) is a critical process in India that assesses and evaluates the potential environmental consequences and impacts of proposed developmental projects. It is a systematic tool used to identify, predict, and evaluate the likely environmental effects of various activities, such as industrial projects, infrastructure development, mining operations, and other significant undertakings. The EIA process in India is guided by the Environmental Impact Assessment Notification, which was first issued in 1994 under the provisions of the Environmental Protection Act, EPA 1986. The notification has undergone several amendments over the years to strengthen the assessment and review procedures. The primary objective of EIA in India is to ensure sustainable development by considering the environmental, social, and economic aspects of proposed projects. It helps in identifying potential adverse impacts on the environment, natural resources, and local communities, allowing decision-makers to make informed choices and take necessary mitigation measures. The EIA process in India aims to strike a balance between development and environmental protection. However, it has also faced criticism for shortcomings in implementation, transparency, and the effectiveness of mitigation measures. The government continues to review and revise the EIA notification to address these concerns and enhance the overall effectiveness of the process.

Objectives

- To discuss the EIA regulation in India
- To discuss the current issues in EIA
- To discuss the case study of hydropower projects/ thermal projects
- To discuss the silent feature of EIA 2006

5.2. Status of EIA in India

The Environmental Impact Assessment (EIA) process in India plays a crucial role in ensuring sustainable development by assessing and managing the

potential environmental impacts of proposed projects. It is a systematic and transparent tool that helps in identifying, predicting, and evaluating the likely environmental consequences of various activities, including industrial projects, infrastructure development, mining operations, and other significant undertakings. This comprehensive analysis aims to provide an overview of the current status of the EIA process in India, including its evolution, regulatory framework, key challenges, and potential areas for improvement.

Evolution of the EIA Process in India:

The EIA process in India has evolved significantly over the years, driven by the need to address environmental concerns and enhance sustainable development. The foundation for the EIA process was laid with the enactment of the Environmental Protection Act (EPA) in 1986, which aimed to protect and improve the environment. The EPA empowered the central government to take measures for environmental protection and introduced the concept of EIA through subsequent amendments. EIS is a development written is the format as specified by department of environment (DoE) Government of India a represents a summary of the environmental inventory and the findings of the environmental assessment.

In 1994, the Ministry of Environment, Forest, and Climate Change (MoEFCC) issued the first Environmental Impact Assessment Notification, which laid down the framework for the EIA process in India. This notification provided guidelines for screening, scoping, and assessing potential environmental impacts of projects falling under its purview. It also established the process for obtaining environmental clearances and emphasized public participation and stakeholder consultations.

Since its initial issuance, the EIA notification has undergone several amendments and revisions to enhance the effectiveness and scope of the process. These amendments aimed to address the emerging environmental challenges, streamline the assessment procedures, and incorporate best practices from international EIA frameworks. The most recent amendment to the EIA notification was proposed in March 2020, which generated significant public debate and scrutiny.

Regulatory Framework for EIA in India:

The EIA process in India is primarily governed by the Environmental Impact Assessment Notification, which outlines the procedural requirements and guidelines for conducting the assessment. The notification establishes the roles and responsibilities of various stakeholders, including the project proponent, regulatory authority, expert appraisal committees, and the public.

Key features of the regulatory framework for EIA in India include:

Scoping: Scoping involves the identification of potential impacts, selection of parameters for assessment, and the preparation of Terms of Reference (ToR) for conducting the EIA study. It includes baseline data collection, impact prediction, and assessment of cumulative impacts.

Public Consultation: The EIA process in India emphasizes public participation and mandates public consultations during various stages of the assessment. Public hearings provide an opportunity for affected communities and stakeholders to express their concerns, provide feedback, and seek clarifications.

Impact Assessment: The EIA study assesses the potential impacts of the proposed project on various environmental components, including air, water, soil, biodiversity, ecosystems, and socio-economic aspects. It considers both direct and indirect impacts, short-term and long-term effects, and identifies potential mitigation measures.

Expert Appraisal Committees (EACs): EACs play a crucial role in the EIA process as they review the project proposals, EIA reports, and provide recommendations to the regulatory authority regarding environmental clearance. EACs consist of subject matter experts and are responsible for ensuring the technical and scientific rigor of the assessment.

Environmental Clearance: Based on the recommendations of the EACs, the regulatory authority grants or denies environmental clearance to the project. The environment assessment process is refined to integrate biophysical impacts, social and community impacts, as well as technical and economic impacts, into a comprehensive and holistic process which relates human aspirations to biophysical limitations as well as technical and economic. This process permits

decisions makers to determine whether certain developments are acceptable and to avoid or mitigate adverse effects. It also requires that the decision maker become more accountable to the public for a particular action.

5.3. Current issues of EIA

The Environmental Impact Assessment (EIA) process in India faces several challenges and issues that impact its effectiveness and ability to adequately assess and mitigate environmental impacts. Some specific examples of current issues related to the Environmental Impact Assessment (EIA) process:

Dilution of EIA Notification: The proposed amendments to the EIA Notification in 2020 sparked widespread criticism for diluting certain provisions that were meant to ensure environmental protection. Concerns were raised regarding the post-facto clearance provision, which allows projects to operate without obtaining prior environmental clearance, leading to potential irreversible environmental damage.

Inadequate Public Participation: Despite the requirement for public consultations, there have been instances where the public is not adequately informed or involved in the decision-making process. The lack of timely and meaningful engagement deprives affected communities of their right to participate, voice concerns, and influence project outcomes.

Exclusion of Marginalized and Vulnerable Communities: Marginalized and vulnerable communities, including indigenous peoples and local communities, often face challenges in effectively participating in the EIA process. Limited access to information, language barriers, and power imbalances can hinder their ability to engage in the assessment and decision-making processes, leading to potential injustices and social impacts.

Inadequate Assessment of Social Impacts: The EIA process primarily focuses on environmental impacts, while the assessment of social impacts, including displacement, livelihood loss, and cultural heritage, is often insufficient. Neglecting social aspects can result in adverse consequences for communities, especially those dependent on natural resources for their sustenance and cultural identity.

Weak Enforcement and Compliance: Ensuring compliance with the conditions stipulated in the environmental clearances is a significant challenge. Weak monitoring and enforcement mechanisms often result in non-compliance with mitigation measures, leading to environmental damage. There is a need for improved monitoring systems and stringent enforcement of environmental regulations to ensure project proponents adhere to the approved conditions.

Expertise and Capacity Constraints: The availability of qualified experts, both within regulatory bodies and as part of project proponents' teams, can be limited. The lack of adequate expertise in conducting impact assessments, reviewing EIA reports, and evaluating the potential environmental consequences poses a challenge to the quality and credibility of the process.

Non-compliance and Weak Monitoring: Non-compliance with mitigation measures specified in environmental clearances is a persistent issue. Inadequate monitoring and enforcement mechanisms allow project proponents to deviate from approved plans, leading to environmental degradation and compromised sustainability. Effective monitoring and stringent enforcement are crucial to ensure project compliance and prevent adverse impacts.

Transparency and Access to Information: Transparency in the EIA process is crucial to build trust and ensure effective public participation. However, there have been concerns regarding the transparency of the process, including limited access to project information, EIA reports, and decision-making criteria. Improving transparency by making project-related information readily accessible to the public can enhance accountability and public trust.

Insufficient Consideration of Alternative Projects: The EIA process does not always adequately consider alternative project options, leading to a lack of exploration of more sustainable alternatives. Alternative analysis and a comparative assessment of different project options can help identify environmentally and socially preferable alternatives, promoting sustainable development.

Limited Scope of Impact Assessment: The scope of impact assessment in some cases does not encompass the full range of potential environmental impacts. For instance, indirect and cumulative impacts, such as those associated

with infrastructure development, are often under estimated or overlooked, resulting in incomplete assessments and potential long-term consequences.

Post-clearance Monitoring and Evaluation: The EIA process tends to focus more on the pre-clearance stages, while post-clearance monitoring and evaluation receive relatively less attention. Adequate post-clearance monitoring is essential to assess the actual environmental impacts of projects, track compliance with mitigation measures, and inform adaptive management strategies.

Influence of Project Proponents: There have been concerns regarding the influence of project proponents on the EIA process, leading to potential biases and conflicts of interest. It is crucial to ensure the independence and integrity of the assessment process by mitigating undue influence and maintaining a robust regulatory framework.

Inadequate Expertise and Technical Capacity: The availability of qualified experts and technical capacity to conduct robust impact assessments and review EIA reports is a challenge. Insufficient expertise within regulatory bodies and project proponents' teams can lead to deficiencies in impact assessments, affecting the quality and credibility of the EIA process.

Inconsistent Decision-Making: There have been concerns about inconsistent decision-making in granting or rejecting environmental clearances. Lack of transparency and subjective criteria for decision-making can raise doubts about the impartiality and reliability of the process, undermining public trust.

Timelines and Expedited Clearances: In recent years, there has been a push to expedite the environmental clearance process to fast-track development projects. However, this emphasis on timelines may compromise the thoroughness of the EIA process and limit the opportunity for comprehensive impact assessment and meaningful public participation.

Climate Change Considerations: Climate change impacts and related considerations are often inadequately addressed in the EIA process. This includes the limited assessment of greenhouse gas emissions, vulnerability to climate change, and the incorporation of climate resilience measures, which are essential for effective climate change mitigation and adaptation.

These examples highlight some of the ongoing challenges and issues within the EIA process in India. Addressing these concerns through improved regulations, enhanced public participation, capacity building, and a stronger emphasis on comprehensive impact assessment can contribute to a more robust and effective EIA framework.

5.4. EIA Case study of hydropower project

This case study focuses on the EIA process of a hydropower project in India. Hydropower projects are a significant source of renewable energy but also have potential environmental and social impacts. The case study highlights the key aspects of the EIA process and the associated challenges and considerations.

The hydropower project under review is located in a hilly region in northern India. It is a large-scale project with a proposed capacity of 500 megawatts (MW). The project involves the construction of a dam, reservoir, powerhouse, transmission lines, and associated infrastructure. The primary objective is to harness the water resources for electricity generation and contribute to the country's renewable energy goals.

EIA Process:

Screening and Scoping:

The project proponent submits the project proposal to the regulatory authority responsible for screening projects under the EIA notification. The authority determines the project's category and decides whether it requires a mandatory EIA study. In this case, due to the project's size and potential impacts, it falls under Category A, requiring a comprehensive EIA. During the scoping phase, the project's potential impacts are identified, and the scope of the assessment is determined. Baseline data collection is carried out to establish the existing environmental, social, and economic conditions in the project area. Scoping also involves stakeholder consultations and public hearings to gather input and address concerns.

Impact Assessment: The EIA study assesses the project's potential impacts on various environmental components, such as water resources, aquatic ecosystems, biodiversity, air quality, soil erosion, and social aspects. The

assessment includes the analysis of direct and indirect impacts, both during the construction and operation phases. Special attention is given to sensitive habitats, endangered species, and cultural heritage sites in the project area. The study also evaluates the potential socio-economic impacts on local communities, including displacement, livelihoods, and socio-cultural aspects.

Mitigation and Management Plan: Based on the impact assessment, a comprehensive mitigation and management plan is developed. It includes measures to minimize, mitigate, or compensate for the identified adverse impacts. For example, fish passages or fish ladders may be incorporated to facilitate fish migration, and measures to restore or create alternative habitats can be proposed. The plan may also address social impacts through the provision of livelihood restoration programs, community development initiatives, and stakeholder engagement strategies. Environmental monitoring and management protocols are established to ensure compliance and adaptive management during the project's lifecycle.

Public Consultation: The EIA process emphasizes public participation and the engagement of affected communities and stakeholders. Public consultations are conducted at various stages, including scoping, impact assessment, and review of the draft EIA report. The objective is to provide information, solicit feedback, and address concerns raised by the public. The project proponent and regulatory authority ensure that the public has access to project-related information and that their inputs are considered in the decision-making process.

Decision-Making: The regulatory authority reviews the EIA report, including public feedback, and assesses the project's environmental clearance. The decision is based on the adequacy and quality of the EIA study, the effectiveness of the proposed mitigation measures, and compliance with relevant environmental regulations. The authority may grant environmental clearance with specific conditions, reject the project, or request additional information or modifications.

Challenges and Considerations:

Hydropower projects often have cumulative impacts on river systems and ecosystems. It is essential to consider the cumulative effects of multiple projects

in the region, especially in terms of altered hydrological regimes, downstream impacts, and the overall ecological integrity of the river basin.

5.5. EIA Case study of Thermal power project

This case study focuses on the EIA process of a thermal power project in India. Thermal power projects, which primarily rely on fossil fuels such as coal or gas, have significant environmental and social impacts. The case study highlights key aspects of the EIA process and provides examples of challenges and considerations specific to thermal power projects.

The thermal power project under review is a coal-fired power plant located in a coastal region in India. The proposed capacity is 1,200 megawatts (MW), and the project involves the construction of a power plant, coal storage facilities, cooling systems, transmission lines, and associated infrastructure. The objective is to meet the increasing demand for electricity in the region and contribute to the country's energy needs.

EIA Process:

Screening and Scoping:

The project proponent submits the project proposal to the regulatory authority responsible for screening projects under the EIA notification. The authority determines the project's category based on factors such as capacity, location, and potential impacts. In the case of a thermal power project of this scale, it falls under Category A, requiring a comprehensive EIA. During the scoping phase, the potential environmental and social impacts of the project are identified. Baseline data is collected to assess the existing environmental conditions, including air quality, water resources, land use, and ecosystems. Stakeholder consultations, including public hearings, are conducted to gather input and address concerns. The EIA study assesses the potential impacts of the thermal power project on various environmental components. For example

" Air Quality: The study evaluates the potential emissions of pollutants, such as particulate matter, sulfur dioxide, nitrogen oxides, and greenhouse gases. It considers the potential impacts on ambient air quality and the associated health and ecological risks."

Water Resources: The assessment examines the project's water requirements for cooling systems and potential impacts on local water sources, including surface water bodies and groundwater. It evaluates the potential for water pollution through coal ash disposal or effluent discharge

Land Use and Biodiversity: The study analyzes the potential loss of land due to project infrastructure and its impacts on local biodiversity, including habitats, flora, and fauna. It considers the need for land reclamation or rehabilitation measures.

Mitigation and Management Plan:

Based on the impact assessment, a comprehensive mitigation and management plan is developed. It includes measures to minimize, mitigate, or compensate for the identified adverse impacts. For example:

Air Pollution Control: The plan may include the installation of air pollution control technologies, such as electrostatic precipitators, flue gas desulfurization systems, and selective catalytic reduction systems, to reduce emissions of pollutants.

Water Management: The plan may propose water conservation measures, recycling and reuse of wastewater and installation of pollution control systems for effluent treatment.

Land and Biodiversity Conservation: The plan may involve the development of greenbelt areas, habitat restoration, or compensation through afforestation or conservation initiatives.

Public Consultation: The EIA process emphasizes public participation and engagement of affected communities and stakeholders. Public consultations are conducted at various stages, including scoping, impact assessment, and review of the draft EIA report. The objective is to provide information, solicit feedback, and address concerns raised by the public. The project proponent and regulatory authority ensure that the public has access to project-related information, and their inputs are considered in the decision-making process.

Decision-Making:

The regulatory authority reviews the EIA report, including public feedback, and assesses the project's environmental clearance. The decision is based on the adequacy and quality of the EIA study, the effectiveness of the proposed mitigation measures, and compliance.

5.6. Salient features of 2006 amendments to EIA notification

The 2006 amendments to the Environmental Impact Assessment (EIA) Notification in India introduced several significant changes to the EIA process.

Expansion of Project Categories: The 2006 amendments expanded the categories of projects that require environmental clearance. It introduced two categories: Category A for projects with potential significant environmental impacts and Category B for projects with lesser impacts. The inclusion of Category B projects aimed to ensure better environmental regulation and monitoring.

Project Screening and Categorization: The amendments provided a detailed procedure for project screening and categorization. It defined thresholds and criteria for categorizing projects into Category A or B based on their capacity, scale, and potential environmental impacts. This categorization determines the level of scrutiny and assessment required for the project.

Public Consultation: The amendments emphasized the importance of public participation in the EIA process. They mandated the conduct of public consultations during the scoping, appraisal, and post-clearance stages of the project. The amendments specified the requirements for public notice, disclosure of project information, and the mechanisms for gathering public feedback and concerns.

Appraisal Process: The amendments established a centralized system for project appraisal. The Expert Appraisal Committees (EACs) were formed at the national and state levels to conduct detailed assessments of projects falling under Category A. The EACs comprise experts from various disciplines who review the EIA reports, conduct site visits, and provide recommendations for environmental clearance.

Timeframes and Timelines: The amendments introduced specific timeframes and timelines for different stages of the EIA process. They set deadlines for the submission of EIA reports, public consultation processes, appraisal by EACs, and decision-making by the regulatory authorities. These timelines aimed to ensure a more efficient and time-bound clearance process.

Baseline Data Collection: The amendments emphasized the importance of collecting baseline data as a crucial component of the EIA process. They specified the requirements for collecting comprehensive data on environmental parameters, including air quality, water quality, soil quality, biodiversity, and socio-economic aspects. Baseline data serves as a basis for assessing project impacts and formulating mitigation measures.

Monitoring and Compliance: The amendments strengthened the provisions for post-clearance monitoring and compliance. They mandated the submission of periodic compliance reports by project proponents and set up a monitoring mechanism to ensure adherence to the clearance conditions. The amendments also introduced provisions for public participation in monitoring and reporting project-related environmental violations.

Capacity Building and Expertise: The amendments recognized the need for building expertise and capacity in the EIA process. They emphasized the training and capacity building of professionals involved in the preparation of EIA reports, appraisal committees, and regulatory authorities. The amendments aimed to improve the quality of assessments, enhance understanding of environmental issues, and promote effective decision-making.

These salient features of the 2006 amendments to the EIA Notification in India aimed to strengthen the EIA process, enhance transparency, and improve environmental governance. They introduced clearer guidelines, public participation, and stricter monitoring to ensure better environmental management and sustainable development.

Environmental Impact Assessment (EIA) regulation in India is a critical tool for assessing and managing the potential environmental and social impacts of development projects. The EIA process in India is governed by the Environmental Impact Assessment Notification, which has undergone several amendments over

the years to strengthen environmental governance and ensure sustainable development. Here is a summary of the EIA regulation in India.

The EIA regulation in India aims to identify and evaluate the potential impacts of development projects on the environment, public health, and local communities. It covers a wide range of projects, including industrial, infrastructure, mining, and thermal power projects. The EIA process begins with project screening and categorization based on capacity, scale, and potential impacts. Projects falling under Category A require a comprehensive EIA, while those in Category B undergo a more streamlined process.

Key features of the EIA regulation include public participation, baseline data collection, impact assessment, mitigation measures, and monitoring. Public consultation is an integral part of the EIA process, ensuring that affected communities and stakeholders have a say in project decision-making. The regulation emphasizes the collection of baseline data to assess the existing environmental conditions and evaluate project impacts. Impact assessment involves studying potential impacts on various environmental components such as air quality, water resources, biodiversity, and social aspects.

Mitigation measures are developed to minimize, mitigate, or compensate for the identified adverse impacts. These measures may include pollution control technologies, water conservation strategies, habitat restoration, and community development programs. The EIA regulation also highlights the importance of post-clearance monitoring to ensure compliance with environmental clearance conditions and the effective implementation of mitigation measures.

The 2006 amendments to the EIA Notification introduced new concepts such as cumulative impact assessment, public hearings, environmental management plans, and post-clearance monitoring. These amendments aimed to enhance the effectiveness, transparency, and stakeholder engagement in the EIA process. The regulation also recognizes the role of digital technology in facilitating project documentation, online consultations, and information dissemination.

To enforce the EIA regulation, regulatory authorities at the central and state levels are responsible for reviewing EIA reports, conducting appraisals, and

granting environmental clearances. Expert Appraisal Committees (EACs) comprising multidisciplinary experts play a crucial role in evaluating EIA reports and providing recommendations.

These new concepts and provisions introduced in the 2006 amendments to the EIA Notification in India aimed to address the emerging challenges, improve stakeholder engagement, and strengthen environmental management in the EIA process. They reflect the evolving understanding of environmental issues and the need for more comprehensive and participatory approaches to environmental impact assessment.

5.7. Summary

The EIA regulation in India provides a structured framework for assessing and managing the environmental impacts of development projects. It promotes sustainable development, ensures public participation, and strives to strike a balance between economic growth and environmental conservation. However, ongoing efforts are needed to address challenges, improve the effectiveness of the EIA process, and align it with emerging environmental concerns and international best practices. The EIA process in India is governed by the Environmental Impact Assessment Notification, which has undergone several amendments over the years to strengthen environmental governance and ensure sustainable development. Here is a summary of the EIA regulation in India: To enforce the EIA regulation, regulatory authorities at the central and state levels are responsible for reviewing EIA reports, conducting appraisals, and granting environmental clearances. Expert Appraisal Committees (EACs) comprising multidisciplinary experts play a crucial role in evaluating EIA reports and providing recommendations. The 2006 amendments expanded the categories of projects that require environmental clearance. It introduced two categories: Category A for projects with potential significant environmental impacts and Category B for projects with lesser impacts. The inclusion of Category B projects aimed to ensure better environmental regulation and monitoring. The amendments emphasized the importance of public participation in the EIA process. They mandated the conduct of public consultations during the scoping, appraisal, and post-clearance stages of the project.

5.8. Terminal questions

Q.1. What is the EIA regulation? Discuss the EIA regulation of India.

Answer:----------

Q.2. Discuss the EIA challenges in India.

Answer:----------

Q.3. Write the current status of EIA in India.

Answer:----------

Q.4. Discuss the case study of EIA of hydropower plant.

Answer:----------

Q.5. Discuss the case study of EIA of thermal power plant.

Answer:----------

Q.6. Write the silent feature of EIA notification 2006.

Answer:----------

5.9. Further suggested readings

1. S.R. Khandeshwar, N.S. Raman and A.R. Gajbhiye , Environmental Impact Assessment, Dreamtech Press-2019.
2. Anjaneyulu Yerramilli, Environmental Impact Assessment Methodologies, BS Publications-2020.
3. George Alex, Environmental Impact Assessment (EIA), Blue Rose Publishers-2020.
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5. N. Maheshwara Swamy, Text Book on Environmental Law, Asia Law House-2022

UNIT 6: LIFE CYCLE ASSESSMENT

Contents

6.1. Introduction

Life cycle assessment (LCA) is a comprehensive environmental accounting tool with well-established procedures and methods that are governed by specific rules and standards, most notably developed by the International Organization for Standardization (ISO).Life Cycle Assessment is a method defined by standards ISO EN 14040 and 14044 to analyze environmental aspects and impact of product systems.

Objectives:

- To understand the life cycle assessment (LCA)
- To study the advantages and disadvantages of LCA
- To understand the steps in the LCA methodology
- To study the Flow of materials-cost criteria
- To study the ISO 14000

6.2. Life Cycle Assessment (LCA)

Definition

The name life cycle assessment, (LCA)was derived from the German term Ökobilanz, in the sense of "ecological balance" or later was initially used in a study by the Environmental Confederation Agency of Switzerland. This study had a great influence on the issue, especially in German speaking countries and from here, results the colloquial expression which is more adequately termed ***Life Cycle Assessment*** in English.

In the introductory part of International Standard ISO 14040LCA is defined as follows:

"A life cycle assessment (LCA, also known as life cycle analysis, eco-balance) is a technique for a product related estimation of environmental aspects and impact, LCA assesses each and every impact associated with all stages of a process from cradle-to-grave (i.e., from raw materials through materials processing, manufacture, distribution, use, repair, maintenance, and disposal or recycling."

Life Cycle Assessment is a methodology used for quantifying sustainability. In general LC is a systematic analysis of environmental impact over the course of the entire life cycle of a product, material, processes or other measurable activity. Life-Cycle Assessment (LCA) is also called Life-Cycle Analysis – is a tool for examining the total environmental impact of a product through every step of its life – from obtaining raw materials all the way through making it in a factory, shipping it, selling it in a store, using it in the workplace or at home, and disposing of it.

When an LCA is performed, a practitioner will set metrics to quantify the different **inputs** (e.g., energy, water, resources, land) and **outputs** (e.g., emissions, wastes, products) that occur throughout the life cycle of an industrial process, technology, or commodity. It allows an assessor to map flows of energy, resources, and materials in and out of a system. These are objective measurements, tracking distinct quantities like volume, mass, or weight. They are collected as part of the **life cycle inventory (LCI)**.

The LCI data is interpreted later in the study, during the **life cycle inventory assessment (LCIA)**, to represent actual impacts on the environment or

human health. For example, certain volume of petroleum may be used to produce one plastic fork. This is recorded in the LCI. In the LCIA, this measurement is used to calculate how much this contributes to global warming.

LCA is standardized in the International Standards Organisation (ISO) 14040 series. Typical types of systems boundaries include:

a. Cradle-to-gate: From raw material extraction to factory gate.

b. Cradle-to-grave: From raw material extraction through product use and disposal.

c. Gate-to-Gate: From one defined point along the life cycle (e.g., where incoming raw materials cross the fence-line of a manufacturing site) to a second defined point further along the life cycle (e.g., where a finished product is delivered to an end user)

Who is to performs LCA?

Life cycle assessment (LCA) of a product is performed by a team of professionals with expertise in various fields such as sustainability, environmental science, engineering, and product design. This interdisciplinary team works together to evaluate the environmental impact of a product over its entire life cycle, from raw material extraction, production, use, and disposal. The team performs the LCA by collecting and analyzing data, applying mathematical models and simulation tools, following internationally recognized standards, such as ISO 14040and 14044. The team can be composed of internal staff members of a company, consultants, or a combination of both.

6.3. Types of LCA

a. Cradle-to-grave

Cradle-to-grave is the complete LCA starting from raw material extraction ('cradle') to use phase and disposal phase ('grave'). All inputs and outputs are reflected for all the stages of the life cycle.

b. Cradle-to-gate

Cradle-to-gate is an assessment of partial life cycle of a product from raw material extraction (cradle) to the factory gate (before it is transporting to the consumer). The use phase and disposal phase of the product are omitted in this case.

c. Cradle-to-cradle or closed loop production

Cradle-to-cradle is a kind of cradle-to-grave assessment, where the end-of-life disposal step for the product is a recycling process. This method minimizes the environmental impact of products by employing sustainable production, operation, and disposal practices.

d. Gate-to-gate

Gate-to-gate is a partial LCA considering only one value-added process in the entire production chain. Gate-to-gate modules may also later be associated with their appropriate production chain to form a complete cradle-to-gate evaluation.

e. Well-to-wheel

Well-to-wheel is the LCA used for transport fuels and automobiles. The analysis is often fragmented down into stages entitled "well-to-station", or "well-to-tank", and "station-towheel" or "tank-to-wheel", or "plug-to-wheel". The first stage that involves feedstock or fuel production, processing and fuel delivery or energy transmission, is known as the "upstream" stage, while the stage dealing with vehicle operation is often called the "downstream" stage. Then, the well-to-wheel analysis is frequently used to evaluate total energy consumption, or the energy conversion efficiency and emission influence of marine vessels, aircraft and automobiles.

f. Economic input-output life cycle assessment

Economic input–output LCA (EIOLCA) involves the use of sector wise aggregated data on the quantum of environmental impact that can be imposed on the environment by each sector of the economy.

6.4. Methodologies of LCA

Life cycle assessment (LCA) is a systematic approach to evaluate the environmental impact of a product or service over its entire life cycle. There are several methodologies used to perform an LCA, including:

Cradle-to-Grave (C2G) Methodology: This is the traditional approach to LCA, which considers all stages of a product's life cycle from the extraction of raw materials to the disposal of the product at the end of its life.

Cradle-to-Gate (C2G) Methodology: This methodology focuses on the environmental impact of a product from the extraction of raw materials to the production stage, before the product is released to the market.

Gate-to-Gate (G2G) Methodology: This methodology focuses on the environmental impact of the production process, excluding the extraction of raw materials and the disposal of the product.

Cut-off Methodology: This approach involves excluding certain stages or impacts that are deemed insignificant, in order to simplify the LCA process.

Hybrid Methodology: This approach combines different methodologies to address specific needs and requirements of the LCA study.

The choice of methodology depends on the specific goals and objectives of the LCA, as well as the available data and resources. The most widely used methodology is the Cradle-to-Grave (C2G) Methodology, as it provides a comprehensive and holistic view of the environmental impact of a product over its entire life cycle.

6.5. Steps involved in lifecycle assessment methodology

The steps of a typical Life Cycle Assessment (LCA) methodology can be summarized as follows:

Step 1- Defining the scope of the study(ISO14040): This includes identifying the goal and objectives of the LCA, the functional unit, the system boundaries, and the time frame.

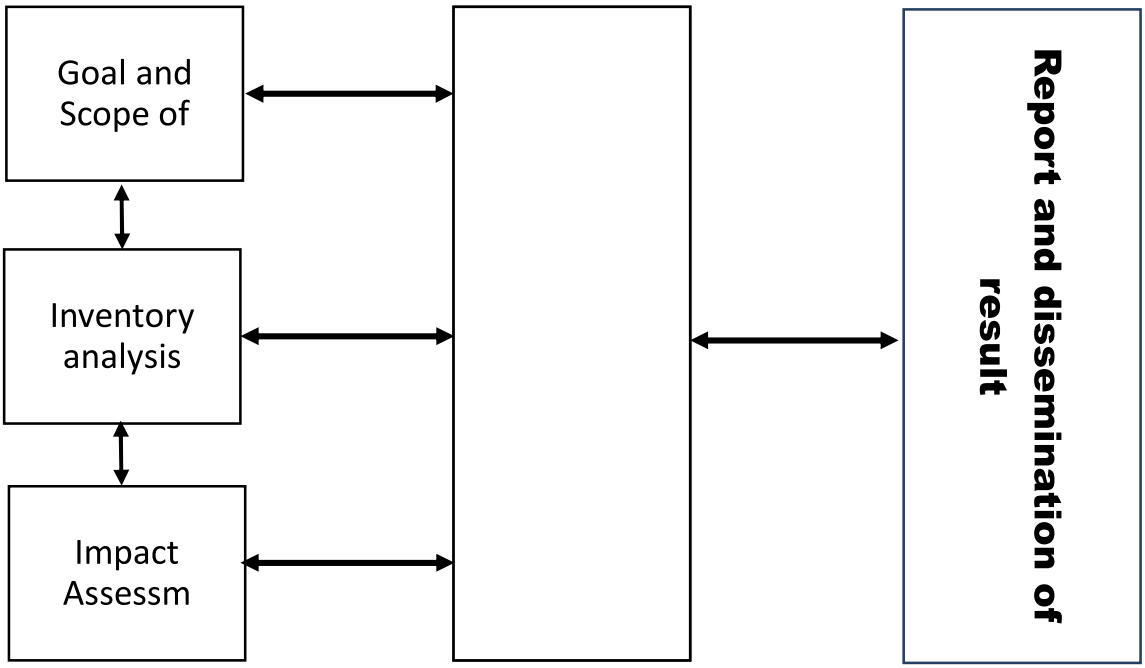
Step 2- Life cycle inventory analysis (LCI) (ISO14041): This involves collecting and compiling data on the inputs and outputs of a product or service over its entire life cycle. This includes data on raw material extraction, production, use, and disposal.

Step 3- Life cycle impact assessment (LCIA) (ISO14042): This involves evaluating the environmental impact of the product or service based on the data collected in the LCI. This involves applying a set of impact categories and indicators to assess the impact on the environment, such as climate change, resource depletion, and toxicity.

Step 4- Interpretation of results (ISO14043): This involves presenting the results of the LCIA in a meaningful and comprehensive way, including a critical evaluation of the assumptions, limitations, and uncertainties of the study.

Step 5- Reporting and dissemination of results: This involves summarizing the findings of the LCA in a report and disseminating the results to relevant stakeholders, including the public, policymakers, and industry.

Note that these steps may vary slightly depending on the specific LCA methodology being used and the goals and objectives of the study. However, the general steps outlined above provide a basic framework for conducting an LCA.



Step 1: Defining the scope and objective of the life cycle assessment (LCA)

It is a crucial first step in the LCA process. The scope and objective of an LCA determine the level of detail, data collection, and analysis required to perform the assessment.

The scope of the LCA defines the boundaries of the product system to be evaluated. This includes defining the product and its components, the life cycle stages to be considered, and the geographic and temporal boundaries of the assessment.

The objective of the LCA defines the purpose of the assessment, such as answering specific questions about the environmental impact of a product, comparing the environmental performance of different products, or identifying areas for improvement in the product system.

Defining the scope and objective of an LCA helps to ensure that the assessment is focused, relevant, and appropriate for the intended purpose, and that the results of the assessment can be used to support informed decision-making. It's important to involve stakeholders in the definition of the scope and objective of the LCA, as this helps to ensure that the assessment addresses their needs and interests, and that the results are relevant and useful to them.

The following six basic decisions should be made at the beginning of the LCA process to make effective use of time and resources:

- Define the goal(s) of the project
- Determine what type of information is in need in additional form to decision-makers
- Determine the required specificity
- Determine how the data should be organized and the results displayed
- Define the scope of the study
- Determine the ground rules for performing the work

Step 2: Life Cycle Inventory

The inventory analysis is the second step in the life cycle assessment (LCA) process. During this step, data is collected and analyzed to identify the inputs and outputs of the product system over its entire life cycle.

The inventory analysis involves the following steps:

a) Process mapping: This involves creating a diagram or flowchart of the product system, including all the life cycle stages and the inputs and outputs associated with each stage.

b) Data collection: This involves gathering data on the inputs and outputs of the product system, such as raw material consumption, energy consumption, emissions, and waste generation. Data can be obtained from various sources, including company records, industry databases, and published studies.

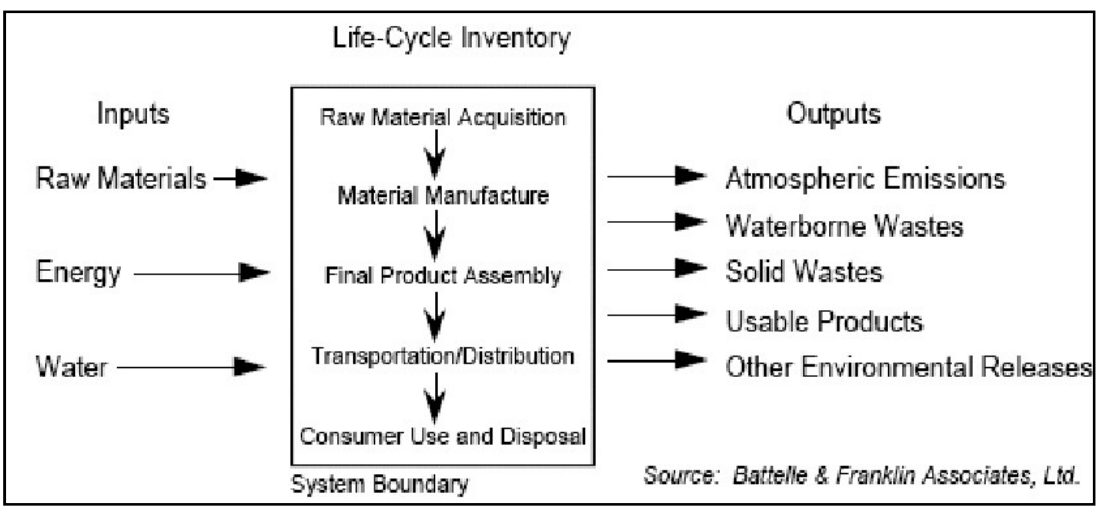
c) Data analysis: This involves analyzing the data collected during the data collection phase, in order to estimate the environmental impact of the

product system. This can include calculations such as mass balances, energy balances, and emissions inventories.

d) Uncertainty analysis: This involves assessing the uncertainty associated with the data and results of the inventory analysis, and determining the level of confidence in the results. The quality and accuracy of the inventory analysis is crucial for the reliability of the LCA results. It's important to use high-quality data, and to be transparent and rigorous in the analysis and interpretation of the results. The inventory analysis provides the foundation for the impact assessment step of the LCA, and is used to determine the environmental impact of the project.

In the lifecycle inventory phase of an LCA, all relevant data is collected and organized, as shown in figure [1] below.
Without an LCI, no basis exists to evaluate comparative environmental impacts or potential improvements. The level of accuracy and detail of the data collected is reflected throughout the remainder of the LCA process.

Fig1: Life Cycle Inventory



Life cycle inventory analyses can be used in various ways. They can assist an organization in comparing products or processes and considering environmental factors in material selection. In addition, inventory analyses can be used in policy-making, by helping the government develop regulations regarding resource use and environmental emissions. EPA's1993 document, "Life-Cycle Assessment: Inventory Guidelines and Principles," and 1995 document, "Guidelines for Assessing the Quality of Life Cycle Inventory Analysis," provide the framework for performing an inventory analysis and assessing the quality of

the data used and the results. The two documents define the following four steps of a life cycle inventory:

- Envelop a flow diagram of the processes being evaluated.
- Develop a data collection plan.
- Collect data.
- Evaluate and report results.

Step 3: Life Cycle Impact Assessment (LCIA)

The impact assessment is the third step in the life cycle assessment (LCA) process. During this step, the environmental impact of the product system is evaluated, based on the data collected during the inventory analysis.

The impact assessment involves the following steps:

A. **Impact categories selection:** This involves selection of the environmental impact categories to be evaluated, such as

- Climate change (contribution to global warming)
- Acidification (contribution to the occurrence of acid rain)
- Energy (cumulative energy demand and loss throughout a life cycle)
- Eutrophication (the release of nitrogen and phosphorous, which leads to algal blooms)
- Radiation
- Land use
- Air pollution
- Resource depletion
- Water use
- Ecotoxicity(the release of toxins that are harmful to life)

B. **Characterization:** This involves converting the data from the inventory analysis into environmental impact values, using characterization factors. These factors are used to convert the inputs and outputs of the product system into impact values, such as kg CO2-equivalent, kg SO2-equivalent, or kg PO4-equivalent.

C. **Normalization:** This involves expressing the impact values in a common unit, in order to enable comparison between different impact categories and different products.

D. **Weighting:** This involves assigning relative importance to different impact

categories, in order to prioritize and focus attention on the areas of highest impact.

E. **Interpretation:** This involves interpreting the results of the impact assessment, in the context of the specific objectives of the LCA. This can involve identifying areas of high impact, and making recommendations for improvement in the product system.

The impact assessment provides valuable insights into the environmental impact of a product system over its entire life cycle, and is a crucial tool for informed decision-making about product design and sustainability.

Step 4: Life Cycle Interpretation

The interpretation and conclusion is the final step in the life cycle assessment (LCA) process. Lifecycle interpretation is a systematic technique to identify, quantify, check, and evaluate information from the results of the LCI and the LCIA, and communicate them effectively. During this step, the results of the impact assessment are interpreted, and conclusions are drawn about the environmental impact of the product system. ISO has defined the following two objectives of life cycle interpretation:

- Analyze results, reach conclusions, explain limitations, and provide recommendations based on the findings of the preceding phases of the LCA, and to report the results of the life cycle interpretation in a transparent manner.
- Provide readily understandable, complete, and consistent presentation of the results of an LCA study, in accordance with the goal and scope of the study.(ISO1998b)

The interpretation and conclusion involves the following steps:

A. **Interpretation:** This involves reviewing the results of the impact assessment, and identifying areas of high environmental impact, as well as areas where the product system could be improved. The results of the LCA can be compared with other products or systems, in order to assess their relative environmental performance.

B. **Validation:** This involves reviewing and verifying the results of the LCA, and ensuring that they are accurate, credible, and relevant to the specific objectives of the LCA.

C. **Conclusion:** This involves drawing conclusions about the environmental

impact of the product system, based on the results of the LCA. This can include recommendations for improvement in the product system, and suggestions for further research or analysis.

D. **Communication**: This involves sharing the results and conclusions of the LCA with stakeholders, in a clear and accessible format. This can involve presenting the results in a report, creating visual aids, or hosting a workshop or meeting to discuss the results.

Step 5:Reporting and dissemination of results:

The reporting and dissemination of results is the final stage of the life cycle assessment (LCA) process. It involves presenting the results of the LCA in a clear and accessible format, and sharing them with stakeholders and decision-makers who are interested in the environmental impact of the product system.

The reporting and dissemination process can involve the following steps:

A. **Report preparation:** This involves compiling the results of the LCA into a comprehensive report, including a description of the product system, the methods used in the LCA, the results of the inventory analysis, impact assessment, and interpretation and conclusion.

B. **Visual aids**: This involves creating visual aids, such as graphs and charts, to help illustrate the results of the LCA and to make them more accessible to a wider audience.

C. **Presentations:** This involves presenting the results of the LCA to stakeholders and decision-makers, either in person or through virtual means, in order to facilitate discussion and understanding of the results.

D. **Dissemination:** This involves sharing the results of the LCA with stakeholders and decision-makers, through a variety of channels, such as reports, presentations, workshops, and public databases.

The reporting and dissemination process is crucial for ensuring that the results of the LCA are accessible and useful to stakeholders and decision-makers, and for promoting informed decision-making about product design and sustainability.

It's important to be transparent and rigorous in the impact assessment, and to involve stakeholders in the interpretation and validation of the results, in order to ensure that the results are reliable and relevant to their needs and interests.

6.6. Advantages of LCA

The results of an LCA can help businesses, policymakers, and other organizations make more informed decisions to advance towards sustainability. It provides critical data that can support the following:

- Process and Product-Design Improvement
- Marketing (e.g., backing up environmental claims or meeting consumer demand for green products)
- Hot-spot analysis to facilitate continuous improvement
- Third-party verification or certification
- Method for quantifying key environmental impacts (e.g., greenhouse gas, carbon emissions, water use, and energy consumption)
- Goal-setting for climate-change and other sustainability policies
- Companies can claim one product is better than another.
- LCA inventory process helps to narrow in on the area where the biggest reductions in environmental emissions can be made.
- LCA can be used to reduce production costs.
- Results of an LCA may qualify the product for an eco-label.

6.7. Drawbacks of LCA

- Comparative analysis may not provide good comparisons
- Energy matrices may not be relevant to process or product.
- LCA may rely on generalized data sets
- Recycling adds complexity to an LCA.
- LCA typically does not include an analysis of support personnel requirements, nor the energy and wastes associated with research and development, sales, and administrative personnel or related activities.
- An LCA typically does not provide information about employee direct impacts. Travel to and from work, travel for work and lunchroom waste, for example, is typically not included in the LCA study.

6.8. Flow of materials-cost criteria

Life cycle assessment (LCA) is a method for evaluating the environmental impacts of a product, process, or service from cradle to grave. In the context of

LCA, the flow of materials can also be evaluated in terms of cost criteria. Some common cost criteria used in LCA include:

Total life cycle cost (LCC):

The Total Life Cycle Cost (LCC) is a comprehensive method of evaluating the cost of a product, process, or service over its entire life cycle, from cradle to grave. It includes all costs associated with the production, use, and disposal of the product, including:

A. **Procurement cost:** The cost of acquiring the materials, equipment, and labor required to produce the product.
B. **Manufacturing cost:** The cost of producing the product, including direct labor, materials, and overhead.
C. **Transportation cost:** The cost of shipping the product from the manufacturer to the end user, as well as any internal transportation costs.
D. **Operating cost:** The cost of using the product, including energy, maintenance, and repairs.
E. **Disposal cost:** The cost of disposing of the product at the end of its life, including recycling, landfill, or other disposal methods.

The total life cycle cost provides a comprehensive view of the costs associated with a product, and can help organizations make informed decisions about product design, sourcing, and manufacturing. By considering the entire life cycle of a product, the total life cycle cost can help organizations minimize costs, reduce environmental impacts, and make more sustainable products.

6.9. Embodied energy cost

Embodied energy cost is a cost criterion used in life cycle assessment (LCA) to evaluate the cost of the energy used in the production and transportation of a material. It refers to the total amount of energy required to extract, process, manufacture, transport, and dispose of a product, including the energy used in the production of raw materials and the energy used in manufacturing and transportation. The embodied energy cost is expressed in units of energy (e.g. joules or BTUs) and can be converted into monetary units based on the cost of energy.

Embodied energy cost is a crucial factor in LCA because the production and use of energy can have significant environmental impacts, such as greenhouse

gas emissions, air and water pollution, and resource depletion. By considering the embodied energy cost of a product, organizations can make informed decisions about product design, sourcing, and manufacturing to minimize energy use and reduce environmental impacts.

It's important to note that the embodied energy cost of a product can vary depending on factors such as the source of energy, the efficiency of the manufacturing process, and the method of transportation. As a result, organizations may need to consider multiple options and trade-offs to determine the most environmentally-friendly and cost-effective option.

6.10. Greenhouse gas emissions cost

Greenhouse gas emissions cost is a cost criterion used in life cycle assessment (LCA) to evaluate the cost of the greenhouse gas emissions associated with the production and transportation of a material. It refers to the total amount of greenhouse gases emitted over the entire life cycle of a product, including emissions from the extraction and processing of raw materials, manufacturing, transportation, use, and disposal. The greenhouse gas emissions cost is expressed in units of greenhouse gas emissions (e.g. CO2 equivalents) and can be converted into monetary units based on the cost of carbon.

Greenhouse gas emissions cost is a crucial factor in LCA because greenhouse gas emissions have significant environmental impacts, such as climate change, ocean acidification, and changes in precipitation patterns. By considering the greenhouse gas emissions cost of a product, organizations may be informed of decisions about product design, sourcing, and manufacturing to minimize emissions and reduce environmental impacts.

It's important to note that the greenhouse gas emissions cost of a product can vary depending on factors such as the source of energy, the efficiency of the manufacturing process, and the method of transportation. As a result, organizations may need to consider multiple options and trade-offs to determine the most environmentally-friendly and cost-effective option.

6.11. Water usage cost

Water usage cost is a cost criterion used in life cycle assessment (LCA) to evaluate the cost of the water used in the production and transportation of a material. It refers to the total amount of water required to extract, process, manufacture, transport, and dispose of a product, including the water used in the production of raw materials and the water used in manufacturing and transportation. The water usage cost is expressed in units of water (e.g. liters or gallons) and can be converted into monetary units based on the cost of water.

Water usage cost is a crucial factor in LCA because the use of water can have significant environmental impacts, such as water scarcity, water pollution, and changes in water flow patterns. By considering the water usage cost of a product, organizations can make informed decisions about product design, sourcing, and manufacturing to minimize water use and reduce environmental impacts.

It's important to note that the water usage cost of a product can vary depending on factors such as the availability of water, the efficiency of the manufacturing process, and the method of transportation. As a result, organizations may need to consider multiple options and trade-offs to determine the most environmentally-friendly and cost-effective

6.12. Resource depletion cost

Resource depletion cost is a cost criterion used in life cycle assessment (LCA) to evaluate the cost of the resources used in the production and transportation of a material. It refers to the total amount of resources used over the entire life cycle of a product, including the resources used in the extraction and processing of raw materials, manufacturing, transportation, use, and disposal. The resource depletion cost is expressed in units of resources (e.g. pounds or kilograms) and can be converted into monetary units based on the cost of the resources.

Resource depletion cost is a crucial factor in LCA because the extraction and use of resources can have significant environmental impacts, such as habitat destruction, resource scarcity, and soil degradation. By considering the resource depletion cost of a product, organizations may be informed decisions about

product design, sourcing, and manufacturing to minimize resource use and reduce environmental impacts.

It's important to note that the resource depletion cost of a product can vary depending on factors such as the availability of resources, the efficiency of the manufacturing process, and the method of transportation. As a result, organizations may need to consider multiple options and trade-offs to determine the most environmentally-friendly and cost-effective option.

These cost criteria can be used in LCA case studies to determine the most environmentally-friendly and cost-effective method of material flow. For example, in a product LCA case study, the total life cycle cost criteria may be used to determine the most cost-effective method of transporting a product from a manufacturing plant to a retail store. In a supply chain LCA case study, the greenhouse gas emissions cost criteria may be used to determine the most environmentally-friendly method of transporting raw materials from a supplier to a manufacturing plant.

It's important to note that in LCA, multiple cost criteria are often considered and trade-offs may need to be made between them. For example, reducing the embodied energy cost may increase the greenhouse gas emissions cost, or reducing the water usage cost that may increase the resource depletion cost.

6.13. ISO 14000

ISO 14000 is a series of international standards for environmental management and sustainability. It provides a framework for organizations to systematically manage their environmental responsibilities and minimize their impact on the environment. The ISO 14000 standards are developed and published by the International Organization for Standardization (ISO), a non-governmental organization that provides globally recognized standards.

The ISO was formed in 1947, which is based in Geneva, Switzerland to develop global technical standards for engineering and industrial parts and processes. It is the world’s largest developer of standards. It promotes the international harmonization and development of manufacturing, product and communications standards. ISO has laid down more than 11000 standards ranging from paper sizes to film speeds and out of which about 350 are for the monitoring

of such aspects like air, water and soil.All ISO standards are voluntary in nature. They are developed in response to market demands that ensure that ensure widespread applicability of these standards and are developed by technical committees.

The ISO 14000 family of standards covers a wide range of topics, including environmental management systems, life cycle assessment, environmental labels and declarations, and the integration of environmental considerations into product design and development.

ISO 14001:2015, the main standard in the ISO 14000 family, is a widely adopted international standard for environmental management systems. It provides a systematic approach for organizations to identify and manage their environmental impacts, set environmental objectives and targets, and monitor and improve their performance over time. Organizations that implement ISO 14001 are able to demonstrate their commitment to sustainability and environmental responsibility to their stakeholders.

The ISO 14000 standards are intended for organizations of all sizes and sectors, including private companies, public sector organizations, and non-profit organizations. They are flexible and can be applied to any organization, regardless of its size, location, or type of activity.

In summary, ISO 14000 provides a comprehensive framework for organizations to manage their environmental responsibilities and minimize their impact on the environment. Implementing ISO 14000 helps organizations to improve their environmental performance, comply with relevant environmental regulations and legislation, and demonstrate their commitment to sustainability and environmental responsibility.

The ISO 14000 family of standards includes the following standards:

ISO 14001: 2015 - Environmental management systems - Requirements with guidance for use

ISO 14004:2016 - Environmental management systems - General guidelines on implementation.

ISO 14015:2001 - Environmental assessment of sites and organizations.

ISO 14040:2006 and ISO 14044:2006 - Life cycle assessment - Requirements and guidelines.

ISO 14050:2012 - Environmental labels and declarations - Vocabulary

ISO 14062:2020 - Environmental management - Integrating environmental aspects into product design and development.

The ISO 14001 standard, in particular, provides a framework for companies and organizations to systematically manage and minimize their environmental impact. It outlines the principles of environmental management, including life cycle thinking, risk-based approaches, and the need for continual improvement. Companies and organizations that implement the ISO 14001 standard are able to demonstrate their commitment to sustainability and environmental responsibility to stakeholders.

ISO 14000 can be applied to:

ISO 14000 is intended for organizations of all sizes and sectors, including private companies, public sector organizations, and non-profit organizations. It can be applied to any organization, regardless of its size, location, or type of activity.

Examples of organizations that may benefit from implementing ISO 14000 include:

A. **Manufacturing companies:** Manufacturers can use ISO 14000 to improve their environmental performance, reduce waste and emissions, and comply with environmental regulations.
B. **Service industries:** Service industries, such as hotels, restaurants, and transportation companies, can use ISO 14000 to minimize their environmental impact and improve their sustainability practices.
C. **Public sector organizations:** Government agencies, schools, and hospitals can use ISO 14000 to demonstrate their commitment to sustainability and environmental responsibility and to comply with environmental regulations.
D. **Non-profit organizations:** Non-profit organizations can use ISO 14000 to demonstrate their commitment to sustainability and environmental responsibility to their stakeholders and to improve their environmental performance.
E. **Supply chain organizations:** Organizations that are part of a supply chain can use ISO 14000 to demonstrate their commitment to sustainability and environmental responsibility to their suppliers and customers.

6.14. ISO 14000 policy

The following are some key components of an ISO 14000 policy:

a. **Environmental objectives and targets**: The policy should include a clear statement of the organization's environmental objectives and targets, such as reducing its carbon footprint, improving resource efficiency, or reducing waste.
b. **Commitment to compliance:** The policy should include a commitment to comply with relevant environmental laws and regulations, and to continuously improve the organization's environmental performance.
c. **Stakeholder involvement:** The policy should acknowledge the importance of involving stakeholders, such as employees, customers, and suppliers, in the organization's environmental efforts.
d. **Continuous improvement:** The policy should commit the organization to continuous improvement of its environmental performance, and to regularly reviewing and updating its EMS to ensure it remains relevant and effective.
e. **Emergency response**: The policy should include a commitment to plan and prepare for potential environmental emergencies, and to respond effectively in the event of an incident.

The ISO 14000 policy should be communicated to all employees and stakeholders, and be publicly available, such as on the organization's website. It should also be reviewed and updated regularly to ensure it remains relevant and effective.

In summary, an ISO 14000 policy is a key component of an organization's environmental management system, and sets out the organization's commitment to environmental responsibility and sustainable practices. The policy provides a framework for the organization to implement its environmental objectives and targets and to continuously improve its environmental performance.

6.15. BENEFITS OF IMPLEMENTING ISO 14000

Implementing ISO 14000 can bring a number of benefits to organizations, including:

a. **Improved Environmental Performance:** The ISO 14000 standards provide a systematic approach for organizations to identify and manage their

environmental impacts, set environmental objectives and targets, and monitor and improve their performance over time. This can lead to reduced waste, lower energy consumption, and improved resource efficiency.

b. **Enhanced Reputation and Credibility:** Implementing ISO 14000 demonstrates an organization's commitment to sustainability and environmental responsibility, which can enhance its reputation and credibility with stakeholders, including customers, investors, and regulators.
c. **Increased Cost Savings:** By reducing waste, conserving resources, and improving environmental performance, organizations can achieve cost savings through reduced costs for waste disposal, energy, and raw materials.
d. **Better Compliance with Environmental Regulations:** Implementing ISO 14000 can help organizations to comply with relevant environmental regulations and legislation, reducing the risk of fines and other penalties.
e. **Improved Risk Management:** ISO 14000 provides a systematic approach for organizations to identify and assess environmental risks and opportunities, and to develop strategies to manage them. This can improve an organization's overall risk management and help it to avoid potential environmental liabilities.
f. **Increased Employee Engagement:** Implementing ISO 14000 can increase employee engagement in environmental issues and encourage them to adopt more sustainable behaviors, both in and outside of work.
g. **Improved Market Access:** Organizations that implement ISO 14000 may have greater access to new markets and customers, as sustainability and environmental responsibility become increasingly important factors in purchasing decisions.

6.16. Summary

Life Cycle Assessment, or LCA, analyses the environmental impacts associated with products, or product systems. It has its origins in the early seventies; LCA type studies were performed in some countries, particularly in Sweden, the UK, Switzerland and the USA. In the 1970’s, the USEPA redefined the methodology for evaluation of environmental impacts of products and these were popularly known as resource and environmental profile analysis (REPA).

The method had its roots in energy and waste management, and the products upon which analysis was executed in this initial period were beverage containers and diapers. In the early 1980s assessments of product life cycle experienced a second life through studies of Environmental Sciences Paper 12 Environmental Management Module 17 Life Cycle Assessment (LCA) the environmental loadings and the potential impacts of beverage containers (e.g., beer cans, milk bottles) performed in various European countries.

Implementing ISO 14000 can bring a range of benefits to organizations, including improved environmental performance, enhanced reputation and credibility, increased cost savings, better compliance with environmental regulations, improved risk management, increased employee engagement, and improved market access.

6.17. Terminal questions

Q.1: What is Flow of materials-cost criteria? How it is helpful in life cycle assessment?

Answer:----------

Q.2: What is lifecycle assessment? Describe its advantages and disadvantages.

Answer:----------

Q.3: Describe the steps involved in life cycle assessment methodologies.

Answer:----------

Q.4: How do lifecycle inventory is prepared?

Answer:----------

Q.5: What is ISO 14000? To whom it may applied?

Answer:----------

Q.6: Define ISO 14000 family standards? Describe its benefits of implementing.

Answer:----------

6.18. Further readings

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SBSEVS-02

Environmental Impact Assessment and Legislation

Block- 3

Environmental Management, Act and Polices

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Introduction

This third block of environmental impact assessment and legislation, this consists of following three units:

Unit-3: This unit covers the environmental management. The environmental appraisal, environmental impact statement (EIS), environmental management plan (EMP), environmental audit; sustainable development are discussed in this unit.

Unit-4: This unit describes the Environmental Act. Environmental laws and protection acts, existing provision of central and state government on environment protection, the Environment (protection) act (1986), the water act (1974), the air act (1981), and wild life act (1972) discussed here.

Unit-5: This unit covers the guidelines and policies for control of environmental pollution, Environmental Policy of India, solid and hazardous waste management, handling and management rules.

Unit-7: Environmental Management

Contents

7.1 Introduction

For environmental management to be effective and systematic it must be within the existing limitation of knowledge

1. Visualize all process (natural and artificial) in total preparative

2. Recognize and understand any processes or problems in the structure and its components, interrelationships.
3. Be able to manipulate or otherwise deals with the inter dependencies characterizing the process or operation as whole.
4. Be able to design, build and operate the management system which would serve as a means to manage the as a whole.

Environment most essential part of our day to day life. It is the sum total of all these external forces, influences and conditions, which affect the life, nature, behavior and the growth of living organisms. The environmental management employs three concepts:

1. **System approach:** a procedure which recognize the relationship between natural and manmade structure between system and analysis, and management techniques, and critical role of human factor.
2. **System analysis**: a technical problem formulation, issue definition and part insight. It concerns itself with finding solution to a problem and does not concerns, itself with applying those solutions. It consists of techniques that can used to find solutions.
3. System management: consists of actual techniques of management for solving problems and prescribe a measurable path to achieve stated environmental objections. Three categories Environmental management offers us a better livelihood by ensuring proper management in different sector of our life. Environmental management promotes physical, social and economic environment of the enterprise or project. It encourages planned investment at the start of the production chain rather than forced investment in cleaning up at the end. The increasing population and the resulting demand have imposed variety of stress on the dynamic equilibrium between man and the environment.

Environmental Impact Assessment (EIA) is a tool used to assess the significant effects of a project or development proposal on the environment. EIAs make sure that project decision makers think about the likely effects on the environment at the earliest possible time and aim to avoid, reduce or offset those effects. This ensures that proposals are understood properly before decisions are made. To deal with the environmental problems environmental management and

scientist must relate to hierarchical prescription by human society, which can impede achievement of optimum decisions. The basic components of this framework are environment, disruptions, effects, (human) ecosystem engineering, technology and legal controls. Integration and proper balance of these components results in effective environmental management.

Objectives

- To understand the environmental management system
- To study about the Environmental impact statement
- To study the steps involved in environmental appraisal
- To understand how to achieve sustainable development goal
- To study process of environmental audit

7.2 Environmental appraisal

There are numerous factors that affect the organization and its operations. These factors can influence the organization in both positive as well as negative ways. Identifying the issues and challenges existing in the external environment it is extremely important for an organization. In order to identify the factors in external environment, an appraisal process of the industry's environment is necessary. Environmental appraisal facilitates the managers with the ability to study the competitive structure and competitive position of the organization along with the position of its competitors. By analyzing and appraising the external environment, the existing opportunities and threats can be identified. It is the responsibility of the managers to avoid the threats and to reap the benefits from the opportunities in the market. Environmental appraisal also helps the managers in analyzing the effects of globalization on the level of competition within a particular industry.

Environmental appraisal refers to the process of evaluating the potential environmental impact of a proposed project or development. It typically involves identifying and assessing the potential environmental risks and impacts associated with a project, such as those related to air and water quality, wildlife and habitat, land use, and cultural and historical resources. The objective of environmental appraisal is to ensure that potential environmental impacts are taken into account

when making decisions about a project, and to minimize or mitigate these impacts where possible.

7.2.1 Levels/Components of Environmental Appraisal

The management of environmental requires the following steps:

1. An analysis of environmental situation, behavior and integrations of various components of including man.
2. A study of dynamics of boundary conditions for understand thresholds (outer limits)
3. The setting of socio-economic and environmental goals for specific objectives.
4. Formulation of a balanced program for the evolution manmade and natural components of the environment.
5. The developmental criteria for evaluating and ranking programs e.g. equality, economic efficiency, reduction in dependence administrative cost effect on political structure etc.
6. The promotion guideline and supervision of such a program which include the continuous monitoring, of economic- ecological and social impacts (outputs) of program.

By analyzing the external environment of a business the marketers are able to identify and highlight the opportunities from the threats and strengths from the weaknesses. The factors which are not dependent on organization and their existence is not based on the activities of the organisation are called as external factors. While strengths and weaknesses are internal. opportunities and threats are external and are not in control of the organisation. Opportunities are those situations that the organizations can use to their advantage. While threats are those negative situations that if not tackled promptly can harm the well-being of the theorganisation. Analyzing the external environment requires analyzing following areas:

7.2.1.1 Environmental Scanning:

In environmental scanning the broad environmental factors are analyzed and studied.

1. Physical factors (water, air, land, minerals and fossil fuels, tidal process, climate, chemical and geological process etc.).

2. Biological factors or resources (animals, wildlife, vegetation, flora etc. food webs specific ecosystem etc.)
3. The man made factors (town, roads, field etc.) urban infrastructure, transportation and communication systems, and agricultural economic etc.
4. Social factors or resources (social groups, political groups, cultural groups, social and political structure, legal structure etc.

These factors are not a part of the organisation's internal environment and hence are uncontrollable in nature. These factors influence the businesses in a significant manner. These factors are a part of the macro environment or the general environment. The common macro environmental factors are economic, political, legal, technological, social, etc.

7.2.1.2 Industry Analysis:

Industry analysis is a tool which is used to assess the degree of competition and complexity within a particular industry. With the help of industry analysis, the marketers study and scrutinize the macro environmental factors that influence a particular industry. Industrial analysis helps the strategic leaders formulate various strategies to neutralize the threats and reap the benefits from the opportunities. Various environmental forces to be studied in the industry analysis are the bargaining power of buyers and suppliers, position of business and competitors. and threats of new entrants as well as the substitutes within the industry.

7.2.1.3 Competitive Analysis:

While appraising the external environment, it is very important to analyse the strengths and weaknesses of the existing and probable competitors. It helps the organisation to formulate the strategies required to survive and succeed in the highly competitive environment. It also outlines the strategies adopted by the competitors. The influence of competition is directly proportional to the degree of concentration in the industry, i.e., if the concentration of the industry is high, the influence of competition is high, and vice versa. Competitive analysis helps the organisations in identifying threat sand opportunities by providing defensive and offensive strategic moves.

7.2.2 Process of environmental appraisal

The process of environmental appraisal can be divided into several stages, including:

(i) Scoping: The first step in the environmental appraisal process is to define the scope of the project and identify the key environmental issues that need to be considered.

(ii) Baseline studies: Baseline studies are used to gather information about the existing environmental conditions in the project area. This information is used to identify potential environmental impacts and to assess the impact of the project on the environment.

(iii) Impact assessment: The next step is to assess the potential environmental impacts of the project. This may involve modeling the impact of the project on air and water quality, wildlife and habitat, and other environmental factors.

(iv) Mitigation: If the environmental appraisal identifies potential impacts, the next step is to identify measures that can be taken to minimize or mitigate these impacts. This may include changes to the project design, construction methods, or operations.

(v) Monitoring and follow-up: Finally, the environmental impact of the project is monitored over time to ensure that the impacts are being effectively managed and mitigated.

Environmental appraisal is an important step in the decision-making process for any development project. It helps to ensure that potential environmental impacts are fully understood and taken into account, and that appropriate measures are put in place to minimize or mitigate these impacts.

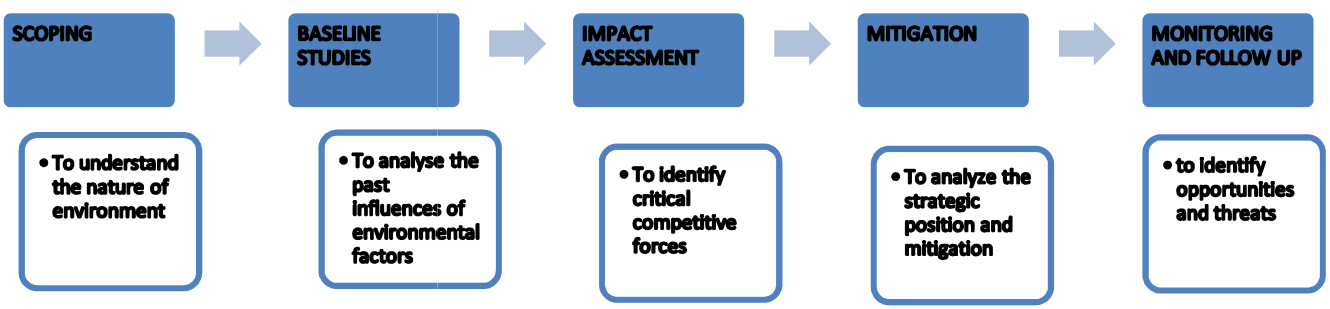

Figure:7.1 Steps involved in Environmental Appraisal

7.2.2.1 Stage 1: Scoping

Scoping is the first step in the environmental appraisal process. It involves defining the scope of a proposed project and identifying the key environmental issues that need to be considered.

Scoping helps to ensure that the environmental appraisal process is focused and comprehensive, for study and evaluation ensure all relevant environmental issues that are taken into account while making decisions about a project.

During the scoping process, the following tasks are typically carried out:

a) **Project definition:** The first step is to clearly define the proposed project, including its location, size, and purpose. This helps to establish the boundaries of the project and the area that will be studied during the environmental appraisal process.

b) **Identification of key issues:** The next step is to identify the key environmental issues that need to be considered. This may include issues related to air and water quality, wildlife and habitat, cultural and historical resources, and other environmental factors.

c) **Determination of the level of detail required**: The level of detail is required for the environmental appraisal and will depend on the nature and scale of the project, as well as on the potential environmental risks and impacts associated with it.

d) **Preparation of a scoping report:** The final step in the scoping process is to prepare a scoping report that summarizes the project definition, key issues, and level of detail required for the environmental appraisal.

Scoping is a critical step in the environmental appraisal process, as it helps to ensure that all relevant environmental issues are taken into account and that the environmental appraisal process is comprehensive and focused.

7.2.2.2 Stage 2. Baseline studies

Baseline studies are an important part of the environmental appraisal process. They are used to gather information about the existing environmental conditions in the project area, and provide a baseline against which the environmental impact of the project can be measured.

Baseline studies typically include the following components:

a) Collection of data: The first step in a baseline study is to gather data about the existing environmental conditions in the project area. This may include data on air and water quality, wildlife and habitat, and other environmental factors.

b) Analysis of data: The collected data is then analyzed to identify any potential environmental impacts that may result from the project. This analysis is used to assess the impact of the project on the environment and to determine if any mitigation measures are required.

c) Identification of baselines: Based on the analysis of the data, the baseline conditions for each relevant environmental factor are established. These baselines serve as the reference point against which the environmental impact of the project can be measured.

d) Preparation of a baseline report: The final step in a baseline study is to prepare a report that summarizes the findings and establishes the baseline conditions for each relevant environmental factor.

Baseline studies are important because they provide a snapshot of the existing environmental conditions in the project area, and serve as the reference point for assessing the environmental impact of the project. By collecting and analyzing data about the existing environment, baseline studies help to ensure that all relevant environmental issues are taken into account while making decisions about a project.

7.2.2.3 Stage 3. Impact assessment

The environmental impact assessment process is redefined to integrate biological impacts, social and community impacts, as well as technical and economic impacts into a comprehensive and holistic process which relates human aspiration to biological limitation as well as technical and economic realities. This process permits decision makers to determine whether certain development is acceptable, and to avoid or mitigate adverse effects. It also requires that decision maker be made more accountable to the public for a particular action. Impact assessment is a key component of the environmental appraisal process. It involves evaluating the potential environmental impacts of a proposed project, and determining the significance of these impacts. The objective of impact assessment is to identify

any potential risks or impacts to the environment and to ensure that they are taken into account while making decisions about the project.

Impact assessment typically involves the following steps:

a) **Identification of potential impacts**: The first step is to identify all potential environmental impacts that may result from the project.
   - Description of the existing environmental system.
   - Determination of the components of the project
   - Definition of environmental modified by the project (including all components of projects)

   This may include impacts related to air and water quality, wildlife and habitat, land use, and cultural and historical resources.

b) **Prediction of impacts:** Once the potential impacts have been identified, the next step is to predict the magnitude and extent of these impacts.
   - Identification of environmental modifications that may be significant.
   - Forecasting of the quality and /or spatial dimensions of change in environment identified.
   - Estimation of the probability that the impact (environmental change) will occur (time period)

   This may involve the use of computer models or other analytical tools to simulate the impact of the project on the environment.

c) **Evaluation of impacts:** The predicted impacts are then evaluated to determine their significance.
   - Determination of the incidence of costs and benefits to user group and population effected by the project**.**
   - Specification and comparison of the trade off (costs or effects benign balanced) between various alternatives.

   This may involve assessing the impact on human health, the environment, and cultural or historical resources, and determining whether the impacts are acceptable or if mitigation measures are needed.

d) **Preparation of an impact assessment report:** The final step is to prepare an impact assessment report that summarizes the findings and conclusions of the impact assessment. This report is used to inform decision-makers about the

potential environmental impacts of the project to help and guide the development of mitigation measures if needed.

e) Impact assessment is an important part of the environmental appraisal process, as it helps to ensure that potential environmental impacts are fully understood and taken into account when making decisions about a project. By evaluating the potential impacts of a project, impact assessment helps to minimize or mitigate these impacts and to ensure that the project is developed in an environmentally sustainable manner.

7.2.2.4 Stage 4: Mitigation

Mitigation is the process of reducing or eliminating the negative environmental impacts of a project. It involves taking steps to minimize or eliminate the impact of a project on the environment and to ensure that the project is developed in an environmentally sustainable manner.

Mitigation may involve a range of measures, including:

a) **Design changes:** One of the most effective ways to mitigate the environmental impacts of a project is to make changes in the design of the project. For example, the project may be re-routed to avoid sensitive areas, or the project design may be modified to minimize its impact on air and water quality.

b) **Best management practices:** Best management practices (BMPs) are techniques and methods that can be used to reduce the environmental impact of a project. For example, BMPs for water management may include measures to reduce runoff and prevent soil erosion, while BMPs for air quality may involve controlling emissions from construction equipment and vehicles.

c) **Monitoring and enforcement:** Ongoing monitoring and enforcement of environmental regulations and standards can help to ensure that the environmental impact of a project is minimized and that mitigation measures are effective.

d) **Compensation and restoration:** In some cases, it may be necessary to compensate for the environmental impact of a project by restoring or enhancing affected areas. This may involve creating new wildlife habitats, planting trees, or restoring cultural or historical resources.

Mitigation is an important part of the environmental appraisal process, as it helps to minimize or eliminate the environmental impact of a project.

7.2.2.5 Stage 5: Monitoring and follow-up

Monitoring and follow-up is an important part of the environmental appraisal process. It involves ongoing monitoring of the environmental impact of a project, and taking corrective action if necessary to ensure that the project is being developed in an environmentally sustainable manner.

Monitoring and follow-up typically involves the following steps:

a) **Monitoring of environmental conditions:** Ongoing monitoring of environmental conditions in the project area is critical to ensure that the project is having the desired environmental impact. This may involve monitoring of air and water quality, wildlife populations, and other environmental factors to assess the impact of the project on the environment.

b) **Implementation of mitigation measures:** Monitoring also helps to ensure that mitigation measures are being implemented and planned so that they are effective in reducing the environmental impact of the project.

c) **Assessment of progress:** Regular assessments of progress are made to evaluate the success of the mitigation measures and to ensure that the project is being developed in an environmentally sustainable manner.

d) **Correction of problems:** If problems are identified during monitoring, the corrective action is taken to address them. This may involve revising the mitigation measures, taking additional steps to reduce the environmental impact of the project, or modifying the project design if necessary.

e) **Preparation of follow-up reports:** Regular follow-up reports are prepared to summarize the findings of the monitoring and to provide information about the progress of the project and the effectiveness of the mitigation measures.

Monitoring and follow-up is important because it helps to ensure that the project is being developed in an environmentally sustainable manner and that the environmental impact of the project is being monitored and addressed. By taking steps to monitor the environmental impact of the project to rectify problems, monitoring and follow-up helps to ensure the project that is developed in a responsible and sustainable manner, and that the long-term environmental goals and objectives are met.

7.3 Environmental Impact Statement (EIS)

An Environmental Impact Statement (EIS) is a document that provides an analysis of the potential environmental impacts of a proposed project or action, along with information about alternatives and measures to mitigate adverse effects. EISs are typically prepared for large-scale development projects such as highways, dams, mines, or major commercial developments, and are often required by federal and state agencies under the National Environmental Policy Act (NEPA) in the United States.

The purpose of an EIS is to provide decision-makers and the public with information about the environmental consequences of a proposed project, so that they can make informed decisions about whether to proceed with the project and what conditions should be imposed to minimize environmental harm. An EIS typically includes a description of the proposed project, an analysis of the impacts of the project on various aspects of the environment (such as air and water quality, wildlife, and cultural resources), an assessment of alternatives to the project, and an evaluation of the potential environmental benefits and costs of the project.

The EIS process is an important tool for balancing the economic, social, and environmental considerations associated with development projects, and helps to ensure that projects are planned and carried out in a way that minimizes harm to the environment and promotes sustainability

7.3.1 Key features of environmental impact statement-

Environmental impact statements are reports that discuss the potential impact on the environment of proposed federal government projects. Environmental impact statements are available on the Environmental Protection Agency (EPA) website. An EIS must include a reasonable range of alternatives to the proposed action, as well as their consequences. An EIS is different from an environmental assessment, a shorter report that may lead to an EIS. The public can weigh in on environmental impact statements when they are in the draft stage. The general features of impact statement are:

1. Description of proposed action, project purposes and environmental setting

2. Relation of the proposed action to land to land use plants, policies and controls for the affected area
3. Probable impact of the proposed action on the environment.
4. Alternative to proposed action
5. Any adverse environmental effects that connote be avoided**.**
6. Relationships between local short-term uses of the human environment and the maintenance and enhancement of long-term productivity.
7. Any irreversible and irreversible commitments of resources that would be involved in the proposed actions should be implemented.
8. An indication of other interest and considerations are through to affect the adverse environmental effects of the proposed action.

7.3.2 Understanding Environmental Impact Statements

Environmental impact statements are required by Section 102(2) (C) of the National Environmental Policy Act of 1969 and are reviewed by the **Environmental Protection Agency** (EPA).The public may comment on an EIS while it is in its draft stage, and the comments may be taken into consideration when the EIS is being finalized.

All EISs are published in the Federal Register and available online at the EPA's website. All current EISs in the draft stage are also available. The environmental agency makes statements available after they have been finalized. Historical EISs, dating back to 1969, can be found at Northwestern University's Transportation Library.

In addition to outlining proposed actions, an Environmental Impact Statement (EIS) also outlines possible alternatives and the potential environmental impacts of the proposed alternatives. Some states, such as California, have adopted similar requirements for their taxpayer-funded projects.

7.3.3 Components of an Environmental Impact Statement

According to the EPA, the components of an EIS are as follows:

- **Cover sheet**: including the name of the lead agency and any cooperating agency
  - Agency contact information
  - The title of the proposed action and its location
  - A paragraph abstract of the EIS

- The date when comments must be received.

➢ **Summary**: A summary of the EIS, including the major conclusions, area of disputed issues, and the issues to be resolved.

➢ **Table of Contents**: Assists the reader in navigating through the EIS.

➢ **Purpose and need statement**: Explains why the agency is proposing the action and what the agency expects to achieve.

➢ **Alternatives**: Consideration of a reasonable range of alternatives that can accomplish the purpose and need of the proposed action.

➢ **Affected environment**: Describes the environment of the area to be affected by the alternatives under consideration.

➢ **Environmental consequences**: A discussion of the environmental effects and their significance.

➢ **Submitted alternatives, information, and analyses:** A summary that identifies all alternatives, information, and analyses submitted by state, tribal, and local governments and other public commenter's for consideration during the scoping process or in developing the final EIS.

➢ **List of preparers**: A list of the names and qualifications of the persons who were primarily responsible for preparing the EIS.

7.3.4 When Is an Environmental Impact Statement Required?

Any major project that uses federal land, federal funding, or that is under the jurisdiction of a federal agency must include an assessment of that project's environmental effects. This does not always require a full EIS, In some cases, a smaller project might only require a shorter environmental assessment. In other cases, there might be a finding of "no significant impact" (FONSI), allowing the project to proceed.

7.3.5 Who Prepares an Environmental Impact Statement?

An EIS must be filed by the federal agency in charge of the project in question. Agencies often outsource this work to contractors.

7.3.6 Process of Environmental Impact Statement (EIS)

The process of preparing an Environmental Impact Statement (EIS) typically includes several stages:

a) Initiation: The lead agency, such as a federal or state agency, determines that an EIS is needed for a proposed project. The agency then

publishes a Notice of Intent to prepare an EIS, which announces the beginning of the EIS process and invites public participation.

b) Scoping: The lead agency holds public meetings and solicits input from interested parties to determine the scope and content of the EIS. This stage is used to identify the key issues and potential environmental impacts of the project that will be addressed in the EIS.

c) Preparation: The lead agency prepares a draft EIS, which is reviewed by other federal and state agencies and made available for public review and comment. The EIS should include a detailed description of the proposed project, a discussion of the potential environmental impacts of the project, and an evaluation of alternatives and mitigation measures.

d) Review and Comment: The lead agency provides an opportunity for public review and comment on the draft EIS. The lead agency must consider all comments received and respond to them in a Final EIS.

e) Final EIS: The lead agency prepares a Final EIS, which includes a response to all comments received during the review and comment period. The Final EIS is used as the basis for the lead agency's decision on whether to approve or deny the proposed project, and if approved, what conditions should be imposed to minimize environmental harm.

f) Decision: Based on the Final EIS and other relevant information, the lead agency makes a decision, whether to approve or deny the proposed project. The decision may include conditions to minimize environmental harm, such as requirements for monitoring and reporting, or for implementing mitigation measures.

g) Implementation: If the proposed project is approved, the lead agency ensures that the approved project is implemented in accordance with the terms and conditions set forth in the EIS and any other relevant permits and agreements.

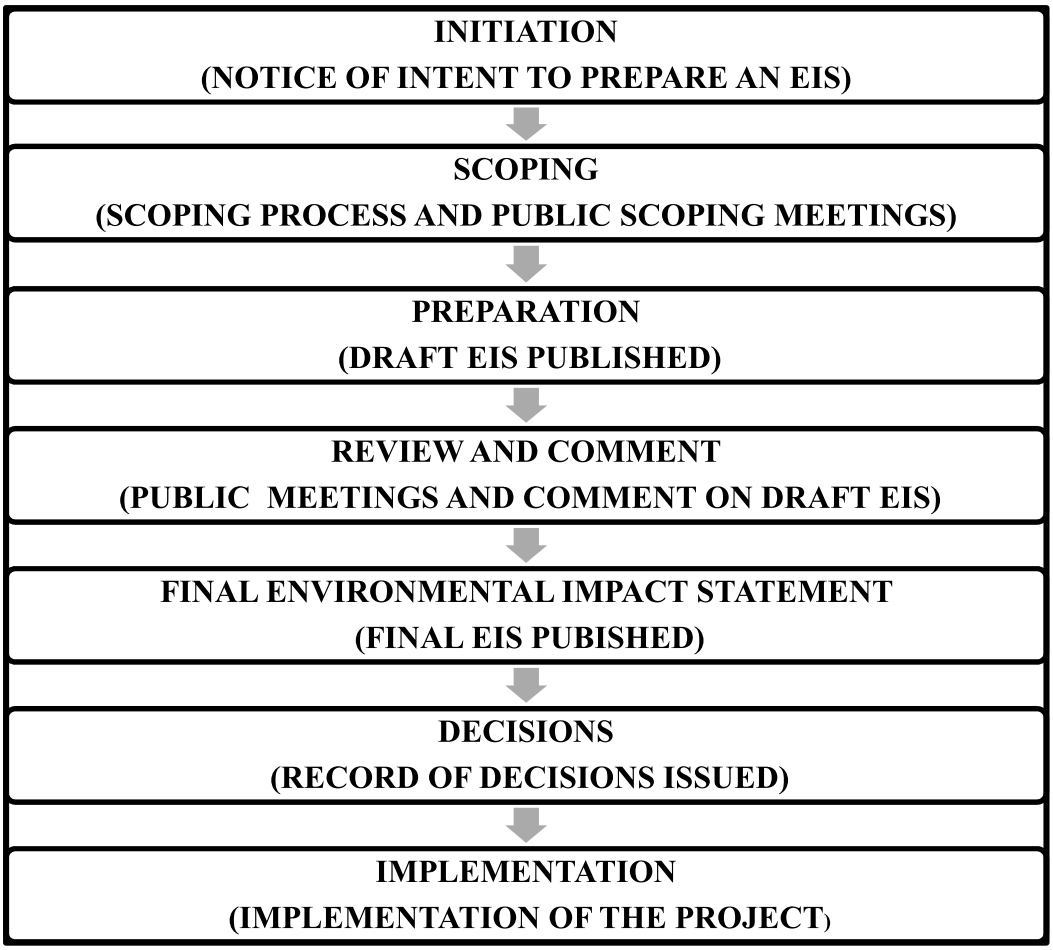

Figure 7.2.: Process of Preparation of Environmental Impact Statement

The EIS process is intended to provide a thorough evaluation of the environmental impacts of a proposed project, to provide opportunities for public input and review, and to promote transparency and accountability in the decision-making process.

7.3.7 Benefits of Environmental Impact Statement (EIS)

The Environmental Impact Statement (EIS) process provides several benefits, including:

(i) Transparency: The EIS process provides a detailed analysis of the potential environmental impacts of a proposed project, which allows decision-makers and the public to make informed decisions about the project. The process also promotes transparency and accountability by providing opportunities for public review and comment on the EIS.

(ii) Environmental Protection: The EIS process helps to minimize the environmental harm caused by proposed projects by requiring a detailed

analysis of the potential impacts and providing opportunities to consider alternatives and mitigation measures. This helps to ensure that projects are planned and carried out in a way that is environmentally responsible.

(iii)Compliance: EISs are often required by federal and state agencies under the National Environmental Policy Act (NEPA) in the United States. Preparing an EIS helps project sponsors comply with NEPA and other environmental regulations.

(iv)Improved Planning: The EIS process provides an opportunity for comprehensive planning and analysis of a proposed project, which can help to identify potential problems and resolve conflicts before the project begins. This can lead to more efficient and cost-effective project implementation.

(v) Public Involvement: The EIS process provides opportunities for public participation and input, which helps to build trust and support for a proposed project. This can be particularly important for controversial or high-profile projects.

(vi)Conflict Resolution: The EIS process can help to resolve conflicts and address concerns raised by various stakeholders, including environmental groups, local communities, and other affected parties.

Overall, the EIS process provides a comprehensive and transparent evaluation of the environmental impacts of proposed projects, which helps to ensure that the projects are carried out in an environmentally responsible and sustainable manner.

7.4 Environment Management Plan

An Environmental Management Plan (EMP) is a document that outlines the steps that a company, organization, or government agency will take to minimize the environmental impact of its operations and activities. The EMP should include a description of the potential environmental impacts of the proposed actions, an assessment of the risks and benefits of the proposed actions, and a plan for mitigating any negative environmental impacts.

An EMP typically covers a wide range of environmental concerns, such as air and water quality, waste management, energy use, and wildlife and habitat protection. The EMP should also include an implementation plan, which outlines

the steps that will be taken to put the EMP into practice, as well as a monitoring and reporting program, which will track the effectiveness of the EMP over time.

The purpose of an EMP is to provide a framework for managing and minimizing the environmental impact of an organization's activities, and to ensure that its operations are in compliance with relevant environmental regulations. An EMP can also help to promote environmental sustainability, improve environmental performance, and reduce the risk of environmental liability.

The development and implementation of an EMP is an ongoing process, and the EMP should be reviewed and updated regularly to ensure that it remains relevant and effective in addressing the environmental impacts of the organization's operations and activities.

7.4.1 Objectives of an Environmental Management Plan (EMP)

The objectives of an Environmental Management Plan (EMP) can vary depending on the specific needs and goals of an organization or project, but some common objectives include:

(i) **Compliance:** Ensure compliance with relevant environmental regulations, such as the National Environmental Policy Act (NEPA) in the United States or other environmental legislation.

(ii) **Environmental protection:** Minimize the environmental impact of an organization's operations and activities and protect the environment and natural resources.

(iii) **Sustainability:** Promote environmental sustainability and reduce the environmental footprint of an organization's operations and activities.

(iv) **Risk management:** Identify and assess the environmental risks associated with an organization's operations and activities, and implement measures to minimize these risks.

(v) **Stakeholder engagement:** Engage with stakeholders, including local communities, environmental organizations, and government agencies, to understand their environmental concerns and incorporate their feedback into the EMP.

(vi) Performance improvement: Improve the environmental performance of an organization's operations and activities and track progress over time.

(vii) Transparency and accountability: Provide transparency and accountability in the management of environmental impacts, and demonstrate the organization's commitment to environmental protection and sustainability.

Overall, the objectives of an EMP are to minimize the environmental impact of an organization's operations and activities, promote environmental sustainability, and ensure compliance with relevant environmental regulations. The EMP should be flexible and adaptable to changes in the organization's operations and activities, and be reviewed and updated regularly to ensure that it remains relevant and effective in achieving its objectives.

7.4.2 Process of developing Environmental Management Plan (EMP)

The process of developing an Environmental Management Plan (EMP) typically involves the following steps:

a) **Environmental assessment:** Conduct a preliminary environmental assessment to identify the potential environmental impacts of an organization's operations and activities. This assessment should consider factors such as air and water quality, waste management, energy use, and wildlife and habitat protection.

b) **Stakeholder engagement:** Engage with stakeholders, including local communities, environmental organizations, and government agencies, to understand their environmental concerns and incorporate their feedback into the EMP.

c) **Risk assessment:** Conduct a risk assessment to identify the environmental risks associated with an organization's operations and activities, and prioritize these risks based on their likelihood and severity.

d) **Mitigation planning:** Develop a plan for mitigating the environmental risks identified in the risk assessment. This may include implementing measures to reduce emissions, improve waste management, and protect natural resources.

e) **Implementation plan:** Develop an implementation plan that outlines the steps that will be taken to put the EMP into practice, including the allocation of resources and responsibilities, and the establishment of a monitoring and reporting program.

f) **Monitoring and reporting:** Establish a monitoring and reporting program to track the effectiveness of the EMP over time, and to identify any opportunities for improvement.

g) **Review and revision:** Regularly review and revise the EMP to ensure that it remains relevant and effective in addressing the environmental impacts of an organization's operations and activities.

Overall, the process of developing an EMP is an ongoing cycle of assessment, planning, implementation, and review. The EMP should be flexible and adaptable to changes in the organization's operations and activities, and be reviewed and updated regularly to ensure that it remains relevant and effective in achieving its objectives.

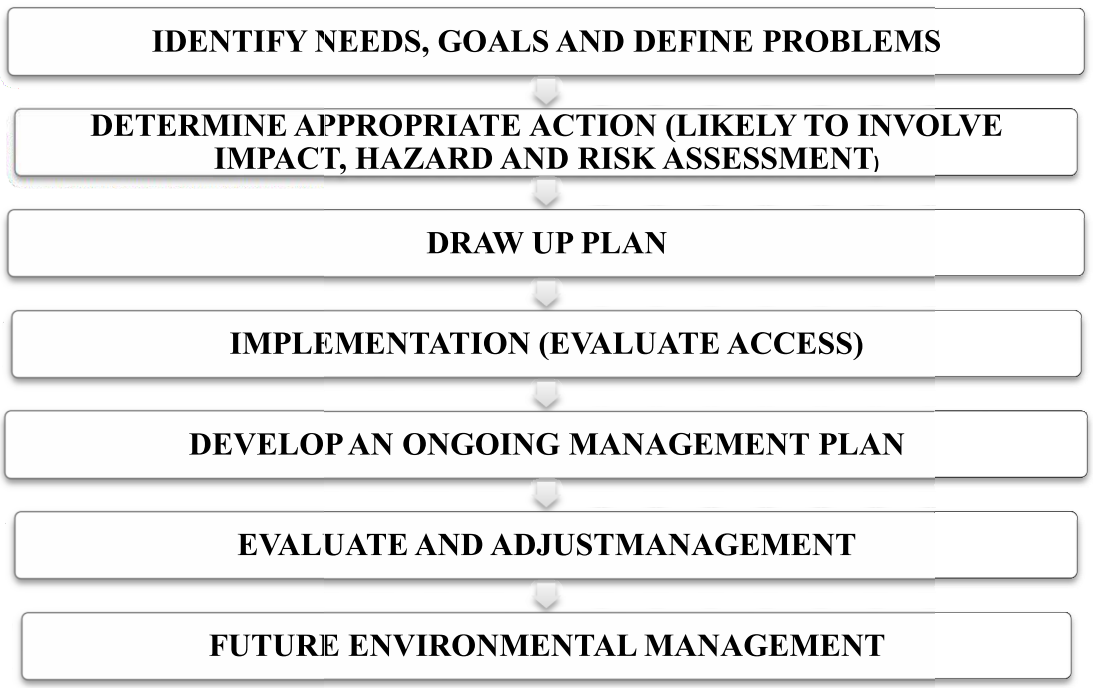

Figure7.3: A typical scheme of practice adopted for environmental management

7.5 Environmental Audit

An environmental audit is a systematic evaluation of an organization's operations, processes, and policies to assess its compliance with environmental regulations and to identify opportunities for improvement in environmental performance. The purpose of an environmental audit is to determine whether the organization is effectively managing its environmental risks and impacts, and to identify areas for improvement in environmental protection and sustainability.

An environmental audit typically covers a wide range of environmental concerns, such as air and water quality, waste management, energy use, and wildlife and habitat protection. The audit process may involve a review of relevant documentation, site inspections, and interviews with key personnel.

Environmental audit is a management tool comprising a systematic, documented periodic and objective evaluation of an organization performing functions of production within the mandated regulatory requirements.

The environmental audit studies serve the following three basic purposes.

(i) Compilation of the complete information on the operation of the industrial facility and its potential sources of pollution through technical inspection.

(ii) Evaluation of the conditions surrounding the industrial facility in order to estimate possible impacts which may be caused and suggested measures for such situations.

(iii) Preparation and implementation of action plans for better control of the environment and environmentally related industrial activities, including further developmental activities of the areas. The obvious advantages of environmental auditing is to help safeguard the environment and to substantiate compliance with local, regional and national laws and regulations, and with the company policy and standards.

The results of an environmental audit can be used to develop an Environmental Management Plan (EMP), which outlines the steps that an organization will take to minimize its environmental impact and to improve its environmental performance. The EMP should include a description of the environmental risks and impacts identified during the audit, an assessment of the

risks and benefits of proposed actions, and a plan for mitigating any negative environmental impacts.

7.5.1 Benefits of Environmental Audit

An environmental audit can help an organization to:

a) **Improve environmental performance:** Identify areas for improvement in environmental performance and implement measures to reduce environmental impacts.

b) **Comply with regulations:** Ensure compliance with relevant environmental regulations and avoid costly fines and penalties.

c) **Demonstrate environmental stewardship:** Demonstrate an organization's commitment to environment protection and sustainability, and enhance its reputation with stakeholders.

d) **Reduce environmental risks:** Identify and assess environmental risks, and implement measures to minimize these risks and reduce potential liability.

Overall, an environmental audit is an important tool for organizations to assess their environmental performance, identify areas for improvement, and promote environmental sustainability and protection.

7.5.2 Who can conduct environmental audit

Environmental audits can be conducted by a variety of organizations and individuals, including:

(i) **Internal audit teams:** Many organizations have internal audit teams that are responsible for conducting environmental audits. These teams are typically comprised of staff members with expertise in environmental management and compliance, and may include environmental specialists, engineers, and health and safety professionals.

(ii) **External auditors:** Some organizations choose to engage external auditors to conduct environmental audits. External auditors are typically independent consultants who specialize in environmental auditing, and can provide an objective and impartial assessment of an organization's environmental performance.

(iii) **Government agencies:** Government agencies may also conduct environmental audits as part of their regulatory and enforcement

responsibilities. For example, the Environmental Protection Agency (EPA) in the United States may conduct environmental audits of facilities that are subject to environmental regulations.

(iv) Non-government organizations: Non-government organizations (NGOs) may also conduct environmental audits as part of their advocacy and watchdog roles. For example, environmental advocacy groups may conduct audits of organizations to assess their compliance with environmental regulations and to identify opportunities for improvement in environmental performance.

Overall, the choice who conducts an environmental audit depends on the specific needs and goals of an organization, and may involve a combination of internal and external auditors, government agencies, and NGOs. The important thing is that the audit be conducted by an experienced and qualified auditor, who can provide an objective and impartial assessment of an organization's environmental performance.

7.5.3 Types of Audit Programs

The two main types of audit programs are:

A. Fixed Audit Program

B. Flexible Audit Program

A. Fixed Audit Program

A fixed audit program is a set of standardized instructions that need to be followed by the auditor while conducting the audit. It includes all possible audit procedures to be followed during the audit, although all of them may not be applicable to a situation. A fixed audit program aims to take care of every possible audit situation that may arise during an audit.

The disadvantage of the fixed audit program is that it is very rigid and nothing is left to the discretion of the audit team. Also, it is difficult to follow the same audit program even in the same organization over the years, as the conditions in the organization are likely to change.

B. Flexible Audit Program

A flexible audit program is one that does not prescribe the exact audit procedure to be followed by the auditors while conducting an audit. It simply gives an outline of the scope, nature and limitations of the audit assignment to be conducted. Also, the nature of work to be performed by each person of the audit staff

is not predetermined under it. The auditors decide most of the things as the work proceeds and the reliability of procedures and internal control system become known to the auditor.

Thus, it allows the auditor to develop, adapt and modify the program according to the situation. Also, there is a scope for some initiative by the audit staff if the situation so requires. However, it is possible that some important audit procedures may not be followed.

7.5.4 General Approach of Environmental Audit

The general approach covers three main phases:

(a) Collection of information

(b) Evaluation of information collected

(c) Formulation of conclusions including identification of aspects needing improvement. These phases cover, pre audit preparation, a site visit, normally involving interviews with persons and inspection of facilities and post visit activities.

7.5.5 Process of Environmental Audit

There are three main Environmental Audit Stages or Phases:

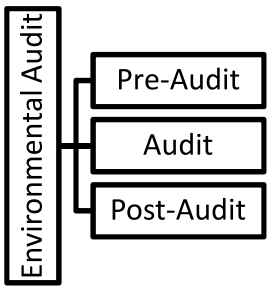

Figure7.4 : Stages of Environmental Auditing

Phase 1: The Pre-Audit

- ❖ Create the Audit Team, including a mixture of skills, talents and perspectives
- ❖ Create an Audit Plan
- ❖ Request and review documents, including:
- ❖ Permits or permit applications
- ❖ Production Records
- ❖ Reports

- ❖ Previous Audits including corrective actions and status of prior audit items
- ❖ Prepare a list of questions that regulators would ask, follow-up questions on prior to audits, and requests for additional materials needed
- ❖ Begin to fill-in the Disclosure of Violation Table as issues are identified

Phase 2: The Audit

- ❖ Set the ground rules
- ❖ Determine what happens which issues are identified
- ❖ Conduct daily meetings to keep everything informed
- ❖ Perform a document review:
- ❖ Policies
- ❖ Compliance
- ❖ Training
- ❖ Air/Water/Waste/Noise controls, monitoring and records
- ❖ Emergency Response Procedures
- ❖ Response to Complaints
- ❖ Check documents for completeness, consistency, legal compliance, and whether it's up to date
- ❖ Conduct a Site Inspection
- ❖ Evaluate Operations for Compliance
- ❖ Take samples if needed
- ❖ Interview EHS personnel, operations, management, maintenance, to see if policies are understood and consistently handled.
- ❖ Discover issues of concern
- ❖ Conduct a Closing Meeting listing and discussing of all issues, develop corrective actions for each issue

Phase 3: Post-Audit

- ❖ Preparing the Environmental Audit Report and Disclosure of Violations form
- ❖ List confirmed issues and Areas of Concern
- ❖ List Action Items and required follow-up
- ❖ What Documents do I Need to Conduct an Environmental Audit?

Before beginning an environmental audit, we should gather and review all the required documents. Here are the six types of documents we will need to begin to an environmental audit:

- Maps and floor plans for the facility will help us to define the scope of an audit. They'll clue us into changes that have been made and procedures that might have changed and need a thorough review.
- Gather copies of all environmental permits. These permits are the first step to verifying that the facility is in compliance with the permit terms.
- Gather environmental inspection reports and checklists that prove that inspections have been completed as required. Hazardous waste manifests, sampling data, and other inspection reports help to show that recordkeeping is up-to-date and in compliance. Likewise, they can help to identify compliance issues.
- An inventory of all chemicals and other raw materials used, their locations, and amounts helps to determine that which environmental regulations are applied to the facility.
- Environmental Plans and procedures, best management practices and other applicable documents show how the facility is managing environmental issues and preventing problems. It includes the EPA Risk Management Plan, Standard Operating Procedures (SOP's) and written emergency response programs, if applicable.
- Employee training records, tests, and certificates show that employees have been trained in the knowledge and skills needed to perform their duties. These records also demonstrate the company's efforts to develop and maintain the facilities environmental standards.

7.5.6 Problems Encountered During Audit

Problems which the audit team may face are variable with respect to facility. However what is expected and needs attention are:

(i) Prior history of the site

(ii) Age of relevant equipment

(iii) Lack of records related to the relevant equipment

(iv) Attitude of concerned personnel on site towards audit studies

(v) Responses of the concerned management for implementation of the corrective measures.

7.5.7Audit Programmes in India

The environment audit programmes were initiated in early ninetys. The Central Pollution Control Board initiated a study in 18 major polluting industries in 1991-92. At the same time a paper on "Outline of Environmental Audits was prepared by MOEF and circulated for comments. This process resulted into issuing a gazette notification on March 13, 1992 through which submission of the Environmental Audit Report has been made mandatory. The term Audit Report was later changed to "Statement" through a revised notification of April 22, 1993. The industries are now supposed to submit their Auditing Statements to the concerned Boards on or before Sept. 30 every year beginning 1993.

7.6 Sustainable development

The increasing impacts of anthropogenic activities on physical and biological environment especially in reference to ecological changes are a matter of great concern to environmentalists. The concept that man lives in close relationship with biotic and abiotic components of nature - symbiotic living, has been established, since man become aware of his surroundings. The progress made in science and technology-biotechnology, genetic engineering, communication engineering, and industry has brought additional pressure on the fragile ecosystem stability. The increase in population in the last three decades has multiplied the impacts. The world's population was 2.0 billion in 1927 and has become triple, 6.0 billion in 2000 and is expected to reach 11 billion by 2050. It is known that population growth and economic development are affecting the environment. There is a close relationship between Population growth and environmental damage

(Erlich Equation) $I = P \times A \times T$

Where I = Impact on environment

` P = Population

A = Affluence (Consumption)

T = Technology Coefficient

India's population has crossed one billion marks. More people mean more pressure on resources, more consumption of energy, more production of wastes and more effect on environment. The management of environment is not possible unless there is a change in perception and attitude, consumption patterns, manufacturing and marketing practices and gel into a technological world that is less intensive in terms of materials and energy. Improvements in efficiency alone will not be enough. "Earth's Carrying Capacity" concept must be adopted.

Sustainable development is a development strategy that aims to balance economic, social, and environmental objectives in a way that meets the needs of the present without compromising the ability of future generations to meet their own needs.

The concept of sustainable development was introduced in 1987 by the World Commission on Environment and Development (WCED), which is also known as the Brundtland Commission, in its report "Our Common Future". The report defined sustainable development as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs."

Sustainable development is based on the principles of intergenerational equity, which means ensuring that the benefits and costs of development are shared fairly between present and future generations, and ecological sustainability, which means using natural resources in a way that does not compromise their availability for future generations.

7.6.1 Goals of sustainable development

The goals of sustainable development are to:

(i) **Meet the basic needs of all people:** Ensure that all people have access to food, shelter, clean water, health care, and education, and that they can live in dignity and security.

(ii) **Promote economic growth and reduce poverty:** Encourage economic growth and development that benefits all people, and reduce poverty by creating jobs, increasing income, and improving access to basic services.

(iii) **Protect the environment:** Preserve the natural environment and its resources, reduce the negative impacts of human activities on the environment, and ensure that the use of natural resources is sustainable and equitable.

(iv) **Improve social equity:** Reduce inequality and discrimination, and ensure that all people have equal access to opportunities and resources.

(v) **Foster good governance:** Promote transparency, accountability, and good governance in decision-making processes, and ensure that the interests of all stakeholders are taken into account.

(vi) **Enhance human well-being:** Improve the overall well-being of individuals and communities by promoting health, education, and a healthy and safe environment.

(vii) **Promote intergenerational equity:** Ensure that the benefits and costs of development are shared fairly between present and future generations, and that the use of natural resources is sustainable and equitable.

These objectives are interdependent and complementary, and achieving sustainable development requires a balance between economic, social, and environmental considerations. To achieve these objectives, sustainable development requires a long-term perspective, the adoption of policies and practices that promote sustainability, and the engagement of all stakeholders in the development process.

7.6.2 Principles of sustainable development

The 9 principles of sustainable development are widely recognized and include:

1. Integration: The need to integrate economic, social, and environmental considerations into decision-making at all levels.

2. Participation: The need to involve all relevant stakeholders, including government, the private sector, civil society, and communities, in the sustainable development process.

3. Precaution: The need to take a precautionary approach to environmental protection, recognizing that some activities may have

significant impacts on the environment and human health, and that it is better to err on the side of caution.

4. Prevention: The need to prevent the degradation of natural resources and ecosystems, and to ensure that their use is sustainable.

5. Reversibility: The need to ensure that activities and interventions that cause environmental damage can be reversed or remediated, where possible.

6. Responsibility: The need to ensure that those who cause environmental damage are held responsible for their actions, and that they are held accountable for the impacts of their activities.

7. Equity: The need to ensure that the benefits and costs of sustainable development are distributed equitably, and that the needs and perspectives of marginalized groups are taken into account.

8. Efficiency: The need to use resources in a sustainable and efficient manner, and to reduce waste and inefficiency in all sectors of the economy.

9. Sustainability: The need to ensure that sustainable development is a long-term and continuous process, and that it is integrated into all aspects of social, economic, and environmental policy and practice.

These principles provide a framework for achieving sustainable development, and provide guidance on the actions that are necessary to achieve this goal. They are widely recognized and adopted by governments, international organizations, and civil society groups, and are reflected in international agreements and commitments, such as the Sustainable Development Goals.

7.6.3 How can we achieve sustainable development?

Sustainable development can be achieved through a combination of policies, practices, and technologies that promote economic growth, social well-being, and environmental protection. Some of the ways to achieve sustainable development include:

a) **Promoting green growth:** Encouraging economic growth that is environmentally sustainable, through policies and incentives that encourage the use of renewable energy, energy efficiency, and sustainable agriculture and forestry practices.

b) Investing in infrastructure: Investing in sustainable infrastructure, such as public transportation systems, renewable energy, and clean water and sanitation systems, to support economic growth and improve access to basic services.

c) Encouraging sustainable consumption and production: Encouraging individuals and businesses to adopt sustainable consumption and production patterns, such as reducing waste, conserving energy and water, and using products made from sustainable materials.

d) Protecting and restoring ecosystems: Protecting and restoring ecosystems, such as forests, wetlands, and coral reefs, which provide critical ecosystem services and support biodiversity.

e) Strengthening social protections: Strengthening social protections, such as access to health care, education, and housing, to ensure that all people can live in dignity and security.

f) Promoting gender equality: Promoting gender equality and empowering women and girls, to ensure that all people have equal opportunities and can participate fully in the development process.

g) Ensuring good governance: Ensuring good governance and accountability, including transparent and participatory decision-making processes, and effective institutions and legal frameworks that promote sustainability.

h) Engaging stakeholders: Engaging all relevant stakeholders, including government, the private sector, civil society, and communities, in the sustainable development process, and ensuring that their voices and perspectives are heard and taken into account.

i) Encouraging research and innovation: Encouraging research and innovation in through sustainable technologies, and investing in scientific and technological solutions that support sustainable development.

j) Monitoring and evaluating progress: Monitoring and evaluating progress towards sustainable development, and regularly assessing the impact of policies, programs, and investments, to ensure that they are effective and achieving their intended outcomes.

Achieving sustainable development requires a multi-disciplinary and integrated approach, and a commitment from all stakeholders to work together towards a common goal. It also requires a long-term perspective, and recognition that sustainable development is a continuous process of learning, adaptation, and improvement.

7.7. Summary

An environmental management system (EMS) is "a system which integrates policy, procedures and processes for training of personnel, monitoring, summarizing, and reporting of specialized environmental performance information to internal and external stakeholders of a firm. Environmental Management addresses hot topic issues such as global warming, pollution, deforestation, soil erosion, landfills, or depletion of Earth's natural resources. Environmental Management covers topics such as resource management, geography, environmental science, and more. Programme curriculums focus on the relationships between science, management, and policy, while providing scientific understanding of ecological and social systems, applicable in a management or policy-making context. Sustainable development is based on the principles of intergenerational equity, which means ensuring that the benefits and costs of development are shared fairly between present and future generations, and ecological sustainability, which means using natural resources in a way that does not compromise their availability for future generations.

7.8 Terminal questions

Q.1: What is Environmental impact statement? Discuss the importance of EIA activities for developing countries.

Answer:----------

Q.2: What are the standard practices followed for EIS studies?

Answer:----------

Q.3: Describe the sustainable development goals and principles.

Answer:----------

Q.4: What is environmental audit? Discuss the process of environmental audit?

Answer:----------

7.8 Suggested Readings

1. Environment Impact Assessment, Barthwal, R.R. New Age International, New Delhi 2002.
2. Environment Impact Assessment (Practical Solutions to Recurrent Problems). David P. Lowrence. Wiley Interscience, New Jersey 2003.
3. Environment Impact Assessment, Srivastava, A.K., APH Publishing Corporation, New Delhi – 2003.
4. Ecology, Impact Assessment and environment Planning, Walter E. Westman., John Wiley & Sons, Canada 1985.

Unit-8: Environmental Act

Contents

8.1. Introduction

Environmental protection Act, 1886 is Act of the parliament of India. It was enacted in May 1986 and cause into force on 19 November 1986. It has 26 sections and 4 chapters. The Act is widely considered to have been a response to the Bhopal gas leak. The Act was passed by the central government India in 1986, which empowers to union government to enact laws to give effect to international agreement signed by the country. The purpose of Act is to implement the decisions of the United Nations conference on the human environment. They relate to protection and improvement of the human environment and the prevention of hazardous to human beings after living creature, plants and properties. The Act is an umbrella legislation that has provided a framework for the environmental regulation in India, cover all the major industrial and infrastructure activity in coastal areas and eco-sensitive areas. The Acts also

provides for coordination of the activities of various central and state authorities under other environmental related laws such as Water Act, Air Act. The ministry of Environment, Forest and Climate Change (MoEFCC), on February 22, 2022 has issued the environmental (protection) Amendment Rules, 1986. This has come into force on February 22, 2022.

Environmental laws in India are a collection of agreements, regulations, laws, and common laws that control how humans interact with their surroundings. The Indian environmental laws not only attempt to safeguard the environment from the worsening crisis, but they also serve as a reminder of who is allowed to use natural resources and under what conditions. Water, air, and land, the inter-relationships that occur among them as well as human beings, other living things, plants, microorganisms, and property, are described as "environment" under the Environmental Protection Act of 1986. Environmental legislation is a collection of laws and regulations related to water quality, air quality, endangered wildlife, and several other environmental factors. Environmental legislation covers many laws and regulations, but they all work towards a common goal of regulating human-nature interactions to reduce threats to the environment and improve public health.

Objectives

- To discuss the environmental laws and protection acts
- To discuss the existing provision of central and state
- To discuss the government on environment protection
- To discuss the Environment (protection) act (1986)

8.2. Environmental laws and protection acts

Environmental laws in India are a collection of agreements, regulations, laws, and common laws that control how humans interact with their surroundings. Environmental laws are an important part of any governance body. It comprises a set of laws and regulations concerning air quality, water quality, and other aspects of the environment. The environmental laws in India are guided by environmental legal principles and focus on the management of specific natural resources, such as forests, minerals, or fisheries. The environmental laws in India are a direct reflection of what was envisaged in the constitution. The need for protection and

conservation of the environment and sustainable use of natural resources is reflected in the constitutional framework of India and also in the international commitments of India. Environmental law is an integral part of any government agency. It includes a series of laws and regulations related to water quality, air quality, and other environmental aspects. The success of environmental legislation mainly depends on how they are implemented. Legislation is also a valuable tool to educate people about their responsibility to maintain a healthy environment. Environmental law in India is based on principles of environmental law and focuses on the management of certain natural resources such as minerals, forests, and fisheries. Environmental law in India directly reflects the provisions of the Constitution. The need to protect and maintain the environment and make sustainable use of natural resources is reflected in India's constitutional framework and India's international obligations. However, after so many initiatives in the field of environmental law to set up sustainability, India's growing economy still lacks to deal with environmental issues. Moreover, Indian regulators are trying hard to revise its existing environmental rules and acts, which may result in more stringent company requirements. But, these initiatives will not work if we as a society don't focus on them. People's awareness plays a significant role in such policy development, which is why we need to come together to work on these major issues. Government and non-government organisations need to work together to solve environmental issues, and there should be a stricter policy regarding environmental legislation.

- Environment (protection) act (1986)
- the water act (1974),
- the air act (1981),
- Wild life act (1972).

Environmental legislation is a collection of laws and regulations related to water quality, air quality, endangered wildlife, and several other environmental factors. Environmental legislation covers many laws and regulations, but they all work towards a common goal of regulating human-nature interactions to reduce threats to the environment and improve public health. As we can imagine, environmental legislation in broad is mainly because the natural environment encompasses

several aspects. This entire means that environmental law must take into account everything from the air we breathe, to the natural resources we depend on, to the flora and fauna that share this world with us. Environment Related Provisions in the Indian Constitution Environment protection is mentioned in the Indian Constitution as part of Directive Principles of State Policy as well as Fundamental Duties.

History of environmental laws in India:

The detailed and developed framework for environmental protection came after the UN conference on Human Environment in Stockholm, in 1972. This led to the formation of the National Council for Environmental Policy and Planning in 1972 within the science and technology department. This was set up to establish a regulatory body for the overview of the environmental-related issues and concerns. This council was later converted to the Ministry of Environment and Forests.

Directive Principles of State Policy (Part IV) Article 48A

For protection and improvement of environment and safeguarding of forests and wildlife, the State shall endeavour to protect and improve the environment and to safeguard the forests and wildlife of the country. It is used to protect and improve the natural environment including forests, lakes, rivers, and wildlife, and to have compassion for living creatures.

8.3. Existing provision of central and state government on environment protection

In India, various environmental protection legislation state that environmental protection is the government's responsibility. Various constitutional provisions provide rights to the citizens to protect the environment:

- **Article 48**: This article falls under the State policy Directive principle. As per the article, the government should make every effort to conserve the environment. It also highlights the protection of the country's forests and animals. Article 48A requires the state to take different measures to preserve it from pollution.

- **Article 51A** (g): According to Article 51 A(g), it is the responsibility of every Indian citizen to maintain and enhance the environment, which includes lakes, rivers, forests, and animals. This article also emphasises the importance of exhibiting compassion for living things. This article is identical to Article 48A, with the exception that it focuses on citizens' fundamental responsibilities.
- **Article 253**: This article empowers Parliament to enact laws for the country to carry out treaty conventions and international agreements. Parliament passed much legislation to safeguard the environment through this article, the Water Act 1974, the Air Act 1981, and the Environmental Protection Act 1984.
- **Article 21**: It asserts that the right to life does not only apply to animals but also to humans who have the right to live in a safe environment with fundamental human dignity. The Supreme Court held in M.C. Mehta vs. Union of India that the right to life includes living in a pollution-free environment and being free of diseases.

8.3.1. Environmental Laws after Independence (1947)

The Indian Constitution, adopted in 1950, made no mention of the environment or pollution prevention and control until the 1976 Amendment. The post-independence Indian approach was focused on economic development and poverty relief rather than the conservation of natural resources.

Progressive steps in the context of Environmental Laws in India after Independence

- The Stockholm Declaration of 1972 motivated the Indian government to shift its focus to environmental conservation.
- The National Council for Environmental Policy and Planning was established in 1972 and later renamed the Ministry of Environment and Forests (MoEF) in 1985.
- The Wildlife Protection Act of 1972 aims to promote reasonable and modern wildlife management.

- The Water (Prevention and Control of Pollution) Function of 1974 establishes pollution control boards at the federal and state levels to act as watchdogs for pollution prevention and control.
- The Air (Prevention and Control of Pollution) Act of 1981 establishes pollution control boards to combat air pollution.
- The Forest (Conservation) Act of 1980 attempts to prevent deforestation and forest area diversion.
- The Public Liability Insurance Act of 1991 makes it mandatory to have insurance in place to provide instant assistance to anyone who has been injured when handling a dangerous product.
- The Biological Diversity Act of 2002 protects endangered species, inhibits bio piracy, and addresses water constraints. It also regulates the use of natural resources to prevent them from being depleted.
- The Environment Protection Act of 1986, India's environmental legislation, establishes a single focus for environmental protection in the country and tries to close loopholes in current legislation.

Environment Protection under Constitutional Framework of India

The constitution of India is not inert but a living document which evolves and grows with time. The specific provisions on environment protection in the constitution are also result of this evolving nature and growth potential of the fundamental law of the land. The preamble to our constitution ensures socialist pattern of the society and dignity of the individual. Decent standard of living and pollution free environment is inherent in this. The Environment (Protection) Act, 1986 defines environment as "environment includes water, air and land and the interrelationship which exists among and between air, water and land and human beings, other living creatures, plants, micro-organism and property".

The chapter on fundamental duties of the Indian Constitution clearly imposes duty on every citizen to protect environment. Article 51-A (g), says that "It shall be duty of every citizen of India to protect and improve the natural environment including forests, lakes, rivers and wild life and to have compassion for living creatures."

The Directive principles under the Indian constitution directed towards ideals of building welfare state. Healthy environment is also one of the elements of welfare state. Article 47 provides that the State shall regard the raising of the level of nutrition and the standard of living of its people and the improvement of public health as among its primary duties. The improvement of public health also includes the protection and improvement of environment without which public health cannot be assured. Article 48 deals with organization of agriculture and animal husbandry. It directs the State to take steps to organize agriculture and animal husbandry on modern and scientific lines. In particular, it should take steps for preserving and improving the breeds and prohibiting the slaughter of cows and calves and other milch and draught cattle. Article 48 -A of the constitution says that "the state shall endeavor to protect and improve the environment and to safeguard the forests and wild life of the country".

The Constitution of India under part III guarantees fundamental rights which are essential for the development of every individual and to which a person is inherently entitled by virtue of being human alone. Right to environment is also a right without which development of individual and realisation of his or her full potential shall not be possible. Articles 21, 14 and 19 of this part have been used for environmental protection.

According to Article 21 of the constitution, "no person shall be deprived of his life or personal liberty except according to procedure established by law". Article 21 has received liberal interpretation from time to time after the decision of the Supreme Court in Maneka Gandhi vs. Union of India, (AIR 1978 SC 597). Article 21 guarantees fundamental right to life. Right to environment, free of danger of disease and infection is inherent in it. Right to healthy environment is important attribute of right to live with human dignity. The right to live in a healthy environment as part of Article 21 of the Constitution was first recognized in the case of Rural Litigation and Entitlement Kendra vs. State, AIR 1988 SC 2187 (Popularly known as Dehradun Quarrying Case). It is the first case of this kind in India, involving issues relating to environment and ecological balance in which Supreme Court directed to stop the excavation (illegal mining) under the Environment (Protection) Act, 1986. In M.C. Mehta vs. Union of India, AIR 1987

SC 1086 the Supreme Court treated the right to live in pollution free environment as a part of fundamental right to life under Article 21 of the Constitution.

Excessive noise creates pollution in the society. The constitution of India under Article 19 (1) (a) read with Article 21 of the constitution guarantees right to decent environment and right to live peacefully. In PA Jacob vs. The Superintendent of Police Kottayam, AIR 1993 Ker 1, the Kerala High Court held that freedom of speech under article 19 (1)(a) does not include freedom to use loud speakers or sound amplifiers. Thus, noise pollution caused by the loud speakers can be controlled under article 19 (1) (a) of the constitution.

Article 19 (1) (g) of the Indian constitution confers fundamental right on every citizen to practice any profession or to carry on any occupation, trade or business. This is subject to reasonable restrictions. A citizen cannot carry on business activity, if it is health hazards to the society or general public. Thus safeguards for environment protection are inherent in this. The Supreme Court, while deciding the matter relating to carrying on trade of liquor in Cooverjee B. Bharucha Vs Excise commissioner, Ajmer (1954, SC 220) observed that, if there is clash between environmental protection and right to freedom of trade and occupation, the courts have to balance environmental interests with the fundamental rights to carry on any occupations.

Public Interest Litigation under Article 32 and 226 of the constitution of India resulted in a wave of environmental litigation. The leading environmental cases decided by the Supreme Court includes case of closure of limestone quarries in the Dehradun region (Dehradun Quarrying case, AIR 1985 SC 652), the installation of safeguard at a chlorine plant in Delhi (M.C. Mehta V. Union of India, AIR 1988 SC 1037) etc. In Vellore Citizens Welfare Forum vs. Union of India (1996) 5 SCC 647, the Court observed that “the Precautionary Principle” and “the Polluter Pays Principle” are essential features of “Sustainable Development.”

At local and village level also, Panchayats have been empowered under the constitution to take measures such as soil conservation, water management, forestry and protection of the environment and promotion of ecological aspect.

Environment protection is part of our cultural values and traditions. In Atharvaveda, it has been said that "Man's paradise is on earth; this living world is the beloved place of all; It has the blessings of nature's bounties; live in a lovely spirit". Earth is our paradise and it is our duty to protect our paradise. The constitution of India embodies the framework of protection and preservation of nature without which life cannot be enjoyed. The knowledge of constitutional provisions regarding environment protection is need of the day to bring greater public participation, environmental awareness, and environmental education and sensitize the people to preserve ecology and environment. The various provisions and laws in India relating to protection of environment. We are surviving because of environment and it is our duty to protect it along with maintenance of Sustainable Development.

Historical Overview:

The Environment Protection Act 1986 defines environment as "environment includes water, air and land and the inter-relationship which exists among and between water, air and land, and human beings, other living creatures, plants, micro organism and property." Besides the physical and biological aspect, the "environment" embraces the social, economic, cultural, religious, and several other aspects as well. The environment, thus, is an amalgamation of various factors surroundings an organism that interact not only with the organism but also among themselves. It means the aggregation of all the external conditions and influences affecting life and development of organs of human beings, animals and plants.

- **Policy and Laws in Ancient India:**

In the ancient India, protection and cleaning up of environment was the essence of the Vedic culture. The conservation of the environment formed an ardent article of faith, reflected in the daily lives of the people and also enshrined in myth folklore, art, culture and religion. In Hindu theology forests, trees and wildlife protection held a place of special reference.

- **Policy and Laws in British India**

By around 1860, Britain had emerged as the world leader in deforestation, devastation its own woods and the forest of Ireland, South Africa and north

eastern United States to draw timber for shipbuilding, iron-smelting and farming. In the early nineteenth century, the Raj carried out a fierce onslaught on the sub continent's forests. The revenue orientation of the colonial land policy also worked towards the denunciation of forests.

The imperial forest department was formed in1864, with the help of experts from Germany, the country which was at the time the leading European nation in forest management. The first inspector-general of forests, Dietrich Brandish, had been a botanist and recognise awesome task of checking the deforestation, forging legal mechanism to assert and safeguard states control over the forests. it was his dual sense that the railway constituted the crucial watershed with respect to the water management in India- the need was felt to start an appropriate department, and for its effective functioning legislation was required to curtail the previously untouched access enjoyed by the rural communities.

8.3.2. Policy and Laws post-independence of India:

The Indian Constitution, as adopted in 1950, did not deal with that the subject of environment or prevention and control of pollution as such (until 1976 Amendment). The original text of the constitution under Article 372(1) has incorporated the earlier existing laws into the present legal system and provides that notwithstanding the repeal by this constitution of enactment referred to in article 397, but subjected to the other provisions of the constitution, all laws in force immediately before the commencement of the constitution shall remained in force until altered, repealed or amended by a competent legislature or other competent authority. As a result, even after five decade of independence, the plethora of such laws is still in operation without any significant changes in them.

The Principles on environment

With a view to protecting and improving the environment, different legislations have been made and different regulations, rules have been issued. The Government of India, through its Ministry of Environment and Forests is administering and enacted nationwide comprehensive laws.

- 1972 Stockholm Declaration affirms that "Man has the fundamental right to freedom, equality and adequate conditions of life in an environment of quality that permits a life of dignity and well-being, and he

bears a solemn responsibility to protect and improve the environment for present and future generations..." This shows that it has been internationally recognized that man's fundamental rights and embraces the need to live in an uncontaminated environment but it also puts forth man's obligation to protect the environment for posterity.

- The Supreme Court has laid down that the "Precautionary principle" and the "Polluter Pays Principle" is essential features of "sustainable development". These concepts are part of Environment Law of the country.
- The "Precautionary Principle" establishes that a lack of information does not justify the absence of management measures. On the contrary, management measures should be established in order to maintain the conservation of the resources. The assumptions and methods used for the determination of the scientific basis of the management should be presented.

The essential ingredients of the precautionary principle are:

- Environmental measures- by the state government and the statutory authorities- must anticipate, prevent and attack the causes of environment degradation.
- When there are threats of serious and irreversible damage, lack of scientific certainty should not be used as a reason for postponing measure to prevent environmental degradation.
- The “Onus of Proof” is on the actor or the developer/industrialist to show that his action is environmentally benign.
- Precautionary duties must not only be triggered by the suspicion of concrete danger but also by concern or risk potential.

In M.C. Mehta v Union of India (CNG Vehicle Case) (AIR 2002 SC 1696), The supreme court observed that any ‘auto-policy’ framed by the Government must, therefore, of necessity conform to the constitutional principles well as overriding statutory duties cast upon the government under the EPA. The auto policy must adopt a ‘precautionary principles’ and make informed recommendations which balance the needs of transportation with the need to protect the environment.

The “polluter pays” principle came about in the 1970's when the importance of the environment and its protection was taken in world over. It was subsequently promoted by the Organization for Economic Cooperation and development (OECD). The ‘polluter pays' principle as interpreted by the Court means that the absolute liability for harm to the environment extends not only to compensate the victims of pollution but also the cost of restoring the environmental degradation.

In other words, Polluter should bear the cost of pollution as the polluter is responsible for pollution’. The principle demands that financial costs of preventing or remedying damage caused by pollution should lie with the undertakings which cause pollution.

It may be noted that the polluter pays principle evolved out of the rule of ‘absolute liability’ as laid down by the apex court in Sriram Gas Leak Case.

Sustainable Development

Sustainable Development means an integration of development and environment imperative. It means, development in harmony with environmental consideration. To be sustainable, development must possess both economic and ecological sustainability. It is a development process where exploitation of resources, direction of investment, orientation of technology development and institutional changes are all in harmony. Sustainable development implies, local control over the resource use, and is the only path for conserving and promoting socio-economic well being in a democratic form.

'eco-development’ is a related concept. It is a process of ecologically sound development, positive management of environment for human benefits. For example banning tree felling in reserve forests and permitting harvesting of minor forest products by rural poor and tribal; development of community or common lands for rural subsistence needs of industries, towns and villages. These are the components of the “new development strategies”. The component of eco-development includes alternative development strategies; biogas, substitute for natural resources, social forestry, micro irrigation and recycling of waste to prevent pollution.

Vellore Citizens Case:

In a landmark judgment where the principle of sustainable development has been adopted by the Supreme Court as a balancing concept, while rejecting the old notion that development and environmental protection cannot go together, the apex court held the view that sustainable development has now come to be accepted as "a viable concept to eradicate poverty and improve the quality of human life while living within the carrying capacity of the supporting eco system." Thus, pollution created as a consequence of development must be commensurate with the carrying capacity of our ecosystem.

FACTS - In this case, certain tanneries in the State of Tamil Nadu were discharging untreated effluent into agricultural fields, roadsides, waterways and on open lands. The untreated effluent finally discharges in the river which has the main source of water supply to the residence of Vellore. The Supreme Court issued comprehensive directions for maintaining the standards stipulated by the Pollution Control Board.

Observations

The Supreme Court Observe that the "precautionary principle" and the "polluter pays principle" are part of the Environment law of the country. These principles are essential features of "Sustainable Development." The "precautionary principle" in the context of the municipal law means: (i)Environmental measures by the State Government and the statutory authorities – must anticipate , prevent and attack the cause of the environmental degradation(ii) Where there are threats of serious irreversible damages, lack of scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation .(iii) The "onus of proof "in on the actor /industrialist to show that his action is environmentally benign.

DECISION: - The Supreme Court directed the Central government to constitute an authority under sec. 3 of the Environment Act, 1986 and confer on the said authority that all the powers necessary to deal with the situation created by the powers necessary to deal with the situation created by the tanneries and other polluting industries in the State of Tamil Nadu. The authority (headed by retired judge of the High Court) shall implement the precautionary and polluter

pays principles. The authority should compute the compensation under two heads, namely, for reserving the ecology and for the payment to individuals.

8.3.3. The Constitutional and Legislative measures

8.3.3.1. The Constitution of India and Environment.

To protect and improve the environment is a constitutional mandate. It is the commitment for a country wedded to the ideas of a welfare State. The Indian constitution contains specific provisions for environmental protection under the chapters of Directive Principles of the State Policy and Fundamental Duties. The absence of any specific provision in the Constitution recognising the fundamental right to (clean and wholesome) environment has been set off by judicial activism in the recent times.

8.3.3.2. Article 48A and 51 (A)(g)

A global adaption consciousness for the protection of the environment in the seventies prompted the Indian Government to enact the 42nd Amendment (1976) to the Constitution. The said amendment added Art. 48A to the Directive Principles of State Policy. It Declares:-

"the State shall endeavor to protect and improve the environment and to safeguard the forests and wildlife of the country".

A similar responsibility imposed upon on every citizen in the form of Fundamental Duty

2.8.2 Art. 51(A) (g)"to protect and improve the natural environment including forest, lakes, rivers and wildlife, and to have compassion for living creatures".

The amendments also introduced certain changes in the Seventh Schedule of the Constitution. 'Forest' and 'Wildlife' were transferred from the State list to the Concurrent List. This shows the concern of Indian parliamentarian to give priority to environment protection by bringing it out the national agenda. Although unenforceable by a court, the Directive Principles are increasingly being cited by judges was a complementary to the fundamental rights. In several environmental cases, the courts have guided by the language of Art. 48A. and

interpret it as imposing “an obligation” on the government, including courts, to protect the environment.

In L.K Kollwal V State of Rajasthan, a simple writ petition by citizens of Jaipur compelled the municipal authorities to provide adequate sanitation. The court observes that when every citizen owes a constitutional duty to protect the environment (Art.51A), the citizen must be also entitled to enlist the court’s aid in enforcing that duty against recalcitrant State agencies. The Court gave the administration six month to clean up the entire city, and dismissed the plea of lack of funds and staff.

The Public Trust Doctrine, evolved in M.C. Mehta v. Kamal Nath, states that certain common properties such as rivers, forests, seashores and the air were held by Government in Trusteeship for the free and unimpeded use of the general public. Granting lease to a motel located at the bank of the River Beas would interfere with the natural flow of the water and that the State Government had breached the public trust doctrine.

A matter regarding the vehicular pollution in Delhi city, in the context of Art 47 and 48 of the Constitution came up for consideration in M.C. Mehta vs. Union of India (Vehicular Pollution Case). It was held to be the duty of the Government to see that the air did not become contaminated due to vehicular pollution. The Apex court again confirming the right to healthy environment as a basic human right stated that the right to clean air also stemmed from Art 21 which referred to right to life. This case has served to be a major landmark because of which lead-free petrol supply was introduced in Delhi. There was a complete phasing out old commercial vehicles more than 5 years old as directed by the courts. Delhi owes its present climatic conditions to the attempt made to maintain clean air.

The Ganga Water Pollution case: M C Mehta V. Union of India, AIR 1988, SC 1037

The owners of some tanneries near Kanpur were discharging their effluents from their factories in Ganga without setting up primary treatment plants. The Supreme Court held that the financial capacity of the tanneries should be considered as irrelevant while requiring them to establish primary treatment

plants. The Court directed to stop the running of these tanneries and also not to let out trade effluents from the tanneries either directly or indirectly into the river Ganga without subjecting the trade effluents to a permanent process by setting up primary treatment

In the very recent case of T.N. Godavarman Thirumulpad v. Union of India, a case concerning conservation of forests, Justice Y.K. Sabharwal, held: Considering the compulsions of the States and the depletion of forest, legislative measures have shifted the responsibility from States to the Centre. Moreover any threat to the ecology can lead to violation of the right of enjoyment of healthy life guaranteed under Art 21, which is required to be protected. The Constitution enjoins upon this Court a duty to protect the environment.

8.3.3.3. Article 246

Art.246 of the Constitution divides the subject areas of legislation between the Union and the States. The Union List (List I) includes defence, foreign affairs, atomic energy, interstate transportation, shipping, air trafficking, oilfields, mines and inter-state rivers. The State List (List II) includes public health and sanitation, agriculture, water supplies, irrigation and drainage, fisheries. The Concurrent list (List III) (under which both State and the Union can legislate) includes forests, protection of wildlife, mines and minerals and development not covered in the Union List, population control and factories. From an environmental standpoint, the allocation of legislative authority is an important one – some environmental problem such as sanitation and waste disposal, are best tackled at the local level; others, like water pollution and wildlife protection, are better regulated uniform national laws.

8.3.3.4 Article 253

Art.253 of the Constitution empowers Parliament to make laws implementing India's international obligations as well as any decision made at an international conference, association or other body. Art.253 states: Notwithstanding anything in the foregoing provision provisions of this chapter, Parliament has power to make any law for the whole or any part of the territory of India for implementing any treaty, agreement or convention with any other country or countries or any decision made at any international conference,

association or other body. The Tiwari Committee in 1980 recommended that a new entry on "environmental Protection" be introduced in the concurrent list to enable the centre to legislate on environmental subjects, as there was no direst entry in the 7th seventh, enables Parliament to enact comprehensive environment laws. The recommendation, however, did to consider parliament's power under Art.253

8.3.3.5 Article 14 and Article 19 (1) (g)

ART. 14 states: "The states shall not deny to any person equality before the law or the equal protection of the laws within the territory of India.'' The right to equality may also be infringed by government decisions that have an impact on the environment. An arbitrary action must necessary involve a negation of equality, thus urban environmental groups often resort to Art.14 to quash arbitrary municipal permission for construction that are contrary to development regulations.

8.3.3.8.6 Article 21

(Right to Wholesome Environment)

"No person shall be deprived of his life or personal liberty except according procedure established by law."

In Maneka Gandhi v Union of India, the Supreme Court while elucidating on the importance of the 'right to life' under Art. 21 held that the right to life is not confined to mere animal existence, but extends to the right to live with the basic human dignity (Bhagwati J.)

Similarly while interpreting Art.21 in Ganga Pollution Case as discussed before, Justice Singh justified the closure of polluting tanneries observed: "we are conscious that closure of tanneries may bring unemployment, loss of revenue, but life. Health and ecology have greater importance to the people."

8.3.4. Some Important Environmental Laws in India

- 1986 - The Environment (Protection) Act authorizes the central government to protect and improve environmental quality, control and reduce pollution from all sources, and prohibit or restrict the setting and /or operation of any industrial facility on environmental grounds.

- 1989 - The objective of Hazardous Waste (Management and Handling) Rules is to control the generation, collection, treatment, import, storage, and handling of hazardous waste.
- 1991 - The Public Liability Insurance Act and Rules and Amendment, 1992 was drawn up to provide for public liability insurance for the purpose of providing immediate relief to the persons affected by accident while handling any hazardous substance.
- 2000 - The Municipal Solid Wastes (Management and Handling) Rules, apply to every municipal authority responsible for the collection, segregation, storage, transportation, processing, and disposal of municipal solid wastes.
- ✓ 2002 - The Noise Pollution (Regulation and Control) (Amendment) Rules
- ✓ lay down such terms and conditions as are necessary to reduce noise pollution, permit use of loud speakers or public address systems during night hours (between 10:00 p.m. to 12:00 midnight) on or during any cultural or religious festive occasion.
- ✓ 1927 - The Indian Forest Act and Amendment, 1984, is one of the many surviving colonial statutes. It was enacted to 'consolidate the law related to forest, the transit of forest produce, and the duty leviable on timber and other forest produce'.
- ✓ 1948 – The Factories Act and Amendment in 1987 was the first to express concern for the working environment of the workers. The amendment of 1987 has sharpened its environmental focus and expanded its application to hazardous processes.

8.3.4. Writs and PILs for Safeguarding the Environment

A writ petition can be filed to the Supreme Court under Art.32 and the High Court under Art.226, in the case of a violation of a fundamental right. Since the right to a wholesome environment has been recognised as implied fundamental rights, the writ petitions are often restarted to in environment cases. Generally, the writs of Mandamus, Certiorari and Prohibition are used in environmental matters. For instance, a Mandamus (a writ to command action by a public authority when an authority id vested with power and wrongfully refuses to

exercise it) would lie against a municipality that fails to construct sewers and drains, clean street and clear garbage (Rampal v State of Rajasthan) likewise, a state pollution control board may be compelled to take action against an industry discharging pollutants beyond the permissible level.

The writs of certiorari and prohibition are issued when an authority acts in excess of jurisdiction, acts in violation of the rules of natural justice, acts under a law which is unconstitutional, commits an error apparent on the face of the record, etc. For instance, a writ of certiorari will lie against a municipal authority that consider a builder's applications and permits construction contrary to development riles e.g. wrongfully sanctions an office building in an area reserve for a garden. Similarly, against water pollution control board that wrongly permits an industry to discharge effluents beyond prescribe levels.

A writ of Certiorari will lie against a municipal authority that permits construction contrary to development rules or acts in excess of jurisdiction or in violation of rules of natural justice for instance wrongly sanctioning an office building in an area reserved for garden.

When a fundamental right, which includes right to wholesome environment is violated Art. 32 and 226 provide appropriate remedy.

In E.Sampath Kumar v. Government of Tamil Nadu, 1998, AIHC 4498

The party an individual was troubled by the excessive noise pollution and vibrations caused by electrical motors, diesel engines, and generator used by a Hotel. The high court held that an affected person can maintain a writ petition while rejecting the hotel owner's plea that a civil suit would be proper remedy.

Public interest litigation describes legal actions brought to protect or enforce rights enjoyed by members of the public or large parts of it.

In a public interest case, the subject matter of litigation is typically a grievances against the violation of basic human rights of the poor and helpless or about or about the content or conduct of government policy this litigation is not strictly adversarial (in a adversarial procedure, each party produces his own evidence tested by cross-examination by other side) and in it a judge play a large

role in organising and shaping the litigation and in supervising the implementation of relief.

Since the 1980s public interest litigation (PIL) has altered both the litigation landscape and the role of the higher judiciary in India. Supreme Court and High Court judges were asked to deal with public grievances over flagrant human rights violations by the state or to vindicate the public policies embodied in statutes or constitutional provisions. This new type of judicial business is collectively called public interest litigation.

In RamdasShenoy v The Chief Officer, Town Municipal Council, Udipi a rate tax payer's right to challenge an illegal sanction to convert a building into a cinema was upheld by Supreme Court.

In Mahesh R Desai V. Union of India, a journalist complained to the Supreme Court that the national coastline was being sullied by unplanned development that violated a Central Government directive. The Supreme Court registered the letter as a petition, requested the court's legal aid committee to appoint a lawyer for the petition and issued notice to the Union Government and the government of the all States.

8.3.4.1. Taj Mahal Case:

In Taj Mahal's case (M C Mehta V. Union of India, AIR 1997, SC 734), the Supreme Court issued directions that coal and coke based industries in Taj Trapezium (TTZ) which were damaging Taj should either change over to natural gas or to be relocated outside TTZ. Again the Supreme Court directed to protect the plants planted around Taj by the Forest Department as under:

The Divisional Forest Officer, Agra is directed to take immediate steps for seeing that water is supplied to the plants. The Union Government is directed to release the funds immediately without waiting for receipt of the proposal from the U.P. Government on the basis of the copy of the report. Funding may be subsequently settled with the U.P. Government, but in any set of circumstances for want of funds the officer is directed to see that plants do not wither away.

The Court held that 292 industries located and operating in Agra must changeover within fixed time schedule to natural gas as industrial fuel or stop

functioning with coke /coal and get relocated. The industries not applying for gas or relocated are to stop functioning with coke/coal from 30-04-97. The Shifting industries shall be given incentives in terms of the provisions of Agra Master Plan and also the incentive normally extended to the new industrial units.

The integration of the international principles of environmental law into the Indian legal framework is an important consequence of the emergence of Public Interest Litigation in the realm of environmental law. (Razzaque, 2004) In fact, the application and re-interpretation of international legal principles in the Indian context reflect a greater concern with making hazardous industrial enterprises responsible towards environmental concerns. In M C Mehta v Union of India the Supreme Court extends the principle of strict liability drawing from the Rylands v Fletchers case in English law to formulate a principle of absolute liability whereby an enterprise carrying out a hazardous activity is "absolutely liable" to compensate for any harm arising from such activity. The principle of strict liability in English common law states that "a person will be strict liable when he brings or accumulates on his land something likely to cause harm if it escapes, and damage arises as a natural consequence of its escape."(Razzaque, 2004: 210) However, in formulating a principle of absolute liability, the Court contends that such liability is not subject to any of the exceptions"under the rule in Rylands v Fletcher.

8.3.4.2. The Bhopal Gas Leak Case

The Bhopal disaster raised complex legal questions about the liability of parent companies for the acts of their subsidiaries, the responsibilities of multinational corporations engaged in hazardous activities, the transfer of hazardous technologies and the applicable principles of liability. Bhopal was inspirational factor for the judicial innovation in the area of evolving principles of corporate liability for use of hazardous technology.

On December 3, 1984,highly toxic methyl isocyanides (MIC), which had been manufactured and stored in Union Carbide's chemical plant in Bhopal, escaped into the atmosphere and killed over 3,500 people and seriously injured about 2 lakh people.

The Bhopal gas leak disaster (Processing of Claims) Act, 1985 was passed by parliament to ensure that the claims arising out of the Bhopal disaster were dealt with speedily, effectively, equitably and to the best advantage of the claimants.

8.3.4.3 High Court Judgment:

Justice Seth used English Rules of procedure to create an entitlement to interim compensation (i.e. it is permissible for courts to grant relief of interim payment under the substantive law of torts). Under the English rules, interim relief granted in personal injury cases if a prima facie case is made out. He said that "more than prima facie case have been made out" against the Carbide.

He observed that the principle of absolute liability without exceptions laid down in M.C. Mehta case applied more vigorously to the Bhopal suit. He holds that Carbide is financially a viable corporation with $ 6.5 billion unencumbered asset and $200millions encumbered assets plus an insurance which could cover up to $250millions worth of damages. Given carbide's resources, it is eminently just that it meet a part of its liability by interim compensation (Rs.250cr.)

In Union Carbide Corporation v Union of India (AIR 1990 SC 273), the Supreme Court secured a compromise between the UCC and Government of India. Under the settlement, UCC agreed to pay US $470 million in full and final settlement of all past, present and future claims arising from the Bhopal disaster. In addition to facilitate the settlement, the Supreme Court exercised its extraordinary jurisdiction and terminated all the civil, criminal and contempt of court proceedings that had arisen out of the Bhopal disaster. It was declared by the court that if the settlement fund is exhausted, the Union of India should make good the deficiency.

Review petition under Art.137 and writ petitions under Art.32 of the Constitution of India were filed questioning the constitutional and under the Bhopal Act (providing for the registration and processing of claims) and the resultant categorization of the victims was also upheld. It was laid down that there is no need to tie down the tortfeasor to future liability [UCC v UOI AIR 1992 SC 248].

8.3.4.4 Criminal Liability of Carbide Officials:

In UCC v UOI (AIR 1992 SC 248), the supreme court reinstate criminal charges for homicide not amounting to murder' (Sec. 304,Part II, IPC) against top executives at Union Carbide(viz. nine UCIL employees and three foreign accused, including Warren Anderson, the CEO) while uploading the rest of the settlement. The CBI in December 1993 finally prepared the documents necessary to extradite Warren Anderson.

The powers vested to the Pollution Control Boards are not enough to prevent pollution. The Boards do not have power to punish the violators but can launch prosecution against them in the Courts which ultimately defeat the purpose and object of the Environmental Laws due to long delays in deciding the cases. Thus, it is imperatively necessary to give more powers to the Boards. What we need is social awareness from below, not laws from the above. No law works out smoothly unless the interaction is voluntary. In order to educate people about the environmental issues, there should be exhibition of slides in the regional languages at cinema houses and television free of cost. Further, as directed by the Supreme Court of India in M C Mehta Case (M C Mehta V Union of India 1992, SC 382) school and college levels in graded system so that there should be general growth of awareness.

8.4. The Environment (Protection) Act, 1986

This act was passed under **article 253 (legislation for giving effect to international agreements)**.This was passed in the wake of the **Bhopal gas tragedy** in December 1984. It was enacted to achieve the UN conference on the human environment, 1972- Stockholm declaration**.** Eco-sensitive zones or ecologically fragile areas are notified by MoEFCC under EPA, 1986 – 10 km buffer zones around protected areas. **The Environment (Protection) Act** was enacted in 1986 with the objective of providing for the protection and improvement of the environment. It empowers the Central Government to establish authorities [under section 3(3)] charged with the mandate of preventing environmental pollution in all its forms and to tackle specific environmental problems that are peculiar to different parts of the country. The Act was last amended in 1991. The Environment (Protection) Act was enacted in the year

1986. It was enacted with the main objective to provide the protection and improvement of the environment and for matters connected therewith. India's original Constitution did not contain any provision for the protection of the natural environment. However, the Fundamental Duties, which were added by the 42nd Amendment to the Constitution, prescribed the protection of the environment including forests, lakes, rivers and wildlife as a duty of the citizens of the country. This amendment also added new Directive Principles of State Policy, one of which was Article 48A, which directed the State to protect and improve the environment and to safeguard forests and wildlife. These developments were a result of the United Nations Conference on Human Environment, held in Stockholm in 1972. First, the Wildlife Protection Act, 1972 was enacted. Then, the Water (Prevention and Control of Pollution) Act, 1974 was passed, followed by the Air (Prevention and Control of Pollution) Act 1981. Then in 1986, the EPA was passed by the Parliament, in the wake of the Bhopal Gas Tragedy, which occurred on Dec 2, 1984 (Know more about the tragedy in the link). The Environment Protection Act, 1986 (the "Environment Act") provides for the protection and improvement of environment. The Environment Protection Act establishes the framework for studying, planning and implementing long-term requirements of environmental safety and laying down a system of speedy and adequate response to situations threatening the environment.

The Environment Protection Act, 1986 (the "Environment Act") provides for the protection and improvement of environment. The Environment Protection Act establishes the framework for studying, planning and implementing long-term requirements of environmental safety and laying down a system of speedy and adequate response to situations threatening the environment.

- It is an umbrella legislation designed to provide a framework for the coordination of central and state authorities established under the Water Act, 1974 and the Air Act.

- The term "environment" is understood in a very wide term under s 2(a) of the Environment Act. It includes water, air and land as well as the interrelationship which exists between water, air and land, and human beings, other living creatures, plants, micro-organisms and property.

- Under the Environment Act, the Central Government is empowered to take measures necessary to protect and improve the quality of environment by setting standards for emissions and discharges of pollution in the atmosphere by any person carrying on an industry or activity; regulating the location of industries; management of hazardous wastes, and protection of public health and welfare.

- From time to time, the Central Government issues notifications under the Environment Act for the protection of ecologically-sensitive areas or issues guidelines for matters under the Environment Act.

- In case of any non-compliance or contravention of the Environment Act, or of the rules or directions under the said Act, the violator will be punishable with imprisonment up to five years or with fine up to Rs 1, 00,000, or with both. In case of continuation of such violation, an additional fine of up to Rs 5,000 for every day during which such failure or contravention continues after the conviction for the first such failure or contravention will be levied. Further, if the violation continues beyond a period of one year after the date of conviction, the offender shall be punishable with imprisonment for a term which may extend to seven years.

Aims and Objectives of the EPA

The chief aims and objectives of the Environment Protection Act, 1986 are listed below.

1. Implementing the decisions made at the United Nations Conference on Human Environment held in Stockholm.
2. Creation of a government authority to regulate industry that can issue direct orders including closure orders.
3. Coordinating activities of different agencies that are operating under the existing laws.
4. Enacting regular laws for the protection of the environment.
5. Imposing punishments and penalties on those who endanger the environment, safety and health. For each failure or contravention, the punishment includes a prison term of up to five years or a fine of up to Rs. 1 lakh, or both. This can also be extended for up to seven years in cases.

6. Engaging in the sustainable development of the environment.
7. Attaining protection of the right to life under Article 21 of the Constitution.

Main Provisions of Environment Protection Act

The EPA empowers the Centre to "take all such measures as it deems necessary" in the domain of environmental protection.

- Under the law, it can coordinate and execute nationwide programmes and plans to further environmental protection.
- It can mandate environmental quality standards, particularly those concerning the emission or discharge of environmental pollutants.
- This law can impose restrictions on the location of industries.
- The law gives the government the power of entry for examination, testing of equipment and other purposes and power to analyse the sample of air, water, soil or any other substance from any place.
- The EPA explicitly bars the discharge of environmental pollutants in excess of prescribed regulatory standards.
- There is also in place a specific provision for handling hazardous substances, which is prohibited unless in compliance with regulatory requirements.
- The Act empowers any person, apart from authorised government officers, to file a complaint in a court regarding any contravention of the provisions of the Act.

8.4.1. Statutory bodies under the EPA, 1986:

- **Genetic Engineering Appraisal Committee**
- **National Coastal Zone Management Authority** (later converted to **National Ganga Council** under Ministry of JalSakthi)

The ozone-depleting substances (regulation and control) rules, 2000.

It set deadlines for phasing out of various Ozone Depleting Substances (ODSs) and regulating production, trade import, and export of the product containing ODS. These rules prohibit the use of CFCs, halons, ODSs such as carbon tetrachloride and methyl chloroform, and SFC except in metered-dose inhalers and for other medical purposes.

Coastal Regulation zone notification 2018:

It was notified based on the recommendations of the **Shailesh Nayak Committee.** To promote sustainable development while taking into account the natural hazards such as increasing sea levels due to global warming. To conserve and protect biodiversity besides livelihood security to local communities including the fishermen. CRZs have been classified into 4 zones for regulation:

1. **CRZ I– ecologically sensitive areas such** as mangroves, coral reefs, salt marshes, turtle nesting ground, and the inter-tidal zone.
2. **CRZ II– areas close to the shoreline** and which have been developed.
3. **CRZ III- Coastal areas that are not substantially built up**, including rural coastal areas.
4. **CRZ IV- water area from Low Tide Line (LTL) to the limit of territorial waters of India.**

8.4.2. The energy conservation act, 2001

It was enacted as a step towards improving energy efficiency and reducing wastage. It specifies the energy consumption standards for equipment and appliances. It prescribes energy consumptions norms and standards for consumers. It prescribes energy conservation building codes for commercial buildings. **Bureau of energy efficiency (BEE)** is a statutory body established under the act.

8.4.3. Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 (FRA)

The act recognizes and vests the forest rights and occupation in forest land in **Forest Dwelling Scheduled Tribes (FDST)** and Other **Traditional Forest Dwellers (OTFD)** who have been residing in such forests for generations. This act comes under the aegis of the Ministry of Tribal Affairs. The act also establishes the responsibilities and authority for sustainable use, conservation of biodiversity, and maintenance of the ecological balance of FDST and OTFD. It strengthens the conservation regime of the forests while ensuring the livelihood and food security of the FDST and OTFD. It seeks to rectify colonial injustice to the FDST and OTFD who are integral to the very survival and sustainability of the forest ecosystem. The act identifies four types of rights:

a. Title rights

It gives FDST and OTFD the right to ownership of land farmed by tribals or forest dwellers subject to a maximum of 4 hectares. Ownership is only for land that is being cultivated by the concerned family and no new lands will be granted.

b. Use rights

The rights of the dwellers extend to extracting Minor Forest Produce, grazing areas, pastoralist routes, etc.

c. Relief and development rights

To rehabilitation in case of illegal eviction or forced displacement and basic amenities, subject to restrictions for forest protection

d. Forest management rights

It includes the right to protect, regenerate or conserve or manage any community forest resource which they have been traditionally protecting and conserving for sustainable use.

8.4.4. The National Green Tribunal Act, 2010

Under the National Green Tribunal Act 2010 for effective and expeditious disposal of cases relating to environmental protection and conservation of forests and other natural resources including enforcement of any legal right relating to environment and giving relief and compensation for damages to persons and property and for matters connected therewith or incidental thereto. It is a specialized body equipped with the necessary expertise to handle environmental disputes involving multidisciplinary issues. The Tribunal shall not be bound by the procedure laid down under the Code of Civil Procedure, 1908, but shall be guided by principles of natural justice.

The Tribunal's dedicated jurisdiction in environmental matters shall provide speedy environmental justice and help reduce the burden of litigation in the higher courts. The Tribunal is mandated to make and endeavour for disposal of applications or appeals finally within 6 months of filing of the same. Initially, the NGT is proposed to be set up at five places of sittings and will follow circuit procedure for making itself more accessible. New Delhi is the Principal Place of

Sitting of the Tribunal and Bhopal, Pune, Kolkata and Chennai shall be the other 4 place of sitting of the Tribunal. It was established in concurrence to **Rio Summit 1992** to provide judicial and administrative remedies for the victims of the pollutants and other environmental damage. It also agrees with **article 21, the Right to a healthy environment to its citizens of the constitution.** The NGT has to dispose of the cases presented to it within 6 months of their appeals. NGT has original jurisdiction on matters related to substantial questions of the environment. The decisions of the NGT can be challenged in High Courts and the Supreme Court. NGT deals with the civil cases under the 7 acts related to the environment:

- Water (Prevention And Control Of Pollution) Act, 1974
- Water (Prevention And Control Of Pollution) Cess Act, 1974
- Air (Prevention And Control Of Pollution) Act, 1977
- Forest Conservation Act, 1980
- Environmental Protection Act, 1986
- Public Liability Insurance Act 1991
- Biological Diversity Act, 2002

There are two acts that have been kept out of the jurisdiction of NGT:

1. Wildlife Protection Act, 1972
2. Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 (FRA)

8.4.5. Compensatory Afforestation Fund Act, 2016

The CAF Act was enacted to manage the funds collected for compensatory afforestation which till then was managed by **ad hoc Compensatory Afforestation Fund Management and Planning Authority (CAMPA). Compensatory afforestation** means that every time forest land is diverted for non-forest purposes such as mining or industry, the user agency pays for planting forests over an equal area of non-forest land, or when such land is not available, twice the area of degraded forest land. As per the rules, **90% of the CAF money is to be given to the states while 10% is to be retained by the Centre.** The funds can be used for the treatment of catchment areas, assisted natural

generation, forest management, wildlife protection and management, relocation of villages from protected areas, managing human-wildlife conflicts, training and awareness generation, supply of wood saving devices, and allied activities. The need for protection and conservation of environment and sustainable use of natural resources is reflected in the constitutional framework of India and also in the international commitments of India. The Constitution under Part IVA (Art 51A-Fundamental Duties) casts a duty on every citizen of India to protect and improve the natural environment including forests, lakes, rivers and wildlife, and to have compassion for living creatures. Further, the Constitution of India under Part IV (Art 48A-Directive Principles of State Policies) stipulates that the State shall endeavour to protect and improve the environment and to safeguard the forests and wildlife of the country. Several environment protection legislations existed even before Independence of India. However, the true thrust for putting in force a well-developed framework came only after the UN Conference on the Human Environment (Stockholm, 1972). After the Stockholm Conference, the National Council for Environmental Policy and Planning was set up in 1972 within the Department of Science and Technology to establish a regulatory body to look after the environment-related issues. This Council later evolved into a full-fledged Ministry of Environment and Forests (MoEF). MoEF was established in 1985, which today is the apex administrative body in the country for regulating and ensuring environmental protection and lays down the legal and regulatory framework for the same. Since the 1970s, a number of environment legislations have been put in place. The MoEF and the pollution control boards ("CPCB", ie, Central Pollution Control Board and "SPCBs", ie, State Pollution Control Boards) together form the regulatory and administrative core of the sector.

Some of the important legislations for environment protection are as follows:

- **The National Green Tribunal Act, 2010**
- **The Air (Prevention and Control of Pollution) Act, 1981**
- **The Water (Prevention and Control of Pollution) Act, 1974**
- **The Environment Protection Act, 1986**
- **The Hazardous Waste Management Regulations, etc.**

Various news reports suggest that over 100 changes have been suggested by the Prime Minister's Office (PMO) to ensure the ease of doing business in India. According to the ministry, some of these changes call for a single clearance window to save time for various development projects like power infrastructure, defence installations and roads. According to an environment ministry official, the government will also finalise the changes made in the Environment Impact Notification 2006 by suggesting standardised terms of references for industrial projects. The ministry will also finalise the issue of land banks that will be accessible to industries for compensatory afforestation.

About the six laws

The six laws related to environmental protection and wildlife are: The Environment (Protection) Act, 1986; The Forest (Conservation) Act, 1980; The Wildlife Protection Act, 1972; Water (Prevention and Control of Pollution) Act, 1974; Air (Prevention and Control of Pollution) Act, 1981 and The Indian Forest Act, 1927.

8.4.6. Biological diversity act 2002

It was implemented to give effect to **CBD, Nagoya Protocol**. To check biopiracy, protect biological diversity, and local growers through a three-tier structure of central and state boards and local committees. To set up National Biodiversity Authority (NBA), State Biodiversity Boards (SBBS), and Biodiversity Management Committees (BMCS). The Biological Diversity Act 2002 and Biological Diversity Rules provide for the conservation of biological diversity, sustainable use of its components, and fair and equitable sharing of the benefits arising out of the use of biological resources and knowledge associated with it.

- Prohibition on transfer of Indian genetic material outside the country, without specific approval of the Indian Government;
- Prohibition on anyone claiming an Intellectual Property Right (IPR), such as a patent, over biodiversity or related knowledge, without permission of the Indian Government;

- Regulation of collection and use of biodiversity by Indian nationals, while exempting local communities from such restrictions;
- Measures for sharing of benefits from the use of biodiversity, including transfer of technology, monetary returns, joint Research & Development, joint IPR ownership, etc.;
- Measures to conserve and sustain-ably use biological resources, including habitat and species protection, Environmental Impact Assessments (EIAs) of projects, integration of biodiversity into the plans, programmes, and policies of various departments/sectors;
- Provisions for local communities to have a say in the use of their resources and knowledge, and to charge fees for this; Protection of indigenous or traditional knowledge, through appropriate laws or other measures such as registration of such knowledge;
- Regulation of the use of genetically modified organisms; Setting up of National, State, and Local Biodiversity Funds, to be used to support conservation and benefit-sharing;
- Setting up of Biodiversity Management Committees (BMC) at local village level, State Biodiversity Boards (SBB) at state level, and a National Biodiversity Authority (NBA).

8.4.7. The Public Liability Insurance Act and Rules 1991 and Amendment, 1992

The Public Liability Insurance Act and Rules 1991 and Amendment, 1992 were drawn up to provide for public liability insurance for the purpose of providing immediate relief to the persons affected by accident while handling any hazardous substance. For more information visit Public Liability Insurance Act (68.5)

The National Environmental Tribunal Act, 1995, Amendment 2010

The Act has been created to award compensation for damages to persons, property, and the environment arising from any activity involving hazardous substances. The three major objectives of the Green Tribunal are

- The effective and speedy disposal of the cases relating to environment protection and conservation of forests and other natural resources. All the previous pending cases will also be heard by the Tribunal.
- It aims at enforcing all the legal rights relating to the environment
- It also accounts for providing compensation and relief to effected people for damage of property.

The salient features of amendment are as follows:

- Amendment provides an equal opportunity to any citizen of India to approach the National Green Tribunal.
- It ensures that the tribunal takes into consideration principles of Sustainable Development, Precautionary principles, Polluter Pays Principles and Inter generational Equity while hearing any appeal and giving judgements.

8.4.8.The National Environment Appellate Authority Act,1997

The National Environment Appellate Authority Act has been created to hear appeals with respect to restrictions of areas in which classes of industries etc. are carried out or prescribed subject to certain safeguards under the EPA.

8.4.9. The Biomedical waste (Management and Handling) Rules,1998

The Biomedical waste (Management and Handling) Rules,1998 is a legal binding on the health care institutions to streamline the process of proper handling of hospital waste such as segregation, disposal, collection, and treatment.

8.4.10. The Environment (Siting for Industrial Projects) Rules, 1999

The Environment (Siting for Industrial Projects) Rules, 1999 lay down detailed provisions relating to areas to be avoided for siting of industries, precautionary measures to be taken for site selecting as also the aspects of environmental protection which should have been incorporated during the implementation of the industrial development projects.

8.4.11. The Municipal Solid Wastes (Management and Handling) Rules, 2000

The Rules apply to every municipal authority responsible for the collection, segregation, storage, transportation, processing, and disposal of municipal solid wastes.

8.4.12. The Ozone Depleting Substances (Regulation and Control) Rules, 2000

The Ozone Depleting Substances (Regulation and Control) Rules, 2000 have been laid down for the regulation of production and consumption of ozone depleting substances. For more information visit ODS.

8.4.13. The Batteries (Management and Handling) Rules, 2001

These rules shall apply to every manufacturer, importer, re-conditioner, assembler, dealer, auctioneer, consumer, and bulk consumer involved in the manufacture, processing, sale, purchase, and use of batteries or components so as to regulate and ensure the environmentally safe disposal of used batteries.

8.4.14. The Noise Pollution (Regulation and control) (Amendment) Rules, 2010

These rules lay down such terms and conditions as are necessary to reduce noise pollution, permit use of loud speakers or public address systems during night hours (between 10:00 p.m. to 12:00 midnight) on or during any cultural or religious festive occasion.

Following are the salient features of the amendment:

- In the heading 'PUBLIC ADDRESS SYSTEM' the words 'AND SOUND PRODUCING SYSTEMS' shall be inserted.
- A loudspeaker or any sound producing system or a sound amplifier shall not be used at night time except in closed premises for communication within like auditorium, conference rooms, community halls, banquet halls or during public emergency.
- The noise level at the boundary of the public place where loudspeaker or public address system is being used the sound should not exceed 10dB above the ambient noise standards of that area or 75dB whichever is less.
- No horn shall be used in silence zones or residential areas at night except in emergency situations.

8.5. The Water (Prevention and Control of Pollution) Act, 1974

Water pollution is a big problem in India, and its control and prevention are other big problems. So far, we have not been able to raise awareness of the

importance of water conservation. The law, of course, provides for various authorities that will work to prevent this; the law provides various complaints procedures and the powers of various agencies. However, more work needs to be done to make the law more comprehensive, involve more local people, and make it a strong deterrent with heavier penalties. Most importantly, more emphasis should be placed on the enforcement aspect, as pollution can not only be controlled through legislation but also must be adequately enforced. The purpose of enacting the Water Act is to prevent and control water pollution in India. Pollution means the contamination of water, or the alteration of the physical, chemical, or biological properties of water, or the discharge of sewage or commercial sewage or other liquids, gases, and solids (whether directly or indirectly) into the water, or as apposite to cause a nuisance or harmful to public health or safety or domestic, commercial, industrial, agricultural or other lawful uses or the life and health of an animal or plant or aquatic tissue. The Water Prevention and Control of Pollution Act, 1974 (the "Water Act") has been enacted to provide for the prevention and control of water pollution and to maintain or restore wholesomeness of water in the country. The further provides for the establishment of Boards for the prevention and control of water pollution with a view to carry out the aforesaid purposes.

Objective:

- To provide prevention and control of water pollution. Maintaining or restoring of wholesomeness and purity of water in the various sources of water.
- It vests regulatory authority in **Centre Pollution Control Boards (CPCB)** and **State Pollution Control Board (SPCB).**
- CPCB and SPSB are statutory bodies created under the Water Act, 1974. It empowers CPCB and SPCB to establish and enforce effluent standards for factories discharging pollutants into water bodies.
- CPCB performs these same functions for union territories along with formulating policies related to the prevention of water pollution and coordinating activities of different SPSBs.
- SPCB controls sewage and industrial effluent discharge by approving, rejecting, and granting consent to discharge.

- The Water Prevention and Control of Pollution Act, 1974 (the "Water Act") has been enacted to provide for the prevention and control of water pollution and to maintain or restore wholesomeness of water in the country.
- It further provides for the establishment of Boards for the prevention and control of water pollution with a view to carry out the aforesaid purposes.
- The Water Act prohibits the discharge of pollutants into water bodies beyond a given standard, and lays down penalties for non-compliance.
- At the Centre, the Water Act has set up the CPCB which lays down standards for the prevention and control of water pollution. At the State level, SPCBs function under the direction of the CPCB and the State Government.
- Further, the Water (Prevention and Control of Pollution) Cess Act was enacted in 1977 to provide for the levy and collection of a cess on water consumed by persons operating and carrying on certain types of industrial activities.
- This cess is collected with a view to augment the resources of the Central Board and the State Boards for the prevention and control of water pollution constituted under the Water (Prevention and Control of Pollution) Act, 1974. The Act was last amended in 2003.
- The Water (Prevention and Control of Pollution) Act, 1974 was enacted to prevent and control water pollution and maintain or restore water health in the country. The law was amended in 1988.
- The Water Act prohibits the discharge of pollutants into water bodies beyond a given standard, and lays down penalties for non-compliance.
- At the Centre, the Water Act has set up the CPCB which lays down standards for the prevention and control of water pollution. At the State level, SPCBs function under the direction of the CPCB and the State Government.
- The Act prohibits discharge of pollutants into water bodies beyond a given standard and lays down penalties for non-compliance with its provisions.
- It set up the Central Pollution Control Board (CPCB) which lays down standard for the prevention and control of water pollution. At the state level,

the State Pollution Control Board (SPCB) functions under the direction of CPCB.

- The functions of CPCB have been laid down in section 16 whereas the functions of SPCB have been laid down in section 17.
- In Delhi Bottling Co. Pvt. Ltd. V. CPCB, AIR 1986 Del 152, it was found that the representatives of board got the samples analysed from a non-recognized laboratory by the state. The court held that since section 21 was not complied upon, the test results were inadmissible as evidence.

8.6. The Air (prevention and control of pollution) act, 1981

The Air (Prevention and Control of Pollution) Act, 1981 (the "Air Act") is an act to provide for the prevention, control and abatement of air pollution and for the establishment of Boards at the Central and State levels with a view to carrying out the aforesaid purposes. The Air Act empowers the State Government, after consultation with the SPCBs, to declare any area or areas within the State as air pollution control area or areas. Under the Act, establishing or operating any industrial plant in the pollution control area requires consent from SPCBs. The act targets to control and prevent air pollution in India and its main objectives are:

- To provide for prevention, control, and abatement of air pollution.
- To provide for the establishment of the boards at the central and state levels to implement the act**.**

CPCB and SPCB were given the responsibility.

- It states that the sources of air pollution such as internal combustion engines, industry, vehicles, power plants, etc., are not permitted to release particulate matter, lead, carbon monoxide, sulphur dioxide, nitrogen oxide, volatile organic compounds (VOCs), or other toxic substances beyond the predetermined limit.
- It empowers the state government to designate air pollution areas.
- The Act aims to control and prevent air pollution in India, and some of its main objectives are:
- Prevent, control, and reduce air pollution.

- To provide for the establishment of boards to enforce the law at the federal and state levels. Central Pollution Control Board (CPCB) and State Pollution Control Board (SPCB) were given the responsibility.
- To counter the problems associated with air pollution, ambient air quality standards were established under the Air Act.
- The Air Act seeks to combat air pollution by prohibiting the use of polluting fuels and substances, as well as by regulating appliances that give rise to air pollution.
- SPCBs are also expected to test the air in air pollution control areas, inspect pollution control equipment, and manufacturing processes.
- To implement the decision taken in the Stockholm Conference, the Parliament enacted the Air Act under Article 253.
- It controls mainly air pollution and its abatement. Also establishes air quality standards.
- The Central and State Boards set up under section 16 and 17 independently notify emission standards.
- Every industrial operator within a declared air pollution area, must obtain a permit from the State Board (Sec-21(1) and (2)).
- Within four months from the date of application for the permit, the board must complete the formalities – either grant or refuse consent.

Power of the Boards:

- Power of entry and inspection
- Power to take samples
- Power to give directions

8.7. The Wildlife (Protection) Act, 1972

The government of India has made numerous acts to protect the environment and biodiversity. The important and impactful environmental laws and acts are listed and explained below. The Act provides for the protection of wild animals, birds, and plants; and for matters connected therewith or ancillary or incidental thereto. It extends to the whole of India. The Wild Life (Protection)

Act, 1972 was enacted with the objective of effectively protecting the wild life of this country and to control poaching, smuggling and illegal trade in wildlife and its derivatives. The Act was amended in January 2003 and punishment and penalty for offences under the Act have been made more stringent. The Ministry has proposed further amendments in the law by introducing more rigid measures to strengthen the Act. The objective is to provide protection to the listed endangered flora and fauna and ecologically important protected areas.

8.7.1. It has six schedules that give varying degrees of protection:

- **Schedule I and part II of Schedule provide absolute protection**, offences under these are prescribed the highest penalties.
- Species listed in **Schedule III and Schedule IV** are also protected, but the **penalties are much lower**.
- Animals under **Schedule V**, e.g. common crows, fruit bats, rats, and mice, are legally considered **vermin** and may be hunted freely.
- The specified **endemic plants in Schedule VI are prohibited from cultivation and planting.**

8.7.2. Statutory bodies under WPA:

1. National Board for Wildlife and state wildlife advisory boards
2. Central Zoo Authority
3. Wildlife Crime Control Bureau
4. National Tiger Conservation Authority

- The Act protects the nation's wildlife, bird and plant species to ensure environmental safety. Among other things, the law imposes restrictions on hunting many animal species.
- The law was last amended in 2006. An Amendment was submitted to the RajyaSabha in 2013 and referred to the Standing Committee but was withdrawn in 2015.
- In India, the Wildlife (Protection) Act 1972 safeguards and protects wild animals. The law is a product of a time when environmental jurisprudence is rapidly developing in India and deserves due credit for judicial activism.

- The enactment of this law acknowledges that all previous laws, such as the Wild Birds and Animals Protection Act of 1912 were inadequate. The current law is comprehensive and covers mostly all the gaps that existed in the previous law.
- However, there are still substantial gaps in the applicable law. There is a vacuum between theoretical laws and practical implementation. In addition, the aim of the law is diluted by bureaucratic interference.
- The Act provides for the protection of wild animals, plants, and birds. It straddles the whole of India. It has six schedules that give different levels of protection:
- Schedule I and part II provide absolute protection, and offences under these will be subject to the highest penalties. Species listed in Schedule III and IV are also protected but with much lower penalties.
- Animals that come under Schedule V, such as common crows, fruit bats, mice, and rats, are legally considered pests and can be hunted freely.
- The endemic plants listed in Schedule VI shall not be cultivated.
- The Wildlife (Protection) Amendment Bill, 2021, The Wild Life (Protection) Amendment Bill, 2021 was introduced in LokSabha by the Ministry of Environment, Forest and Climate Change. The Bill aims to increase the number of species protected under the law and implement the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES).

8.7.3. Some of the key areas the Bill focuses on:-

Standing Committees of State Boards of Wildlife: This Bill proposes the creation of a Standing Committees of State Boards of Wildlife. These Committees will operate like the National Board for Wildlife (NBWL). It can make decisions about wildlife management and project licensing without having to refer most projects to NBWL.

Rationalization of Schedules for Wildlife: The Bill simplifies Schedules for Wildlife under the Act, bringing it down from 6 to 4 major Schedules. The Bill states that the Wildlife Management Plans, which are prepared for national parks across the country, are now part of the Wildlife Act. The Chief Wildlife Warden must also approve them of the state. This ensures stricter protection of these protected areas. Previously, the plans were approved by executive order.

8.8. Summary

India has implemented several significant environmental acts to address the country's environmental challenges and promote sustainable development. The Water (Prevention and Control of Pollution) Act, 1974 aim to prevent and control water pollution by regulating the discharge of pollutants into water bodies and establishing authorities to enforce pollution control measures. The Air (Prevention and Control of Pollution) Act, 1981 provides provisions for regulating industrial emissions, setting emission standards, and establishing pollution control boards. The Environment (Protection) Act, 1986 covers a wide range of issues, including environmental impact assessment, hazardous waste management, and conservation of forests and wildlife. The Forest (Conservation) Act, 1980 requires prior approval from the central government for any diversion and aims to ensure the conservation and sustainable management of forests. The Wildlife Protection Act, 1972 prohibits hunting of protected species, establishes protected areas .The National Green Tribunal Act, 2010 is also related to environmental protection and conservation, providing a forum for speedy resolution of environmental disputes. The Hazardous and Other Wastes aim to regulate the management of hazardous and other wastes, including their generation, collection, storage, transportation, treatment, and disposal. These acts, among others, play a crucial role in addressing environmental issues in India, promoting sustainable development, and ensuring the protection of the country's natural resources, biodiversity, and ecosystems.

8.9. Terminal questions

Q.1: Discuss the objectives and policies of environmental acts.

Answer: ----------

Q.2: What are environmental laws and protection Acts? Discuss briefly.

Answer: ----------

Q.3: What is the existing provision of central and state?

Answer: ----------

Q.4: Discuss the government on environment protection.

Answer: ----------

Q.5: Discuss the Environment (protection) Act (1986) and its limitations and advantages.

Answer: ----------

Q.6: What is the definition of water pollution according of CPCB? Discuss the water Act (1974).

Answer: ----------

Q.7: What is the definition of air pollution according of CPCB? Discuss the air act (1981).

Answer: ----------

8.10. Further suggested readings

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2. Anjaneyulu Yerramilli, Environmental Impact Assessment Methodologies, BS Publications-2020.
3. George Alex, Environmental Impact Assessment (EIA), Blue Rose Publishers-2020.
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5. N. Maheshwara Swamy, Text Book on Environmental Law, Asia Law House-2022

Unit-9: Guidelines and Policies

Contents

9.1. Introduction

Environmental protection guidelines and policies are essential tools used by governments, organizations, and communities to promote sustainable practices and mitigate the negative impacts of human activities on the environment. These guidelines and policies aim to protect natural resources, preserve biodiversity, reduce pollution, and address climate change. Environmental protection policies often emphasize the concept of sustainable development, which seeks to meet the needs of the present generation without compromising the ability of future

generations to meet their own needs. This involves balancing economic development with social well-being and environmental conservation. We consider that our number one mission is to satisfy our customers by providing safe and high quality product and service.1) Responsibility for business activity: we fulfil our corporate responsibilities in environmental protection, loss reduction, effective use and recycling of resources, energy conservation, waste reduction and prevention of environmental pollution throughout our business activities.2) cooperation with customer and disclosure of information: we listen to the customer feedback and work with them on environmental protection and them inspect, document and disclose the result of all our other customer and employees.3) cooperation with local communities and social contribution: we consider environment issues in cooperation within the environmental field to fulfil our role as a cooperate citizen.4) Employee responsibility and awareness: we ensure that all our employee act, based on these environmental guidelines, with an awareness of their own roles in regard to environmental issues in their respective positions within the company and within the society. However, the guidelines and policies focus on the sustainable use and conservation of natural resources such as forests, water, minerals, and energy sources. They promote responsible extraction, efficient consumption, and the protection of ecosystems to maintain ecological balance. Environmental policies address various forms of pollution, including air, water, and soil pollution. They establish standards and regulations to limit emissions, encourage the use of clean technologies, and promote waste management practices that minimize environmental harm.

Objectives:

- To discuss the guidelines and policies for control of environmental pollution
- to discuss the major environment policies and legislations in India
- to discuss the hazardous waste management rules 2016
- to discuss solid waste management rules 2016

9.2. Guidelines and policies for control of Environmental Pollution

Environmental Pollution is one of the major problems that we have been facing globally. It reduces our necessities and the biggest concern is it

accumulates pollution. Pollution has many forms, the water that we drink to the sound that we hear can be considered as some aspects that contribute to environmental pollution which would, in turn, lead to health hazards, adverse effect on ecosystem and wildlife. Pollution can be stated as the introduction of harmful substances or any foreign particles that would have a bad effect on the environment.

Pollution Prevention Law and Policies

Every significant pollution control regulation in the United States (e.g., Clean Water Act, Safe Drinking Water Act, Clean Air Act, Resource Conservation and Recovery Act, Toxic Substances Control Act, and the Comprehensive Environmental Response Compensation and Liability Act) allows for chemical pollution up to set limits that are (presumably) established to protect human health and the environment.

P2 Law

In 1990, Congress passed the Pollution Prevention Act (P2 Act) which states "The Environmental Protection Agency must establish a source reduction program which collects and disseminates information, provides financial assistance to States, and implements the other activities.

The "Findings" section of the Pollution Prevention Act of 1990 explains why Congress passed the Act. Some of the reasons include:

- The United States of America annually produces millions of tons of pollutants and spends tens of billions of dollars per year controlling this pollution.
- There are significant opportunities for industry to reduce or prevent pollution at source through cost-effective changes in production, operation, and raw materials use.
- The opportunities for source reduction are often not realized because existing regulations, and the industrial resources they require for compliance, focus upon treatment and disposal, rather than source reduction.
- Source reduction is fundamentally different and more desirable than waste management and pollution control.

P2 Defined

Pollution prevention is reducing or eliminating waste at the source by modifying production processes, promoting the use of nontoxic or less toxic substances, implementing conservation techniques, and reusing materials rather than putting them into the waste stream.

Pollution prevention means source reduction and EPA defines P2 in this Memorandum - May 28, 1992, Subject: EPA Definition of "Pollution Prevention."

The Pollution Prevention Act defines "source reduction" to any mean practice which:

- Reduces the amount of any hazardous substance, pollutant, or contaminant entering any waste stream or otherwise released into the environment (including fugitive emissions); prior to recycling, treatment or disposal; and
- Reduces the hazards to public health and the environment associated with the release of such substances, pollutants or contaminants.

The term includes: equipment or technology modifications; process or procedure modifications; reformulation or redesign of products; substitution of raw materials; and improvements in housekeeping, maintenance, training or inventory control. Under the Pollution Prevention Act, recycling, energy recovery, treatment and disposal are not included within the definition of pollution prevention.

National Pollution Prevention Policy

The Pollution Prevention Act establishes a national policy that EPA implements:

- Pollution should be prevented or reduced at the source whenever feasible;
- Pollution that cannot be prevented should be recycled in an environmentally safe manner whenever feasible;
- Pollution that cannot be prevented or recycled should be treated in an environmentally safe manner whenever feasible; and
- Disposal or other release into the environment should be employed only as a last resort and should be conducted in an environmentally safe manner.

2010-2014 Pollution Prevention Program Strategic Plan - This plan identifies a number of opportunities to reduce: the emission of greenhouse gases; the use of hazardous materials; and the use of natural resources, while contributing to a more sustainable economy.

Evaluation of EPA Efforts to Integrate Pollution Prevention Policy throughout EPA and at Other Federal Agencies - This evaluation, from October 2008, describes key areas that could benefit from additional attention to P2 integration and makes connections between P2 integration activities and sustainability policy developments.

Pollution Prevention Policy Statement - New Directions for Environmental Protection, Carol M. Browner - then EPA Administrator. June 15, 1993.

Executive Orders

Former executive orders related to P2 and environmentally preferable purchasing:

- Executive Order 14057 on Catalyzing American Clean Energy Industries and Jobs Through Federal Sustainability.
- Executive Order 13834, "Efficient Federal Operations" was signed by President Trump on May 17, 2018 (revoked except for sections 6,7, and 11).
- Executive Order 13693, “Planning for Federal Sustainability in the Next Decade” was signed by President Obama on March 19, 2015.
- Executive Order 13514, “Federal Leadership in Environmental, Energy, and Economic Performance" was signed by President Obama on October 8, 2009.
- Executive Order 13423, "Strengthening Federal Environmental, Energy, and Transportation Management" was signed by President George W. Bush on January 24th, 2007.
- Executive Order 13101, “Greening the Government Through Waste Prevention, Recycling, and Federal Acquisition” was signed by President Clinton on September 14, 1998.
- Executive Order 12873, “Federal Acquisition, Recycling, and Waste Prevention” was signed by President Clinton on October 22, 1993.

Pollution Prevention Mandates in Federal Statutes

Pollution Prevention Act (PPA)

§ 13103 - EPA mandated to develop and implement a strategy to promote source reduction.

§ 13104 - EPA as administrator is given the authority to provide grants to the States to promote source reduction by businesses.

§ 13105 - EPA mandated to establish a database that contains information on source reduction.

§ 13106 - Owners and operators of businesses that are required to file a toxic chemical release form must include a toxic reduction and recycling report.

Clean Air Act (CAA)

§ 7402 - Encourages cooperation amongst the federal departments, states, and local governments for prevention and control of air pollution.

§ 7403 - EPA mandated to establish a national research and development program for prevention and air pollution control.

Also, EPA must facilitate coordination amongst air pollution prevention and control agencies.

§ 7405 - EPA can make grants to air pollution prevention and control agencies.

§ 7412 - Facilities that reduce their emission of toxics into the air by 90-95% can qualify for permit waivers.

§ 7414 - 7418 - EPA may establish record keeping, inspections, and monitoring for all facilities that emit pollutants.

§ Subchapter I, Part C Sec 7470-7479 - Prevention of significant deterioration of air quality-establishment of a plan that includes emissions limitations to protect public welfare and the environment.

§ Subchapter II 12. General emissions standards.

Emergency Planning and Community Right to Know Act (EPCRA)

§ 11001-11005 - Emergency planning requirements for pollution and fire control. Provides substances and facilities covered under this act.

§ 11021-11022 - Facilities covered under EPCRA must have ready Material Safety Data Sheets for all chemicals (MSDS) and must complete hazardous chemical inventory forms.

§ 11023 - Owners and operators of facilities covered under EPCRA must complete a toxic chemical release form.

Resource Conservation and Recovery Act (RCRA)

§ 6907 - EPA must establish waste management guidelines.

§ 6908a - EPA may assist Indian tribes in waste management.

§ 6921: Hazardous Waste requirements established for owners and operators of facilities that produce hazardous wastes.

Under § 6922 - Generators must certify in shipping manifests that they have a plan to reduce waste. They must also submit a biennial report indicating their efforts to reduce volume and toxicity of wastes.

§ 6925 - Permit required for treatment and storage of hazardous wastes.

§ 6927 - EPA can make facilities describe their waste reduction program and inspect them to determine whether a program is actually in place.

§ 6931 - Grants appropriation to the States for assistance in development of Hazardous Waste Programs.

§ 6981 - EPA shall render financial assistance to federal, state, and local agencies that are researching, investigating, or providing in areas of waste management and minimization.

Clean Water Act (CWA)

§ 1251 - National goal is to eliminate the discharge of pollutants into navigable waters.

§ 1252 - EPA mandated in cooperation with federal state, and local agencies and industries to develop programs for preventing, reducing, or eliminating the pollution of the navigable waters and ground waters and improving the sanitary condition of surface and underground waters.

§ 1256 - Appropriation of funds to state and local agencies for pollution control.

§ 1342 - EPA can put additional restrictions on permits (not included in the act).

§ 1381 - EPA given authority to make grants to states for pollution control revolving fund for implementation of management and conservation plans.

Federal Insecticide, Fungicide and Rodenticide Act (FIFRA)

§ 136 - All pesticides and pesticide establishments must be registered. Non-registered pesticides may not be sold or distributed in the U.S.

National Environmental Policy Act (NEPA)

§ 4331 - Congress recognizes "the profound impact of man's activity on the interrelations of all components of the natural environment."

§ 4363 - EPA shall establish a program for long -term research for all activities listed under NEPA.

§ 4363a-EPA mandated to conduct demonstrations of energy-related pollution control technologies.

§ 4368a-Utilization of talents of older Americans in projects of pollution prevention, abatement, and control through technical assistance to environmental agencies.

§ 4368b-Provide technical assistance to Indian Tribes for environmental assistance on Indian lands.

9.3. Major environment policies and legislations in India

The Ministry of Environment & Forests is the nodal agency in the administrative structure of the Central Government, for the planning, promotion, co-ordination and overseeing the implementation of environmental and forestry programmes. The Ministry is also the Nodal agency in the country for the United Nations Environment Programme (UNEP). The principal activities undertaken by Ministry of Environment &Forests, consist of conservation & survey of flora, fauna, forests and Wildlife, prevention & control of pollution, afforestation & regeneration of degraded areas and protection of environment, in the frame work of legislations. The main tools utilized for this include surveys, impact assessment, control of pollution, regeneration programmes, support to organizations, research to solve solutions and training to augment the requisite

manpower, collection and dissemination of environmental information and creation of environmental awareness among all sectors of the country's population.

The **Central Pollution Control Board (CPCB),** statutory organisation, was constituted in September, 1974 under the Water (Prevention and Control of Pollution) Act, 1974. Further, CPCB was entrusted with the powers and functions under the Air (Prevention and Control of Pollution) Act, 1981. It serves as a field formation and also provides technical services to the Ministry of Environment and Forests for the provisions of the Environment (Protection) Act, 1986. Principal Functions of the CPCB, as spelt out in the Water (Prevention and Control of Pollution) Act, 1974, and the Air (Prevention and Control of Pollution) Act, 1981, (i) to promote cleanliness of streams and wells in different areas of the States by prevention, control and abatement of water pollution, and (ii) to improve the quality of air and to prevent, control or abate air pollution in the country.

9.3.1. Policies to protect environment in India

- Environment Protection Act, 1986
- National Conservation Strategy and Policy Statement on Environment and Development, 1992
- Policy Statement for the Abatement of Pollution, 1992
- National Environment Policy, 2006
- Vision Statement on Environment and Health

9.3.2. Legislations and Rules for the protection of environment in India

- Water pollution
- Air Pollution
- Environment Protection
- Wildlife
- Forest Conservation
- Biodiversity
- National Green Tribunal
- Animal Welfare

Various Initiatives undertaken by Government for mitigation of Air Pollution

Posted On: 22 NOV 2019 2:39PM by PIB Delhi

Government is taking all efforts for the mitigation of air pollution in the country. Central Government has taken a number of regulatory measures for prevention, control and abatement of air pollution in the country.

Action Plans for Improvement of Air Quality…..

- The Central Government has launched National Clean Air Programme (NCAP) under the Central Sector "Control of Pollution" Scheme as a long-term, time-bound, national level strategy to tackle the air pollution problem across the country in a comprehensive manner with targets to achieve 20 % to 30 % reduction in PM_{10} and $PM_{2.5}$ concentrations by 2024 keeping 2017 as the base year for the comparison of concentration.102 non-attainment cities mostly in Indo-Gangetic Plains have been identified based on ambient air quality data for the period 2011 – 2015 and WHO report 2014/2018. The city specific Action Plans have been approved for all 102 non-attainment cities for implementation on ground.
- The Central Government has notified a Comprehensive Action Plan (CAP) in 2018 identifying timelines and implementing agencies for actions identified for prevention, control and mitigation of air pollution in Delhi and NCR.
- Graded Response Action Plan (GRAP) was notified on January 12, 2017, for prevention, control and abatement of air pollution in Delhi and NCR. It identifies graded measures and implementing agencies for response to four AQI categories, namely, Moderate to Poor, Very Poor, Severe and Severe + or Emergency.
- Several steps have been taken for creating awareness amongst the general population. These steps are as follows.
- SAMEER app has been launched wherein air quality information is available to public along with provision for registering complaints against air polluting activities.
- Air quality information collection and dissemination are done from a centralized location. It provides real time air quality status to all stakeholders.
- A dedicated media corner, Twitter and Facebook accounts have been created for access to air quality related information and to provide a platform for lodging complaints by general population.

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- Crowd sourcing of innovative ideas/ suggestions/proposals from public is done through CPCB website to strengthen efforts for improving air quality in Delhi-NCR.
- The Ministry of Environment, Forest and Climate Change is implementing Environment Education, Awareness and Training Scheme with the objective to promote environmental awareness among all sections of the society and to mobilize people's participation for conservation of environment. Under the National Green Corps (NGC) programme of the Ministry, about one lakh schools have been identified as Eco-clubs, wherein, nearly thirty lakh students are actively participating in various environment protection and conservation activities, including the issues related to the air pollution.
- Ministry is promoting peoples participation and awareness building among citizens for environmental conservation that focus on promotion of cycling, saving water and electricity, growing trees, proper maintenance of vehicles, following of lane discipline and reducing congestion on roads by car pooling etc.
- For field feedback on air polluting activities in Delhi and major NCR towns, 46 teams of Central Pollution Control Board have been deployed since October 7, 2019.
- The initiatives taken by the Government for the abatement and control of air pollution in Delhi and NCR since 2016 have bore good results. As per Continuous Ambient Air Quality Monitoring Stations (CAAQMS) data, the number of 'Good', 'Satisfactory', and 'Moderate' days has progressively increased to 159 in 2018, as compared to 152 in 2017 and 106 in 2016, and the number of 'Poor', 'Very Poor' and 'Severe' days has reduced to 206, compared to 213 in 2017 and 246 in 2016. In Delhi, reduction in PM2.5 levels in 2018 is 7.3% over 2017 and 14.8% over 2016. In Delhi, reduction in PM10 levels in 2018 is 8.6% over 2017 and 16.5% over 2016.
- There is overall improvement in air quality of Delhi in 2019 (From Jan 2019 – 18th November, 2019) successively since 2016. Number of 'Good' to 'Moderate' days increased to 175 in 2019, as compared to 158 in 2018, and number of 'Poor' to 'Severe' days reduced to 147, compared to 164 in 2018.

- This information was provided by Minister of State, Ministry of Environment, Forest and Climate Change, Shri Babul Supriyo in written reply to a question in LokSabha today.

9.3.3. Ways to Reduce Environmental Pollution

Protection of our environment is one of our major responsibilities and a natural way of caring for self and for our future generations. There are several factors that would help reduce the impact of our consumption habits. Beneath are some of the practical ways that can be implemented in our daily life to reduce pollution.

Choosing a Transportation Facility

Avoid using a car for short-distance travel; instead, you can make use of a bicycle which will be beneficial in terms of health as well as in the reduction of air pollution.

- ✓ **Food Choices**

As transporting the food across various parts of the country would lead to consumption of considerable fuel, we can minimize the consumption of excessive fuel by choosing food products that have been grown locally and naturally using viable methods. Hence reducing air pollution.

- ✓ **Energy choices**

Ensure that you switch off the lights and other electrical appliances when you are not in the room. Unplugging them when not in use would also help to save energy. Use energy-efficient light bulbs.

- ✓ **Usage of Chemicals**

Make use of eco-friendly chemicals for washing utensils, cars and homes as they get washed down into the sewage system that would, in turn, get collected as groundwater.

- ✓ **Avoid Flushing your Medication**

Medicines with high dosage when end up in the sanitation system, are very difficult to isolate from the water system and would cause an adverse effect on people who would consume this water.

✓ **Conservation of Water**

Avoid excess unwanted usage of water. Some of the simple ways to prevent wastage of water include, making use of water-saving apparatus, fixing leakage of taps and avoiding washing utensils with running water.

- ✓ Conserve energy - at home, at work, everywhere.
- ✓ Look for the ENERGY STAR label when buying home or office equipment
- ✓ Car pool, use public transportation, bike, or walk whenever possible.
- ✓ Follow gasoline refuelling instructions for efficient vapor recovery, being careful not to spill fuel and always tightening your gas cap securely.
- ✓ Consider purchasing portable gasoline containers labeled "spill-proof," where available.
- ✓ Keep car, boat, and other engines properly tuned.
- ✓ Be sure your tires are properly inflated.
- ✓ Use environmentally safe paints and cleaning products whenever possible.
- ✓ Mulch or compost leaves and yard waste.
- ✓ Consider using gas logs instead of wood.

On Days when High Ozone Levels are Expected, Take these Extra Steps to Reduce Pollution:

- Choose a cleaner commute - share a ride to work or use public transportation.
- Combine errands and reduce trips. Walk to errands when possible.
- Avoid excessive idling of your automobile.
- Refuel your car in the evening when it's cooler.
- Conserve electricity and set air conditioners no lower than 78 degrees.
- Defer lawn and gardening chores that use gasoline-powered equipment, or wait until evening.

On Days when High Particle Levels are Expected, Take these Extra Steps to Reduce Pollution:

- Reduce the number of trips you take in your car.
- Reduce or eliminate fireplace and wood stove use.
- Avoid burning leaves, trash, and other materials.
- Avoid using gas-powered lawn and garden equipment.

9.4. Environmental Policy of India

Environment policies of the Government of India includes legislations related to environment. In the Directive Principles of State Policy, Article 48A says "the state shall endeavour to protect and improve the environment and to safeguard the forests and wildlife of the country"; Article 51-A states that "it shall be the duty of every citizen of India to protect and improve the natural environment including forests, lakes, rivers and wildlife and to have compassion for living creatures. India is one of the parties of the Convention on Biological Diversity (CBD) treaty. Prior to the CBD, India had different laws to govern the environment. The Indian Wildlife Protection Act 1972 protected the biodiversity. It was amended later multiple times. The 1988 National Forest Policy had conservation as its fundamental principle. In addition to these acts, the government passed the Environment (Protection) Act 1986 and Foreign Trade (Development and Regulation) Act 1992 for control of biodiversity. Environment policies of the Government of India include legislations related to environment. In the Directive Principles of State Policy, Article 48(a) says "the state shall endeavour to protect and improve the environment and to safeguard the forests and wildlife of the country"; Article 51-A states that "it shall be the duty of every citizen of India to protect and improve the natural environment including forests, lakes, rivers, and wildlife and to have compassion for living creatures."

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- Notably, the government has passed various legislations to curb the damage caused to the environment such as the Environmental Protection Act, 1986, Forest Conservation Act, 1980, Water Prevention and Control of Pollution Act, 1974, Biological Diversity Act, 2002, Public Liability Insurance Act 1889 and National Green Tribunal Act, 2010.

- According to Article 48 (A) of the Indian Constitution, the state shall try to protect and improve the environment. It should also endeavor to safeguard forests and wildlife of the country.

- According to Article 51(A) (g) of the Indian Constitution, every citizen of India has a fundamental duty to protect and improve the natural environment including forest, lakes, rivers, and wildlife and should have compassion for living creatures.

- Since about the late 1980s, the Supreme Court of India has been pro-actively engaged in India's environmental issues. In most countries, it is the executive and the legislative branches of the government that plan, implement and address environmental issues; the Indian experience is different. The Supreme Court of India has been engaged in interpreting and introducing new changes in the environmental jurisprudence directly. The Court has laid down new principles to protect the environment, re-interpreted environmental laws, created new institutions and structures, and conferred additional powers on the existing ones through a series of directions and judgments.

- The Court's directions on environmental issues go beyond the general questions of law, as is usually expected from the highest Court of a democratic country. The Supreme Court of India, in its order, includes executive actions and technical details of environmental actions to be implemented. Indeed, some critics of India's Supreme Court describe the Court as the *Lords of Green Bench* or *Garbage Supervisor*. Supporters of India's Supreme Court term these orders and the Indian bench as pioneering, both in terms of laying down new principles of law, and in delivering environmental justice.

- The reasons for the increasing interjection of India's Supreme Court in governance arenas are, experts claim, complex. A key factor has been the failure of government agencies and the state owned enterprises in discharging their Constitutional and Statutory duties. This has prompted civil society groups to file public interest complaints with the Courts, particularly the Supreme Court, for suitable remedies.

- Public interest litigation and judicial activism on environmental issues extends beyond India's Supreme Court. It includes the High Courts of individual states.

- India's judicial activism on environmental issues has, as some suggest, delivered positive effects to the Indian experience. Proponents claim that the Supreme Court has, through intense judicial activism, become a symbol of hope for the people of India. As a result of judicial activism, India's Supreme Court has delivered a new normative regime of rights and insisted that the Indian state cannot act arbitrarily but must act reasonably and in public interest on pain of its action being invalidated by judicial intervention.

- India's judicial activism on environmental issues has, as others suggest, had adverse consequences. Public interest cases are repeatedly failed to block infrastructure projects aimed at solving environmental issues in India, such as but not limiting to water works, expressways, land acquisition for projects, and electricity power generation projects. The litigation routinely delays such projects, often for years, whilst rampant pollution continues in India, and tens of thousands die from the unintended effects of pollution. Even after a stay related to an infrastructure project is vacated, or a court order gives a green light to certain project, new issues become grounds for court notices and new public interest litigation.

- Judicial activism in India has, in several key cases, found state-directed economic development ineffective and a failure, then interpreted laws and issued directives that encourage greater competition and free market to reduce environmental pollution. In other cases, the interpretations and directives have preserved industry protection, labour practices and highly polluting state-owned companies detrimental to environmental quality of India. Proactive measures should be taken to conserve the depleting environment.

The Indian government tried to stop Greenpeace freedom of expression in 2015.

Legislation	Year	Domain	Protected areas	Use of other natural resources

Indian Forest Act	1927	British India	Developed procedures for setting up and protection of reserved forests, protected forests, and village forests	Regulation of movement and transit of forest produce with duties on such produce. Special focus on timber
1st Five Year Plan	1951			
2nd Five Year Plan	1956			
3rd Five Year Plan	1961	Almost the same but with added deer conservation acts		
4th Five Year Plan	1969			
Wildlife Protection Act	1972	India except J &K	Formalisation of national parks, wildlife sanctuaries, *conservation reserves* and *community reserves*. Protection to habitat and wildlife within premises of such protected areas. Development of *National Board for Wildlife* and *State Boards for*	Penal codes for animal poaching, and trade in products derived from protected animals

			Wildlife for identification of future protected areas.	
National Wildlife Action Plan	1973			
5th Five Year Plan	1974			
6th Five Year Plan	1978			
7th Five Year Plan	1980. Forest (Conservation) Act, 1980 (with Amendments Made in 1988)	environment protection act 1986 [1] (23 May 1986) I it is a legislation which signifies the central government's determination to take effective steps to protect the environment.	stating that: No State Government or other authority shall make any order directing- (i) that any reserved forest shall cease to be reserved; (ii) that any forest land or any portion thereof may be used for any non-forest purpose; (iii) that any forest land or any portion thereof may be assigned by way of lease or otherwise to any private person or to any authority, corporation, agency or any other organisation not	

			owned, managed or controlled by Government; (iv) that any forest land or any portion thereof may be cleared of trees which have grown naturally in that land or portion, for the purpose of using it for reafforestation.	
Environment (Protection) Act	1986			
National Forest Policy	1988			
Foreign Trade (Development and Regulation) Act	1992			
8th Five Year Plan	1992			
9th Five Year Plan	1997			
10 Five Year Plan	2002	National Environmental Policy,2006		
11th Five Year Plan	2007			

The Stockholm Declaration in 1972 pushed India towards ensuring environmental protection by setting up an authority named National Council for Environmental Policy and Planning within the Department of Science and Technology that same year. It was later transformed into the Ministry of Environment and Forest (MoEF) in 1985, which is an apex body to regulate and ensure environmental protection in India. A constitutional amendment incorporated Article 48A and Article 51A (g) under Directive Principles of State Policy and Fundamental Duties, respectively, to strengthen the environmental laws in India.

S. No.	Name of Policy and Year	Aim/Target	Status
	National Water Policy, 1987	To govern the planning and development of water resources and their optimum utilisation	It was reviewed twice (National Water Policy, 2002 and National Water Policy, 2012) to strengthen efficiency to manage challenges associated with water availability and water use efficiency in an integrated manner.
	National Forest Policy, 1988	To maintain ecological balance and safeguarding the interest of tribals and forest-dependent people by involving them in timber production and other local livelihood opportunities	A draft National Forest Policy was released in 2018 and accepted in 2019 to undertake actions for water conservation, carbon sequestration and livelihood security under this policy.
	National Conservation Strategy and Policy Statement on Environment and Development,	To regulate the utilisation of natural resources through joint efforts of local communities and other stakeholders by incorporating traditional knowledge for environmental protection	Supporting institutional development for research, mobilization, training and capacity building on environmental conservation and sustainable development. Recently, a National Conservation Strategy was launched for one horned Rhinos in India and Nepal, which are under the vulnerable category of IUCN.

1992		
Policy Statement for the Abatement of Pollution, 1992	To strengthen the environmental compliance and enforcement of pollution control norms in India through CPCB and SPCBs	According to a study by the Centre for Science and Environment (CSE), nine states in India are procuring 60 percent of their electricity from coal power plants that are not taking adequate steps to meet the SO2 norms notified in 2015.
National Population Policy, 2000	To achieve a stable population by 2045 through strategically managing the Total Fertility Rate (TFR)	Insufficient efforts to increase access to education, economic and other development opportunities to enhance women empowerment, which will positively affect TFR.
National Environment Policy, 2006	To achieve sustainable development, by incorporating environmental consideration into the development process	Environmental misgovernance is fueling the destruction of the environment by moulding the norms in the favour of development.
National Agroforestry Policy, 2014	To increase sustainable agricultural production by combining tree farming with agriculture	Limited work is being done towards promoting agroforestry practice among farmers.

The environmental safeguard policies are framed by the Government of India (GoI) to reduce the risks due to impacts of development. These environmental safeguards have the potential to address key challenges such as biodiversity conservation, natural resource management and pollution abatement through specific policies that integrate environmental concerns into decision-making.

9.4.1. Safeguards Policies

Since the enforcement of the Environment (Protection) Act in 1986, the Government of India has launched programs for conservation of natural resources and biodiversity. However, the challenges have increased with rapid urbanisation, industrialisation and other destructive human activities leading to climate change.

1. Developmental activities are continuously on the rise, aiming to lift social and economic growth, while India has 13 out of 20 riskiest cities of the world that are facing extreme air and water pollution.

2. The existing loopholes in carrying out appraisal, granting clearances and monitoring compliance of a proposed project or activity under Environmental Impact Assessment (EIA) Notification 2006 are further widened through the draft EIA Notification 2020, as follows:

- Screening and Scoping are completely omitted in draft EIA 2020 for fast-track clearance of projects.
- More projects are added in Category B2, which will exempt them from public hearing and EIA study for getting Environmental Clearance.
- Post-facto clearance is allowed in draft EIA 2020 for projects that are operating without any Environmental Clearance.
- The Central Government can categorise projects as 'strategic' and reduce transparency of such projects as per the draft EIA 2020.
- The draft has reduced the period for submission of public responses from 30 days (in EIA notification 2006) to 20 days.

3. No real progress towards achieving multilateral environmental agreements (MEAs), which has been neglected for the sake of 'ease of doing business'.

4. Overriding the environmental regulatory regime by pushing nature and natural resources towards privatization.

5. Ineffective implementation of norms intended to reduce, eliminate, and replace sources of pollution under the National Clean Air Plan, and the Water and Air Acts which is then fueling industrial accidents in India.

6. Non-prioritization of efforts to empower local communities and use their traditional knowledge for governing and tapping opportunities to mitigate climate change.

7. Endorsing massive intrusions of ill-conceived 'development' projects into natural ecosystems and near wildlife populations by systematically weakening the regulatory regimes. For instance, the Coastal Regulation Zone (CRZ) notification 2019 was passed despite huge public

opposition, or the bypassing of the Wild Life Protection Act in clearing 'development' projects inside protected areas.

The rapid changes in climate and increasing environmental destruction require effective up gradation of the existing policies and revision of acts, such as the current Wildlife Act that neglects the conservation of marine ecosystems. The effective identification, monitoring and management of environmental risks such as pollution and water stress by CPCB (Central Pollution Control Board) and SPCBs (State Pollution Control Boards), will reduce carbon emission from industries, vehicles etc., and improve the capabilities of environmental norms.

It will also ensure resilience from economic losses due to increasing extreme weather events in India. The Non-Governmental Organisations (NGOs) and Civil Society Organisations (CSOs) can strengthen the environmental safeguard system in India by monitoring and evaluating the impacts of these policies. Ecological sustainability should be placed at the centre of all planning, budgeting, and programmes related to development, rather than being considered an externality or a formality for clearance purposes.

By making the safeguard policies and their implementation for environmental protection more stringent, India can boost its potential for achievement of the following Sustainable Development Goals (SDGs) by 2030:

- ***Goal 1: No Poverty***
- ***Goal 3: Good Health and Well-being***
- ***Goal 5: Gender Equality***
- ***Goal 6: Clean Water and Sanitation***
- ***Goal 7: Affordable and Clean Energy***
- ***Goal 10: Reduced Inequalities***
- ***Goal 11: Sustainable Cities and Communities***
- ***Goal 12: Responsible Consumption and Production***
- ***Goal 13: Climate Action***
- ***Goal 14: Life Below Water***
- ***Goal 15: Life On Land***

9.4.2. National Environment Policy (NEP) - Ministry of Environment and Forests (2006)

The National Environment Policy (NEP) by the Ministry of Environment and Forests (MoEF) aims at mainstreaming environmental concerns into all developmental activities. It emphasizes conservation of resources, and points that the best way to aid conservation is to ensure that people dependent on resources obtain better livelihoods from conservation, than from degradation of the resources. It argues that environmental degradation often leads to poverty and poor health outcomes among populations. The document goes on to highlight the principles underlying the policy that emphasize the

- Important role of human beings in the sustainable development processes
- The non negotiability and incomparable value of environmental resources
- Right to development for all
- Equity in the use of environmental resources and
- The need for the decentralized and multisectoral approach in dealing with environmental issues.

The objectives of the policy include:

- Conservation of critical environmental resources
- Intra-generational equity
- Livelihood security for the poor
- Inter-generational equity
- Integration of environmental concerns in economic and social development
- Efficiency in environmental resource use
- Environmental governance
- Enhancement of resources for environmental conservation

The document outlines a range of strategies to meet these objectives that aim at:

- Conservation of existing environmental resources through regulatory reforms
- Emphasis on education, information, research, capacity building and technological innovations

- Intersect oral collaboration and periodic evaluations of the existing policies.
- Solid and hazardous waste management, handling and management rules.

9.5. Hazardous Waste Management Rules 2016

Hazardous Waste Management Rules are notified to ensure safe handling , generation, processing, treatment, package, storage, transportation, use reprocessing, collection, conversion, and offering for sale, destruction and disposal of Hazardous Waste. These Rules came into effect in the year 1989 and have been amended later in the years 2000, 2003 and with final notification of the Hazardous Waste (Management, Handling and Tran boundary Movement) Rules, 2008 in supersession of former notification. The Rules lay down corresponding duties of various authorities such as MoEF, CPCB, State/UT Govts., SPCBs/PCCs, DGFT, Port Authority and Custom Authority while State Pollution Control Boards/ Pollution Control Committees have been designated with wider responsibilities touching across almost every aspect of Hazardous wastes generation, handing and their disposal.

What is Hazardous Waste?

Hazardous waste means any waste, which by reason of characteristics, such as physical, chemical, biological, reactive, toxic, flammable, explosive or corrosive, causes danger to health, or environment. It comprises the waste generated during the manufacturing processes of the commercial products such as industries involved in petroleum refining, production of pharmaceuticals, petroleum, paint, aluminium, electronic products etc. As per the information furnished by Central Pollution Control Board (CPCB) in the year 2015, the total hazardous waste generation in the country is 7.46 million metric tonnes per annum from about 44,000 industries These Rules falls under the Environment (Protection) Act, 1986 and Section.3(14)-"hazardous waste" It means any waste which by reason of any of its physical, chemical, reactive, toxic, flammable, explosive or corrosive characteristics causes danger or is likely to cause danger to health or environment, whether alone or when in contact with other wastes or substances, and shall include-

- wastes listed in cloumn (3) of Schedule-1;

- wastes having constituents listed in Schedule-2 of their concentration is equal to or more than the limit indicated in the said Schedule; and
- wastes listed in Lists 'A' and 'B' of Schedule-3 (Part-A) applicable only in case(s) of import or export of hazardous wastes in accordance with rules 12, 13 and 14 if they possess any of the hazardous characteristics listed in Part-B of Schedule-3.

9.5.1. Hazardous and other Wastes (Management &Trans boundary Movement) Rules, 2016

- First Amendments Rules, 06.07.2016
- Second Amendments Rules, 28.02.2017
- Third Amendments Rules, 11.06.2018
- Fourth Amendments Rules, 01.03.2019
- Fifth Amendments Rules, 09.10.2020
- Second Amendments Rules, 12.11.2021
- Sixth Amendments Rules, 21.07.2022

9.5.2. Hazardous Waste (Management, Handling &Transboundary Movement) Rules, 2008

- First Amendments Rules, 21.07.2009
- Second Amendments Rules, 23.09.2009
- Third Amendments Rules, 30.03.2010
- Fourth Amendments Rules, 13.08.2010

9.5.3. Importance of Proper Hazardous Waste Management

Scientific disposal of hazardous waste through collection, storage, packaging, transportation and treatment, in an environmentally sound manner minimises the adverse impact on human health and on the environment. The hazardous waste can be disposed at captive treatment facility installed by the individual waste generators or at Common Hazardous Waste Treatment, Storage and Disposal Facilities (TSDFs). There are 40 Common Hazardous Waste Treatment, Storage and Disposal Facilities (TSDFs) available in 17 States/UTs.

Hazardous waste such as lead acid battery scraps, used oil, waste oil, spent catalyst etc. and other waste such as waste tyres, paper waste, metal scrap etc. are used as raw material by the industries involved in recycling of such waste and as supplementary resource for material and energy recovery. Accordingly, it is always preferable to utilise such waste through recycling, or for resource recovery to avoid disposal through landfill or incineration. There are about 1080 registered recyclers; 47 cement plants permitted for co-processing; and about 108 industries permitted for utilization of hazardous waste.

9.5.4.Problems of unscientific disposal of Hazardous and other waste

Unscientific disposal of hazardous and other waste through burning or incineration leads to emission of toxic fumes comprising of Dioxins & Furans, Mercury, heavy metals, causing air pollution and associated health-related problems. Disposal in water bodies or in municipal dumps leads to toxic releases due to leaching in land and water entailing into degradation of soil and water quality. The workers employed in such unscientific practices suffer from neurological disorders, skin diseases, genetic defects, cancer etc.Hence, there is a need for systematic management of hazardous and other waste in an environmentally sound manner by way of prevention, minimisation, re-use, recycling, recovery, utilisation including co-processing and safe disposal of waste.

9.5.5. The salient features of Hazardous and Other Wastes (Management & Trans boundary Movement) Rules, 2016 include the following:-

- The ambit of the Rules has been expanded by including 'Other Waste'.
- Waste Management hierarchy in the sequence of priority of prevention, minimization, reuse, recycling, recovery, co-processing; and safe disposal has been incorporated.
- All the forms under the rules for permission, import/export, filing of annual returns, transportation, etc. have been revised significantly, indicating the stringent approach for management of such hazardous and other wastes with simultaneous simplification of procedure.
- The basic necessity of infrastructure to safeguard the health and environment from waste processing industry has been prescribed as Standard Operating

Procedure (SOPs), specific to waste type, which has to be complied by the stakeholders and ensured by SPCB/PCC while granting such authorisation.

- Procedure has been simplified to merge all the approvals as a single window clearance for setting up of hazardous waste disposal facility and import of other wastes.
- Co-processing as preferential mechanism over disposal for use of waste as supplementary resource, or for recovery of energy has been provided.
- The approval process for co-processing of hazardous waste to recover energy has been streamlined and put on emission norms basis rather than on trial basis.
- The process of import/export of waste under the Rules has been streamlined by simplifying the document-based procedure and by revising the list of waste regulated for import/export.
- The import of metal scrap, paper waste and various categories of electrical and electronic equipments for re-use purpose has been exempted from the need of obtaining Ministry's permission.
- The basic necessity of infrastructure to safeguard the health and environment from waste processing industry has been prescribed as Standard Operating Procedure (SOPs) specific to waste type.
- Responsibilities of State Government for environmentally sound management of hazardous and other wastes have been introduced as follows:
  - To set up/ allot industrial space or sheds for recycling, pre-processing and other utilization of hazardous or other waste.
  - To register the workers involved in recycling, pre-processing and other utilization activities.
  - To form groups of workers to facilitate setting up such facilities.
  - To undertake industrial skill development activities and ensure safety and health of workers.
- List of processes generating hazardous wastes has been reviewed taking into account technological evolution in the industries.
- List of Waste Constituents with Concentration Limits has been revised as per international standard and drinking water standard.
- The following items have been prohibited for import:

- Waste edible fats and oil of animals, or vegetable origin;
- Household waste;
- Critical Care Medical equipment;
- Tyres for direct re-use purpose;
- Solid Plastic wastes including Pet bottles;
- Waste electrical and electronic assemblies scrap;
- Other chemical wastes especially in solvent form.

- State Government is authorized to prepare integrated plan for effective implementation of these provisions, and have to submit annual report to Ministry of Environment, Forest and Climate Change.
- State Pollution Control Board (SPCB) is mandated to prepare an annual inventory of the waste generated; waste recycled, recovered, utilised including co-processed; waste re-exported and waste disposed and submit to the Central Pollution Control Board by the 30th day of September every year

WHAT IS THE APPLICABILITY [Section.2] OF HAZARDOUS AND OTHER WASTES (MANAGEMENT AND TRANSBOUNDARY MOVEMENT) RULES, 2016?

This act is applicable to the whole of India and the rules are applicable to the management of hazardous and other wastes as specified in the Schedules to these rules.

WHAT IS THE NON-APPLICABILITY [Section.2] OF HAZARDOUS AND OTHER WASTES (MANAGEMENT AND TRANSBOUNDARY MOVEMENT) RULES, 2016?

1. waste-water and exhaust gases as covered under the provisions of the Water (Prevention and Control of Pollution) Act, 1974 (6 of 1974) and the Air (Prevention and Control of Pollution) Act, 1981 (14 of 1981) and the rules made thereunder and as amended from time to time;

2. wastes arising out of the operation from ships beyond five kilometres of the relevant baseline as covered under the provisions of the

Merchant Shipping Act, 1958 (44 of 1958) and the rules made thereunder and as amended from time to time;

3. radio-active wastes as covered under the provisions of the Atomic Energy Act, 1962 (33 of 1962) and the rules made thereunder and as amended from time to time;

4. bio-medical wastes covered under the Bio-Medical Wastes (Management and Handling) Rules, 1998 made under the Act and as amended from time to time; and

5. wastes covered under the Municipal Solid Wastes (Management and Handling) Rules, 2000 made under the Act and as amended from time to time.

WHAT ARE THE RESPONSIBILITIES OF OCCUPIER FOR THE MANAGEMENT OF HAZARDOUS AND OTHER WASTES?

The "Occupier" [as defined in Sec. 2(f) of the Act is in relation to any factory or premises and means a person who has control over the affairs of the factory or the premises and includes in relation to any substances, the person in possession of the substance] shall perform the responsibilities for the management of hazardous and other wastes by taking steps as follows:-

1. Prevention
2. Minimization
3. Reuse
4. Recycling
5. recovery, utilization including co-processing
6. safe disposal

- The occupier is responsible for safe and environmentally sound management of hazardous and other wastes.
- The hazardous and other wastes generated in the establishment of an occupier shall be sent or sold to an authorized actual user or shall be disposed of in an authorized disposal facility.
- The occupier shall transport the hazardous and other wastes to an authorized actual user or to an authorized disposal facility

- The occupier shall give the information for safe storage and disposal of hazardous and other wastes which is intent to be treated and disposed of by the operator.
- The occupier shall take all the steps while managing hazardous and other wastes to-
    - contain contaminants and prevent accidents and limit their consequences on human beings and the environment; and
    - Provide persons working in the site with appropriate training, equipment and the information necessary to ensure their safety.

WHEN THE UTILIZATION OF HAZARDOUS WASTES WILL BECOME RESOURSE?

Only after obtaining authorization from the State Pollution Control Board in respect of waste on the basis of standard operating procedures or guidelines provided by the Central Pollution Control Board.

IS IT PERMITTED TO DISPOSE OFF THE IMPORTED HAZARDOUS WASTE?

NO, hazardous waste cannot be disposed of but can be permitted only for recycling, recovery, reuse and utilization including co-processing.

IS IT PERMITTED TO EXPORT HAZARDOUS WASTE?

YES, hazardous waste can be exported only after the permission of Ministry of Environment, Forest and Climate Change.

FORMS

S. No	Forms	Description
1	Form 1	Application required for grant/renewal of authorisation for generation or collection or storage or transport or reception or recycling or reuse or recovery or pre-processing or co-processing or utilisation or treatment or disposal of hazardous and other waste
2	Form 2	Form for grant or renewal of authorisation by state pollution control board to the occupiers, recyclers, reprocessors, reusers,

		user and operators of disposal facilities
3	Form 3	Format for maintaining records of hazardous and other wastes
4	Form 4	Form for filing annual returns
5	Form 5	Application for import or export of hazardous and other waste for reuse or recycling or recovery or co-processing or utilisation
6	Form 6	Transboundary movement- movement document
7	Form 7	Application form for one time authorisation of traders for part- d of schedule iii, waste
8	Form 8	Labelling of containers of hazardous and other waste
9	Form 9	Transport emergency (trem) card
10	Form 10	Manifest for hazardous and other waste
11	Form 11	Format for reporting accident
12	Form 12	Application for filing appeal against the order passed by state pollution control board

SCHEDULES TO THE RULES

S. No.	Schedules	Description
1	Schedule I	List of processes generating hazardous wastes.
2	Schedule II	List of waste constituents with concentration limits.
3	Schedule III	List of Hazardous Wastes applicable for import and export.
4	Schedule IV	List of the commonly recyclable wastes.
5	Schedule V	Specification of used oil suitable for recycling and specification of fuel derived from waste oil.
6	Schedule VI	List of Hazardous and other wastes prohibited for import.
7	Schedule VII	List of authorities and corresponding duties.
8	Schedule VIII	List of documents for verification by customized for import of certain wastes.

9.6. Solid Waste Management Rules 2016

The Solid Waste Management Rules has the ability to fully alter the waste management system in India. The rules sound too good to be true for a country with such colossal waste management. Unfortunately, the SWMR was not followed up with the correct mobilization of the agencies. There are a variety of other elements required for transformational change in location. Several people across the spectrum are willing to take the initiative to get involved. The policy structure, in particular SWMR, supports sustainable waste management through the steps set out above, with provisions that also encourage local authorities to impose user fees to cover their costs, etc. However, the existing programs generate overflowing and over-exhausted landfill sites. Even if people are encouraged to segregate waste at the source, the non-compartmentalized transport and dumping equipment would discourage such responsible behaviour. The problem is that the organizations responsible for making such improvements are not geared and motivated. Community participation has not been withheld. While the rest of the world evolves, local management mechanisms do not seem to be capable of handling this. Not because of some agency's deliberate mal-intentions, but simply because we, as a state and community, have no idea as to how this and subsequent generations so desperately sought after the change agenda can be furthered.

- According to Union Minister of State for Environment, Forests and Climate Change, Prakash Javedkar, 62 million tonnes of waste is generated annually in the country at present, out of which 5.6 million tonnes is plastic waste, 0.17 million tonnes is biomedical waste, hazardous waste generation is 7.90 million tonnes per annum and 15 lakh tonnes is e-waste. He added that only about 75-80 per cent of the municipal waste gets collected and only 22-28 per cent of this waste is processed and treated.
- The new rules are now applicable beyond municipal areas and have included urban agglomerations, census towns, notified industrial townships, areas under the control of Indian Railways, airports, special economic zones, places of pilgrimage, religious and historical importance, and State and Central Government organisations in their ambit.

- The Union Ministry of Environment, Forests and Climate Change (MoEF&CC) recently notified the new Solid Waste Management Rules (SWM), 2016. These will replace the Municipal Solid Wastes (Management and Handling) Rules, 2000, which have been in place for the past 16 years.
- These rules are the sixth category of waste management rules brought out by the ministry, as it has earlier notified plastic, e-waste, biomedical, hazardous and construction and demolition waste management rules.
- It is difficult to comment as to whether there has been any learning from the past that has been incorporated in the new rules. They fail to incentivise and impose a strict penalty in case of poor implementation. The rules have not pushed for decentralized management of waste but have encouraged centralized treatment such as waste to energy, the present state of which is not good in the country. Also, the informal sector has been considerably neglected in the new rules.

What is Solid Waste?

With the ever increasing population and urbanization, the waste management has emerged as a huge challenge in the country. Not only the waste has increased in quantity, but the characteristics of waste have also changed tremendously over a period, with the introduction of so many new gadgets and equipment. It is estimated that about 62 million tonnes of waste is generated annually in the country, out of which 5.6 million is plastic waste, 0.17 million is biomedical waste. In addition, hazardous waste generation is 7.90 million TPA and 15 lakh tonne is e-waste. The per capita waste generation in Indian cities range from 200 grams to 600 grams per day (2011). 43 million TPA is collected, 11.9 million is treated and 31 million is dumped in landfill sites.

Important Terms

- "Biodegradable waste" – means any organic material that can be degraded into simpler stable compounds by microorganisms.
- "Bio-methanation" – means a process which involves the organic matter to go under enzymatic decomposition by microbial action to produce methane.

- "Combustible waste" – means a composition of non-biodegradable, non-recyclable, non-hazardous solid waste with a high calorific value of over 1500 kcal/kg, except plastic chlorinated materials and wood pulp, etc.
- "Composting" – means a scientific process involving microbial decomposition of organic matter.
- "Disposal" – means the disposal of post-processed residual solid waste and collected street sweepings and silt from the surface of drains to prevent contamination of groundwater, unpleasant odour and attraction of stray animals or birds.
- "Domestic Hazardous waste" – means the remaining household products which given under certain circumstances can catch fire, react or explode, or are corrosive or toxic in nature.
- "Inerts" – means wastes which are not biodegradable, recyclable or combustible in nature like dust and silt removed from the surface drains or street sweeping.
- "Leachate" – means the solvent that trickles from the solid waste medium and has absorbed or contains dissolved products.
- "Material recovery facility" – means a facility in which non-compostable solid waste may be deposited temporarily by a municipal agency in order to facilitate the aggregation, storage, and recycling, through waste recyclers, or by some other local body prior to collection of waste for its processing or disposal.
- "Non-biodegradable waste" – means any waste which can not be converted to simpler stable compounds by microorganisms.
- "Recycling" – means a process of collecting and processing by which one can transform their old goods or the solid waste into a new product for use or raw material for the building of other goods or products.
- "Refuse derived fuel" – means fuel generated from fractions of solid waste such as plastic, wood, pulp or organic waste, rather than chlorinated products, in the form of pellets or fluff formed by drying, shredding, dehydrating and compacting solid waste.

- "Sanitary landfilling" – means that the safe and final disposal of the residual solid and inert wastes on land in, a facility which is specially built with protective measures against contamination of groundwater, surface water and dust, wind-blown litter etc.
- "Segregation" – means the collection and separate handling of different components of solid biodegradable waste, including agricultural and dairy waste; non-biodegradable waste, including recyclable waste, non-recyclable fuel waste, sanitary waste and non-recyclable toxic waste, household hazardous waste, and building and demolition waste.
- "Solid waste" – means and involves solid or semi-solid waste, sanitary waste, industrial waste, administrative waste, hospitality and agricultural waste and other non-residential pollutants, street sweepings, surface water sludge, greenhouse waste, farm and livestock waste, municipal hazardous waste and other bodies.
- "Vermicomposting" – means the process of conversion from compost is obtained by earthworms out of biodegradable waste.
- "Waste Generator" – means and includes all persons or groups, on residential and non-residential premises, including Indian Railways, defence facilities which produce solid waste.
- "Waste Hierarchy" – means the priority order of management of solid waste by emphasizing prevention, reduction, reusability, recycling, and waste disposal, prevention as the preferred choice, and its disposal at the landfills is the least possible.
- "Waste Picker" – means an individual or groups informally engaged in the recovery of recycled and recyclable solid waste from waste streams, street bins, recycling facilities for recyclers to gain their livelihood directly or by an intermediary.

9.6.1. Proper solid waste management

- Scientific disposal of solid waste through segregation, collection and treatment and disposal in an environmentally sound manner minimises the adverse impact on the environment. The local authorities are responsible for the

development of infrastructure for collection, storage, segregation, transportation, processing and disposal of Municipal Solid Waste.

- As per information available for 2013-14, compiled by Central Pollution Control Board (CPCB), municipal authorities have so far only set up 553 compost &vermi-compost plants, 56 bio-methanation plants, 22 RDF plants and 13 Waste to Energy (W to E) plants in the country.

9.6.2. Problems of unscientific Municipal Solid Waste disposal

- Only about 75- 80% of the municipal waste gets collected and out of this only 22-28 % is processed and treated and remaining is disposed of indiscriminately at dump yards. It is projected that by the year 2031 the MSW generation shall increase to 165 million tonnes and to 436 million tons by 2050. If cities continue to dump the waste at present rate without treatment, it will need 1240 hectares of land per year and with projected generation of 165 million tons of waste by 2031, the requirement of setting up of land fill for 20 years of 10 meters height will require 66,000 hectares of land.
- As per the Report of the Task Force of erstwhile Planning Commission, the untapped waste has a potential of generating 439 MW of power from 32,890 TPD of combustible wastes including Refused Derived Fuel (RDF), 1.3 million cubic metre of biogas per day, or 72 MW of electricity from biogas and 5.4 million metric tonnes of compost annually to support agriculture.

9.6.3. Salient features of Solid Waste Management Rules, 2016

- The Rules are now applicable beyond Municipal areas and extend to urban agglomerations, census towns, notified industrial townships, areas under the control of Indian Railways, airports, airbase, Port and harbour, defence establishments, special economic zones, State and Central government organizations, places of pilgrims, religious & historical importance.
- The source segregation of waste has been mandated to channelize the waste to wealth by recovery, reuse and recycle.
- Responsibilities of Generators have been introduced to segregate waste in to three streams, Wet (Biodegradable), Dry (Plastic, Paper, metal, wood, etc.) and domestic hazardous wastes (diapers, napkins, empty containers of

cleaning agents, mosquito repellents, etc.) and handover segregated wastes to authorized rag-pickers or waste collectors or local bodies.

- Integration of waste pickers/ rag pickers and waste dealers/ Kabadiwalas in the formal system should be done by State Governments, and Self Help Group, or any other group to be formed.
- No person should throw, burn, or bury the solid waste generated by him, on streets, open public spaces outside his premises, or in the drain, or water bodies.
- Generator will have to pay 'User Fee' to waste collector and for 'Spot Fine' for Littering and Non-segregation.
- Used sanitary waste like diapers, sanitary pads should be wrapped securely in pouches provided by manufacturers or brand owners of these products or in a suitable wrapping material and shall place the same in the bin meant for dry waste / non- bio-degradable waste.
- The concept of partnership in Swachh Bharat has been introduced. Bulk and institutional generators, market associations, event organizers and hotels and restaurants have been made directly responsible for segregation and sorting the waste and manage in partnership with local bodies.
- All hotels and restaurants should segregate biodegradable waste and set up a system of collection or follow the system of collection set up by local body to ensure that such food waste is utilized for composting /bio-methanation.
- All Resident Welfare and market Associations, Gated communities and institution with an area >5,000 sq. m should segregate waste at source- in to valuable dry waste like plastic, tin, glass, paper, etc. and handover recyclable material to either the authorized waste pickers or the authorized recyclers, or to the urban local body.
- The bio-degradable waste should be processed, treated and disposed of through composting or bio-methanation within the premises as far as possible. The residual waste shall be given to the waste collectors or agency as directed by the local authority.
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- New townships and Group Housing Societies have been made responsible to develop in-house waste handling, and processing arrangements for bio-degradable waste.
- Every street vendor should keep suitable containers for storage of waste generated during the course of his activity such as food waste, disposable plates, cups, cans, wrappers, coconut shells, leftover food, vegetables, fruits etc. and deposit such waste at waste storage depot or container or vehicle as notified by the local authority.
- The developers of Special Economic Zone, industrial estate, industrial park to earmark at least 5% of the total area of the plot or minimum 5 plots/ sheds for recovery and recycling facility.
- All manufacturers of disposable products such as tin, glass, plastics packaging etc. or brand owners who introduce such products in the market shall provide necessary financial assistance to local authorities for the establishment of waste management system.
- All such brand owners who sale or market their products in such packaging material which are non-biodegradable should put in place a system to collect back the packaging waste generated due to their production.
- Manufacturers or Brand Owners or marketing companies of sanitary napkins and diapers should explore the possibility of using all recyclable materials in their products or they shall provide a pouch or wrapper for disposal of each napkin or diapers along with the packet of their sanitary products.
- All such manufacturers, brand owners or marketing companies should educate the masses for wrapping and disposal of their products.
- All industrial units using fuel and located within 100 km from a solid waste based RDF plant shall make arrangements within six months from the date of notification of these rules to replace at least 5 % of their fuel requirement by RDF so produced.
- Non-recyclable waste having calorific value of 1500 K/cal/kg or more shall not be disposed of on landfills and shall only be utilized for generating energy

either or through refuse derived fuel or by giving away as feed stock for preparing refuse derived fuel.

- High calorific wastes shall be used for co-processing in cement or thermal power plants.
- Construction and demolition waste should be stored, separately disposed off, as per the Construction and Demolition Waste Management Rules, 2016.
- Horticulture waste and garden waste generated from his premises should be disposed as per the directions of local authority.
- An event, or gathering organiser of more than 100 persons at any licensed/ unlicensed place, should ensure segregation of waste at source and handing over of segregated waste to waste collector or agency, as specified by local authority.
- Special provision for management of solid waste in hilly areas:- Construction of landfill on the hill shall be avoided. A transfer station at a suitable enclosed location shall be setup to collect residual waste from the processing facility and inert waste. Suitable land shall be identified in the plain areas, down the hill, within 25 kilometers for setting up sanitary landfill. The residual waste from the transfer station shall be disposed off at this sanitary landfill.
- In case of non-availability of such land, efforts shall be made to set up regional sanitary landfill for the inert and residual waste.

Image source - https://bit.ly/3hEjCGW

The Municipal Solid Waste (Management and Handling) Rules, 2000 were notified in the year 2000 and came into force on September 25, 2000. However, post the suggestions of the public, the set of rules were updated in the areas of plastic, e-waste, biomedical, hazardous and construction and demolition waste management rules. Later the Government notified Solid Waste Management Rules, 2016 in the year 2016.

The new set of rules are now not only applicable in Municipal Areas but have also included urban agglomerations, census towns, notified industrial townships, and also areas which fall under the control and direction of Indian Railways, Airports, Special economic zones, Places of Pilgrimage, Religious and Historical importance, and Organisations under the conduct of State and Central Government.

Waste and its management

The Municipal Solid Waste comprises household waste, Commercial and Institutional waste, Marketing and Catering waste, Street sweepings and silt from Drains, Horticulture and dairy waste, Slaughterhouse waste, and Treated Biomedical Waste. (The Construction and Demolition waste is no longer a part of municipal solid waste. Construction and Demolition Waste Management Rules 2016, Plastic Waste Management Rules 2016, E-Waste Management Rules 2016, Biomedical Waste Management Rules 2016, and Hazardous and Other Waste Management Rules, 2016 are separately notified). It may be further categorized through three ways-

- Emergence
- Contents
- Hazard potential

Solid Waste Management reduces or eliminates its hostile impact on the environment & human health. It's poor management causes Air pollution, Water and Soil contamination. This is the reason why a municipality includes a number of processes for effective waste management i.e. monitoring, collection, transport, processing, recycling and disposal of waste. The amount of waste generated in the area depends on various factors like different lifestyles of the people. However,

the two overwhelming challenges facing urban local governments in putting an effective solid waste management system in place are:

- Environmental sustainability, and
- Financial sustainability.

Duties of Waste Generators

- Each waste generator shall separate the waste that is generated and store it in three different parts which are biodegradable, non-biodegradable and household hazardous waste and store it differently. Subsequently, the collected waste shall be passed to the approved rag pickers or collectors.
- The sanitary waste used, for example, diapers, sanitary pads etc., shall be securely wrapped in pouches provided or in a suitable wrapping material by the manufacturers of these items and placed in the bins intended for dry or non-biodegradable wastes.
- Construction and demolition waste shall be treated separately and disposed of according to the Waste Management Rules 2016 for Building and Demolition.
- The waste generated from the premises through horticulture or garden shall be stored separately and be disposed of as per the Rules.
- The practice of burying, burning or throwing the solid waste generated by the individual in open public areas, on streets, drains or water bodies shall be stopped immediately.
- As per the laws of the local authorities, the waste generators shall pay a fee for solid waste management.
- Under no circumstances until the permission given by the local authority no event or gathering of more than 100 people shall be made at any unlicensed place and a permit should be taken at least three working days prior to the event. The segregation of the waste and handling of it over to the waste collector shall be monitored by the organiser.
- Storage containers shall be kept by all the street vendors for keeping the waste generated such as food waste, disposable plates, cups, cans, wrappers, coconut shells, leftover food, vegetables, fruits etc. and shall be disposed of properly.

9.6.4. Duties of ministry of urban development in solid waste management

National Policies and Strategies on Solid Waste Management including the policies on Waste to Energy shall be made. Promotion of research and development, technical guidelines and project finance shall be and reviewable of the measures taken by the States shall be done by the ministry.

- Duties of Department of Fertilizers, Ministry of Chemicals and Fertilizers

- The Ministry shall provide market development assistance on the city compost and promote co-marketing of compost with chemical fertilizers bags by the fertilizer companies.

- Duties of Ministry of Agriculture, Government of India

- The Ministry shall provide leniency in the Fertilizer Control Order for the production and sale of compost and shall promote its use of compost on agricultural land. They shall set up laboratories for testing the quality of compost produced by local authorities.

- Duties of the Ministry of Power

- The Ministry shall decide the charge of energy generated from waste to energy plants from the solid waste and ensure the mandatory purchase of energy generated from such waste to energy plants by DISCOMs.

- Duties of Ministry of New and Renewable Energy Sources

- The Ministry of New Renewable Energy Sources shall facilitate the creation of infrastructure for waste to energy plants and provide necessary incentives for such energy plants.

- Duties of the Secretary–incharge, Urban Development in the States and Union Territories and of Village Panchayats or Rural Development

9.6.5. Department in the State and Union Territory

- All of them shall come together within a year to frame a state policy on solid waste management.
- They shall make a plan to identify and allocate suitable land for setting up the processing and disposal facilities for solid wastes within one year and start incorporating them.

- Separate areas shall be reserved for segregation, storage and decentralized treatment of solid waste as specified in the development plan for group housing or industrial, institutional or any other non-residential complex of more than 200 dwellings or having a plot area of more than 5,000 square metres.
- They shall ensure that the developers of the Special Economic Zone, Industrial Estate, and Industrial Park have at least 5 percent of the total area of the plot or at least 5 plots/holes for recovery and recycling facilities.
- Notifications shall be given to the buffer zone for solid waste treatment and disposal facilities of more than 5 tons per day in consultation with the State Pollution Control Board and a framework for the registration of waste pickers and waste dealers shall be created.

9.6.6. Duties of the Central Pollution Control Board

- The coordination between the Central Pollution Control Board and the State Pollution Control Boards shall be maintained for the enactment of these rules and adherence to the standards prescribed by the ground authorities. Also, the formulation and review of the standards for groundwater, air, noise pollution, in respect of all solid waste processing and disposal facilities shall be done.
- The proposals given by the state pollution control boards or pollution control committees on the use of any new technologies for processing, recycling and treatment of solid waste shall be reviewed.
- Preparation of an Annual Report on the enactment of these rules and submission of it to the Ministry of Environment, Forest and Climate Change shall be done and the report shall also be put in the public domain.
- Publish guidelines for the management of buffer zones that exclude any residential, industrial or other building operation from the outer boundary of waste treatment and disposal facilities for various facilities handling more than 5 tons of solid waste each day.
- The publication of guidelines on the environmental aspects of the treatment and disposal of solid waste shall take place from time to time in order to enable local authorities to abide by the terms of the law and to provide assistance to States or Union Territories on the interstate movement of waste.

Duties and Responsibilities of local authorities and village Panchayats of census towns and urban agglomerations

- Within six months, local authorities must draw up a comprehensive waste management strategy according to State policy.
- Collection of segregated waste from door to door shall be arranged.
- Within one year a user fee shall be prescribed to the waste generators and appropriate by laws for incorporating these rules shall also be created.
- Guide waste generators not to dispense and separate waste at source and pass on separated waste to approved waste recyclers from the local authorities.
- Create material recovery plants or secondary storage plants and provide easy access for the collection of recycled waste to waste pickers and recyclers.
- Establish safe waste storage and transportation facilities for household hazardous waste to the hazardous wastes disposal facility.
- Instruct road sweepers not to burn tree leaves gathered from street debris and store them individually and later, pass them to the waste collectors or to the local authority appointed agent.
- Train waste collectors and waste collectors in solid waste management.
- Promote the establishments in suitable locations on the markets, or near the markets, for decentralized compost plant or biomethanation plant, ensuring sanitary conditions.
- Collect waste separately, depending on the populations, businesses, and locations, by streets, paths and by-lanes daily or in alternative days or twice a week.
- Collect horticulture, gardening and parks waste separately and process as much as possible in parks and gardens itself.
- Transportation of separated bio-degradable waste to processing plants such as compost, bio-methane plant, or any other faculty shall be done.
- Non-bio-degradable waste should be transported to their respective processing facilities or material recycling (MRF) or secondary storage facilities.

- According to the provisions present in the Construction and Demolition Waste Management Rules, 2016, the transportation of the waste generated at these sites shall be made.
- Initiate community involvement in waste management and promotion of domestic composting, biogas production, decentralized waste processing at the community level subject to odour management and maintenance of sanitary conditions in the facility.
- Phasing out of chemical fertilizer and using compost in all parks and gardens maintained by the local authorities and, where possible, elsewhere within the jurisdiction of the local authority, over the next two years. The informal waste recycling sector can provide incentives for recycling initiatives.
- Facilitate constructing, operating and maintaining waste processing facilities such as bio-methanation, microbial composting, vermicomposting, anaerobic digestion or any other appropriate bio-stabilization method for bio-degradable waste; waste for energy processes like waste fuel for fuel fraction of waste or for feedstock to the solid waste-based power plant.
- If the volume of waste reaches 5 metric tons per day, a proposal should be made for authorisation to create a waste collection, processing and disposal facility.
- Prepare and forward the annual report to the Commissioner, Controller, Municipal Administration or Appointed Officer by 30 April of the following year and send it to the Secretary, Chair of the Department for State Urban Development or Village Panchayat or the Department for Country Development or the respective State Pollution Control Board or Pollution Control Committee on 31 May of the following year.
- Contractors and door to door collection supervisors shall be directed to collect and transport non-mixed waste to processing or disposal sites, during primary and secondary transport.
- The plant operator shall ensure that the facility provides personal safeguard equipment to all employees who handle solid waste, including uniform, fluorescent jackets, hand gloves, raincoats, suitable footwear and masks.

- Ensure that guidelines are included in the building plan for creating centres to receive, segregate and store separated wastes when providing for building plans for the housing population or complex business group.
- Identify by laws and administer spot fine requirements for persons who litter or refuse to comply, and delegate powers to officers and local authorities to levy spot fines under the by-laws specified. Stop the deposition or disposal of mixed waste immediately following the schedule stated in Rule 23 for the establishment and operation of sanitary waste.
- Enable the inert and pre-processed refuse and waste from manufacturing facilities to be moved to sanitary sites including non-usable, non-recyclable, non-biodegradable, non-combustible and non-reactive materials.
- Investigate and analyze all old open dumpsites and existing operational dumpsites for their potential of bio-mining and bio-remediation and wherever feasible, take necessary actions to bio-mine or bio-remediate the sites.
- In absence of the potential of bio-mining and bio-remediation of the dumpsite, it shall be scientifically capped as per landfill capping norms to prevent further damage to the environment.

Duties of District Magistrate or District Collector or Deputy Commissioner according to Solid Waste Management Rules, 2016

At least once in a quarter, the District Officer or District Collector or Deputy Commissioner shall make it possible to identify and allocate appropriate land for the construction and disposal of solid waste, and to review the performance of local authorities.

Duties of the State Pollution Control Board or Pollution Control Committee according to the Solid Waste Management Rules, 2016

These laws shall be imposed in their respective states by the State Pollution Control Boards or the Commissions. The environmental quality shall be monitored by the commission and the request to grant authorization shall be considered; inter-state waste movement should be taken under control.

Duty of manufacturers or Brand owners of disposable products and sanitary napkins and diapers according to the Solid Waste Management Rules, 2016

- The implementation of this waste management scheme shall be sponsored by all producers of disposable goods, such as tin, glass, plastics, packaging, etc. or the brand owners, who bring these items into the market.
- All brand owners who are selling or distributing their goods in non-biodegradable packaging material must develop a system for recovering the packaging waste generated by their production.
- Manufacturers or brand owners or companies that sell sanitary napkins or diapers shall explore the possibility to manufacture their products by using all recyclable materials or have a pouch for disposal, along with the packet of their sanitary items, of any fabric or fabric for each dress.
- Education to the masses shall be given for the wrapping and disposal of their products by all the brand owners, companies or manufacturers.

Duties of the industrial units located within one hundred km from the RDF and Waste to Energy plants based on solid waste according to Solid Waste Management Rules, 2016

All fuel-using industrial plants located within 100 kilometres of an RDF solid waste plant must arrange for the replacement of at least 5 percent of its fuel requirement by RDF so provided within six months of the notification of those laws.

Criteria for setting up solid waste processing and treatment facilities.

- The land allocation department must provide appropriate land for the construction of the processing and treatment plants for solid waste.
- The facility operator shall obtain appropriate authorization and shall be responsible for the safe and environmentally friendly operations and/or process of solid waste in the facilities by the State Pollution Control Board or Pollution Control Committee.
- An annual report shall be submitted to the State Pollution Control Board and Local Authority by 30th April by the operator of the solid waste collection and treatment facility.

Criteria and actions to be taken for solid waste management in hilly areas

- Construction of landfill on the hill shall be avoided. A transfer station at a suitable enclosed location shall be set up to collect residual waste from the processing facility and inert waste. A suitable land shall be identified in the plain areas down the hill within 25 kilometres for setting up sanitary landfill. The residual waste from the transfer station shall be disposed of at this sanitary landfill.
- Efforts shall be made to establish the regional sanitary wasteland for inert and residual waste in case of non-availability of such land.

Criteria for waste to energy process

- Non-recyclable waste of 1500 kg/cal/kg or longer shall not be disposed of in dumps and only used as a feedstock for the preparation of waste-driven fuel, either by refuse-derived fuel, or by refuse-disposing it.
- High calorific wastes shall be used for co-processing in cement or thermal power plants.

State Level Advisory Body

Within 6 months of the notification date of these laws, each of the departments in charge of the local bodies of the concerned State Government or Union Territory Administration shall constitute the State Level Advisory Body.

- **Time frame for implementation**

The local authorities and other concerned authorities, as applicable, shall set up on their own initiative or by engaging agencies within the time limits laid down in the Rules the necessary infrastructure to enforce these regulations. Create a solid waste disposal facility for all local authorities with 100,000 or more inhabitants within two years, create local authorities and census towns with a population of less than 1000, develop common or autonomous health sites by or for all local authorities with a population of 0.5 million or more, and set up a common or national sanity site for all local authorities and census towns with less than 0.5 million people.

- **Specifications for Sanitary Landfills**

The regulations provide for site selection requirements, site development, landfill site development and site closure design, site closure, contamination control, old dump closure and restoration, and define the conditions for special provisions for hillock areas.

- The rules also specify Standards of processing and treatment of solid waste, composting, treated leachates, incineration.

- **Monitoring**

Overall oversight of the country's enforcement of these rules shall be conducted by the Ministry of the Environment, Forest and Climate Change. It shall constitute a Center for Monitoring, chaired by the Minister of Environment, Forest and Climate Change and comprising the Ministry of Urban Development, the Ministry of Rural Development, the Ministry of Climate Development, the Ministry of Agriculture, the Central Pollution Control Board and the Three-State Pollution Control Boards/ Pollution Control Boards and the urban planning and management boards, three Urban Local Bodies, Two census towns, FICCI, CII and Two subject experts. This Committee shall meet at least once a year to track and review the compliance of the laws. If required, the Ministry can collaborate with other experts. Every three years, the Committee shall be renewed.

9.6.7. Important Provisions updated in the Solid Waste Management Rules, 2016

❖ **Segregation at source**

The new rules include the segregation of the waste stream to collect, reuse and recycle waste. Waste generators will now need, before the waste being passed on to the collector, to sort waste into three fluxes-biodegradable, dry material (plastics, paper, metalworking, wood etc.) and domestically hazardous waste (diaper, serviettes, mosquito repellents, cleaning agents, etc.). Institutional generators, business groups, event managers and hotels and restaurants were primarily responsible for the segregation and waste collection and control of waste in cooperation with local authorities. In the occurrence of an event or gathering in a place licensed/non-licensed of more than 100 people, the organizer shall

guarantee the segregation of waste at the source and the distribution of separated waste, as stipulated by the local authority, to the waste collector or organization.

- **Collection and disposal of sanitary waste**

The waste generators shall dispose of the waste of sanitary napkins generated in a pouch or wrapper for proper disposal which shall be provided by the manufacturer or the brand owner with the sanitary product as it is their responsibility.

- **Collect Back scheme for packaging waste**

In accordance with the rules, a scheme to collect packaging waste from their manufacturing should be put in place for the brand owners who sell or market their products in a packaging material that is non-biodegradable.

- **User fees for collection**

The new rules gave local authorities in India the authority to assess user charges. City authorities can charge usage fees from bulk generators for collection, disposal and distribution. According to the regulations, the generator must pay the "User Fee' to the waste collector and "Spot Fine" in the case of waste disposal and non-segregation, the quantum of which will be decided by the local bodies. In addition, new rules have been referred to on incorporating the State government into the formal sector rag pickers, waste pickers and kabadiwalas from the informal sector.

- **Waste processing and treatment**

In compliance with the new rules, it was advised that the biodegradable waste should be refined, treated and disposed of as far as possible by composting or bio-methanation at the facility as needed. Developers of the Special Economic Zone, industrial estate and industrial areas shall devote at least 5% of the total area of the property to the recovery and recycling facilities or at least 5 plots/sheds. All local agencies with 1 million or more inhabitants within two years will have to establish waste processing facilities. The rules also require the bio-remediation or capping within five years of old and abandoned dump sites.

❖ **Promoting the use of compost**

According to the regulations, the Fertilizer Department, the Chemicals Ministry and Fertilizers will provide city compost for business growth assistance and ensure co-commercialisation with chemical fertilisers for the fertilizer companies, with a ratio of 3-4 bags to 6-7 bags as far as the composting sector is made accessible to the companies. In the Fertiliser Control Order, the Ministry of Agriculture should also provide for the manufacture and sale of compost, the promotion of compost use on agricultural land and the establishment of compost quality testing laboratories manufactured by local authorities or their approved agencies.

❖ **Promotion of waste to energy**

In a not-so-welcome move, the Solid Waste Management Rules, 2016 emphasise the promotion of waste to energy plants. The rules mandate all industrial units using fuel and located within 100 km from a solid waste-based Refuse-Derived Fuel (RDF) plant to make arrangements within six months from the date of notification of these rules to replace at least 5 percent of their fuel requirement by RDF so produced. As per the rules, the Ministry of New and Renewable Energy Sources should facilitate infrastructure creation for Waste to Energy plants and provide appropriate subsidy or incentives for such Waste to Energy plants. The Ministry of Power should fix tariff or charges for the power generated from the Waste to Energy plants based on solid waste and ensure compulsory purchase of power generated from such Waste to Energy plants by DISCOMs.

❖ **Revision of parameters and existing standards**

Under this new regulation, the deposit site is located 100 meters from the river, 200 meters from the ponds, 500, 200 meters from highways, homes, public parks and wells and 20 kilometres from airports. There are complete modifications to the emission standards including dioxin, furan and particulate matter reduction limits between 150 and 100 and now 50. The compost standards were also modified to comply with the Fertiliser Control Order.

❖ **Management of waste in hilly areas**

The development of sites on hills is to be avoided according to the new guidelines. In plain areas within 25 kilometres, land for building sanitary sites in hilly areas will be listed. Transfer plants and processing plants in hilly areas shall however be operational.

❖ **Constitution of a Central Monitoring Committee**

The Government also created the Central Monitoring Committee, chaired by the Secretary of the MoEF&CC, to monitor the overall enforcement of the laws. The Committee of the various stakeholders of the central and state governments will meet once a year to track the enforcement of these laws.

9.7. Summary

The guidelines and policies can vary between countries and regions based on their specific environmental priorities, challenges, and legal frameworks. However, the overarching goal is to promote environmental sustainability and ensure a healthy planet for present and future generations. Policies emphasize the importance of public participation and education in environmental decision-making processes. They promote transparency, encourage public involvement, and aim to raise awareness about environmental issues, fostering a sense of responsibility and action. It often encourages international cooperation and collaboration to address global environmental challenges. They may involve agreements, treaties, and partnerships among nations to work collectively towards environmental conservation and sustainable development. The policies and guidelines aim to protect and conserve biodiversity, control various forms of pollution, including air, water, and soil pollution, also recognizing the importance of diverse ecosystems for ecological stability and human well-being. Guidelines and policies focus on the sustainable use and conservation of natural resources such as forests, water, minerals, and energy sources. They promote responsible extraction, efficient consumption, and the protection of ecosystems to maintain ecological balance.

9.8. Terminal questions

Q.1: Discuss different policies to protect environment in India.

Answer: ----------

Q.2: Discuss the environmental Legislations for the protection of environment in India.

Answer: ----------

Q.3: Discuss the ways to Reduce Environmental Pollution.

Answer: ----------

Q.4: Discuss the safeguard policy for environmental protections.

Answer: ----------

Q.5: Discuss the National Environment Policy (NEP).

Answer: ----------

Q.6: Discuss the Hazardous Waste Management Rules 2016.

Answer: ----------

Q.7: Discuss the role for Ministry of Environment and Forests (2006) for environmental protection.

Answer: ----------

9.9. Further suggested Readings

1. S.R. Khandeshwar, N.S. Raman and A.R. Gajbhiye , Environmental Impact Assessment, Dreamtech Press-2019.
2. Anjaneyulu Yerramilli, Environmental Impact Assessment Methodologies, BS Publications-2020.
3. George Alex, Environmental Impact Assessment (EIA), Blue Rose Publishers-2020.
4. Teacher_manual_master_EIA.pdf (iitr.ac.in)
5. N. Maheshwara Swamy, Text Book on Environmental Law, Asia Law House-2022

Note

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