

UNIT-I

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Definition :

Environmental Impact assessment is an 'investigation of the effects on the environment arising from a major Activity (plan/policy/project)

(i) in this study proposal means to mitigate (or) reducing the significant impacts on the environment.

(ii) In this process the effects of the project undertaken (or) analysed first the effects are recorded in a report followed by a consulting experts on the report and these making a final decision based on the experts comments and informing the public. All these activities continued to sustainable development on the environment.

The phrase EIA has been borrowed from section 102(2) of the national environmental policy act 1969 USA. In India the environment was given serious thought with the active involvement of late Smt. Indira Gandhi in the united nations conference on human environment in stockholm in 1972.

A. national committee on environmental planning and coordination (NCEPC) was setup in the dept of science and technology.

- The tiwari committee has proposed the formation of a dept of environment aimed at environmental protection.
- To carry out environmental impact assessment of proposed development projects and to leave authority for pollution monitoring uncontrolled.

Aims of EIA:

- Evaluation (or) assessment of environment impacts of a developmental projects. prior to decision making.
- planning aid for adopting mitigating measures (or) reducing adverse impacts of the proposed projects.
- To support the goals of environmental protection and sustainable development.
- To bring out the proposals to decision makers to

- provide an advice to the decision makers on whether the proposal (or) scheme to be allowed to proceed (or) not
- to facilitate the sustainable development.

Impact:

A change or deviation of the baseline situation arising from a proposed project/plan.

Baseline situation:

It is an existing environmental condition before a proposed project (or) activity.

Environmental Impact:

It refers to a positive (Beneficial) or negative (adverse) change to ecosystem (or) human health as a consequence of human intervention in the environment through proposed public and private developmental activities such as projects and programmes.

Beneficial:

Afforestation for Coastal management projects.

Adverse:

- land use
- Drainage problems
- loss of trees.
- loss of historical and cultural monuments for mass transit system.

→ Environmental impact assessment:

An activity carried out to determine and minimise the impact of any project on physical, chemical (or) biological parameters of environmental and also human health is termed as environment impact assessment.

Classification:

Environmental impact assessment is broadly classified into 3 different ways.

① positive (or) negative impacts

② Temporary (short term) (or) permanent (long term) impacts.

③ Reversible (or) irreversible impacts.

① positive (or) negative impacts:

→ Tourism activities have both beneficial and adverse effects on environment.

→ The impacts from construction of infrastructure facilities like roads, airports, resorts, hotels, restaurant, shops can have positive impacts by raising awareness of environmental values and serve as a medium to finance protection of natural areas and increase their economic importance.

→ uncontrolled tourism can lead to adverse effects like soil erosion, increase in pollution (air, noise, solid waste,

sewage, oils & chemicals) Discharges into sea, rivers depletion of water resources.

② Temporary (or) permanent impacts:

→ the short term impacts are the construction, traffic, noise, dust, disruption of vehicles and pedestrian traffic.

→ The long term impacts are the consumption of energy resources, generation of waste, increase in impervious surface leading to increased storm water runoff.

Reversible (or) irreversible impacts:

Based on the severity of potential impact by any proposal project the impact may be either reversible or irreversible.

→ Impact of noise due to the construction activities are reversible.

→ They harm to the environment due to more infrastructural facilities like transport, trade, commerce and service sectors are irreversible.

Elements of EIA:

The key elements in environmental impact assessments are

- ① screening
- ② scooping
- ③ Assessment
- ④ Alternatives
 - (i) Feasibility
 - (ii) Diverse
 - (iii) scheduling
 - (iv) public involvement
- ⑤ mitigating methods
- ⑥ EIS
- ⑦ Reviewing & decision making
- ⑧ Continuous monitoring.

① screening:

screening of development program is usually done by an EIA authority (or) Govt. agencies constituting a variety of experts as a multidisciplinary team like environment scientist, engineers, ecologist, agricultural scientist, zoologist, economist and sociologist.

② Scooping:

this step recognise the important issues of a concern at a preliminary level of the planning process. It helps in site selection possible technical options and avoid all kinds of delays that arise during

the project. It provides sufficient information to the public about the proposed project and understand this project and issues.

③ Assessment:

The EIA authority must record the Construction operations, maintenance plans of the proposed project and its impact on the ecologist and socio Economic environmental and suggest alternatives for site selection for development solutions, techniques and their impacts

④ Alternatives:

These are included in the EIA to identify and evaluate alternate actions that can be undertaken to achieve similar goals and promote sustainable development. Alternatives in EIA are

- (i) Feasibility: The proposed alternatives should be Economically feasible with least negative environment impacts.
- (ii) Diverse: The proposed alternatives must have diverse alternatives that include both design and site routes for development.
- (iii) Scheduling: The proposed alternative should be timely presented to encourage more environmentally sound and publicity acceptable solutions.
- (iv) Public involvement: public participation should be encouraged to integrate citizens into the environmental

decision making process by arranging public meetings and hearings.

⑤ Mitigation methods:

This step includes the modifications in the proposals to prevent avoid or minimise the potential significant effects of a project. It may also include substitution of an alternative technology.

⑥ EIS:

The findings of the environmental statement assessment are reported as environmental impact statement it is a comprehensive clear and concise non technical summary of the project including location, design, size and mitigation results.

⑦ Reviewing and Decision making:

When the working document of the proposed project reaches the decision making committee (EIA authority or Govt) will consider its simplifications, for projects implementation.

⑧ Continuous monitoring:

Continuous monitoring of the environmental impact by project implementation is essential during the construction and operation stages (or) phases of a project. This phase of EIA ensures effective environment management and protection.

Factors affecting Of EIA:

- ① meteorology & Air quality → It deals with atmosphere its phenomenon.
- ② topography → It deals with (or) It Study about shape & features of an area.
- ③ water → It studies about hydrological studies.
- ④ Demographics → statical data about population
- ⑤ land use → For which the land is used.
- ⑥ soil condition → type/classifications of soil, properties.
- ⑦ mineral resources / Activities:
- ⑧ Ecological studies → Study of flora, fauna.

The study of the EIA process help to evaluate, analyse and report the environmental conditions from the activities. Resulting from several departments / developments. An EIA should include details of the above aspects at the proposed site.

- ① meteorology and Air quality: The science dealing with the atmosphere and its phenomenon including weather and climate. It includes
 - (i) effect of temperature
 - (ii) precipitation, relative humidity, evaporation and fog conditions.

Exposure

(ii) wind patterns

(iv) severe weathers such as Hurricanes, Volcanoes.

(v) Air quality and odour level.

(vi) sound levels and sources of sound at the proposed project development site.

(vii) These studies are carried out with the help of Computer models, satellite data and climate theories.

② Topography: It is the study of the shape and features of land surfaces. It describes the physical features of an area of land. These features typically include natural formations such as mountains, rivers, valleys, lakes etc., man made features such as roads, dams, and cities may also be included. It includes the local and regional geology studies, major land formations, geology structure and resources, seismic hazardous.

③ water:

The quality of surface water and ground water along with hydrological studies. It is the study of the amount and quality of water being stored or conveyed on the land surface and in soils and in rocks near the surface.

④ Demographics: (Statistical data of population especially)

this showing average age, income and education etc...

→ This refers to the population distribution, change in population numbers, population characteristics (such as male to female ratio, Age structure, rate of migration, municipal services (such as demand for social services, hospital beds, school places, housing etc.))

⑤ Land use:

This includes the purpose for which the land is used namely agricultural activities, industrial activities (or) mining activities, Regional planning for future use and zoning etc.,

⑥ Soil conditions: classification of soil, properties of soil and soil mapping.

⑦ Mineral resources/activities:

The mineral resources available at the proposed project, development site, minerals like uranium, Coal, oil and gas and other minerals.

⑧ Ecological Studies:

These studies involving data on type and government species of flora and fauna, aquatic reptiles, amphibians, threatened species and distribution of species habitat migratory species and species of commercial importance.

All these factors have to be taken into consideration during the EIA process to enable better design buildings to plan heating and cooling systems as well as practising sustainable agricultural activities.

Sustainable development:

The concept of sustainable development aims at improving the quality of life for all the inhabitants of the planet without over consuming the natural resources beyond the capacity of the environment to reproduce them indefinitely. An important aspect which invites serious consideration is the balance between the development and environmental production.

Role of Sustainable development:

Sustainable development is extremely important for the following reasons.

→ ① To manage the resources efficiently.

→ We need to use the natural resources wisely that includes not throwing away products, they are available use less energy and land fill spaces.

→ To Comeback Climate Change ()

The latest report indicates that the climate change and its resulting effect will continue to worsen in the future. The concentration of green house gases like carbon dioxide, water vapour, CH_4 , N_2O , CFC's have been increasing as a result of human activities such as combustion of fossils, deforestation, overuse of fertilizers, decay of organic matter, accumulation of CFCs all these results in greater warming of earth surface, rising sea level, changes in precipitation factors increase in the frequency of severe weather events, melting of glaciers, scarcity of fresh water resources which will collapse the functioning of ecosystems.

* Life cycle Assessment (LCA)

According to the ISO 14040 life cycle assessment is a technique for assessing the environmental aspects and potential impacts associated with a product. Life cycle assessment is also known as ecobalance and cradle to grave analysis.

- Compiling an inventory of relevant inputs and outputs of a product system.
- Evaluating the potential environment impacts associated with those inputs and outputs.
- Interpreting the results of the inventory analysis and impact assessment phases in relation to objectives of

the study.

Aims of the life cycle assessment:

- It gives an insight to the product inputs related to environmental impacts.
- It provides an understanding of the independent nature of the state of environment resulting from anthropogenic activities.
- It enables the decision makers to take appropriate measures for improving the environment by using sustainable materials for the manufacture of products.
- It helps to analyse the origin of the problem related to the product.
- It helps to design new products that are ecofriendly and greener.

Example: Fruit juices are packed in two possible alternatives i.e. glass bottle and carton

A glass bottle may be reused many times whereas a carton can be used only once. Additionally the glass bottles need washing and transportation whereas the carton can be disposed of after single use.

But the carton is more expensive compared to glass bottles. Thus we can conclude that carton would be the environmentally best choice for packaging processed juices.

Phases:

The methodology for LCA involves four interrelated phases

- ① Goal & Scope
- ② Inventory
- ③ Impact Assessment
- ④ Interpretation.

① Goal & Scope:

In this phase, the purpose of study, the reason for conducting the study, the spatial and temporal scope, the decision taken in support of LCA.

Inventory Analysis:

In this phase, the identification and qualification of the inputs and outputs of materials, energy, water and pollutants released into the environment.

③ Impact Assessment:

It involves assessment of impacts on resource depletion on human health and ecological impacts.

④ Interpretation:

The inventory analysis and impact assessment results are interpreted by the decision makers to reduce the impact of the products on the environment.

Preparation of Environmental Base map:

A Base map is an aerial photograph which simply means the photograph taken from air with the help of air borne camera fitted to a light aircraft to prepare a base map to require two-three experts (or) specialist, aerial photogrammetric camera, field camera, photogrammetric scanner, plotter and software (Autocad map environment & GIS) the cameras used are film based single lens cameras. The photogrammetric scanner enables the conversion of analog images to digital files and represents as pixels.

Environmental Base map is one of the important stages of a project development. It contains the plan of site and final design of the proposed construction in the form of a schematic diagram. It includes the basic information of the project site such as environmental conditions, soil conditions, population distribution, air quality, quality of surface water and ground water hydrology, land quality and ecological resources.

It provides information on the existing status of the ecosystem potentially threatened by the developmental activities of proposed construction projects.

Environmental parameters:

The environmental data at the site where a particular proposed act on is being considered for an EIA study is collected by the EIA team members as environmental scientist, Biologist, Geologist, agricultural scientist, sociologist, economist and engineers. This multidisciplinary team (or) EIA team considered the following EIA parameters (or) environmental parameters:

- ① Land
- ② Climate
- ③ Air quality
- ④ water quality
- ⑤ Territory
- ⑥ Flora
- ⑦ Fauna

① Land:

The following details of the land are necessary for the EIA study. The land details are mainly considered as land ownership, land tenure, existing land use, crop productivity and natural vegetation. This land data enables less adverse social impacts on the Indigenous people to provide equitable benefits to local communities.

② Climate:

The climatic profile of the site is being

Include the data on the rainfall evaporation, wind speed, relative humidity, minimum and maximum temperatures and barometric pressure.

③ Air quality:

This includes the amount of suspended particulate matter and fall out dust in the concentration of the gaseous emissions like Carbon monoxide, sulphur dioxide, Noxious fumes

④ Water quality:

The study of water quality data includes the quality of surface water and ground water resources temperature, pH, turbidity, total dissolved solids, hardness of the water, total alkalinity, acidity, contents of calcium, magnesium, dissolved oxygen, dissolved carbon dioxide chloride, sulphate, silica, iron, copper, sodium, potassium, phosphate, fluoride, Biological oxygen demand & COD.

⑤ Territory:

The study of terrain analysis at the proposed construction site includes the data of the Geology, classification of the land (Arid land, Grazing land, wet land & wild land) drainage, erosion potential and soil classification

⑥ Flora:

The study of the flora at the proposed development site should include the population of different types of plants. Also note the different types of vegetation

identification of valuable vegetation species, Identification of rare species and aquatic flora.

⑦ Fauna :

The study of fauna at the proposed development site should include the population of different types of fauna, density data of different types of fauna, Data on permanent and migratory population, and data on the rare species.

Role of stakeholders in EIA preparation:

When the draft of the proposed project is ready then it is sent to approval from the Government agencies. This requires notification in the newspaper and media to lead the general public know about the proposed project. This process involves preparing questions for a survey to be carried out on various aspects of the proposed action. The public decides if the proposed project is beneficial to them Geographically aesthetically and economically. The entire process is systematic time bound and carried out in transparent manner. ensuring possible public participation at the proposed site.

Stages in EIA:

The complete EIA procedure can be divided into two corresponding functions or stages.

Initial environmental examination:

It is the first phase of the EIA process

Carried out to review the potential both positive and negative impacts on the environment caused by the proposed development project. It contains a brief information of the major environmental issues based on the readily available recorded information to be used in decision making process of project planning. The main objective of IEE is to enable the decision makers and project proponents and to compare the alternative project proposals.

It contains a detail information of the proposed project which is reported as environmental impact assessment.