EIA of Development Projects

Introduction

- An Environmental Impact Assessment (EIA) for a development project is a study that evaluates the potential environmental impacts of a proposed development taking into account inter-related socio-economic, cultural and human-health impacts, both beneficial and adverse.
- Typically involves a detailed review of the proposed development site, including assessing the project's potential impacts on the surrounding environment, such as air and water quality, soil quality, biodiversity, and natural resources.
- The study may also evaluate the project's potential impacts on local communities, including social and economic impacts.

Introduction

- Based on the findings of the EIA, the project developer and regulatory authorities can work together to identify measures to mitigate any negative impacts.
- This may include modifications to the project design, changes to the construction methods, or implementation of environmental management plans.
- The goal of an EIA is to ensure that the proposed development is designed and implemented to minimize its environmental impact and protect the local community and surrounding ecosystems.
- The process helps to balance the economic benefits of the development with the need to protect the environment and the welfare of the local community.

Projects listed in EIA Regulations

A. Energy

1. Hydroelectric power generation over 50 MW.
2. Thermal power generation over 200 MW.
3. Transmission lines (11 kV and above) and grid stations.
4. Nuclear power plants.
5. Petroleum refineries.

Projects listed …. contd

B. Manufacturing and processing

1. Cement plants.
2. Chemical plants.
3. Fertilizer plants.
4. Food processing industries including sugar mills, beverages, milk and dairy products.
5. Industrial estates (including export processing zones).
6. Man-made fibers and resin projects.
7. Pesticides (manufacture or formulations).
8. Petrochemicals complex.
9. Synthetic resins, plastics and man-made fibers, paper and paperboard, paper pulping, plastic products, textiles (except apparel) printing and publishing, paints and dyes, oils and fats, vegetable ghee projects.
10. Tanning and leather finishing projects.

Projects listed …. contd

C. Mining and mineral processing

1. Mining and processing of coal, gold, copper, sulphur and precious stones.
2. Mining and processing of major non-ferrous metals, iron and steel rolling.
3. Smelting plants.

Projects listed …. contd

D. Transport

1. Airports.
2. Federal or Provincial highways or major roads (except maintenance, rebuilding or reconstruction of existing roads).
3. Ports and harbor development for ships of 500 gross tons and above.
4. Railway works.

E. Water management, dams, irrigation and flood protection

1. Dams and reservoirs with storage volume of 50 Mm^3 and above or surface area of 8 km^2 and above.
2. Irrigation and drainage projects serving 15000 hectares and above.

Projects listed …. contd

F. Water supply and treatment
Water supply schemes and treatment plants.

G. Waste Disposal
1. Waste disposal and storage of hazardous or toxic wastes including landfill sites and incineration of hospital toxic waste.
2. Waste disposal facilities for domestic or industrial wastes, with annual capacity more than 10000 m^3.

Projects listed …. contd

H. Urban development and tourism

1. Land use studies and urban plans in large cities.
2. Large-scale tourism development projects.

I. Environmentally sensitive areas

All projects situated in environmentally sensitive areas.

J. Other projects

1. Any other project for which filing of an EIA is required by the Federal Agency.
2. Any other project likely to cause an adverse environmental effect.

Mining Projects

Phases:

- Exploration
- Development
- Active Mining (Exploitation)
- Disposal of overburden and waste
- Extraction
- Beneficiation
- Tailings disposal
- Site reclamation and closure

Environmental and Social Impacts of Mining

- **Impacts on water resources**
  - Acid mine drainage & contaminant leaching
  - Eroded soil & mine waste into surface waters
  - Contamination of groundwater through leaching
- **Impacts on air quality**
  - Dust, smoke and gases from mobile & stationary sources
  - Noise and vibration
  - Release of mercury
- **Impacts on wildlife**
  - Habitat loss or fragmentation

Impacts of Mining ….contd

- **Impacts on soil quality**
  - Soil contamination from windblown dust
  - Chemical spills and residues
- **Impacts on social values**
  - Human displacement and resettlement
  - Access to clean water, livelihood, public health
- **Climate change considerations**
  - Enhanced CO_2 emission, reduction in uptake by plants and ore processing







Oil & Gas Exploration

- **Exploration**
  - Seismic surveys, testing, exploratory drilling
- **Drilling/Development**
  - Ground clearing, removal of vegetative cover, drilling, construction/installation of facilities
- **Production**
  - Operation of wells & compressor stations, pump stations, waste management, maintenance and replacement of components
- **Decommissioning/Reclamation**
  - Closure of production & injection wells, removal of components from well pads, re-contouring of surface

Impacts During Exploration Phase

- Noise:
  - Caused by earth-moving equipment, vehicular traffic, seismic survey, blasting & drilling
- Air Quality:
  - Release of particulates, NO_x, CO, SO_2, & VOCs
- Ecological Resources:
  - Affects on vegetation, wildlife, aquatic biota and their habitat

Impacts During Exploration Phase

- **Hazardous materials and waste**
  - Waste generated by crew, drilling fluid & mud, used oil & filters, spills, drill cuttings, scrap metals
- **Health & Safety**
  - Occupational accidents & injuries, exposure to weather extremes, wildlife encounters, falls etc
- **Land use**: temporary & localized
- Soils & Geological Resources
- Water Resources

Drilling Phase

- **Impacts on Cultural resources**
  - Damage to artifacts, sacred landscape, historic trails
- **Environmental Justice**
  - Minority or low-income population may be adversely affected
- **Socioeconomic impacts**
  - Affect on local economy through employment opportunities, property value and royalty

Drilling Phase

- **Impacts on Ecological resources**
  - Removal of vegetation and topsoil, erosion
  - Loss of wildlife habitat, plant diversity, introduction of noxious weeds
  - Mortality of biota (fish /wildlife), exposure to contaminants, harassment/poaching
  - Depletion of surface water resources and degradation of aquatic resources


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Seaports & Terminals

- Environmental issues in port and terminal construction and operation
  - Dredged materials management
  - Air emissions
  - General waste reception
  - Wastewater
  - Solid waste management
  - Hazardous materials and oil management
  - Noise
  - Biodiversity


Mole 2
Mole 1
B2
Fuel
Pier

Roads & Highways Impacts

- Soil: loss of productive soil, erosion and contamination
- Water resources: surface & groundwater flow/quality
- Air quality: pollutants
- Flora & fauna
- Communities
- Land acquisition & resettlement
- Cultural heritage
- Noise
- Human health and safety



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Methods of Assessment

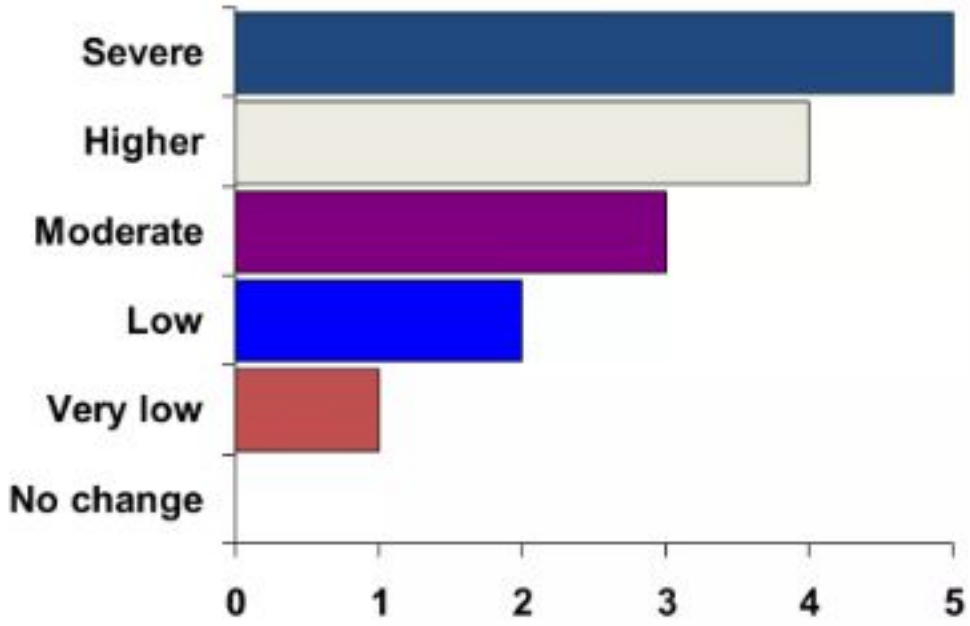
- Environmental Impact Value

$$EIV = \sum_{i=1}^{n} (V_i) W_i$$

- *Vi* = Relative change of the environmental quality of parameters
- *Wi*= Relative importance or weight of parameter
- *n* = total number of environmental parameters

Quantification of Environmental Impact

- Changes of environmental parameters
  - Severe (+5 or -5)
  - Higher (+4 or -4)
  - Moderate (+3 or -3)
  - Low (+2 or -2)
  - Very Low (+1 or -1)
  - No change (0)



Relative Importance of Environmental Parameters

- All parameters are not of equal importance or weight

[Degree of Impact]

- It varies from country to country
- In Bangladesh flood, employment, agriculture, fisheries carry more importance.
- In next slide, a summary of relative importance of parameters for Thana Road project is presented.

ENVIRONMENTAL PARAMETERS	Relative Importance Value	Degree of Impact	EIV#
I. ECOLOGICAL			**-18**
Fisheries	10	-2	
Forest	5	0	
Tree Plantation	2	+1	
Wetland/Wetland Habitant	4	0	
II. PHYSICO-CHEMICAL			**-13**
Erosion and Siltation	2	-1	
Regional Hydrology/Flooding	6	-1	
Drainage Congestion/Water logging	5	-1	
Obstruction to Waste Water Flow	3	0	
Dust Pollution/Noise Pollution	2	0	

#EIV = ∑(Relative Imp. Value*Degree of Impact)

ENVIRONMENTAL PARAMETERS	Relative Importance Value	Degree of Impact	EIV
III. HUMAN INTEREST			**+26**
Loss of Agricultural Lands	4	+2	
Employment Opportunities	4	+3	
Navigation/Boat Communication	3	-2	
Commercial and Service Facilities	3	+2	
Industrial Activities	1	+2	
Irrigation Facilities	2	+3	
Landscape	2	-1	
Total Environmental Impact Value			**- 5**

- **Changes of environmental parameters:: Higher (+5 or-5)**