EWCE 431 – SB

LO1

16/06

ECC → Env. Cleanance Certificate

Env. crisis

Causes

In developing countries

Example

Env. issues

Causes

1. Defonestation
2. Pollution
3. Desertification
4. Extinction of species

IUCN

LO2

23/06

Sustainable Development

Impact Analysis

What is Environment (comprehensive)

Environmental Parameters

- Ecological
- Physico - chemical
- Human - interest

example Environmental Impact

L03 30/06

Basic concept for Assessing Environmental Impact

Baseline situation
Types of impacts & their attributes
Activity
The EIA process

Phase 1 of EIA process

L04

20/07

Steps / Procedures of EIA

Screening

Scoping

↓↓ Importance

Timing

Initial Env. Examination (IEE)

The structure of EIA Report

[Show w/ flow chart; may obtain from elsewhere as well]

LO5 21/07

~~Mitigation~~ > Introduction

Project listed in EIA Regulations

A. Energy
B. Manufacturing & processing
C. Mining & mineral
D. Transport
E. Water management, dams, irrigation, and flood protection
F. Water supply & treatment
G. waste disposal
H. Urban development and tourism
I Environmentally sensitive area
J. Other projects

Mining projects

Phases
Impact

. . -

Oil & Gas Exploration

Impacts

Lec 1 CT

Rough / CT-1 26/07

Lec 1: Env. and Social Impact Assessment

Environmental crisis / causes:

- Population growth
- Pressure on natural resources
- Urbanization
- Industrialization
- Unrestrained profit motive

Four major env. issues (due to global development)

1. Deforestation
2. Desertification
3. Pollution
4. Extinction of certain species

Specific reasons why development causing env. impact:

1. Population growth → baseline demand ↑
2. Economic necessity → immediate growth over long-term ecological conservation
3. Corruption, greed → bypass env regulations
4. Debt → over-harvest
5. Increased consumption → eg, plastic
6. Industrial dev → degrade natural land cover
7. Higher lvl of pollution → industrial eff.
8. Global warming → release of greenhouse gases.

2. Deforestation

Removal of trees and plants by human to use the land for other purposes.

Drivers:
1. Human settlement expansion
2. Industrial production
3. Timber

Consequences:
1. Reduced CO_2 absorption capacity
   O_2 production
2. Destroys habitant for wild lives
3. Disrupts rainfall pattern
4. Topsoil erosion → flooding

2. Pollution

Contamination of physical env. — air, water, soil, by agricultural or industrial by-products

Drivers:
1. Exhaust emissions of fossil fuel combustion (transport & power plant.
2. Toxic discharge from industrial plants
3. Chemical runoff from agricultural lands

Consequences:
1. Ecological degradation
2. Health hazard to living organisms
3. Compromise access to fresh, clean drinking water.

3. Desertification:

Process through which productive and fertile land degrades over time to become infertile.

Drivers:
1. Over farming due to global economic trade imbalance
2. Over exploitation of natural water
3. Growing demand of land for over population

Consequences:
1. Permanent loss of arable land
2. Lower crop yields
3. Vulnerability to famine
4. Soil loss

4. Extinction:

Irreversible and permanent loss of plant or animal species regionally or globally.

Drivers: combined effect from
a. Deforestation (habitant)
b. Pollution (toxicity)
c. Desertification (loss access to clean water / food)

EIA – Env. Impact Assessment

A formal process of identifying the potential effects of a particular event or activity on environment & human welfare.

Impact analysis :

- Type → bio-physical, social, health, economic
- Nature → dir / indir / cumulative
- Extent → regional, global, ...
- Severity
- Timing
- Duration
- Uncertainty
- Reversibility
- Significance

Example of env. impact due to infrastructure dev.:

Construction high embankment highway through a floodplain,

Ecological impact:

- Disrupt fisheries migration for feeding and breeding
- Destroys habitants of wild lives, deforestation
+ Organized tree plantation along embankment

Physio-chemical:

- waterlogging & flooding: blocks natural drainage
  increases u/s water level (as dam)
- Erodes; loose soil from construction and deposits d/s
- Dust → respiratory health, crops

Human-interest:

+ Employment
+ Connectivity to better markets for local industries
- Damaged scenery by unfinished construction
- Permanent farmland lost
+ small-scale water storage at pits

LO7 28/07

Project listed in EIA regulations

Mining: - - -

Drilling phase

Seaports & Terminals

Roads & Highway

methods of Assessment

Quantification of Environmental Impact

Relative importance of Env. Params

ToR [not imp for exam]

- - -

L08 10/08

Economic Evaluation of EIA

Introduction

Why important

what are env. costs

How can economic valuation be used

- Enter into Cost Benefit Analysis
- motivate and prioritize mitigation measures

L09 11/08

Assignment

- Min 10 page
- Airport ext. proj.

Cont. Economic Eval. of EIA

Compare significance of diff. impacts

Easier to analyze proj alts

Methodology - . . .

Adequate considerations to be taken

Steps in economic evaluation

Air pollutant dose

Avg. daily dose

L10 17/08

Potency factor

Exercise

Category of impact

Steps in economic eval.

methods

Specific evaluation techniques

Bring printed copy of ques

L11

18/08

Math:

EoM

Legal Aspects of EIA:

Environmental Clearance Certificate

Checklist. ---

NOC [No objection Certificate]

Required docs for application to DoE

Include points from "EIA Report" into assignment

mid Lec 2

Rough / midterm 24/08

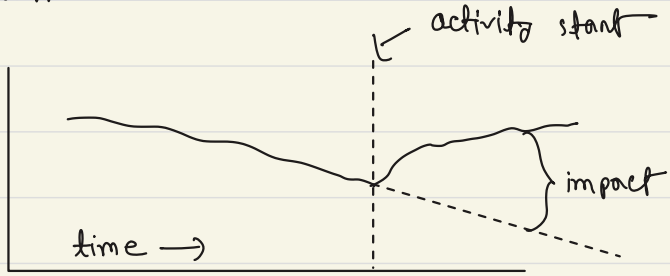
Lec 2 Basic concepts

EIA: formal process to:

- identify likely impacts of an activity on env. and on human health and interest.
- provide means and measures to mitigate and monitor these impacts.

Impact: Deviation from baseline situation.

↳ short / long term
adverse / beneficial
direct / indirect
cumulative



↳ intensity, direction, spatial extent, duration, frequency, probability, reversibility

↳ not all to be treated equally

Activity: Desired accomplishment / output
market access road rehabilitation

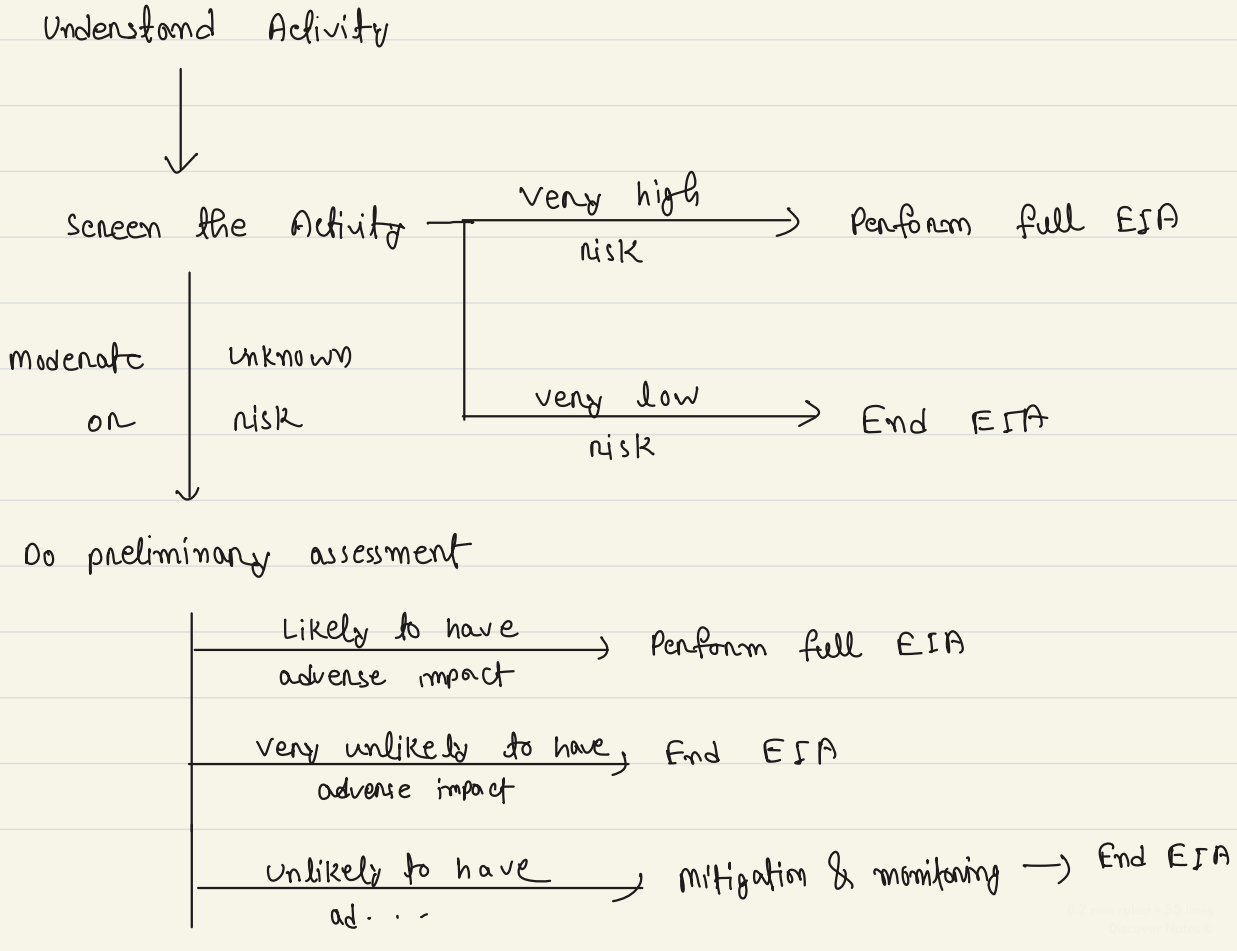
Action → surveying, grading, culvert cons., compaction

EIA process:

Phase 1 → understand proj
screen
preliminiary assessment
} init inquiry

Phase 2 → Full EIA study (if needed)
Scoping
Baseline situation
Alternatives
Impact prediction & analysis
Mitigation & monitoring develop
Document & communicate

Phase 1



Understand activity:

Why → Development objective → Increase access to market
What → Market access road rehabilitation
Actions → surveying, grading, culvert cons., compaction

Screening → Asking basic set of questions about nature of activity.
↳ donor agency or local EIA law

Preliminary assessment → Rapid, simplified EIA study with simple tools.

- Allows preparer to determine whether adverse impact likely.
- " reviewer to agree/disagree.
- sets out mitigation and monitoring plan.

outline:
1. Background
2. Baseline situation
3. Potential impact eval
4. Mitigation & monitoring plan
5. Recommendations on findings

mitigation: Implementation measures designed to reduce undesirable eff.

Findings: Identify potential impacts
Predict " "
Judge significant of " "

Phase 2: The full EIA study

1. Scoping
2. Baseline study
3. Develop alts
4. Determine and analyze potential impacts across all alts.
5. Compare alts
6. Mitigation and monitoring strategy

→ Documenting and comm throughout the process

Scoping: very early step that attempts to identify env. components of public and professional interests.

Reveals: 1. Spatial & temporal boundary of EIA study
2. Significant challenges
3. Info for decision making

Important: 1 Determines area to study
2. Saves cost and time by not studying unnecessary areas
3. Ensures vital issues are not overlooked.

Bodies involved: Sponsor
Regulatory agencies
Review authorities
Public

making EIA eff.: Integral part, honest, transparent & accessible

24/08

L12

Clearance from DoE

P15: Footnotes

Application process of ECC

Population displacement and Rehabilitation

L13

25/08

Population displacement and Rehabilitation

Reasons for displacement
Risks
Effects
Rehabilitation strategy

TEZ
Tongail Economic Zone

L14 31/08

Rehabilitation Programme

- Aspects to be considered
- Operational procedures (description)

Social Impact Assessment

Process of SIA
Impact assessment
Data sources
Identifying stakeholders

LIS

01/09

SIA

Screening
Scoping
Survey
Identifying & Assessing the risk
Developing a mitigation plan

Briefly describe the processes of SIA

Assessment of Impacts
what is socio-economic survey
How to conduct socio-eco survey

L16 07/09

How to conduct socio-economic study

Design
Planning
Implementation
~~BBB~~ Questionnaire [be provided a project & asked to prep]

L17 08/09

Gender Issues in ESIA

CT → Economic eval.

Rough / CT-3 12/09

Economic Evaluation of EIA

Converts env. impacts into monetary values to int. ecological considerations into proj. decision making.

why important:

i) Inclusion of env impacts into financial analysis.
ii) Cost/Benefit, adv./disadv. analysis.
iii) Find the most eff. instrument to solve env. problems.
iv) Systematic comp. of alts

Classification of env cost:

Direct: cost directly associated w/ env. damages, mitigation, and compliances:

a) Pollution cleanup — chemical spillage
b) Ecosystem restoration
c) Regulatory expenditures
d) Greener/cleaner operations

Indirect: Cost arising from broader economic/env. degradation not tied directly to a single activity:

a) Human health (pollution)
b) Loss of biodiversity
c) Infrastructure damage from extreme weather evt.
d) Reduced agri. productivity

Usage of economic eval.:

i) Enter into cost Benefit Analysis
ii) Motivate & prioritize different mitigation options
iii) Comparable significance of different impacts
iv) Systematically eval alt. project design, location, measures, etc

Enter into CBA: Economic eff.
Objective is obtained at least cost to society.
Net benefit > cost

Motivate and prioritize diff. mitigation strategy:
Produce continuous net benefit, with and w/o mitigation.
If benefit outweighs cost, mitigation justified.
Rank individual mitigation measures.

Comparable significance of different impacts:
Converts all impacts to cost
Relative significance of each impact can be established.

Project alts: alt loc, measures, tech, of
Ensures no other alt exists with substantially lower env. impacts.

Methodology: link valid impact attribute to proj. activities.

Considerations:

i) Identify stakeholders
ii) with vs w/o project scenario
iii) List of potential impacts
iv) Quantification of impacts over time
v) valuation in monetary terms
vi) Aggregation over time of impacts with consideration of net present value.
vii) Sensitivity analysis to account for extreme case.
viii) Recommendation:

i) Based on physical impacts affecting aggregated val.
ii) Mitigation measures to improve significant impacts.

Steps in economic evaluation:

Activity/source: Development proj w/ significant pos/neg env. impact.
Stresson. Denotes the biological/chemical change in env. associated w/ proj. activity.
Env. mitigation avoids/reduces inc. in stresson lvl
Env. media: air, land, etc, through which stressons affects receptors
Recepton: people, animals, plants, etc.
Impact: chemical/biophysical changes expected on receptons after change in exposure to stressons. Quantified via dose-response rltnshp.
Unit val: economic value per physical unit of diff impacts.
Env. cost: multiplied

Air pollution dose:

$$D = \frac{C \times IR \times EF}{BW} \quad (mg/kg/d)$$

C = contaminant conc. (mg/m^3)

IR = Rate of intake of contaminant (m^3/day)

EF = Exposure factor

BW = Body wt

$$E.F = \frac{\text{exposure in yr}}{\text{total time in yr}}$$

Potency factor: At low exposure where dose-response curve is assumed linear, slope of the curve.

Incremental risk = CDI × P.F [Chronic Daily Intake]

Exercise:

40% of the time

$C = 0.01\ mg/m^3$

$P.F = 2.9 \times 10^{-2}\ (mg/kg \cdot day)^{-1}$

IR = 20 m^3 (adult); 12 m^3 (child)

E.F = 350 days/yr

Duration = 30 yr

BW = 70 kg, 15 kg

$$E.F = \frac{\text{intake days / life}}{\text{life days}} = \frac{0.4 \times 350 \times 30}{365 \times 70} = 0.164$$

$$CDI_{ad} = \frac{C \times IR \times E.F}{BW} = \frac{0.01 \times 20 \times 0.164}{70} = 0.47 \times 10^{-3}$$

$$\rightarrow 13.63 \times 10^{-6}$$

$$CDI_{Ch} = \frac{0.01 \times 12 \times 0.164}{15} = 1.31 \times 10^{-3} \rightarrow 37.99 \times 10^{-6}$$

$$> 10^{-6}$$

Categorization of impacts in terms of human... :

Health: mortality, morbidity
welfare: materials — infrastructure damage
Aesthetic — greenary, noise, traffic congestion
social — relocation
Resource use — reduced yields
Env. : Marine — fishery loss, reduced mangrove
GW depletion
Biodiversity — loss of diversity flora & fauna
soil nutrients loss
Global : Oin — climate chng, sea lvl rise, ozone depletion
Indin - Desertification

Methods of putting value of a change:
First estimate :

- Change in productivity
- change in income
- cost of avoid / reducing env. impact
- Cost of compensatin for damage.

Obtain cost from related market — property val
travel cost
prod substitution meth
wage diff. method

Contingent valuation method (willing to pay, WTP)

Market method: Revealed preference
Observe people for cost of obtain / avoid loss

Hypothetical method: state their preference
Ask WTP / take compensation

L18 14/09

Public Participation in EIA

EIA report from DoE or BEPZA website

Diagram identification of issues
contact-ba...
p.p

[describe]

L19

15/09

Environmental Management Plan (EMP)

W14 21/09

EMP

ØØØ In EMP, how to show mitigation → table

ØØ Impacts and mitigation Alternative Analysis
(combined)
may be asked for a particular act

W14

22/09

Case study "Final Report_TF2"

optional

Rough / Final

29/10

Lec 02 Env. crisis, issues, and params

Development — env. degradation:

Due to demographic, economic, and industrial pressures:

1. Over population: extract nat. resources faster than regeneration
2. Industrial dev: untreated effluents, greenhouse gases
3. Economic necessities: greed, unrestrained profit motive
4. Consumption pattern: non-degradable plastic, fossil fuel
5. Agricultural: over-farming, over irrigation, agrochemicals
6. Infrastructure: deforestation, distrupt lateral & longitudinal migration

Major environmental issues:

2. Deforestation: Large-scale clearance of woodland, primarily driven by:

    a) Timber harvest
    b) Conversion to agro land
    c) Infrastructure/ human settlement

2. Pollution: Across all env. media:

    a) Air: gases from motor vehicles to particulate matters of industries.
    b) Water: untreated waste discharge, agro-chemical runoff
       Over 800m people globally not have access to safe drinking water
    c) Soil: pesticide, non-biodegradable mats; disrupts soil microbiomass & enters foodchain
    d) Noise: motor vehicles, industries

3 Desertification: Progressive degradation of top-soil fertility. Caused by over using of agri. land driven by world economic dynamics, over-extraction of water resources.

4. Extinction: Combined effect of deforestation, pollution, and desertification has resulted in extinction of certain species. Caused by habitat fragmentation, aquatic obstruction, chemical toxicities, etc.

Sustainable development :

Development that meets the needs of today w/o compromising the capabilities of future generations to meet their own need.

It envisions a societal state where human consumption meets human necessities w/o degrading integrity of natural biotic systems.

EIA:

A formal, systematic process for identifying, predicting, and evaluating potential biophysical, social, and other relevant changes due to a project, program, activity before major decisions are taken.

Ensures potential env. or human health effects are understood, mitigated, and incorporated into early project stages.

Acts as an actionable framework for achieving sustainable development.

Impact analysis :

Type — biophysical, social, health, eco
Nature — direct, indirect
Extent — local, regional, trans-boundary, global
Magnitude — severe, low, moderate
Timing — short / long-term
Duration — temporary / permanent
certainty
Reversibility
Significance

Environment :

Everything that surrounds us.

Env params / checklist :

Ecology : Aquatic — fisheries, eutrophication, aquatic weeds, species diversity, species endangerment, aquatic habitats & wetland
Terrestrial — forest, wildlife, speies diversity, endangerment

Physio-chemical : Land — erosion - siltation, bank stability, drainage, soil chars.
GW — GWT, GW contamination, recharge, regional hydrology
SW — water pollution, silt ld, regional hydrology
Atm — noise, air, dust pollutim

Human interest : Health — nutrition, disease, sanitation
Aesthetic — recreation, landscape
Socio-eco — land loss, crop prod, row, transport, agro-industry, irrigation, resettlement, flood control, aquaculture, employment

Environmental impact:

Any impact caused by a development activity on the env including human health & safety, flora-fauna, soil, water, ...

Impacts from road construction project:

Ecology:

- 1. Fisheries — migration (lateral, longitudinal), breeding
- 2. Deforestation
- 3. Wild life habitats
+ 4. Afforestation - roadside

Physio-chemical:

- 1. Erosion - siltation — poor embankment
- 2. Drainage — obstruction to flow (cross drainage)
- 3. Regional hydrology - flood; cross-sectional struct — backwater eff.
- 4. Dust pollution
- 5. Noise pollution

Human-int:

+ 1. Employment: short & long
- 2. Land loss (agri)
- 3. Traditional nav
+ 4. Connectivity
- 5. Resettlement
+ 6. Irrigation facilities (borrow pits)
- 7. Aesthetic — borrow pits
+ 8. Commercial act
+ 9. Industrial act

Lec 2 Basic concept

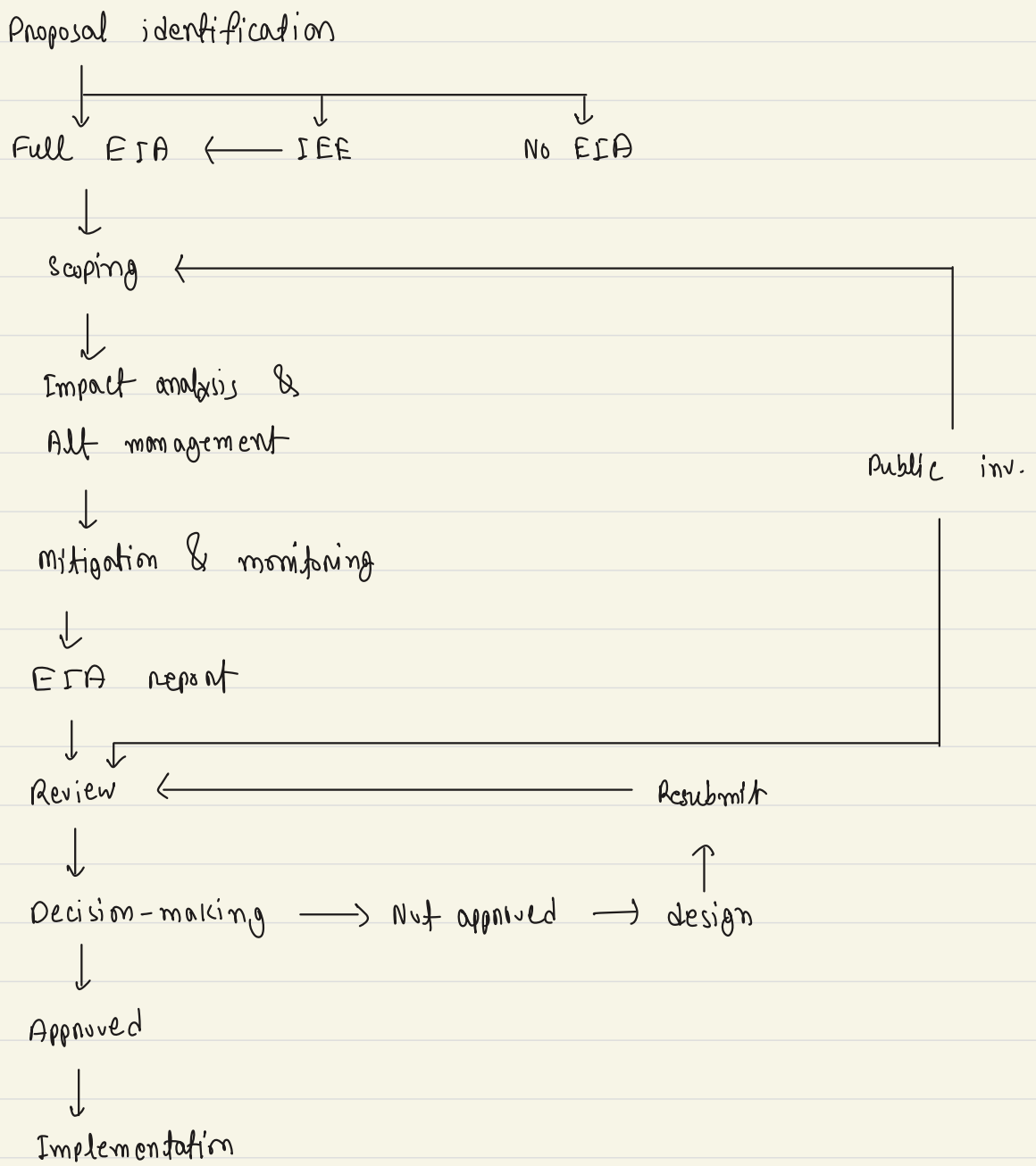
Impact: Deviation from baseline situation caused by an activity.
Baseline situation: Existing env. situation in the absence of the activity.

EIA process:

Phase I: Understand
Screen
Preliminary assessment

Phys II (Full EIA study): scope
Baseline study
Identify & chose alts
Eval each alt.
Mitigation & monitoring
Communicate & document

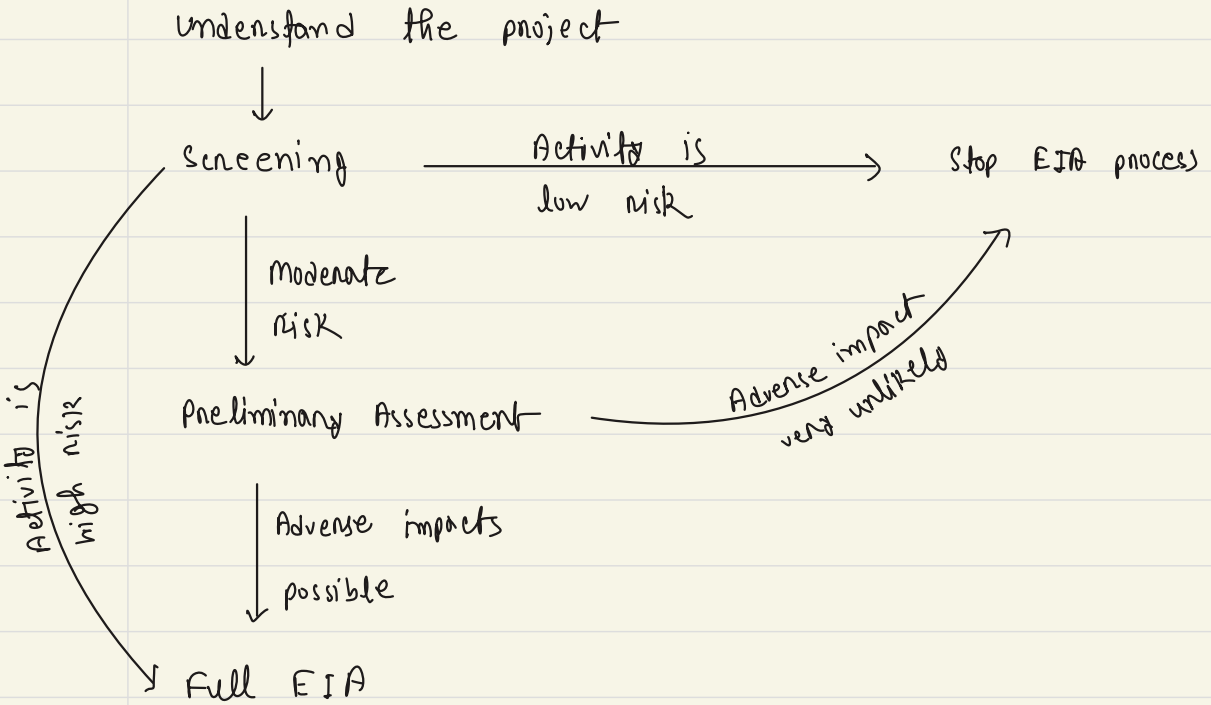
EIA flowchart:



Three tier procedure of EIA:

2. Screening / Scoping
2. IEE (Init. Env. Examination)
3. Detailed EIA

EIA on IEE:



Screening:

Assessment of an industry from environmental viewpoint.

Scoping:

Early stage of EIA that attempts to identify key env. and social attributes of public concerns upon which EIA is to be focused.

Importance:

1. Focuses time and resources: direct investigation toward significant impact receptors.
2. Early problem identification and thereby cost saving.
3. Clear boundaries: identifies project footprint, study area, temporal stages (construction, operation, post-closure stages)
4. Stakeholder engagement: Ensures local public involvement, regulatory bodies on developer.
5. Prevents EIA rejection by guiding correct methodology.

Timing of scoping: Begining of proj., before EIA commencement.

IEE; A rapid and preliminary assessment of a proposed project or activity (particularly of orange & red category) to identify potential impacts on env. using available data and experiences.

Steps: Collect baseline info
Identify issues
Impact analysis, alts, mitigation, EMP
Recommend whether full EIA

Collect → identify → impact → miti → recommend

Structure of EIA report:

1. Basemap
2. Environmental parameters

   Land use

   Natural physical res

   " biological res

   Socio-economic status

   Quality of life value

   Env. sensitive areas

3. Impact & mitigation

   3.1 Major findings from IEE

   3.2 Detailed Examination of unresolved issues

   3.3 Evaluation of Impacts

   3.4 Critical Evaluation

4. EMP

   4.1 Technical aspects

   Final design

   Construction equips

   Schedule

   cost

   Recycling

   4.2 monitoring org

4.3 Env. Monitoring Program

4.3.1 Ambient env. monitoring

4.3.2 Emission and effluent monitoring

4.3.3 Monitoring of env. significant param

4.3.4 Data presentation & submission

4.3.5 Estimate of Annual cost

Who is involved in EIA:

1. Sponsor of the activity
2. Regulatory body
3. Broad-based public

Make EIA effective:

1. Integral part of dev.
2. Honest
3. Transparency and accessibility

Impacts of mining project:

Ecology → Terrestrial: Habitat loss or fragmentation

Forest → CO_2 release ↑ CO_2 sink ↓

Physio-chemical → Land: windblow soil cont.

accidental spillage

SW cont.

GW cont.

Atm: noise & vibration

gas, dust emission

release of mercury

Human interest → resettlement

health risk

access to clean water ↓

Impacts of oil & gas expl.

Ecology → i) loss of vegetative cover leading reduced plant diversity

ii) loss of habitat

iii) degradation of aquatic resources

Physio-chemical → i) top soil erosion

ii) exposure to toxic chemicals → incr. mortality

iii) local surface water depletion for drilling

iv) accumulation of drilling fluids

v) noise & vibration

vi) release of particulate matts (NO_x, CO, SO_x, VOCs)

Human-interest → i) displacement, resettlement
ii) health risk
iii) disproportionate distribution of env. and health burden on low-income / minority population
iv) alteration to local economy by short-term job generation

Seaport & terminal:

Ecology: i) dredging mats management
ii) fisheries migration disruption (traffic)

Physio-chemical: i) sediment, turbidity, water quality
ii) waste water, solid waste
iii) General waste
iv) Noise pollution
v) Air emissions

Human-interest: i) livelihood on fishing
ii) employment
iii) Resettlement & land loss

Environmental Impact value:

$$EIV = \sum_{i=1}^{n} v_i w_i$$

Lec 3 Economic Evaluation of EIA

Converts env. impacts into monetary values to integrate ecological considerations into decision making.

why important:

i) Inclusion of env. impacts into financial decision making.
ii) Cost-benefit, adv. disadv. analysis
iii) Find the most efficient instrument to solve env. issues
iv) systematic comp of alts.

classification of cost:

Direct: costs directly tied to specific activity

→ spillage cleanup, restoration of ecology, compliance

Indirect: Not directly tied but from broader env. impact.

→ health prob, loss of biodiversity, damage from bad weather

Main usage of economic eval:

1. Enter into cost-benefit analysis;
   Main criterion: economic efficiency
   Attain the project obj. w/ least cost to society
   If net benefit to society is positive, project is carried out.

2. Motivate & prioritize measure:
   If env. benefit is of cost of mitigation measure, it makes sence for decision maker to continue and is justified.
   If range of mitigation measure is available, env analyst can recommend a combination of measure that'd yield highest benefit.

3. Relative significance of impacts:
   Conv. all impacts to their monetary values and impacts can be rank based on significance.

4. Analyze project alts:
   Ensures there are no other alts that has substantially lower env. impacts.

methodology :

i) Identify stakeholders
ii) w/ and w/o proj. scenario
iii) List of potential impacts
iv) Quantification of impacts over time
v) valuation in monetary terms
vi) Aggregation over time w/ respect to NPV
vii) sensitivity analysis to account for extreme cases
viii) Recommendation

- Based on physical impacts affecting aggn. val
- mitigation measures

steps in eco. eval. :

Activity → Stressor → Env. media → receptor → physical impact

↓

env. cost ← unit valuation

Activity: Dev. projects expected to have significant imp. on env.

Stresson: Denotes to phy/chem change in env. due to project activity

Env. media: Land, air, water through which stresson affects receptors

Receptor: People, animal, plants, etc.

Physical impact: Expected chemical/biophysical change on receptors after change in stresson; quantified via dose-response rltnshp.

Unit value: economic val. per unit of physical impact.

Env. cost: unit price x magnitude.

Air pollutant dose:

$$D = \frac{\text{Conc.} \times \text{daily_intake} \times E.F}{\text{body_wt}} \qquad \left[\frac{C \times IR \times EF}{BW}\right]$$

$$E.F = \frac{\text{exposure_time}}{\text{total_time}}$$

Chronic daily intake:

Potency factor: Slope of the dose-response curve at low exposure. Assumed linear.

$$CDI = \frac{\text{avg dose}}{\text{body_wt}}$$; avg dose: lifetime dose avged over 70 yr.

Incremental risk: CDI x PF

Ex. P22/

$C = 0.01\ mg/m^3$

$PF = 2.9 \times 10^{-2}\ (mg/kg\text{-}day)^{-1}$

daily intake = $20\ m^3/d$ (adult)

$12\ m^3/d$ (child)

Exposure frequency = 350 d/yr

Exposure duration = 30 yr

Wt = 70 kg, 15 kg

$$\text{Avg dose} = \frac{0.01 \times 0.4 \times IR \times 350 \times 30}{365 \times 70} = 0.0329\ mg/d \quad \text{(adult)}$$

$$= 0.0197\ mg/d \quad \text{(child)}$$

$$CDI = \frac{avg}{BW} = 0.00047\ mg/d\text{-}kg$$

$$= 0.00131\ mg/d\text{-}kg$$

$$Risk = CDI \times PF = 13.63 \times 10^{-6} > 10^{-6}$$

$$= 37.99 \times 10^{-6}$$

methods of economic evaluation:

Market methods:

Revealed preference: observe people's behavior on a proxy market.

Dose - response func

Damage and resources cost — chng in productivity, cost of illness, ...

Hypothetical methods: stated preference

Contingency valuation method: Ask people to state their maximum willingness to pay (WTP) to preserve env. state and willingness to accept (WTA) as compensation to accept the degradation.

Benefit transfer: from earlier studies.

Example:

Receptor	Endpoint damage	Price
Material	Shorter lifespan	cost of replacement + install
Animals	Reduced fish catches	Price of fish
Industry	Reduced output	Price of output

Specific eval. techniques:

Cost = just multiply all

mortality cost, hospital adm. cost, workday loss

Prob/

Component	w	S_C	w_{SC}	S_B	w_{SB}	S_A	w_{SA}	S_B	w_{SB}	S_C	w_{SC}
Ain	0.17	-4	-.72	-4	-.72	-2	-.44	-2.4	-.432	-2.4	-.432
SW	0.22	-5	-1.1	-2	-.44	-2	-.44	-5	-1.1	-2	-.44
GW	0.15	-3	-.45	-12	-.18	-12	-.18	-3	-.45	-12	-.18
SQ	0.10	-2	-.2	-2	-.2	-2	-.2	-2	-.2	-2	-.2
NE	0.08	-2	-.16	-2	-.16	-4	-.6	-2.4	-.096	-1.2	-.096
E11	0.15	-4	-.6	-4	-.6	+4	+.48	-2.4	-.36	-2.4	-.36
SEE	0.12	+4	.48	+4	+.48		-1.82	+4	0.48	+4	+.48
			-2.75						-2.158		-1.228

Alt C exceeds budg.

∴ Alt D

Lec 4 Legal Aspects

Env. clearance checklist:

1. Site location
2. Project components
3. Raw mats
4. Energy use
5. Effluent & its management
6. Impact on health, habitat, env.
7. water logging, land erosion

Env. clearance:

Green → tea packing, sports goods, ...

Doc for application to DoE:

1. Application through Form-3 of ECR 2023
2. Fees under Section-13 of ECR 1997
3. General info about industrial unit or proj.
4. Description of raw mats & output
5. No objection certificate from local authority.

Orange A: those w/ minor and temporary env. impacts.
E.g. cinema hall restaurants, ...

Docs:
1. Application through Form-3
2. Fee as per Section 13
3. General description of project
4. Raw mats and output
5. NOC from local authority
6. Process flow diagram
7. Layout plan
8. Effluent discharge arrangement
9. Relocation, rehabilitation plan } if applicable
10. Other

Orange B: moderate env. impact; brick field, glass manufacture, ...

Docs;
1. Form 3
2. Section 13
3. Gennal info of proj.
4. Raw mats & outputs
5. NOC
6. Flow diagram
7. Layout
9. Feasibility report
10. EE
11. Effluent discharge arrangement
12. EMP
13. Emergency plan for adverse impact
13. Mitigation of pollutants
14. Rehabilitation

Red: Adverse impact; tannery, power plant

Docs:
1. Form 9
2. Section 13
3. General info
4. Raw mats & output
5. NOC
6. Feasibility report,
7. EEE & EIA report
8. Layout plan, flow diagram, ETP schedule
9. EMP [for existing project]
10. Plan for adverse situation
11. Pollutants mitigation
12. Rehabilitation

General steps for Env. Clearance.

1. Submit application w/ all relevant docs
2. verification
3. Inspection by authorized officer
   → Clearance for green
4. meeting of Env. Clearance committee [orang & Red]
5. Decision

Renewal:

Green has validity = 3 y; others = 1 y
Renew > 30 d prior to expiration.

Outline of EIA report:

Executive summary

1. Introduction
2. Policy, legal, and administrative framework
3. Project description
4. Baseline env.: ecological, physio-chemical, social
5. Public consultation and information disclosure
6. Impact identification and evaluation
7. Mitigation measures
8. Alt analysis
9. EMP
10. Concl.

Lec 5 Population Displacement & Rehabilitation strategy

Displacement:

Process through which dev. project causes people to loss their land and/or access to resources.

Reasons: natural disaster
man-made "
dev. project
infrastructural "
energy proj.
agricult "
conservation of wildlife proj.

Types: Direct → people are moved out to make space for dev. project
or people move to dev. project

Indirect → people migrate as a consequence of an activity
e.g., forced move due to pollution by mining project.

predictable, manageable by upfront planning.

Risk → joblessness, homelessness, landlessness, incr. mortality, social articulation, food insecurity, ...

Effects;

1. Little to no support: usually tribal or rural people not on priority list
2. Insignificant compensation; not paid, delayed, so little
3. Loss of livelihood
4. Lack of facilities
5. Incr. stress
6. Health problem: nutrition
2. Loss of identity

Resettlement/ Rehabilitation;

Process through which adversely affecteds are assisted in the efforts to improve on atleast restore their living standards and income.

Land Acquisition Assessment
Resettlement Action Plan (RAP)

Rehabilitation strategy:

1. Removal of poverty
2. Appropriate compensation
3. Employment opportunities
4. Should be moved to the neighborhood of their own env.
5. Should be taken into consideration throughout each step of implementation through public meeting
6. Elderlies should be considered
7. mental health services
8. cont. monitoring

Features of RAP:

1. Statement of policy principles
2. List of matrix for assessing compensation eligibility.
3. Review of scope of resettlement through survey of those affected
4. Implementation plan w/ established responsibility for delivery of assistance.
5. Resettlement timetable coordinated w/ project timetable.
6. Discussion of opportunities of participation in the planning, of those affected.

Aspects to be considered for rehabilitation :

1. Program should be planned with data collected, classified by social groups.
2. Should be implemented carefully after acquisition of farm land & other ammenities.
3. New land should be provided instead of cash for land acquired.
4. Must not be undermined.
5. Tribal people should be recognized and their needs be met.
6. Wishes of host people should also be recognized.
7. Land should be of optimum amount as to continue their earlier economic status.
8. Housing sites be available.
9. Lump sum money for incidental expense.
10. Basic civic ammenities like roads, water.
11. Loans could be given.

Operational procedures:

2. Sample survey of communities
2. Information campaign & meeting w/ families
3. Census of people
4. Enclosing planning data
5. Site selection for settling displaced pop.
6. Action plan for resettlement
7. Land acquisition
8. Participation of affected
9. Compensation
10. Construction of new settlement
11. Community dev.

Lec 6 / partial Gender & public participation

Gender — socially constructed roles & power rltn btwn men & women.
Gender equality – equal societal statues, opportunities, and benefits.

Incorporate gender equality into ESIA:

1. Scoping: Identify key gender issues
2. ToR: Include to collect gender specific data and gender balanced team
3. Baseline data call.: Collect gender data on work within on out-of household
4. Impact identification: conduct analysis on gender and identify key positive/negative effects on men & women.
5. Public consultation: Ensure participation of men & women of different groups.
6. Mitigation measure: Lay out plans for mitigating identified issues
7. EMP: Dev Gender Action Plan
8. Monitoring: Use gender specific indicators.

Cause of low participation:

1. Mass illiteracy
2. Ignorance about the importance of women's participation.
3. Traditional view of male dominance
4. Women's opinions are not always entertained by male counterpart.
5. Lack of encouragement
6. Lack of advocacy
7. Lack of information dissimation
8. Lack of awareness
9. Triple role — productive, reproductive, community

Women's challenges in public participation:

1. Their opinions are often overlooked.
2. Discourage to give public speech by the norms of women decorum.
3. Less time due to heavier burden of work.
4. Social & cultural norms.
5. Unequal access to education.
6. Reluctant as they historically have little to gain from.

why gender issues are a challenge for proj. sustainability :

1. Disproportional burden of env. degradation
   In rural places, GW draw down or deforestation directly multiplies women's work.
2. No name on land doc → no compensation
3. Socio-cultural norms
4. Wage discrimination

Public participation / objective :

1. Obtain local knowledge.
2. Facilitate consideration of alts and mitigation.
3. Ensure important impacts are not overlooked. and benefits are maximized.
4. Reduce conflicts by early identification of controversial subjects.
5. Provide an opportunity to the public for influencing project design.
6. Improve transparency.

Identify public:

Any one who has a distinctive interest on the project.
Chose by,

i) Proximity
ii) Economic
iii) Resource use
iv) value
v) social

Importance / benefits of PP:

1. Public consensus reduce conflict
2. Process of decision making and fical decisions beome more transparent & legitimate.
3. Ensures no important fact is overlooked.
4. More solutions to a problem.
5. Cost of doing wrong is reduced.

Disadvantages:

1. Confusion
2. Incomplete / wrong info spread
3. Delay & cost

PP across various stages of ESIA:

1. Screening & scoping:
   obtain public interest & values
2. Impact identification & assessment
   obtain local issues
   identification of priorities for assessment
3. mitigation
   comment on the acceptibility of impacts
   acceptibility of relocation sites
4. Draft EIA
   comment on acceptibility of EIA report
5. monitoring
   Participatory monitoring & grivance redress

methods of PP:

2. Information provision:	Leaflets
	Brochures
	Advertisements
	Public displays
	Site visits
2 Information feedback:	Public meeting
	Toll-free telephone lines
	Internet
	Public hearings
	Interviews
	Surveys
3. Involvement & consultation:	Focus group
	Workshop
	Open house
	The Delphi method
4. Extended involvement:	Local juries
	Advisory groups
	Community visioning
	Task forces

Practical considerations for consultation:

i) Be concerned about the detail
ii) Prepare meeting agenda
iii) Keep presentation simple
iv) Be sincere, willing to work on problems
v) Speaker should've both oratory & technical skill

People's participation in EIA:

i) Make bangla summary available to the public
ii) Release date & time of public hearing
iii) Public can comment within 30 d
iv) Minutes of pub hearing approved by DoE
v) Upload approved EIA to DoE website.

Lec 7 EMP

EMP & EIA :

- EIA is a process for analyzing env. impacts of project
- EMP is an action plan that is based on the results of EIA.

EMP — set of monitoring & mitigation measure taken during proj. implementation to reduce, offset, eliminate, reduce adverse impacts.

Roles:

- Identify responses to adverse impacts
- Determine reqs for ensuring that those responses are made effectively & in timely manner
- Describe means for meeting those reqs
- Minimize adverse impacts to acceptable standards.

- Management & implementation measures
- Implementation & supervision responsibilities
- " schedue
- Include measures to consider during imp. & op.
- Training needs & budget

- Covers docs, method to achieve targets of EIA

Contents of EMP:

Brief intro of proj. design
Major findings of screening
Env. impacts overview
Regulatory framework
Env. Management proposed:

- Op. phase activities
- Implementation arrangement
- Institutional "
- Monitoring mechanism
- Reporting system
- Training and management budget

EMP example:

Component	Impact	Mitigation measure	Responsibility	Cost
Air	Dust generate	Cover exposed site	Site manager	$100
Water	Turbid	Implement erosion prevention		$6,000