

Environmental Impact Assessment (EIA) Certificate Course with ECRMII

Two-Day Intensive Training

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Introduction, Legal Framework, and EIA Methodologies

Day 1 Content (2 Hours)

Session 1 (30 min): Introduction to EIA

Session 2 (30 min): Legal & Regulatory Framework
(Nigeria & International)

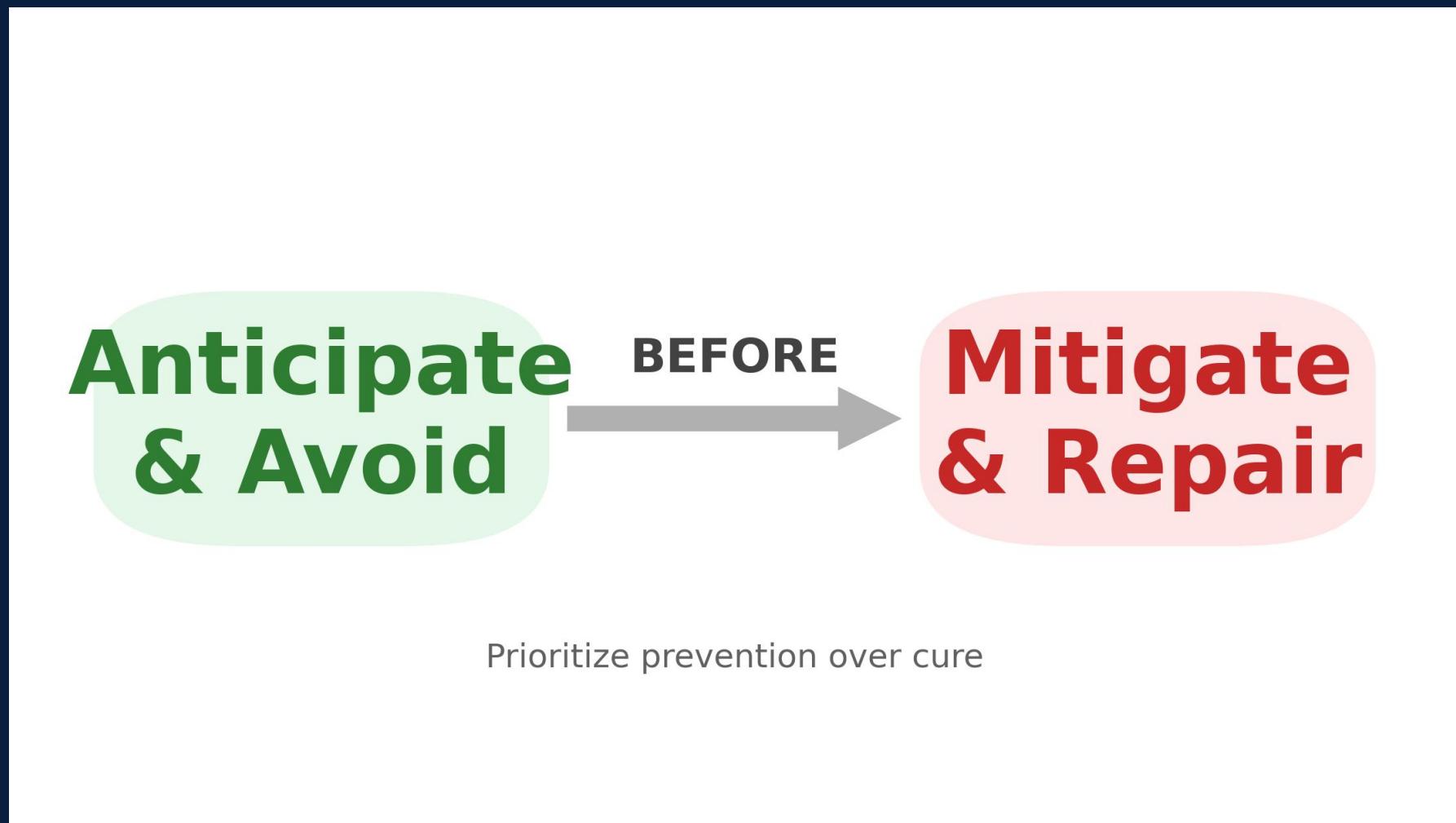
Session 3 (50 min): EIA Process & Methodologies

Session 4 (10 min): Wrap-up & Assignment



What is Environmental Impact Assessment (EIA)?

- ✓ **Definition:** systematic process to identify, predict, evaluate environmental effects before decisions
- ✓ **EIA is a study conducted before a project begins, to check how the project might affect the environment and how to reduce any harmful effects.**
- ✓ **Scope:** physical, biological, and socio-economic environments
- ✓ **Purpose:** integrate environment and development; inform decision-making
- ✓ **Key Principle:** 'anticipate and avoid' **before** 'mitigate and repair'



What is Environmental Impact Assessment (EIA)?

- ✓ Think of it like a football match: without rules and referees, players can do whatever they want, and someone might get hurt.
- ✓ (EIA provides the “rules and referees” that keep development activities orderly, safe, and environmentally responsible)
- ✓ The Legal Framework for EIA makes sure developers follow the rules before kicking off any project

Why EIA Matters in the Oil & Gas Sector

- ✓ Prevents costly delays & penalties from environmental non-compliance.
- ✓ Protects marine & terrestrial ecosystems around pipelines, onshore & offshore sites.
- ✓ Builds community trust in host areas (esp. Niger Delta).
- ✓ Enhances sustainability in exploration & production.



Principles of Good EIA Practice

- ✓ Participation, Transparency, Accountability
- ✓ Integration of environmental, social, & economic aspects
- ✓ Lifecycle perspective: Exploration → Production → Decommissioning
- ✓ Precautionary & Polluter-Pays principles



Nigeria's Legal & Regulatory Framework

- ✓ EIA Act No. 86 of 1992 - Federal Law
- ✓ FMEnv, NESREA, and NUPRC regulate oil & gas projects
- ✓ EGASPIN: Environmental Guidelines & Standards for the Petroleum Industry in Nigeria
- ✓ Public participation, disclosure, and compliance requirements



Nigeria EIA Act No. 86 (1992)



- ✓ Makes prior EIA mandatory for any project likely to significantly affect the environment.
- ✓ Administered by FMEnv; binds all approving authorities.
- ✓ Mandatory list: large agro/industrial estates, dams/reservoirs, refineries/field dev., power plants, long pipelines, airports/ports/rail/major roads, major waste sites.
- ✓ Process: screening → scoping → EIA report (alternatives, baseline, impacts, mitigation/EMP) → public review → decision & certificate → monitoring.
- ✓ Penalties: up to ₦100k or 5 years imprisonment; firms ₦50,000–1M.

International EIA Frameworks

- ✓ World Bank Environmental & Social Framework (ESF)
- ✓ IFC Performance Standards (PS1–PS8)
- ✓ Espoo Convention (Transboundary EIAs)
- ✓ Relevance: Access to global funding & credibility



EIA Process Overview - 8 Steps

1. Screening
2. Scoping
3. Baseline Studies
4. Impact Assessment
5. Mitigation
6. Reporting
7. Review & Decision
8. Monitoring & Audit



Screening & Scoping

- ✓ Determines if full EIA is required
 - ✓ Engages stakeholders early
 - ✓ **Screening:** does the project need full EIA? (triggers, thresholds)
 - ✓ **Scoping:** identify key VECs (Valued Environmental Components) & ToR
 - ✓ Stakeholder mapping and engagement plan
 - ✓ Deliverable: Scoping/ToR report for regulator review
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Baseline Studies & Impact Prediction

- ✓ Environmental media: Air, water, soil, noise, biodiversity, land use, socio-economics
 - ✓ Techniques: Sampling, remote sensing/GIS, surveys, seasonality, modelling
 - ✓ Example: Baseline air quality study before gas flaring project approval
 - ✓ Address uncertainty with sensitivity analysis
 - ✓ Prediction tools: checklists, Leopold matrix, networks, modelling
-

LEOPOLD MATRIX

Proposed Action Resources	Immigration of Labor	Dam Construction	Transmission Line	Reservoir Filling	Heavy Metal Discharge	Growth of Aquatic Weeds	Relocation of Inhabitants
Health	5 8	4 6		5 8	4 7	6 6	
Spawning of Fish		3 4		3 6	3 7	5 5	
Archeological Artefacts	4 6			8 8			
Tourism			7 6	7 6			
Downstream water pollution		7 7		7 8	2 4		
Social and Economic Aspects							8 7
Forestry		4 2					
Fishery		2 5			2 5		
Navigation				6 5			
Aquatic Plants				6 5			
Leopold Method	9 14	20 24	7 6	42 47	11 23	11 11	8 7

Public Participation

- ✓ Conducted during scoping, draft EIA review & monitoring
 - ✓ Tools: Focus groups, town hall meetings, local-language communication
 - ✓ Promotes ownership & conflict prevention
 - ✓ When: scoping, draft ESIA review, monitoring feedback
 - ✓ How: public hearings, focus groups, local language materials
 - ✓ Why: legitimacy, local knowledge, conflict prevention
 - ✓ Record-keeping & grievance mechanisms
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Day 1 Exercise (10 min)

Task A (Screening)

Which projects require a full EIA?

- a) 5 MW solar farm
- b) Rural borehole
- c) 20 km gas pipeline

Task B (Outline)

1-page EIA outline for small hydropower in your state

- ✓ Deliverable: Submit at start of Day 2
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Answer to Day 1 Exercise

Task A

- a) 5 MW solar farm → Yes, may require initial environmental review but often below EIA threshold unless located in sensitive area.
 - b) Rural borehole → No, generally exempt; minimal environmental impact.
 - c) 20 km gas pipeline → Yes, requires a full EIA under the EIA Act (No. 86 of 1992) due to linear infrastructure length, emissions, and land disturbance.
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Answer to Day 1 Exercise

Task B

Sample points:

- ✓ Project Description: 2 MW hydropower plant on local river.
- ✓ Baseline Environment: Water quality, aquatic life, nearby settlements.
- ✓ Potential Impacts: Minor flooding, sedimentation, fish migration issues.
- ✓ Mitigation Measures: Fish ladders, sediment traps, reforestation.
- ✓ Public Consultation: Local farmers & fishermen associations.
- ✓ Monitoring Plan: Quarterly water sampling & biodiversity check.

Deliverable: Concise EIA outline covering description, impacts, mitigation, consultation, and monitoring.

FISH LADDERS / PASSES



Mitigation, Social Impact Assessment, EMP, and Case Studies

Day 2 Content (2 Hours)

- ✓ Session 1 (40 min): Impact Identification & Mitigation Hierarchy
 - ✓ Session 2 (40 min): Monitoring & Auditing + Social Impact Assessment (SIA)
 - ✓ Session 3 (30 min): Environmental Management Plan (EMP) Development
 - ✓ Session 4 (10–15 min): Case Studies & Final Group Exercise
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Identifying Environmental Impacts

Types

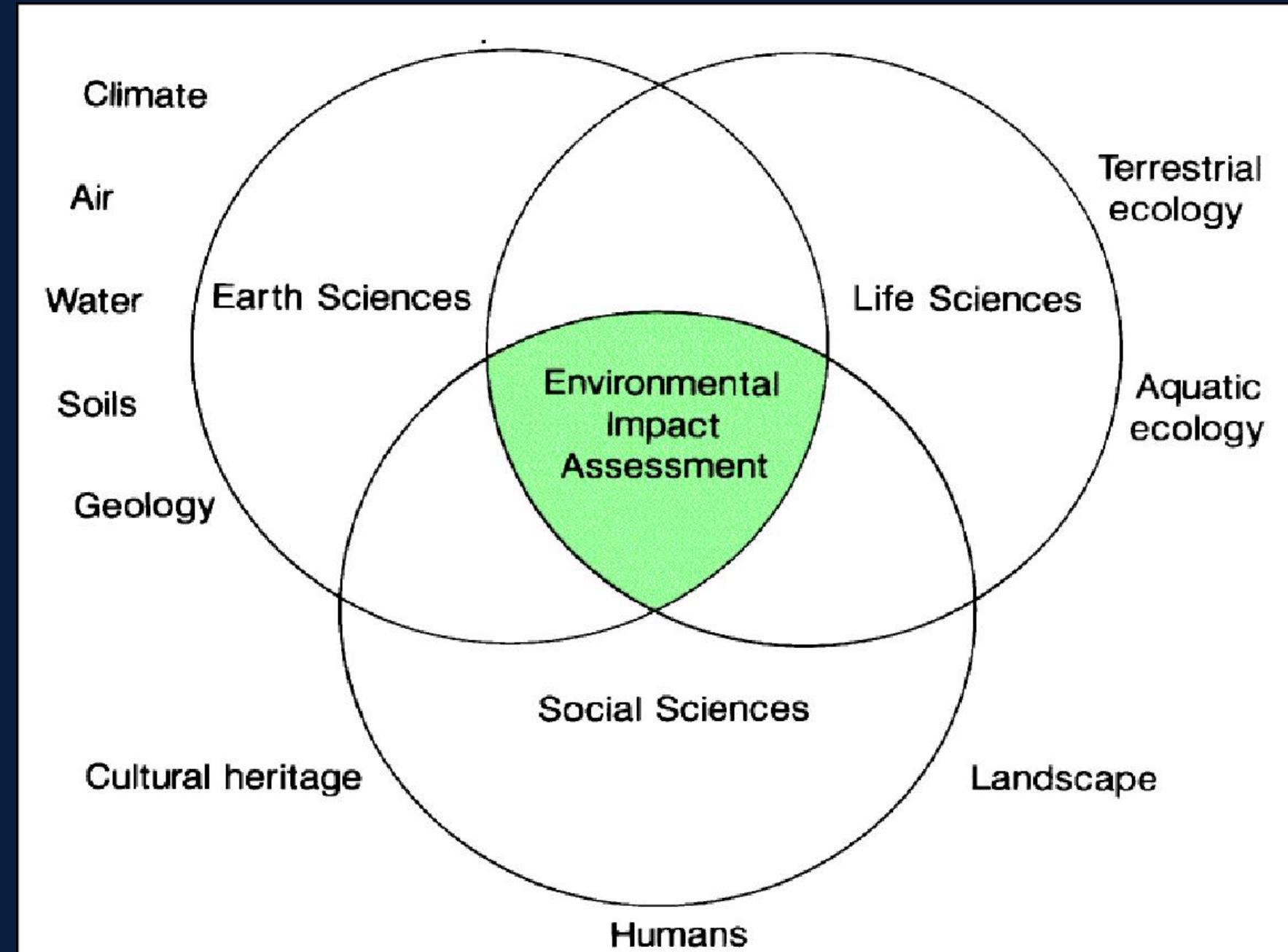
- Positive/Negative;
Direct/Indirect;
Short/Long-term;
cumulative

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- Focus on cumulative impacts (oil spills, gas flaring, noise pollution)
 - Prioritize receptor sensitivity (mangroves, fisheries, communities)
 - Receptor sensitivity vs. magnitude of change
 - Significance evaluation & mitigation triggers
 - Documenting assumptions and uncertainties

Identifying Environmental Impacts

Project Activity	Environmental Component Affected	Type of Impact	Nature of Impact	Description of Impact	Significance
Site Clearing & Vegetation Removal	Flora & Habitat	Negative	Direct	Loss of vegetation; disturbance of habitat; reduced biodiversity	High
Excavation & Earthworks	Soil Quality	Negative	Direct	Soil erosion, land instability, sedimentation of streams	Medium–High
Construction Equipment Operation	Air Quality	Negative	Direct	Emission of dust and exhaust gases	Medium
Transportation of Materials	Community / Traffic	Negative	Indirect	Increased traffic congestion, noise, accident risk	Medium
Waste Generation (Solid & Liquid)	Water & Soil	Negative	Direct	Possible contamination from poor waste handling	High
Project Operation Phase	Employment & Economy	Positive	Direct	Job creation and local economic boost	High
Site Restoration	Landscape	Positive	Direct	Land rehabilitation and improved aesthetics	Medium

Identifying Environmental Impacts



EIA and Other Environmental Science Disciplines

Impact Identification Methods

Checklists (simple, comprehensive)

✓ Leopold Matrix (action–receptor scoring)

✓ Networks (cause–effect chains)

✓ GIS mapping (hotspots, buffers, corridors)

Impact Identification Methods

GIS Tool	What It Means	Purpose in EIA
Hotspots	Areas of concentrated environmental value or risk	Identify sensitive zones needing protection
Buffers	Fixed-distance zones around environmental or project features	Determine extent of influence or regulatory compliance
Corridors	Pathways connecting habitats or project routes	Analyze movement, connectivity, and route impacts

Mitigation Measures - The Hierarchy

- Avoid → Minimize → Rehabilitate → Offset/Compensate
- Design changes: route relocation, timing windows, low-noise equipment
- Biodiversity offsets & net gain targets (when applicable)
- Residual impacts and adaptive management
- Example:
 - ✓ Avoid flaring via gas capture systems
 - ✓ Minimize through emission controls
 - ✓ Offset by reforestation

Monitoring & Auditing

- Compliance vs. impact monitoring
- Indicators: air (PM2.5), water (BOD/COD), noise (dB), biodiversity indices
- Audit cycles, corrective actions, and reporting
- Community monitoring & transparency dashboards, ensure adherence to EMP, monitoring during pipeline operations

Monitoring & Auditing {Water (BOD/COD)}

Parameter	BOD	COD
Full Meaning	Biochemical Oxygen Demand	Chemical Oxygen Demand
Measures	Oxygen needed by microbes	Oxygen needed for chemical oxidation
Includes	Only biodegradable organics	Biodegradable + non-biodegradable organics
Testing Time	5 days (BOD_5)	2–3 hours
Typical Use	Assess river/stream pollution	Assess industrial effluent strength

Social Impact Assessment (SIA)

- Scope: livelihoods, displacement, health, culture, vulnerable groups
- Tools: household surveys, key informant interviews, focus groups
- Free, Prior, and Informed Consent (where applicable)
- Link to RAPs, LRP, and GRM
- Examines livelihoods, health, displacement, cultural heritage
- Case link: Oil spill impact on fishing communities in Bayelsa

Stakeholder Engagement Best Practices

Early, inclusive, continuous; use local languages

- ✓ Accessible disclosure: posters, radio, townhalls
- ✓ Grievance Redress Mechanism (GRM) with clear timelines
- ✓ Document consent, dissent, and commitments

Environmental Management Plan (EMP) – Structure

- Mitigation measures & responsibilities
 - ✓ Monitoring plan with indicators and frequency
 - ✓ Institutional arrangements & training
 - ✓ Budget, schedule, and reporting
- Outlines mitigation, monitoring, & reporting framework
- Assigns responsibilities, budget, and training
- Reviewed periodically during project lifecycle



Case Study: Lekki Deep Seaport (Nigeria)

- Issues: dredging, marine ecology, fisheries, resettlement concerns
- Mitigation: dredge timing, sediment control, community compensation
- Outcome: improved acceptance via stakeholder engagement
- Lesson: integrate EIA+SIA early to shorten permitting timelines

Case Study: Nairobi Expressway (Kenya)

- Issues: noise, air quality, displacement of roadside businesses
- Mitigation: barriers, tree planting, business relocation support
- Monitoring: noise & air sensors; community hotline
- Lesson: integrating EIA outcomes into PPP contracts strengthens compliance

Case Study: Bonga Deepwater Project (Shell Nigeria)

- Issue: Offshore drilling, produced water discharge
- Mitigation: Re却jection systems, oil spill contingency plan
- Lesson: Early baseline study improves environmental risk prediction

Case Study: NLNG ‘Train 7’ Expansion

- **Issue:** Gas flaring, community displacement, waste management
- **Mitigation:** Flare reduction technology, stakeholder compensation
- **Lesson:** Continuous engagement reduced protest risk

Mini Quiz - Knowledge Check

1. What's the first step in the mitigation hierarchy?
2. Which Nigerian law regulates EIA?
3. Name one petroleum-specific EIA guideline.



Mini Quiz Answers

1. What's the first step in the mitigation hierarchy?

Avoid. (Avoid impacts before minimizing, rehabilitating, or offsetting.)

2. Which Nigerian law regulates EIA?

Environmental Impact Assessment Act No. 86 of 1992.

3. Name one petroleum-specific EIA guideline.

Environmental Guidelines and Standards for the Petroleum Industry in Nigeria (EGASPIN).



Exercise – Mini EMP Draft

Scenario: A 50 km oil pipeline project in the Niger Delta

- ✓ Identify potential environmental issues
 - ✓ Propose mitigation & monitoring measures
 - ✓ Assign responsible parties
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EMP Template - Fill During Exercise

Impact	Mitigation Measure	Indicator (Performance / Compliance)	Responsible	Frequency / Approx. Cost*
Oil spills / hydrocarbon releases	Pipeline integrity management (coating, cathodic protection); Leak detection system (SCADA), pigging; ERP & spill kits; Secondary containment	Spill frequency; Volume released; Time-to-detection; Hydrocarbon levels in soil/water	Pipeline Operator, EHS Manager, Emergency Contractor	Continuous SCADA; monthly inspections; annual integrity surveys (Med-High cost)
Water contamination (BOD/COD, TPH, oil & grease)	Runoff control (silt traps); Refuelling pads; Effluent treatment; Immediate soil remediation	BOD/COD; TPH; Turbidity; Upstream-downstream comparison	Environmental Specialist, Lab Contractor, Site Supervisor	Baseline; monthly during construction; quarterly in operations (Low-Med cost)
Habitat loss/fragmentation	Route optimisation; Minimal ROW; HDD crossings; Re-vegetation & mangrove restoration	Area cleared vs restored (ha); Plant survival rate; Number of HDD crossings	Biodiversity Officer, Contractor, NGOs	Pre-construction, 6 months, 1 year, 3 years (Medium cost)
Erosion & sedimentation	Silt fences; Drainage control; Soil stabilization; Progressive reinstatement	TSS/turbidity; Presence of gullies; Stabilized area (ha)	Civil Engineer, Env. Officer	Weekly, especially rainy season (Low-Med cost)
Air quality impacts (PM2.5, dust, VOCs)	Dust suppression; Equipment maintenance; Idle reduction; VOC control	PM2.5/PM10; Complaint records; VOC readings	EHS Officer, Contractor	Baseline; weekly construction; monthly operation (Low for monitoring)
Noise impacts	Mufflers; Maintenance; Barriers; Daytime work	dB(A) levels; Exceedances; Complaints	EHS Officer, CLO, Contractor	Baseline; weekly during works; quarterly operations (Low-Med cost)
Biodiversity impacts (fauna, invasive species)	Pre- construction surveys; No- hunting rules; Prevent invasive species; Habitat offsets	Species richness; Illegal hunting incidents; Invasive species presence	Biodiversity Officer, Rangers, NGOs	Baseline; seasonal for 2–3 years (Medium cost)
Community health & safety	H&S plan; PPE; Traffic management; Local hiring; Grievance system	Number of incidents/LTIs; Grievances; Local employment stats	HSE Manager, CLO, HR	Daily H&S; monthly reports (Low-Med cost)
Waste management	Segregation; Hazardous waste controls; Licensed disposal	Waste volume by type; % properly disposed; Dumping incidents	Waste Coordinator, Contractor	Weekly checks; monthly reporting (Low-Med cost)
Cultural heritage	Chance-find procedure; Surveys; Avoidance	Number of finds; Resolution time	CLO, Heritage Specialist, Authorities	Pre-construction + incident-based (Low cost)
Security & vandalism	Patrols; Fencing; Community engagement; Remote monitoring	Security breaches; Downtime events	Security Team, CLO, Contractors	Continuous; monthly reports (Medium cost)

Exercise Answers

Potential Environmental Issues:

- ✓ Vegetation loss & soil erosion
- ✓ Oil spill risk & water contamination
- ✓ Noise & air emissions during construction
- ✓ Community disruption, land acquisition disputes

Mitigation Measures:

- ✓ Route selection to avoid sensitive habitats Spill prevention plan & containment systems
- ✓ Regular maintenance and corrosion checks
- ✓ Compensation & stakeholder engagement

Exercise Answers Cont'd

Monitoring Measures:

- ✓ Biannual environmental audits
- ✓ Noise & air quality measurements
- ✓ Pipeline integrity testing

Responsible Parties:

- ✓ Project developer (primary responsibility)
- ✓ Environmental consultants (monitoring & reporting)
- ✓ NUPRC & NESREA (regulatory oversight)

Key Point: Integrate EMP into project's operational plan and ensure community involvement.

Group Exercise (10–15 min) - Solar Mini-Grid EMP

- Identify key environmental/social issues (land, biodiversity, glare, community)
 - Propose mitigation (site selection, fencing, spill control, OHS training)
 - Define indicators (complaints logged, vegetation cover, noise at boundary)
 - Assign responsibilities and monitoring frequency
-

Group Exercise Answers

Key Environmental/Social Issues:

- ✓ Land clearing & habitat disturbance
- ✓ Glare affecting nearby homes Risk of electrical shock or waste panel disposal
- ✓ Community acceptance & employment

Mitigation:

- ✓ Site selection on already-disturbed land Fencing and glare shields
- ✓ Spill control kits & OHS training
- ✓ Local workforce engagement

Group Exercise Answers Cont'd

Indicators:

- ✓ Number of grievances recorded
- ✓ Vegetation regrowth rate
- ✓ Ambient noise and light reflection levels

Responsibilities:

- ✓ **Developer:** Construction & mitigation implementation
- ✓ **Community:** Reporting issues
- ✓ **Regulator:** Auditing compliance
- ✓ **Monitoring Frequency:** Quarterly during construction, biannually during operation.

References & Notes

- Nigeria EIA Act (1992); NESREA; EGASPIN (Petroleum) World Bank ESF; IFC Performance Standards (PS1–PS8)
- EU EIA Directive (2014/52/EU); Espoo Convention
- Case studies: Lekki Deep Seaport; Nairobi Expressway; Bonga Deepwater Project; NLNG Train 7 Expansion
- All images included on respective slides.... (public/official sources)



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