Introduction to Environmental Impact Assessment (EIA)

What is EIA?

- It is an instrument for environmental management.
- It provides a framework and information which is required for decision making.
- It can be termed as decision making tools for the management team.
- Environmental Impact Assessment (EIA) is directly linked to the UN Sustainable Development Goals (SDGs) because it ensures that development projects balance economic growth with environmental protection and social well-being.
- **Task**: Find out SDGs which are related with EIA.

Example: A **hydropower Dam Project**


1 NO POVERTY
2 ZERO HUNGER
3 GOOD HEALTH AND WELL-BEING
4 QUALITY EDUCATION
5 GENDER EQUALITY
6 CLEAN WATER AND SANITATION
7 AFFORDABLE AND CLEAN ENERGY
8 DECENT WORK AND ECONOMIC GROWTH
9 INDUSTRY, INNOVATION AND INFRASTRUCTURE
10 REDUCED INEQUALITIES
11 SUSTAINABLE CITIES AND COMMUNITIES
12 RESPONSIBLE CONSUMPTION AND PRODUCTION
13 CLIMATE ACTION
14 LIFE BELOW WATER
15 LIFE ON LAND
16 PEACE, JUSTICE AND STRONG INSTITUTIONS
17 PARTNERSHIPS FOR THE GOALS
SUSTAINABLE DEVELOPMENT GOALS

- **SDG 7 (Affordable & Clean Energy):** Provides renewable electricity, reducing reliance on fossil fuels.
- **SDG 9 (Industry, Innovation & Infrastructure):** Supports modern infrastructure and energy systems.
- **SDG 13 (Climate Action):** Helps mitigate greenhouse gas emissions by replacing coal/oil-based power.
- **SDG 8 (Decent Work & Economic Growth):** Creates jobs during construction and operation.
- **SDG 6 (Clean Water & Sanitation):** EIA ensures water quality, sedimentation control, and downstream flow management.
- **SDG 15 (Life on Land):** Protects biodiversity by assessing impacts on forests, wetlands, and wildlife habitats.
- **SDG 14 (Life Below Water):** Evaluates aquatic ecosystem impacts, fish migration, and river health.
- **SDG 11 (Sustainable Cities & Communities):** Manages resettlement, cultural heritage, and community safety

SDG 16 (Peace, Justice & Strong Institutions): Public consultation in EIA reduces conflict and promotes transparency.

SDG 17 (Partnerships for the Goals): Large hydropower projects often involve international financing and cooperation.

Definition of EIA

- According to Canter, EIA can be defined as the systematic identification and evaluation of the potential impacts of proposed projects, plans and programs or legislative actions related to the physical, chemical, biological, cultural, and socio-economic components of the total environment.
- According to Munn, EIA refers to the need to identify and predict the impact on the environment and on humans' health and well-being of legislative proposals, policies, programs, projects and operational procedures, and to interpret and communicate information about the impacts.
- According to UNECE, An assessment of the impact of a planned activity on the environment.
- According to IAIA, EIA is the process of identifying , predicting, evaluating, and mitigating the biophysical ,social, and other relevant effects of proposed development proposals prior to major decisions being taken and commitments made.
- According to AI, An Environmental Impact Assessment (EIA) is a formal process used to evaluate the potential environmental consequences of a proposed project before it is approved or implemented.

Genesis of EIA

- EIA was first introduced by USA within the framework of National Environmental Policy Act (NEPA) in 1969 and it became law in 1st January 1971.
- Since the first EIA system was established in the USA in 1970, EIA systems have been set up worldwide and have become a powerful environmental safeguard in the project planning process.
- In Europe, EU Directive 85/337/EEC and amending Directive 97/11/EC on EIA (EC 1985, 1997) set the legal basis for individual member states' EIA regulations.
- After 1992 Earth Summit, EIA becomes mandatory for any development project.
- According to Principle 17, Rio Earth Summit,1992 " EIA as a national instrument, shall be undertaken for proposed activities that are likely to have a significant adverse impact on the environment and are subject to a decision of a competent national authority"

Different Names of EIA

- Environmental Impact Assessment (EIA)
- Environment Impact Statement (EIS)
- Environmental Statement (ES)
- Environmental Assessment Report (EA report)
- Environmental Effects Statement (EES)

EIA in Bangladesh

- In Bangladesh, Environmental Impact Assessment (EIA) is a mandatory regulatory tool designed to ensure that development projects are environmentally sustainable and socially responsible. It is overseen by the Department of Environment (DoE) under the Environment Conservation Act (1995) and the Environment Conservation Rules (1997).
- Any industrial, infrastructural, or development project must obtain an Environmental Clearance Certificate (ECC), which often requires an EIA.
- Clause 12 of the act requires that no industry or project shall be established without obtaining environmental clearance from Director General of department of Environment
- The procedure for obtaining environmental clearance of various projects is specified in Clause 7 of the Environment Conservation Rules (ECR,1997).

Category of industries according to DoE: Green, Orange A, Orange B and Red.
Task: Find out the requirements and categories.

Ser	Industry
1	Leather tanning & processing
2	Textile dyeing, printing & finishing
3	Steel re-rolling mills
4	Printing presses
5	IT firms
6	Small garment factories
7	Hospitals
8	Small-scale confectioneries

Ser	Industry	Category	Requirement
1	IT firms	Green	Environmental Clearance Certificate (ECC)
2	Small-scale confectioneries	Green	Environmental Clearance Certificate (ECC)
3	Small garment factories	Orange A	ECC with limited documentation
4	Printing presses	Orange A	ECC with limited documentation
5	Hospitals	Orange B	ECC + Initial Environnemental Examination (IEE)
6	Steel re-rolling mills	Orange B	ECC + Initial Environnemental Examination (IEE)
7	Leather tanning & processing	Red	ECC + IEE + EIA, mandatory ETP
8	Textile dyeing, printing & finishing	Red	ECC + IEE + EIA, mandatory ETP

Objectives of EIA

- One of the main objectives of EIA is to provide decision makers with an aim to account of the implications of proposed courses of actions before decisions is made.
- The primary purpose of EIA is to encourage the consideration of the environment in planning and decision making and to ultimately arrive at an actions that are more environmentally compatible.
- EIA directed toward achieving or supporting ultimate goals of environmental protection and sustainable development, framed in EIA laws and policies.

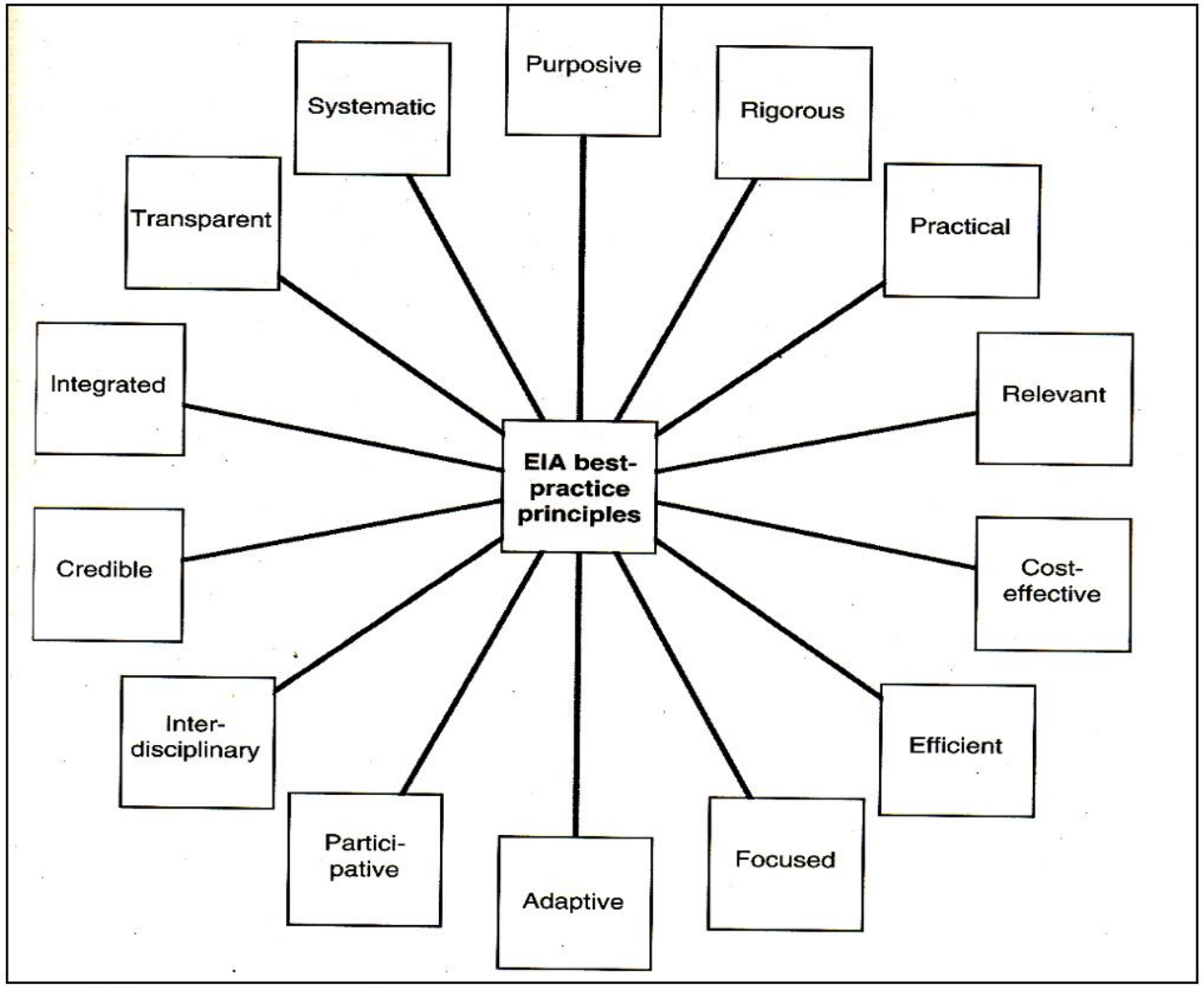
Advantages of EIA

- Systematic approach
- Information to the public
- Information to the decision maker
- Consistency of approach
- Improved design
- Provides systematic methods of impact assessment
- Estimates the cost/benefit trade-off of alternative actions
- Provides an effective mechanism for coordination, environmental integration and negotiation
- Achieve a balance between the impact of developmental and environmental concern
- Feed back
- Early discussion
- Long term outlook
- Avoid surprises
- Avoid retrofit

Disadvantages of EIA

- Adds to complexity
- Adds to delay
- Costly
- Requires multidisciplinary team
- Requires understanding of environmental systems and processes
- Forecasting of cost/schedule

Basic Principles of EIA



Purposive	EIA should aim to inform sustainable decision-making.
Systematic	Follow a structured, stepwise process from screening to monitoring.
Rigorous	Use scientifically sound methods and data.
Practical	Recommendations must be feasible and implementable.
Relevant	Focus on significant environmental and social issues.
Cost-effective	Achieve objectives efficiently without unnecessary expense.
Efficient	Minimize delays and duplication in assessment procedures.
Focused	Concentrate on key impacts rather than peripheral details.
Adaptive	Allow flexibility to respond to new information or conditions.
Participative	Involve stakeholders and communities transparently.
Interdisciplinary	Integrate expertise from multiple fields (ecology, sociology, economics, etc,
Credible	Ensure objectivity, transparency, and trustworthiness.
Integrated	Link environmental, social, and economic dimensions.
Transparent	Make processes and decisions open and accessible to all stakeholders.

Main Functions of EIA

- **To Predict Problems**: The EIA also predicts the conflicts and constraints between the proposed project, programme or sectoral plan and its environment.

- **To Find Ways To Avoid Them**: It provides an opportunity for mitigation measures to be incorporated to minimize problems.

- **To Enhance Positive Effects**: The EIA provides a unique opportunity to demonstrate ways in which the environment may be improved as part of the development process.

Core Values of EIA

- **Integrity**: The EIA process should be fair, objective, unbiased and balanced
- **Utility**: The EIA process should provide balanced, credible information for decision making
- **Sustainability**: The EIA process should result in environmental safeguards

Example: Hydropower Dam Project

Integrity

- The EIA team conducts independent baseline studies on river ecology, fish migration, and community livelihoods.
- Data is collected transparently, with public hearings to ensure local voices are heard.

Utility

- EIA compares three alternative dam sites and evaluates trade-offs in terms of energy output, displacement of communities, and biodiversity loss.
- Decision-makers receive clear, balanced information that helps them choose the site with the least social and ecological disruption

Sustainability

- The final project design integrates fish ladders, sediment management, and reforestation programs.
- Long-term monitoring ensures water quality and biodiversity are maintained.

Stages of EIA

Preliminary Assessment

- Screening
- Scoping

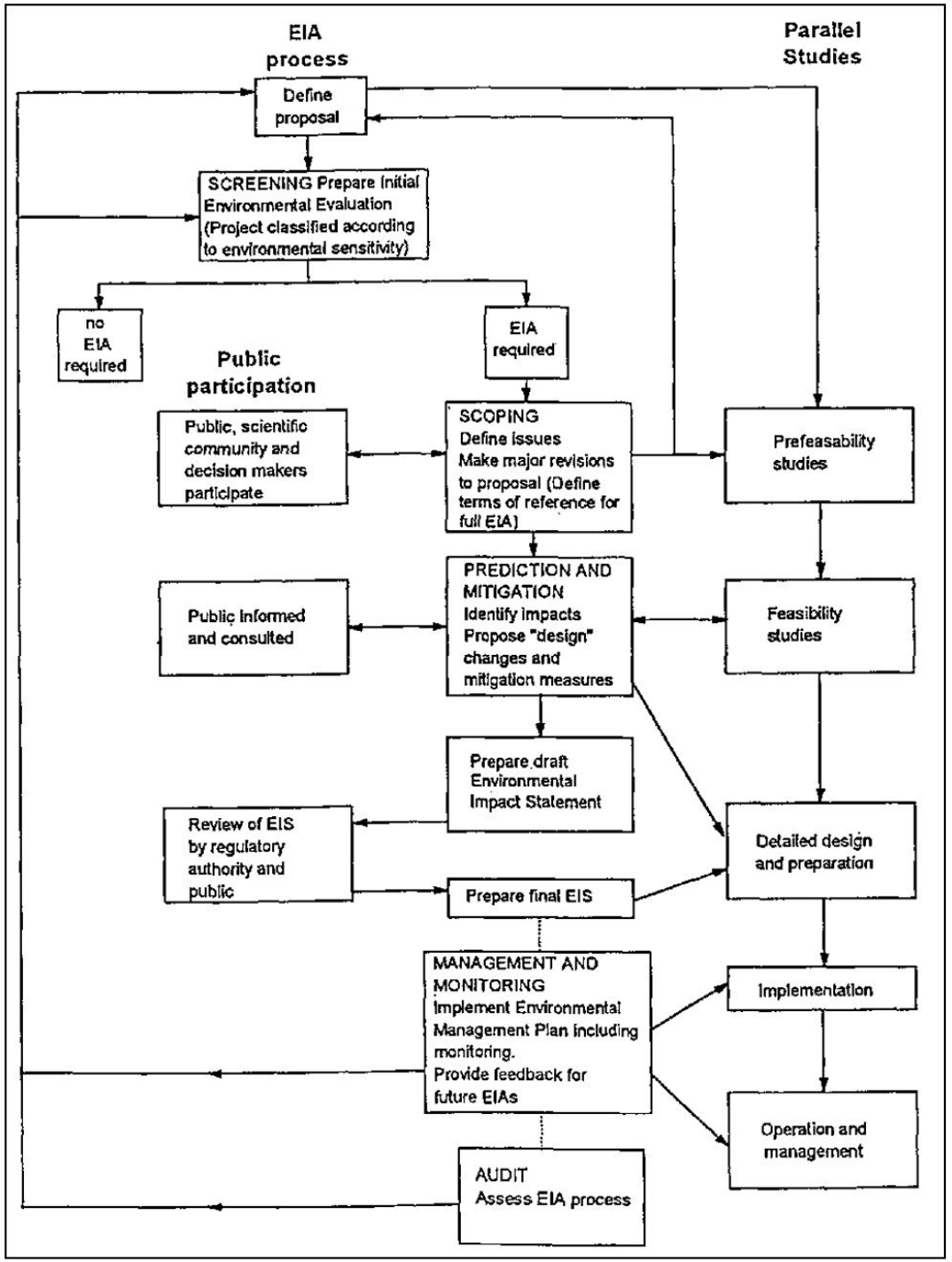
Detailed Assessment

- Baseline study
- Impact analysis i.e. to identify, predict and evaluate the potential significant impacts, risks and consequences
- Mitigation measures
- Reporting to document the results of EIA (EIS)
- Review of EIS

Review Process

- Monitoring
- Management to address unforeseen events or unanticipated impacts
- Audit/evaluation to learn from experience and improve EIA

Flow Diagram of EIA



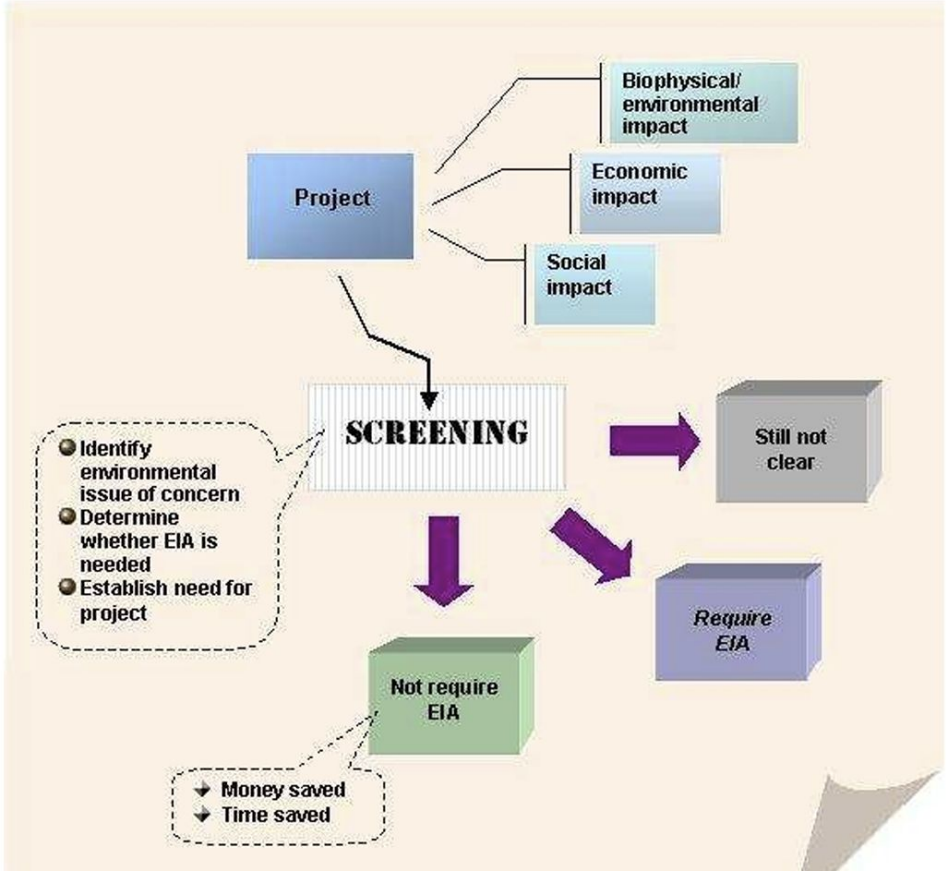
Screening

Screening determines:

- whether or not EIA is required for a particular project
- what level of EIA is required

Screening outcomes:

- Full or comprehensive EIA required
- Limited EIA required
- No EIA required
- The output from the screening process is often a document called an Initial Environmental Examination or Evaluation (IEE).
- The main conclusion will be a classification of the project according to its likely environmental sensitivity. This will determine whether an EIA is needed and if so to what detail



Initial Environmental Examination (IEE)

- An IEE is essentially an initial examination of the potential effects of project on the environment within a very limited budget and short time.
- Parameters considered in IEE are the same as in full scale EIA
- The nature and size of the projects sometimes dictate whether an IEE or an EIA is to be performed.
- Project location is another factor

Scoping

- Scoping is the process of identifying the key environmental issues and it is the most important step in an EIA.
- Scoping confirms that an environmental assessment is actually required.
- Scoping is the very early exercise in an EIA in which attempt is made to identify the attributes of components of the environment for which there is public and professional concern and upon which the EIA should be focused
- Scoping is important for two reasons. First, so that problems can be pinpointed early allowing mitigating design changes to be made before expensive detailed work is carried out. Second, to ensure that detailed prediction work is only carried out for important issues.
- Scoping establishes the content and scope of the EIA report
- A major activity of scoping is to identify key interest groups, both governmental and non-governmental, and to establish good lines of communication.

Scoping

- The major purpose of scoping at an early stage of project planning is to clearly define all the communities and agencies which should be allowed to influence decisions relating to the proposal.
- Scoping identifies what studies will be required, how long they are likely to take and whether there are resources to manage the study
- Establishes terms of reference for full scale EIA
- Identifies

  Spatial and temporal boundaries for the EIA

  Important issues and concerns

  Information necessary for decision making

  Significant effects and factors to be considered

Methods of Scoping

- **Making A Plan For Public Involvement**: The plan should identify whom to talk to, as well as when and how to undertake the communication exercise.
- **Assembling Relevant Existing Information**: Information should be collected on the nature of the project, including preparation of a preliminary list of potential environmental impacts and practical alternatives.
- **Distribution of Information to Affected Persons**: The information collected in the previous step should be processed and assembled into an information package and distributed to appropriate individuals and organizations for comment.
- **Identifying Major Issues of Public Concern**: All the concerns and issues raised by affected groups should be compiled into a comprehensive list.
- **Evaluating the Significance of Issues on the Basis of Available Information**: Once the issues have been identified and grouped, their scientific validity needs to be carefully evaluated.
- **Establishing Priorities for Environmental Assessment**: Issues to which immediate solutions can be provided or issues which have no relevance to the proposed project should be dropped.
- **Developing A Strategy for Addressing Priority Issues**: Identifying the priorities areas.

Prediction and Mitigation

- This stage forms the central part of an EIA.
- Several major options are likely to have been proposed either at the scoping stage or before and each option may require separate prediction studies.
- It is important to assess the required level of accuracy of predictions. Mathematical modeling is a valuable technique, but care must be taken to choose models that suit the available data.
- An important outcome of this stage will be recommendations for mitigating measures.
- Mitigation measure would be such that it helps to minimize any identified adverse impacts and enhance positive impacts.
- Many mitigating measures do not define physical changes but require management or institutional changes or additional investment, such as for health services.
- Mitigating measures may also be procedural changes, for example, the introduction of, or increase in, irrigation service fees to promote efficiency and water conservation.

Management and monitoring

- The part of the EIS covering monitoring and management is often referred to as the Environmental Action Plan or Environmental Management Plan.
- This section not only sets out the mitigation measures needed for environmental management, both in the short and long term, but also the institutional requirements for implementation.
- All the management proposals need to be clearly defined and costed.
- The purpose of monitoring is to compare predicted and actual impacts, particularly if the impacts are either very important or the scale of the impact cannot be very accurately predicted.

Management and Monitoring

- The results of monitoring can be used to manage the environment, particularly to highlight problems early so that action can be taken.
- The use of satellite imagery to monitor changes in land use and the 'health' of the land and sea is becoming more common and can prove a cost-effective tool, particularly in areas with poor access. Remotely sensed data have the advantage of not being constrained by political and administrative boundaries.
- Monitoring should not be seen as an open-ended commitment to collect data. If the need for monitoring ceases, data collection should cease. Conversely, monitoring may reveal the need for more intensive study and the institutional infrastructure must be sufficiently flexible to adapt to changing demands.
- The information obtained from monitoring and management can be extremely useful for future EIAs, making them both more accurate and more efficient.

Auditing

- The last stage of an EIA is to carry out an Environmental Audit.
- It will 22 therefore usually be done by a separate team of specialists
- The audit should include an analysis of the technical, procedural and decision-making aspects of the EIA.
- Technical aspects include: the adequacy of the baseline studies, the accuracy of predictions and the suitability of mitigation measures.
- The audit will determine whether recommendations and requirements made by the earlier EIA steps were incorporated successfully into project implementation.

EIA Study Techniques

- Baseline studies: Baseline studies using available data and local knowledge will be required for scoping.
- The ICID Check-list: A comprehensive and user-friendly checklist is an invaluable aid for several activities of an EIA, particularly scoping and defining baseline studies.
- Network diagrams: A network diagram is a technique for illustrating how impacts are related and what the consequences of impacts are.
- Overlays: Overlays provide a technique for illustrating the geographical extent of different environmental impacts.
- Mathematical modelling: Mathematical modeling is one of the most useful tools for prediction work.
- Expert advice: Expert advice should be sought for predictions which are inherently non-numeric and is particularly suitable for estimating social and cultural impacts.
- Economic techniques: Economic techniques have been developed to try to value the environment and research work is continuing in environmental economics.