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Environmental Impact Assessment and Management: Protecting Ecological - Green Country; a Study on INDIA

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----------**Abstract**----------
In developing country has a huge impact on anthropogenic and natural ecosystems. Pollution sources, material waste, electricity uses, increase with the expansion of city and cause contamination of water, air and soil. The absence of green environmental planning and management strategies has resulted in greater concern for feature country development. The main objective of this paper is to study initiative environmental impact and management on urban area in India. Therefore Environmental Impact assessment and Management Systems provides a framework for achieving this goal and would help firms integrate environmental values into their business operations and reduce liabilities. India aims to establish a sustainable country that demonstrates our corporate and community commitment to the environment and reflects our responsibility to feature generations.

Keywords: Environmental evaluations, Environmental impact assessment (EIA); Management strategies, Auditing; Follow-up.

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1. Introduction

Environmental Impact Assessment (EIA) is a decision tool employed to identify and evaluate the probable environmental consequences of certain proposed development actions. The first formal EIA system was established on the 1st January 1970 by the US National Environmental Policy Act (NEPA). [1]Taking into account social, economic, and environmental considerations at the earliest appropriate stage of decision-making is an essential component of sustainable development. EIA supports this process by providing appropriate environmental information. Therefore, EIA is required to assist the government in the formulation of future development strategies.Environmental impact assessment (EIA) is being used globally, either as a planning or management tool, in order to minimise the harmful consequences of development. Its emphasis is on prevention and it is hence an example of the precautionary principle (Glasson, 1995a).Ensuring environmental protection and management is the primary goal of EIA (Bailey, 1997; Morrison-Saunders and Bailey, 1999). [2]

2. Environmental Evaluations

An evaluation of the environmental impacts of human activities for the purpose of comparing alternatives generally involves the three following steps.

Step a: Definition of evaluation criteria

i. identification of areas of protection, and the relevant categories of environmental impact end points related to those protection areas;
ii. choice of impact category end points relevant to the comparison, and possible midpoints or target points used as a "proxy" for the true end point;
iii. choice of criteria or approach to produce a score or a ranking for the impact category.

Step b: System definition and inventory

iv. choice of the system boundaries of the process system relevant to the comparison;
v. inventory of relevant environmental interventions caused by this system;

Step c: Selection of alternatives

vi. selection of relevant alternatives;
vii. integrated judgement of remaining alternatives;
viii. sensitivity analysis;
ix. final choice of the alternative.

This general evaluation scheme is divided into three parts. Step A involves defining how and by what criteria alternatives should be judged. In effect, the "yardsticks" for scoring alternatives are chosen in this stage. In step B, the process trees that have to be included in the system are analyzed, and an inventory is made of the relevant environmental interventions identified in step A (e.g., primary resource use and emissions). In step C, the impacts (identified in step A) of the relevant processes (identified in step B) are compared. Step B has also been termed the "system definition step," while step A represents the "impact assessment step." [3]

3. Environmental impact assessment

EIA is a procedure that aims to ensure that the decision-making process concerning activities that may have a significant influence on the environment takes into account the environmental aspects related to the decision. [3]The EIA identifies and evaluates any potential environmental impacts and, when appropriate, proposes measures to mitigate negative impacts. The need for safe, responsible, and sustainable management of wastes is vital in order to eliminate health hazards and adverse ecological effects. This EIA study was conducted according to the guidelines set in the proposed draft EIA decree. It describes the policy, legal, and administrative frameworks, the proposed project, and the existing environmental conditions, identifies potential environmental impacts, proposes alternatives, and recommends an environmental management plan with mitigation, monitoring, institutional and capacity building schemes. [4]

4. Monitoring And Auditing In EIA

The EIA process passes through a series of iterative steps including; consideration of alternatives, action design, screening, scoping, preparation of the EIA report, reviewing or evaluating the report, decision making, and post decision activities such as monitoring and auditing (Glasson et al., 1994; Wood, 1995). According to Bird and Therivel (1996), environmental impact monitoring is an essential part of the EIA process, which forms part of its management component.Because the aim of EIA is to ensure that the consequences of any development action throughout its entire life cycle are understood and are acceptable, EIA should have some mechanism for checks on the design, implementation, operation and decommissioning stages of the project cycle. EIA itself is a check on the project design. The implementation of monitoring and auditing is the only mechanism available to establish further checks on the later stages of the project cycle.

Thus, monitoring and auditing can play a significant role in the post-decision stage of the EIA process and, in fact, without their implementation EIA may lose its credibility. [2]Monitoring and auditing in EIA have been defined in many ways and are referred to as follow-up actions and post-development audit by some prominent authors (Bailey and Hobbs, 1990; Sadler, 1996; Wood, 2003).

Definitions of EIA abound in the literature but rarely do they make any mention of post-development activities such as monitoring and auditing. The definition given by Berkes (1988) clearly refers to these activities:The implementation of EIA follow-up in practice is not a simple matter (Arts et al., 2001), with the major issues relating to the initiation mechanism and responsibility (Morrison-Saunders et al., 2001). Another issue to consider is that environmental monitoring and auditing activities are also undertaken outside the EIA process. Pollution control, waste management, land use planning, natural resource management and other aspects of development planning and policy-making all involve various forms of monitoring of activities. There is often considerable overlap between the monitoring of EIA and all other aspects of environmental management (Lee and George, 2000) and it is therefore necessary to establish some sort of mechanism that can avoid or reduce the overlap between the monitoring and auditing requirements in EIA and other aspects of environmental management.

It is necessary to keep in mind to make EIA more effective and meaningful without promoting any unnecessary complexity. Therefore, it is important to look into the existing mechanism of the implementation of monitoring and auditing in EIA in order to work out an effective and uncomplicated mechanism, which can ensure integration between impact predictions, impact management and monitoring schemes. [2]

5. Environmental Impact Assessment Effectiveness

Monitoring and auditing play a vital role in making EIA an effective environmental management tool. According to Bird and Therivel (1996) environmental impact monitoring and impact auditing are two vital activities, which must be performed in order to assess an EIA's effectiveness at achieving environmental protection. Morrison-Saunders (1996) argues that the effectiveness of EIA is the extent to which it achieves its goals for environmental protection and management. Gibson (1993) considers monitoring of effects as one of the basic principles for evaluating the EIA process. Sadler (1996) focused on follow up as one the major themes in his international EIA effectiveness study and identified follow-up activities as one of the major priorities for improving EIA effectiveness. In fact, without monitoring and auditing there is no opportunity for feedback in the EIA process and without feedback EIA is a static and linear process that does not have any mechanism for the improvement in the future.[2]

6. Monitoring And Auditing: The Weakest Areas In The EIA Process

EIA is far from perfect; there are problems in many of the procedural steps from baseline studies through to monitoring requirements. It is widely believed that monitoring and auditing are the weakest areas in the EIA process globally. This is considered as a major weakness of EIA globally (Glasson et al., 1999).

There is some research on environmental impact auditing that determines the overall performance of impact predictions within the EIA procedure. Some of the prominent earlier research including the work of Buckley (1989a) in Australia, Culhane et al. (1987) in the United States and Bisset (1984) in the United Kingdom identified weaknesses in EIA in predicting impacts. A study on 28 UK projects by Wood et al. (2000) showed that out of 865 predictions 488 (56%) were auditable and of them 105 (21%) predictions were in accurate. This study reported six unanticipated impacts and identified the reasons, including the lack of data, vague or ambiguous prediction and time dependency, which made the predictions not auditable. Buckley (1989a) reported that many EIAs in Australia were descriptive as opposed to predictive and there was considerable problem with predictions in EIA (28% of the auditable predictions were found to be completely inaccurate). Bailey et al. (1992) found 22% of the auditable predictions inaccurate in seven artificial waterway developments in Western Australia and noted that the lack of monitoring data constrained auditing of impacts. Another study in Western Australia by Morrison-Saunders (1996) found 29% of inaccurate predictions with 14% of actual impacts not predicted at all. This research found the faunal predictions in the EIS of a mineral mine accurate and useful overall.

7. Framework Of Analysis

The existing literature on EIA follow-up and indigenous participation in environmental management does not offer a framework that could be utilized in analyzing EAs. It is therefore necessary to build such a framework. The approach adopted is to identify, based on a review of the literature, barriers to EIA follow-up and indigenous participation, and on this basis to identify key issues that EAs must address if they are to make a significant contribution to ensuring effective EIA follow-up and substantial and meaningful indigenous involvement in environmental management.

Six key issues are identified. Four of these, termed 'Goals, purposes and mandates', 'Structures and decision-making', 'Resources', and 'Expertise and knowledge' are relevant (though in different ways) to both EIA follow-up and indigenous participation. The final two, 'Processes' and 'Recognition and standing', relate specifically to indigenous participation. [5]

a. Goals, purposes and mandates

The first issue involves the goals and purposes set out in an EA, and the mandates allocated to any institutions or bodies created through it. The goals and mandates of many existing corporate and government institutions involved in environmental management do not afford a central place to promoting indigenous participation, effective EIA follow-up or adaptive management. Rather existing institutional mandates tend to focus on the environmental approval process and the permitting of projects .New bodies created by EAs should have EIA follow-up and promotion of indigenous participation as explicit and central components of their mandates.

b. Decision-making structures

The second issue involves the structures that are created for making and implementing decisions on environmental management of major projects. Typically, structures for EIA focus on a single set of decisions, whether to approve or not to approve a project and, if it is approved, what conditions should be attached to it. They do not focus on decisions relating to ongoing environmental management, a reality reflected, for instance,

in the fact that panels, committees or commissions established as part of EIA processes are disbanded once a decision is made to approve a project. Thus in the mining country for instance impact assessment is used 'to satisfy short term ends in gaining project permits' rather than as 'a management tool throughout the life cycle of amine'. To facilitate effective indigenous participation, structures established by EAs must confer on indigenous participants a real and substantial role in decision making, rather than merely affording them an advisory or titular role.

8. The use of (elements of) LCA in EIA

LCAs concentrate solely on a comparison of product systems. When an EIA is not concerned with product systems (or similar systems) but, for example, with a single production plant, the system choice and impact assessment might be different to the one normally used in LCA. But if an EIA has to compare alternatives with similar characteristics to product LCAs (i.e., whole systems related to a central product function, thus a process including its "Ecological Ru cksack"), it seems logical to use the fruits of the discussions on LCA methodology as a basis for the evaluation in that particular EIA. This section focuses on identifying types of EIA and types of alternatives that have the same characteristics as a product LCA.

a. Types of alternatives relevant in an EIA

As previously stated, EIA is often seen as an instrument for evaluating alternatives at a local level (an industrial plant, a specific location). Following the decision-making levels broadly identified by Feldmann [17], one can roughly discern the following levels of EIA: (a) a strategic EIA (e.g., an electricity plan or a waste management plan); (b) an EIA at company level (or a so-called project EIA); and (c) an EIA of location choices or spatial organization.

i. Goal and policy alternatives: the discussion centers on the goal, or the policy for reaching that goal. This type of alternative is generally relevant in strategic plans of provincial or national authorities, and thus in strategic EIAs. The alternatives have an impact at what can be termed the system level: whole production chains are influenced if another policy alternative is chosen. For instance, promoting reuse of waste produces less use of raw materials (thus fewer effects due to the extraction of these materials), but might consume more energy. These kinds of secondary effects can only be taken into account if a system approach similar to LCA is adopted and a broad range of effects is taken into account.

ii. Process alternatives: the discussion centres on the production process to make certain products or to fulfill certain needs. Such alternatives may be relevant in project EIAs and strategic EIAs. For instance, a strategic electricity plan will most probably involve a choice as to the mode of production of electricity. Obviously, such process alternatives have an impact on the local environment. Applying clean technology often means that fewer local emissions are produced. However, there may be effects on the system level. Certain processes may have to use a better quality of raw material (which has to be refined elsewhere), or may yield better recyclable waste than others.

iii. Abatement alternatives: abatement alternatives are typically relevant in a project EIA. Abatement measures are in general primarily taken to ensure that no direct adverse effects occur on man and nature in the direct vicinity of an industrial plant. In most cases, the abatement measure has to deal with just one or a few critical effects on this local level. Examples are the reduction of VOC emissions to prevent smog formation, or the reduction of the emission of a few critical toxic substances. For an analysis on local level, the comparison of abatement alternatives can thus concentrate on just these few critical effect types. However, it has to be noted that different abatement alternatives, that are equally effective in dealing with the locally critical environmental effect, may have very different overall environmental impacts when all the related systems are taken into account as well.

iv. Location alternatives: the discussion centers on the location of a certain activity. This is the typical decision for which an EIA of location choices is made. In general, this type of alternative has only local consequences, and is unlikely to influence other links in the production chain. An exception is where the location may have a considerable influence on transport distances and transport's contribution to impacts is not negligible.

9. Environmental Management Plan

The consultant shall prepare a detailed environment management plan (EMP) covering the measures to mitigate and/or minimize the negative impacts and implementation and monitoring plan for the same. Further, the EMP shall cover the following details:

(a) Mitigation measures: For each of the significant negative impacts, the consultant should recommend measures to eliminate and or mitigate the impact. In case any impact is nonmitigable, the cost of damage shall be estimated. The cost (capital and recurring) of all the mitigation measures and the responsible parties for implementation should be clearly identified. Wherever possible the measures should be drafted as contract clauses, which can be incorporated in construction/operational, phase agreements. The mitigation measures shall contain conceptual designs where needed, and includes a process to establish neighborhood committees to supervise effective implementation of the proposed mitigation measures.

(b) Budget Estimates: The EMP budget estimates shall be prepared for each of the subproject components and shall be integrated with the overall project cost estimates.

(c) Monitoring Plan: The Consultant should specify the types of monitoring needed for potential environmental impacts during construction and operation. As in the case of the mitigation plan, the monitoring plan will specify what is to be monitored, as well as how and by whom (with clear delineation of responsibilities between the line department, contractors and relevant agencies). Cost estimates are necessary. Where monitoring reports are to be prepared, the recipient responsible for review and any corrective action should be identified. The monitoring plan should be supplemented with a detailed schedule of implementation of EMP measures.

(d) Institutional Arrangement to Manage Environment Impacts Effectively: In line with the recommendations of the SEA, the consultant shall identify all institutional and organizational needs to implement the recommendations of the sub-project EA.Preparation of environmental management plan is required for formulation, implementation and monitoring of environmental protection. The management plans should be necessarily based on considerations of resource conservation and pollution abatement, some of which are:

- **Liquid Effluents**

- Effluents from the workshop should be treated well to the standards as prescribed by the instructor safety guide.
- Soil permeability studies should be made prior to effluents being discharged into holding tanks or impoundments and steps taken to prevent percolation and ground water contamination.
- Special precautions should be taken regarding flight patterns of birds in the area. Effluents containing toxic compounds, oil and grease have been known to cause extensive death of migratory birds.
- Deep well burial of toxic effluents should not be resorted to as it can result in re-surfacing and ground water contamination. Re-surfacing has been known to cause extensive damage to crop and livestock's.
- In all cases, efforts should be made for re-use of water and its conservation.

- **Air Pollution**

- The emission levels of pollutants from the different stacks should conform to the pollutin control standards prescribed by Central or State Boards.
- Adequate control equipment should be installed for minimising the emission of pollutants from the various stacks.
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- **Solid Wastes**

- The site for waste disposal should be checked to verify permeability so that no contaminants percolate into the ground water or river/lake.
- Waste disposal areas should be planned down-wind of villages and townships.
- Reactive materials should be disposed of by immobilising the reactive materials with suitable additives.
- The pattern of filling disposal site should be planned to create better landscape and be approved by appropriate agency and the appropriately pretreated solid wastes should be disposed according to the approved plan.
- Intensive programs of tree plantation on disposal areas should be undertaken.

- **Noise**

➢ Adequate measures should be taken for control of noise in the campus.

- **Occupational Safety and Health**

➢ Proper precautionary measures for adopting occupational safety and health standards should be taken.

- **House - Keeping**

➢ Proper house-keeping and cleanliness should be maintained both inside and outside of the campus.

- **Staff/Student Settlements**

➢ Quarter/Hostel should be located away from the solid and liquid waste dumping areas. Meteorological and environmental conditions should be studied properly before selecting the site for Quarter/Hostel areas in order to avoid air pollution problems.

- **Transport Systems**

➢ Proper parking places should be provided for the College bus, personal car, ambulance van, student bicycle and other vehicles by the institute to avoid any congestion or blocking of campus roads.
➢ Spillage of chemicals/substances on roads inside the campus may lead to accidents. Proper road safety signs both inside and outside the campus should be displayed for avoiding road accidents.
➢ Travel Plan-Campus shout be designed to assist in the sustainability element of the College's estate by attempting to reduce the volume of traffic journeys, especially by private motor car, related to the College's activities on and out with its estate.

- **Recovery - reuse of waste products**

1) Efforts should be made to recycle or recover the waste materials to the extent possible. The treated liquid effluents can be conveniently and safely used for irrigation of lands, plants and fields for growing non-edible crops.

- **Vegetal-Cover**

➢ City should plant trees and ensure vegetal cover in their premises. Since institute is on extending city about 540 acres of land.

- **Disaster-Planning**

➢ Proper disaster planning should be done to meet any emergency situation arising due to fire, explosion, sudden leakage of gas etc. Firefighting equipment and other safety appliances should be kept ready for use during disaster/emergency situation including natural calamities like earthquake/flood.

a) **Management Procedures**

i. Environmental Aspects

An environmental aspect is defined for the purposes of ISO 14001 as any change to the environment, whether adverse or beneficial, arising from an organisations activities, products and services. Environmental Aspects will be evaluated by the Environmental Co-ordinator. All new development project, services and activities with the potential to add to the College's Environmental Aspects, are identified by all departments annually at the setting of the College Operational Plan with an interim review.

ii. Legal and Other Requirements.

To ensure that this Register is kept up to date and relevant to the College's activities a review takes place twice each year. This review is carried out by the Environmental Co-ordinator and the College Health and Safety Officer. An evaluation of compliance to environmental legislation will be carried out at the time of preparing the annual environmental review. This will consist of a consideration of the following procedures:

1. The results of environmental audits, spot checks and other verification procedures;
2. An examination of the current register of legislative, regulatory and other policy requirements. This document to be used as a checklist and circulated to all relevant staff;
3. The existence of any legal proceedings or third party complaints in relation to environmental issues

4. Wherever practicable the extent to which specific legislation applies to the College's environmental aspects will be determined as new legislation is enacted, or by adherence to particular codes of practice e.g. Duty of Care, Outdoor Access Code etc. or by a suitable summary.

10. Conclusion

Study on environmental assessment and Preparation of environmental management plan is required for formulation, implementation and monitoring of environmental protection. The management plans should be necessarily based on considerations of resource conservation and pollution abatement, some of which are:

- Reduce energy use and neutralise greenhouse gas emissions.
- Reduce total water use.
- Remove potable water from landscape irrigation.
- Reduce material waste by;
- ✓ Continually reducing resource waste by applying the waste hierarchy (an emphasis on waste avoidance, reduction, reuse, recycling and disposal, in that order).
- ✓ Reducing unsustainable procurement, and increasing re-use and recycling.
- ✓ Reducing waste to landfill
- Maximise sustainable transport by;
- ✓ Increasing green commuting and minimising single-occupant vehicles.
- ✓ Reducing fleet vehicle emissions, and continuing to off-set 100% of fleet emissions.
- Maximise resilience by continually reducing;
- ✓ Residual pollution risk below a 20% baseline.
- ✓ Stocks and flows of hazardous materials on campus.
- ✓ Exposure to environmental hazards.
- Establish a sustainable landscape by;
- ✓ Balancing vegetation losses with new assets through new protection zones and plantings.
- ✓ Adopting sustainable landscape strategies that protect landscape values and reduce dependence on potable water.
- Foster a culture of sustainability by continually increasing:
- ✓ Community engagement in campus sustainability initiatives.
- ✓ Events and information campaigns to raise public interest in sustainability.
- ✓ Sustainability-related professional training and development opportunities through internships, facilitated workshops, national and international alliances.
- Integrate environmental management issues into research and teaching by continually increasing:
- ✓ Academic collaboration and support for student projects that address ANU campus sustainability issues.
- ✓ Student project time devoted to practical ANU sustainability issues.
- ✓ Opportunities for research publications on sustainable facilities management.

Rural area in India sustainability to be program, works within Facilities Management to help "green" the country. Concentrating on issues such as waste reduction, recycling, environmentally preferable purchasing, energy conservation, and alternative transportation, the country hopes to reduce its impact on the environment.
Based on the assessment in this report, a number of specific requirements that will facilitate improvement in the use of environmental management tools can be listed:

- A framework of sustainability objectives has to be established, with appropriate objectives at different levels of application and decision-making. The different levels have to relate and „add up" though.
- More environmental impact management tools should be legislated in order to improve their uptake and perceived credibility. In particular, there should be much wider obligations for the use of SEA, and much stronger obligations for monitoring and reporting on environmental implementation.
- Examples of best practice environmental management coordination should be identified and replicated in both regulated and voluntary forms.
- Officials must be trained in the use of various environmental management tools, in order to be able to guide EAPs and understand their application.
- The application of sector-specific tools must be restricted to EAPs who have the necessary qualifications or skills, and similarly, reviewed by officials or peers with the same abilities.
- Ecosystem guidelines, as well as training for EAPs and officials operating in national biodiversity priority areas should become a requirement.
- Assessments must be designed to be simpler to review and comment on.
- Implementation requirements should be realistic – for example, it is often hard to completely reverse and rehabilitate environmental damage.

- Continual improvement of compliance enforcement that targets both „on site" implementation issues and further refinement of process.
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A second argument in this paper is that applying a LCA-like comparison of alternatives in EIA may be more useful than is often thought. In traditional project EIAs, process and abatement alternatives usually play a role. Obviously, such alternatives may have different direct impacts on the surrounding environment, which are normally covered in traditional EIAs.

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