

Environmental Impact Assessment and Social Impact Assessment - Decision Making Tools for Project Appraisal in India

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Abstract—In view of the fact that development is an ever growing process, its impact is also ever increasing, leading to rapid deterioration in environmental conditions and human health, Impact assessment thus ensures that the potential problems are foreseen and addressed at an early stage in the projects planning and design. Environmental Impact Assessment (EIA) and Social Impact Assessment (SIA) are used to predict the consequences of any development project; as such Impact Assessment provides regional approach to sustainable development. The impacts Assessment are thus a systematic process of identifying and mitigation impacts on individuals or society in consultation with the individuals or society in consultation with the individuals or society affected. This paper aims to integrate aspects of EIA and SIA and its practicable in India.

Keywords—EIA, Process, SIA, Sustainability

I. INTRODUCTION

IN view of the fact that development is an ever growing process, its impact is also ever increasing, leading to rapid deterioration in environmental conditions and human health. Impact Assessment thus ensures that the potential problems are foreseen and addressed at an early stage in the projects planning and design. Environmental Impact Assessment (EIA) and Social Impact Assessment (SIA) are used to predict the consequences of any development project. As such Impact Assessment provides a rational approach to sustainable development.

Environmental Impact Assessment (EIA) tools have been applied internationally to ensure that proposed actions are economically viable, socially equitable and environmentally sustainable or not. EIA is a process having the ultimate objective of providing decision-makers with an indication of the likely consequences of their actions. Environmental Assessment enables us in carrying out Environmental Cost-Benefit Analysis of projects at an initial stage. It is thus a precursor to detailed analysis of environmental impacts, which are taken up only if a need for the same is established. It gives a view of the actors involved in the development-environment

linkages. This is required in view of the fact that the community at large is always at a loss in terms of deterioration of living environment that accompanies any development. Based on Environmental Assessment, the regulatory measures can be identified and the roles of concerned agencies defined for achieving more efficient environmental management.

Social Impact Assessment (SIA) is carried out to ascertain the impacts, which would occur due to implementation of the project. The exercise facilitates identifying types and extent of impacts and also identifying impacts that can be minimized by good engineering practices. Efforts are made to mitigate impacts, which cannot be minimized during the planning stage. The Impacts Assessment is thus a systematic process of identifying and mitigating impacts on individuals or society in consultation with the individuals or society affected. This paper aims to integrate aspects of EIA and SIA and its practicability in India.

II. ENVIRONMENTAL IMPACT ASSESSMENT PROCESS IN INDIA

A. Background

The phrase Environmental Impact Assessment comes from Sec. 102 (2) of the National Environmental Policy Act (NEPA), 1969, USA. In India, the environmental action formally started after UN Conference on Human Environment in Stockholm in 1972. A National Committee on Environmental Planning & Coordination (NCEPC) was established to be the apex body in the Department of Science and Technology. The term Environment figured for the first time in the Fourth Five Year Plan (1969-74) which recorded that harmonious development is possible only on the basis of a comprehensive appraisal of environmental issues. The Tiwari Committee (Committee on Review of Legislative Measures and Administrative Measures), in its report in 1980, recommended creation of a Department of Environment as a nodal agency to ensure environmental protection, to carry out environmental impact studies of proposed development projects, and to have administrative responsibility for pollution monitoring and control. The department came into being in 1980 within the Ministry of Science and Technology. In 1989 the subjects of wildlife and forestry were added to the list and a new Ministry of Environment and Forests was created. Since its inception the Department (under the Ministry) has issued guidelines on EIA for various projects.

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On 27 January 1994, the Union Ministry of Environment and Forests (MEF), Government of India, under the Environmental (Protection) Act 1986, promulgated an EIA notification making Environmental Clearance (EC) mandatory for expansion or modernisation of any activity or for setting up new projects. Since then there have been 12 amendments made in the EIA notification of 1994. Thereafter on 2006 new EIA legislation was notified. The MoEF recently notified new EIA legislation in September 2009. Certain activities permissible under the Coastal Regulation Zone Act, 1991 also require similar clearance.

B. Administrative Framework

The existing EC (Environmental Clearance) process is a two-tier system involving both central and state authorities. At central level, Impact Assessment division (IA) under MoEF, regional offices of MoEF and Central Pollution Control Board (CPCB) are three important institutions, whereas SPCBs and state Departments of Environment (DoE) are working at the province level.

Role of IA: IA (Impact Assessment Division), in consent with relevant state and central authorities, is responsible for setting guidelines for the preparation of the EIA reports, questionnaires and checklists for major sectors. It prepares and issues various notifications and amendments pertaining environmental laws. IA has constituted six multi-disciplinary expert committees known as Environmental Appraisal Committee (EAC), as specified in the EIA Notification, to carry out review for the mining, industries, thermal power plant, river valley and hydro-electricity project, nuclear power plant, infrastructure and miscellaneous activities.

The appraisal process of EC, involving review of the EIA report and various documents submitted by the project proponent, is the leading responsibility of IA. IA may also seek clarification from the proponent and conduct site visits if it feels necessary during the review procedure. Based on the documents submitted and clarification presented IA either grants or rejects the environment clearance of the developmental project. This division also carries out follow-ups of the litigation in the various courts regarding EC decisions, notifications and amendments issued.

Role of CPCB: The Central Pollution Control Board (CPCB) is an autonomous organization under administrative control of MoEF. Initially it was known as Central Board for Prevention and Control of Pollution of Water, which came into being as a statutory organization in 1974, with the enactment of Water (Prevention and Control of Pollution) Act, 1974. Later in 1981, board was renamed and assigned the powers and functions specified under Air (Prevention and Control of Pollution) Act, 1981 too. CPCB primarily has powers explicit to Water and Air act, but now it in an umbrella organization with legal strength of several acts that came afterwards. CPCB has no direct role in environmental clearance process, though it acts as a research organization, which by collecting, analysing and disseminating information pertaining to pollution prevention and abatement, benefits the MoEF, SPCBs and several other stakeholders of environmental

clearance process. It is a common practice that technical staff and experts of CPCB are designated in the expert committee constituted by IA. Member secretary of CPCB or his representative in particular is appointed in all the sector specific committees.

Role of State DoE and SPCB: Environmental matters of any state ranging from the execution to formulation of

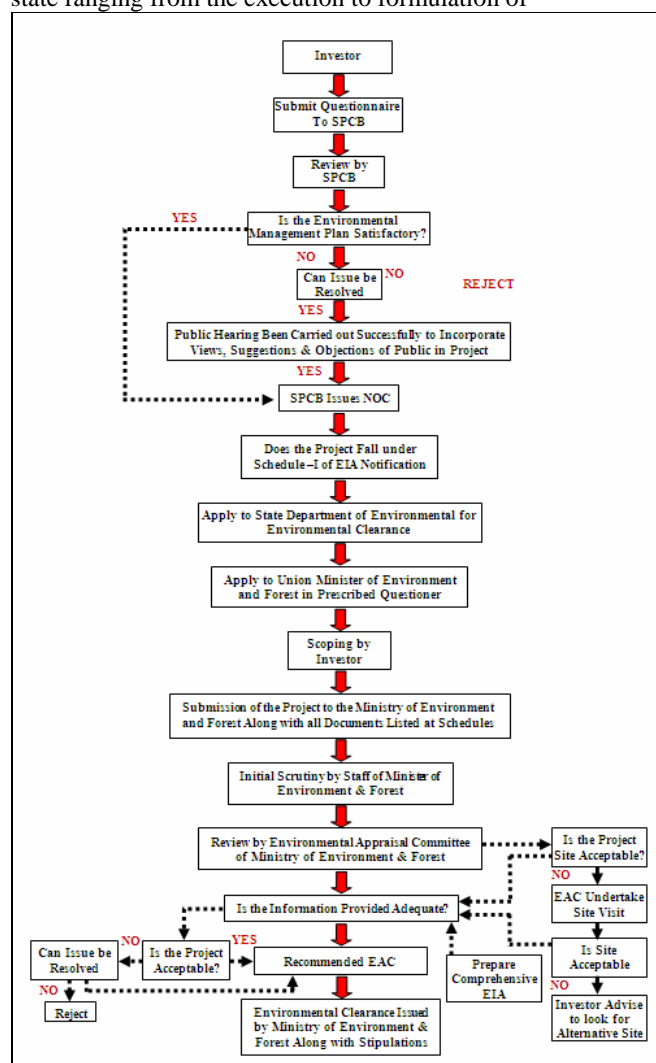


Fig. 1 Procedure of Environmental Clearance

guidelines have been entrusted to the state Directorate of Environment (DoE). A cabinet minister heads these departments. To carry out its functions many State Governments have set up framework to accomplish EC at state levels, within state DoE. The State Pollution Control Boards (SPCBs) work under DoE having different structures for project appraisals.

The IA has conferred the responsibility of public hearings to SPCBs. The minutes of the meeting and major findings are to be furnished to IA within 30 days. SPCBs are also involved in the national EC, in case of non-compliance of industries. The Ministry may direct SPCBs to look into the matter and take up desired measures.

Role of MoEF Regional Offices (ROs): The Ministry of Environment & Forest (MOEF) has set up six regional offices with a head quarter (HQ) unit at New Delhi. Post Project Monitoring (PPM) of the cleared projects in particular is the major responsibility of these offices. Project authorities are required to submit monitoring reports to these ROs every 6 months.

C. Procedural Framework

The whole process of environmental clearance involves many activities (Fig. 1). The process for environmental clearance is showing in following diagram.

Site clearance is required for some of the activities i.e., mining, prospecting and exploration of major minerals, pithead thermal power plants, multipurpose river valley projects and major ports and harbours. Consents from airport authority and state forest departments are also considered necessary if any airport is nearby and project involving any forestland respectively. Once the project proponent receives all the approvals, he submits an application to MoEF for environmental clearance.

D. Process

The stages of an EIA process will depend upon the requirements of the country or donor. However, most EIA processes have a common structure and the application of the main stages is a basic standard of good practice. There are a number of generic steps like Environmental Screening, Environmental Scoping, Impact Assessment, Mitigation Measures, EIA Report, Authority Approval, Environmental Management Plan, Environmental Monitoring Plan, Environmental Budget, Monitor and Audit, Implementation. The eight steps of the EIA process are presented in brief below-

Screening: First stage of EIA, which determines whether the proposed project, requires an EIA or not and if it does, then the level of assessment required. In India, 32 activities, any project in ecologically fragile areas and any project falling under coastal zone regulation, requires an EIA. The investment clause has also been formulated to streamline screening process. It specifies that new projects with investment more than 100 crores (10 millions) and modernisation projects involving investment more than 50 crores (10 millions) require EIA. This clause is not applicable to industries involving hazardous chemical processes.

Scoping: This stage identifies the key issues and impacts that should be further investigated. This stage also defines the boundary and time limit of the study. Scoping identifies the concerns and issues to be addressed for a particular project. MoEF has set guidelines and review checklists for relevant issues for different project types and provides general questionnaires for all the sectors. Study of alternatives and public hearings are undertaken at this stage only. Alternate scenario must account for no project condition along with project scenario employing best-suited technology or processes.

Baseline Analysis: A comparison of project-induced environmental changes with the expected environmental

changes without proposed project is assessed through baseline analysis. The quality of the baseline analysis establishes the viability of the appraisal of the impacts, and therefore of the EIA itself. In India, data is collected on both project engineering and environmental aspects. Project engineering deals with process technology, raw material, water and energy requirements, whereas data on air emissions, wastewater, noise, solid waste and hazardous/toxic waste is required for the environmental study. Project proponent conducts monitoring for various required environmental quality parameters or data available with the local monitoring stations of SPCBs and CBCP may also be used. MoEF provides the detailed guidelines on the procedures of monitoring and analysis of the baseline data.

Impact analysis: This stage of EIA identifies and predicts the likely environmental and social impact of the proposed project and evaluates the significance. Once collecting the relevant environmental information, consequences of the project are outlined. The prediction analysis should forecast the nature and significance of the expected impacts, or explain why no significant impacts are anticipated. Several mathematical models are listed in the manual of MoEF for environmental and socio-ecological impacts predictions. Suggestions have also been made on the kind of conditions where they could be used. Socio-economic and ecological impacts are essential to be covered in this analysis.

Mitigation: This step in EIA recommends the actions to reduce and avoid the potential adverse environmental consequences of development activities. In an EIA, mitigation measures are proposed to avoid or reduce environmental and social impacts. Environmental Management Plan (EMP), risk assessment report and disaster management plan (if hazardous substances are involved in the project), rehabilitation plan (if displacement of people is anticipated) are prepared to suggest remedial measures. EMP in particular should entail aspects of Pollution prevention and Waste minimization. In addition to this EMP must be supplied with the work plan, time schedule, place and cost of implementing the mentioned measures.

Reporting: This stage presents the result of EIA in a form of a report to the decision-making body and other interested parties. A concise but comprehensive report is prepared. It summarizes the description of the project, regional settings, baseline conditions, impact prediction and important findings of the study. Project proponents hire consultants to carry out the EIA and preparation of report for them

Review of EIA: It examines the adequacy and effectiveness of the EIA report and provides the information necessary for decision-making. The Indian system provides an opportunity to involve affected people and vulnerable groups to develop terms of references for EIA thus incorporating their concerns into decision-making process. The SPCB is required to publish notices for public hearing in two local newspapers and one of which should be in vernacular language of the concerned locality. The date, time and place of the hearing should be mentioned in the notice. EIA notification also makes provision for access to the executive summary of the project at the offices of district collector, district industry centre, commissioner of the municipal corporation/local body, SPCB

and state DoE. The composition of the public hearing panel has also been specified by the law, which may consist of members of local authorities and representatives of the public nominated by the district collector.

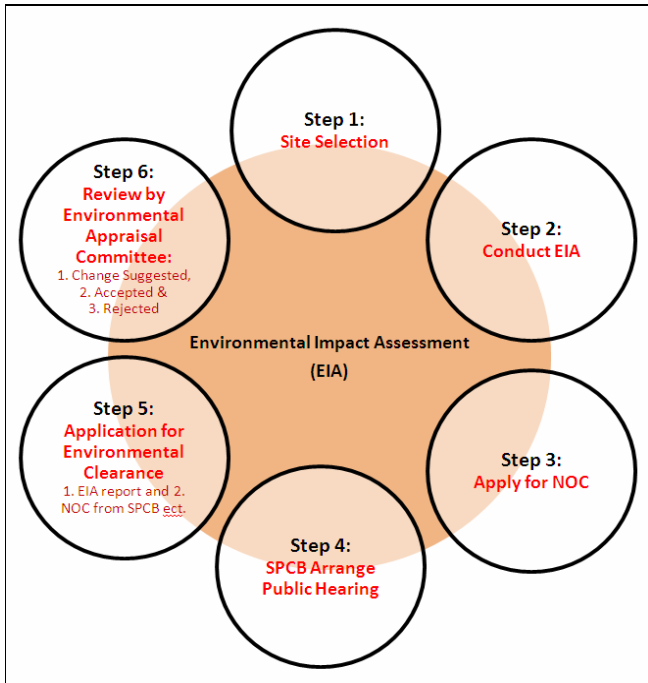


Fig. 2 Generalised process flow sheet of the EIA process

Decision-making: It decides whether the project is rejected, approved or needs further change. The review and decision-making starts as the proponent files an application accompanied by the documents i.e., EIA and EMP report, NOC, risk assessment and emergency preparedness plan, rehabilitation plan, details of public hearing, clearance from different authorities and state forest departments, etc., to IA. The IA reviews the report with reference to the guidelines provided by MoEF in its manual. The IA is free to conduct site visits if considers necessary. Based on the EIA review and other information, the IA either grants or rejects the environment clearance to the project. The assessment has to be completed within a period of 90 days from the receipt of the requisite documents from the project authorities and completion of public hearing. The decision has to be conveyed to the proponent within 30 days thereafter.

Post monitoring: This stage comes into play once the project is commissioned. It checks to ensure that the impacts of the project do not exceed the legal standards and implementation of the mitigation measures are in the manner as described in the EIA report. Post Project Monitoring (PPM). The PPM aims to ensure that an action had been implemented in accordance with the measures specified while providing the EC. Thus, it performs a dual task of identifying the actual environmental impacts of the project and checks if the EMP is having the desired mitigation measures. Post-implementation monitoring is the responsibility of MoEF's six regional offices and SPCBs.

III. SOCIAL IMPACT ASSESSMENT PROCESS IN INDIA

Social Impact Assessment is predicated on the development interventions have social ramifications and it is imperative that decision makers to understand the consequences of their decisions before they act and affected people get the opportunity to participate in implementation process and their future development. Social Assessment helps to make the project responsive to social development concerns. Development initiatives informed by social assessment alleviate poverty, enhance inclusion and building ownership while minimizing and compensation for adverse social impacts on the vulnerable and the poor.

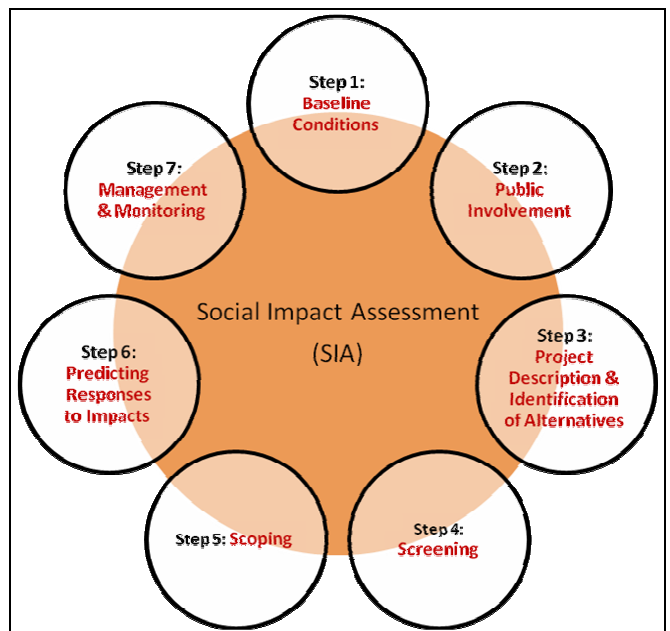


Fig. 3 Stages in Social Impact Assessment

Social Impact Assessment can be defined in terms of efforts to assess or to estimate, in advance, the social consequences that are likely to follow specific policy actions and specific government actions. It is a process that provides a framework for prioritizing, gathering, analyzing and incorporating social information and participation into the design and delivery of development interventions. It ensures that deployment interventions are informed and take into account the key relevant social issues and incorporate a participation strategy for involving a wide range of stakeholders. And Generic Steps of Social Impact Assessment:

Step 1: Baseline Conditions: The Baseline Conditions are the existing conditions and past trends associated with the human environment in which the proposed activity is to take place. This varies with the type of project being taken up. For instance, in the case of construction projects, the baseline unit may be a cluster of population identified along with the distribution of special population at risk. The relevant human environment may be more dispersed collection of interested and affected people, interest (stake holders) groups, organizations and institutions. The generic set of dimensions

for investigation should include (1) population characteristics, (2) community and instructional structure, (3) political and social resources, (4) individual and family changes and (5) community resources.

Step 2: Public Involvement: This requires identification and working with all potentially affected groups starting at the very beginning of planning for the proposed action(s). Groups affected by proposed actions include those who live nearby; those who would be affected by the development intervention; those who are forced to relocate because of a project and those who have interest in a new project or policy change but may not live in proximity (people in direct impact zone/area). Others affected include those who might normally use the land on which the project of policy change but may not live in proximity (people in indirect impact zone/area).

Once identified, representatives from each group would be systematically interviewed to determine potential areas of impact and ways each representative might be involved in the planning process. Public meetings by themselves are inadequate for collecting information about public perceptions. Survey data could be used to define the potentially affected population. In this first step, the pieces are put in place for public involvement programme which will last throughout the environmental and social impact assessment process.

Step 3: Project Description and Identification of Alternatives: The proposed action is described in enough details to enable identification of the data requirements to frame the SIA. This should include:

- Location;
- Land requirements;
- Needs for ancillary facilities (roads, transmission line, sewer and water lines);
- Construction schedule;
- Size of the workforce (construction and operation, by year or month);
- Facility size and shape;
- Need for a local workforce;
- Institutional resources.

1) It is equally important to identify feasible alternatives for proposed actions within the ambit of the project.

Step 4: Screening: Screening is done to determine the boundaries of SIA. It is concerned with selected developments that require assessment. Conduct of screening thus involves making a proposal in terms of impact on people and its relative significance. A certain level of basic information about the proposal and its location is required for this purpose. Screening procedures employed can be based on the already existing legal frameworks.

Step 5: Scoping: After initial screening, the SIA variables need to be selected for further assessment. Considering needs to be given both the impacts perceived by the acting agency and to those perceived by affected groups and affected communities. The methods to be used by experts and reviews of the existing published data and available literature, public consultation and

socio-economic survey of the affected population. It is important for the views of affected people to be taken into consideration. Ideally, all the affected people and affected families contribute to the selection of the variables assessed through either by participatory process or by review made by responsible officials. Relevant criteria for selecting significant impacts include the under written statement:

- Probability of the event occurring;
- Number of people including indigenous populations that will be affected;
- Duration of impacts (long term V/S short term);
- Value of benefits and costs to impacted groups (intensity of impacts);
- Extent to which the impact is reversible or can be mitigated;
- Likelihood of causing subsequent impacts;
- Relevance to present and future policy decision;
- Uncertainty over possible effects;
- Presence or absence of controversy over the issue.

Step 6: Predicting Responses to Impacts: “social impacts” refer to the consequences to human population of any public or private actions – that alter the ways in which people live, work, play, relate to one another, organize to meet their needs and generally cope as members of the society. The term also includes cultural impacts involving changes to the norms, value and beliefs that guide and rationalize their cognition of themselves and their society. Adverse social impacts could be in the form of:

- Loss of Land;
- Loss of Structures;
- Loss of Livelihood;
- Loss of crops/trees and
- Loss of access to community infrastructure/public utility lines ect.

After the estimation of direct impact has been estimated, how the affected people will respond in terms of attitudes and actions must be taken into account. Their attitudes before implementation predict their attitudes afterwards, through there are increase data that show fears are often exaggerated and that expected benefits fall to meet expectations.

The actions of affected groups can be estimated using comparable cases and consultation and interviews. A lot depends on the nature of location leadership (objectives and strengths of these leaders) this marks such assessments highly uncertain. However, such an exercise enables policy makers to be aware of potential problems and unexpected results. This step is also important because adoption and response of affected parties can have consequences of their own, whether for the agency that proposes an action (as when political protests stalls a proposal) or for the affected communities, whether in the short-term or in the long-term.

Patterns in previous assessments guide this analysis and expert judgment and field investigations are used to see whether the case study follows the typical patterns or it is developing uniquely. Being able to show potentially affected

people that significant impacts are been incorporated into the assessment is critical to the success of this step.

Step 7: *Management and Monitoring*: Use of social impact assessment is not just to forecast impacts - it should identify means to mitigate adverse impacts. This includes the possibility of avoiding the impact by not considering the project at all, if the felt impact is likely to be too severe. Alternately if the predicted impact is minimal, can be managed and mitigation measures must be put in place. This could be in the form of:

- Modification of the specific event in the project;
- Operation and redesign of the project or policy and
- Compensation for the impact by providing facilities, resources and opportunities.

Ideally, mitigation measures should be built into the selected alternative, but it is appropriate to identify mitigation measures even if they are not immediately adopted or if they would be the responsibility of another person of the government. Ideally effort should be to avoid all adverse impacts. A Social Management Plan (SMP) must be prepared. The components of the SMP must include the following:

- Enumeration of the Project Affected Persons/Families;
- Measures to Minimize Resettlement;
- Consultation and involvement of PAPs;
- Entitlement Framework;
- Institutional Arrangements.

A monitoring framework should be developed that is capable of identifying deviation deviations from the proposed action and any important anticipated impacts. This should track project and program development and compare real impacts with project ones. It should spell out (to the degree of possibility) the nature and extent of additional steps that should take place when unanticipated impacts or those larger than the projection occurs.

IV. CONCLUSION

Environmental Impact Assessment (EIA) and Social Impact Assessment (SIA) are tools used to identify the environmental, social and economic impacts of a project prior to decision-making in Indian context. But by using EIA and SIA both, environmental, social and economic benefits can be achieved after use on actual ground. Formal legislation for individual has been enacted by making an amendment in different periods but still limited involvement of public and government agencies in the initial phases, screening done on the basis of a defined list. Threshold values on the size of the project have been used to decide whether the project will be cleared by the state government or the central government. EIA and SIA are acted as manual than a guidelines for project execution. Earlier scoping was done by consultant or proponent with an inclination towards meeting standard for control requirements, rather than addressing the full range of potential impacts from a proposed development. Over the period EIA and SIA scoping of work has gone through under several changes. But still EIA and SIA process, *have to have playing a crucial role in all future decisions upon the development of areas between*

flow principle, that is based on an equilibrium of material and energy and also financial input/output for improving the quality of life including ecological, cultural, political, institutional, social and economic components without leaving a burden on the future generations.

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