

Environmental Practices vis-à-vis Industrialization: An Indian Scenario

Nalini Bhat, PhD

All development projects use natural resources in one form or another. The supporting ecosystems serve as a source of raw materials and also as a sink for waste generated. It is, therefore, natural that environmental issues should be at the heart of any development activity, be it an industrial project, power generation facility, mineral extraction operation, or any other project. Traditionally, industrial development has been considered a means to improve the quality of life via the generation of wealth. Now, environmental quality itself is considered to be a major indicator in deciding upon a level of development. Therefore, industrial development has to be uncoupled from associated environmental degradation. This is expected to occur through the Second Industrial Revolution based on cleaner production. The media has played an anchor role in highlighting the ill effects of development, and has brought about awareness regarding the magnitude of environmental problems. Environmental concerns and practices, therefore, have become the focus of discussion by many professionals including policy planners, entrepreneurs, project reviewers, as well as those at various donor agencies. India is no exception to this trend.

India has a rich and diverse resource base that includes a land mass of 329 million hectares, large mineral reserves of coal and lignite (that could last up to 1200 years), 124 perennial river systems, adequate groundwater reserves, and a vast diversity of flora and fauna. The available natural resources are being continuously exploited year after year in the name of development, with scant respect for the environment. The result is that the envisaged benefits from the projects are not getting delivered. Realizing the problems, a modest beginning for incorporation of environmental aspects and aspirations of local people into the development projects has been achieved through the introduction of project level environmental analysis for 29 categories of

potentially polluting activities. Also, public hearing involvement was made mandatory during planning. In the absence of incentives and subsidies for pollution control, the emphasis remained on pollution control rather than prevention, and on the use of outdated technologies.

The development pattern adopted for the last five decades in India has created a serious backlog of pollution problems. The signs of stress on natural resources are many: water pollution of major rivers; deterioration of air quality, particularly in major cities; soil degradation and loss of fertility on which food security is dependent; extinction of many species of flora and fauna; shrinking of forest cover; and so on. Thus the immediate tasks are to clean up the backlog, and to reorient the development strategy for future projects. Give the present circumstances, the challenge to be faced on environmental and ecological fronts is multifarious. There is no ready-made solution. In the background, various steps must be initiated in order to ensure that future development plans are environmentally sound and socially acceptable.

Some of the major issues which need urgent attention are as follows:

- incorporation of micro level environmental concerns while evolving macro level plans;
- harmonizing of sectoral policies and programs through Strategic Environmental Analysis;
- proactive approach to pollution via pollution prevention rather than pollution control;
- use of cleaner technologies through promotion of cleaner processes and "best practices";
- sound technical management process;
- increasing the effectiveness, efficacy, and relevance of Environmental Impact Assessment (EIA) for development projects;
- development planned based on carrying capacity; and
- involvement of people in resource utilization.

Translation of the concepts indicated above into practicable action plans requires coor-

dination between various agencies, institutions, and policy planners. A modest beginning has been made in various sectors of development, including power generation and water resources projects, for implementing strategies for sustainable development. However, it is clear that the listing of priorities would be rather difficult, and a multi-pronged strategy would be needed. In the paragraphs that follow, an attempt is made at illustrating measures initiated in various categories of development projects.

Sustainable Growth in the Power Sector

The growth rate of the power sector during the next 15 to 20 years is projected to be around 8%. The present generation capacity is about 91,066 MW, which includes 68,789 MW through coal-based power projects and 22,083 MW through hydroelectric generation. Keeping in view the projected growth in the industrial and domestic sector, the additional power generation capacity that will be required in the next decade is expected to be 100,000 MW. Considering the available coal reserves and the technologies available for commercial exploitation, coal will be the principal indigenous source of commercial energy.

For environmentally sustainable growth in the power sector, the following steps have been initiated.

1. The concept of "Site Selection and Clearance" has been recently introduced for Mega Power Projects (i.e., coal-based projects with more than 1000 MW of capacity and hydroelectric projects with more than 500 MW of capacity). Under this concept, the environmental acceptability of the site is decided via a quick reconnaissance survey, site visit, etc. During the site selection stage, scoping of environmental issues is undertaken so that, while environmental impact assessment reports are prepared, critical issues are fully studied for evolving requisite management plans. In the past, promoters have spent time and money on environmental impact assessments for sites which were not environmentally acceptable. Many times, these sites were located near ecologically sensitive areas such as National Parks, Biosphere Reserves, Sanctuaries, Archaeological Monuments of national

importance, and so on. The site clearance concept has helped in the incorporation of environmental concerns in the pre-feasibility stage of the project.

2. Indigenous Indian coal has a very high ash content ranging between 35–45% depending on the location of the mining block. For better performance of the power plants and to avoid transportation of coal with such high ash content over long distances, the Government of India has issued a Notification for use of beneficiated coal with ash content not exceeding 34% for power projects which are located beyond 1000 km from the mining block and which are near critically polluted areas/major cities. The use of better quality coal is expected to reduce air pollution, allow for a better plant load factor, and result in a reduction in diversion of land for ash disposal at site. A new problem to be faced is how to use washery rejects and account for loss of carbon. The need for additional mining of coal along with the associated environmental implications will also have to be examined.

3. Due to the dependence of the Indian Power Sector on coal, it has been estimated that 100 MT ash will be generated per year by the year 2000. The disposal of such a vast quantity of ash is a challenge being faced by the policy makers. Presently, about 3 to 5% ash is used in brick making, aggregate road construction, and other activities. The remaining ash is being disposed of at identified sites. To minimize diversion of productive land for such activities, the latest technologies such as High Density Slurry Disposal are being tried. With this technology, the area requirement is reduced as is water use, in comparison to conventional methods of ash disposal. To avoid contamination of groundwater due to leaching, soil analysis is undertaken to ascertain the necessity of lining of the area. Grouting of the Ash Dyke Area to avoid seepage and other problems is also being considered.

4. Generation of power is a water intensive activity. Fresh water has a number of competing demands including, for example, drinking water, irrigation, and industrial use. Keeping in view the scarcity of this resource, water conservation techniques such

as installation of closed circuit cooling towers, use of treated effluents for in-house activities and for plantations, and so on, are insisted upon in power plant operations.

Cleaner Technologies

The use of cleaner technologies is promoted for natural resource conservation. The policy statement for abatement of pollution adopted in 1992 provides instruments in the form of legislation and regulation, fiscal incentives, voluntary agreements, and awareness campaigns to prevent and abate pollution through various developmental activities. Since the adoption of the policy statement, the focus of various programs and schemes of the Ministry of Environment and Forests and its associated organizations has been prevention and control of pollution at the beginning of the pipeline by adoption of clean technologies, waste minimization, and resource preservation. The main focus of pollution prevention and abatement programs is command and control methods as well as voluntary regulations.

Under this program, the Ministry is establishing the Indian Centre for Promotion of Cleaner Technologies as a network of expert institutions which will provide the necessary inputs in creating a database on available technologies, their relative performance and ranking, sources of these technologies, needed investments, and so on. To begin with, two priority sectors, namely, Industry and Energy have been identified for creation of the database. The significant feature of the Centre is that it will provide evaluated and ranked technology options to entrepreneurs. Further, for optimum utilization of resources, a Life Cycle Assessment study in the steel sector has been initiated with involvement of major steel plants in the country. Under the clean production program, demonstration projects have also been initiated.

Most of the refineries have started installing captive power plants based on refinery by-products such as petroleum coke and vacuum residue. These fuels have high calorific value and also high sulfur content. For such fuels, clean technologies like Integrated Gasification Combined Cycle have been considered. This, in fact, is a step in

the direction of the Life Cycle approach for material use in the refinery sector.

Carrying Capacity Based Planning

The concept of regional and carrying capacity based planning has also been tried. A study was initiated in 1992 to ensure environmentally sound industrial, power, and municipal development of the Singrauli area in central India. This area has major coal reserves, a large water source in the form of the Rihand Reservoir, and a good transportation network. It has been estimated that the total coal reserves of 10,850 MT would be sufficient to generate up to 20,000 MW in next two decades. The region hosts a number of other industries including an aluminum smelter, a high-tech carbon plant, and a caustic soda plant. Various future development scenarios (short term and long term) for regional development of the area have been examined in this study. Socioeconomic issues have also been addressed; this is crucial due to both population growth and the influx of a migrant labor work force to this area.

The results of this study have highlighted the preferred portfolio of projects that can be sustained in the region. Critical parameters and sensitive zones have also been identified and delineated. The main cause of concern again in this region is displacement of people due to industrial establishments, power projects, and mining activities. Rehabilitation of affected families, lack of facilities for the migrant population, and change in land use are other areas of concern. Even though water quality is acceptable in most of the region, there are certain patches around the ash disposal area where it is deteriorating. Air quality is less of a problem due to meteorological conditions and the state-of-the-art Pollution Control Technologies used with various projects.

The study has helped in planning for future projects in the region. A similar study was also undertaken in the Korba region of Madhya Pradesh. This area is also known for its coal reserves and water availability. The other areas where carrying capacity studies have been initiated include the National Capital Region of Delhi, Damodar Basin in Bihar and West Bengal, Ankalesh-

war Industrial Estate in Gujarat. This exercise has helped in determining the critical parameters for the region and the limiting factors for future developmental plans.

Basin Approach to Hydroelectric Projects

While planning for hydroelectric projects, one is faced with different sorts of problems. There is a general feeling that hydroelectric projects should be preferred over thermal power plants. But this is a gross underestimation of the environmental implications of hydroelectric projects. Most of the South Asian countries including India started with project level EIA and continued with it. But the accelerated pace of development has compelled the country to go beyond the project level EIA as this management tool neither considers cumulative impact nor addresses alternative development issues. Ideally planning for hydroelectric projects should take a "Basin Management Approach." This provides an opportunity for cumulative assessment and optimization of both land and water resources.

The Basin approach was introduced for the first time for integrated development in Narmada Valley. Narmada is one of the major rivers proposed to be harnessed through the construction of 30 major, 300 medium, and more than 3000 minor projects. To manage the water resources and to resolve interstate issues, Narmada Control Authority has been constituted. An integrated approach is being practiced while

analyzing the environmental implications of various projects. The approach includes consideration of not only the dam construction but also the upstream catchment conditions and watershed management, and downstream impacts including command area development. The Environmental Management Plan covers all of these issues.

Stakeholder Involvement

A majority of the developmental schemes have a social angle during the planning and implementation stages. It is a well-established fact that involvement of stakeholders is necessary for successful implementation of projects. The Public Hearing, therefore, has been made mandatory in India since April 1997 for certain categories of projects covered under the Environmental Impact Assessment Notification of January 1994. Whoever wants to apply for environmental clearance of a project under the Public Hearing procedure has to submit to the concerned State Pollution Control Board an Executive Summary containing salient features of the project both in English as well as local language. Wide publicity is given about the project for seeking comments and suggestions from bonafide residents, environmental groups, and others located at or near project sites.

A Public Hearing panel is constituted for conducting open hearings. This panel consists of local bodies, senior citizens of the area, representatives of government departments, and so on. The issues raised in

the Public Hearing are required to be considered by the promoters while finalizing the layout plan, technology, and other elements of the proposed project. The mandatory public hearing has introduced an element of transparency in decision making.

Conclusion

The road map for environmental conservation has been drawn after a protracted discussion with various institutions, departments, and research organizations. The actual implementation remains an uphill task. This is primarily due to change in priorities from time to time, limited funds available for project implementation in general and for environmental management plans in particular, limited infrastructure available for undertaking research and development activities, and the attitudes of entrepreneurs and corporate business houses towards environmental issues concerns. Hence, a change in mindset will be required in planning ecologically sound and hence economically viable projects on the premises of sustainable development.

This article was provided courtesy of D. K. Banerjee, PhD, Contributing Editor to Environmental Practice.

Address correspondence to Nalini Bhat, Ministry of Environment & Forests, Paryavaran Bhavan, CGO Complex, Lodhi Road, New Delhi—110 003