

*Discussion note*

*Social and  
Environmental  
Impacts of Power  
Projects*

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Power projects have historically had significant social and environmental costs associated with them. The two most common types of such projects in India are hydro and thermal power projects. This paper focuses on the possible adverse impacts of storage dam projects and of coal based thermal power projects.

### **Hydroelectric projects**

Hydroelectric projects, especially those involving large dams, by and large have the more significant environmental and social impacts. Some of the main impacts are listed below:

#### ***Upstream of the dam***

1. Degradation of the catchment. This can be due to the project, partly as a result of project activities and partly because of increased pressures on the remaining catchment once a part has been submerged under the reservoir. Apart from the adverse impacts this has on the biodiversity of the region, it also often has critical implications on the livelihood needs of the local people.
2. Of course, degraded catchments, whatever be the cause of degradation, can also have significant impacts on the dam project itself by, among other things
  - Increasing the silt load
  - Causing erratic water runoffs
  - Posing a possible threat of surplussing due to sudden increase in water flow
3. There is also the threat of backwater build-ups and consequent floods and destruction
4. There is also the threat of reduced water availability upstream, as the water is required to fill the reservoir

***At the reservoir and project site:***

5. Dust Pollution
6. The threat to rim stability
7. The potential for breeding vectors
8. Adverse impact on the aquatic ecosystem and biodiversity
9. Possible adverse Impact on fisheries
10. Impact on the water quality including potential for mineral contamination of water
11. Submergence and destruction of flora and fauna
12. Submergence of agricultural land
13. Submergence of grazing land
14. Submergence of sources of local fuel wood and other non timber forest produce
15. Reservoir induced seismicity
16. Adverse micro climatic changes
17. Human Displacement

***Downstream***

18. Adverse impacts on aquatic ecosystem and biodiversity downstream
19. Adverse impact on fisheries downstream
20. Adverse impact on water availability downstream
21. Adverse impact on water pollution levels downstream, especially due to reduced river flow
22. Possible salt water ingress
23. Threat from sudden releases of water
24. Threat from dam failure

***Command Area (in multipurpose projects)***

25. Threat of water logging and salinity
26. Threat of vector breeding

Unfortunately, there are many projects in India and in other parts of the world, which manifest one or more of these adverse impacts.

## The Problem

Hydroelectric projects in India are rarely, if ever, properly investigated for their environmental and social impacts. Their environmental and social viability is, therefore, often not established. Besides, the measures to mitigate the social and environmental impacts are poorly planned and shoddily implemented. In the anxiety to cut costs and, perhaps, to make projects appear economically viable, the funds allocated to mitigate these impacts are usually insufficient, with many costs being ignored and various benefits exaggerated. Activities related to the assessment and mitigation of environmental and social costs are often started very late and then hurried along so as not to delay project implementation.

There has been an unfortunate tendency, in recent years, to grant hydroelectric projects "conditional clearance", with the stipulation that environmental assessment and the mitigation of adverse impacts be carried on *pari passu*. Some prominent beneficiaries of such clearances are the Sardar Sarovar Project in Gujarat, the Indira Sagar Narmada Project in Madhya Pradesh, and the Tehri Project in Uttar Pradesh.

What such conditional clearances imply is that the project is given a go ahead before its environmental impacts have been assessed and, consequently, its viability established. It also usually means that the assessment is never properly done, and mitigative measures are delayed to a point where they become ineffective. Also, project authorities prefer to interpret *pari passu* to mean *co-terminus*, thereby leaving a bulk of the work to be done just as the project is nearing completion.

A good example of this is the Tehri Project, where conditional clearance was given in July, 1991, with the stipulation that most of the required studies should be completed by the middle of 1992, failing which the construction work would be brought to a halt. However, not one of the required studies was completed in the prescribed time frame, in fact most of them were not even initiated by then. Even in 1997, many of the required studies have not been satisfactorily completed, and the government has itself

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\* For a detailed description of the various problems with river valley projects in India, see Shekhar Singh, et al, 'Evaluating Major Irrigation Projects in India', in *Big Dams : Displaced People*, edited by Enakshi Ganguly Thukral, Sage Publications, New Delhi, 1992

admitted more than once in Parliament that the conditions of clearance were not complied with. Yet, work on the project continues.

Even though the project is in its early stages, the political will to enforce the conditions of clearance is lacking. It is therefore unrealistic to expect a project to be stopped, leave alone abandoned, when it is nearing completion. Therefore, to ensure that the prescribed environmental conditions are complied with, once the project has been given "conditional clearance", is a hopeless task.

### **Rehabilitation**

Hydroelectric projects also take a heavy toll of the human populations in the submergence areas, who are made homeless in their thousands. Till recently, we had very inhumane rehabilitation policies, where by and large the "oustees" were handed a small amount of money in lieu of their homes, livelihood and heritage, and asked to fend for themselves. Thousands of communities fragmented and disappeared over the years, victims of hydroelectric projects. Recently there has been a serious effort to change all this. Some of the newer projects, notably the Sardar Sarovar Project in Gujarat, offer land for land and other facilities to the "project affected people".

Despite this, the cost paid by the project affected people, mostly poor villagers and tribals, is horrific. And the benefits of the electricity generated goes mostly to the rural rich and to the urban populations.

### **Coal Based Thermal Power Projects**

Though the adverse environmental and social impacts of thermal power projects are not as dramatic as that of dams, they are still significant. This is especially so if one assesses the impacts from "cradle to grave", i.e., including the impact of mining the coal and of its transportation to the power plant.

The major environmental and social impacts of thermal power stations are listed below.

#### ***Construction phase***

1. Displacement of people
2. Dust pollution
3. Local level disturbance
4. Destruction of fauna and flora

### ***Operational phase***

5. Air pollution
6. Water pollution
7. Withdrawal of water
8. Land pollution, mainly through fly ash
9. Noise pollution
10. Micro climatic changes

Unfortunately, thermal power plants are also not properly assessed for their environmental and social impacts, and alternative sites and technologies are rarely explored.

Instead of having a national perspective towards the generation of thermal power, state and local perspectives prevail. This inhibits the location of such power projects at sites that are optimal from the environmental and social perspectives. It also comes in the way of locating coal based power stations at or near coal pit heads, so that the economic and environmental costs of transporting coal over long distances could be minimised.

### **The Problem**

Perhaps the three most critical issues with regards to thermal power stations, in terms of their social and environmental impacts are:

1. The location of the plant. Inappropriate locations imply heavy environmental and social costs and an inability to adequately mitigate these costs without making the project economically nonviable.
2. The use and discharge of water. As water is a scarce commodity in most parts of the country, the use of water by power stations results in greater, sometimes critical, deprivations for the local populations.
3. The dumping of fly ash. Fly ash is perhaps the single greatest hazard to the environment, to land and to human health.

Many examples of thermal power plants, which were posed for environmental clearance without a proper appreciation of these issues, are available. Some of the notable examples are described below.

### **The Dholpur Thermal Power Project, Rajasthan**

This power project is proposed to be built on the banks of the Chambal river, adjacent and, in part, within the National Chambal Sanctuary. The efforts of the Environmental Appraisal Committee to get the state government to shift

this power station even a few kilometres, so that the impact on the sanctuary could be minimised, were unsuccessful. Consequently, the project was not accorded clearance for many years and has only recently managed to get cleared, in its initial location, but with very stringent environmental conditions. The loss of time and the additional costs of environmental safeguards could all have been prevented if a more suitable site had been agreed to.

#### Kayamkullam Power Project, Kerala

This project is proposed to be built adjacent to a fragile system of *Kayals* (backwaters) in the state of Kerala. The project envisages dredging the *Kayals* in order to get fill material for the project site. Such dredging would destroy the *kayal* as an ecosystem and have significant adverse impact on the fisheries in the region. Again, efforts to have the site shifted by a few kilometres were not successful. The project was, therefore, not recommended for clearance. Later, the Ministry of Environment and Forests cleared the project, over ruling the recommendations of its own appraisal committee.

However, if the project does come up it will have unacceptable environmental costs.

### **RECOMMENDATIONS**

1. To ensure that ecologically fragile areas are not degraded or destroyed by inappropriate or badly designed and implemented power projects, a major thrust should be on strengthening the Environmental Impact Assessment procedure and practices in India. This is required not only at the project or the regional level but also at the policy level. Notwithstanding EIA having become mandatory, it suffers from the following serious draw backs:
  - Project proponents still consider EIA to be a formality, which is presumed to be completed as soon as environmental clearance is granted. They rarely understand that EIA, as a decision making tool, can significantly enhance the benefits of the project while ensuring environmental protection.
  - The consultants preparing the environmental impact statements on behalf of the project proponents often act as agents of the project proponents, with the result that their reports are often biased, unreliable and remain unimplemented. The consultants tend to tow the line of the project

proponents because their future prospects and often even their consultancy fees are dependent on the project being approved.

- Lack of transparency, objectivity and "public participation", which are prerequisites for making the EIA process successful. Informed and meaningful public participation assumes that there is free access to all relevant information. The need to be transparent has been supported by various court orders.
- Lack of objectivity, accountability and transparency in the screening and assessment processes used by regulating agencies for approving or rejecting projects.
- Ineffective monitoring of the stipulated remedial measures.

Accordingly, the following steps need to be taken:

- A) The stipulations in the EIA notification to penalise the proponents and/or their consultants for furnishing false data need to be seriously implemented to make the EIA reports objective.
- B) There were initial efforts to make the process of EIA more transparent and participatory. However, the rules under the Environment (Protection) Act, which were first amended to allow such transparency and participation, were very quickly again amended to minimise this. Consequently, this remains a high priority. All efforts to ensure that proper EIA of projects and activities is done would fail if the process is not transparent. Secrecy in these matters only encourages manipulation by vested interests.

Therefore, the rules under the Environment (Protection) Act must be suitably amended. Provisions must be made, if necessary through a special scheme, for making available all information on which EIA is based. It must be ensured that there is adequate discussion with non-governmental experts and with the affected communities, before a power project is given environmental clearance.



- C) Transparency and accountability in decision-making should be strengthened by permitting public scrutiny, of files regarding projects approved or rejected, for at least one month before the decision becomes effective. Action should be taken against those responsible for indefensible technical and/or administrative decisions.
- D) The practice of granting "pari-passu", or "conditional", approval in cases where environmental action plans are to be submitted later, should be discarded altogether. Past experience has shown that the spirit of such conditional clearances is never honoured.
- E) Even when projects are being scrutinised and cleared after stringent environmental scrutiny, the experience is that project authorities often flout the conditions of clearance. There exists, at the moment, a very inadequate system of monitoring projects and activities in order to ensure that they comply with the conditions of environmental clearance. Consequently, it is important to involve the NGOs, educational and research institutions, and interested and qualified individuals in monitoring power projects in terms of their compliance with environmental and social safeguards.
- F) Being part of the Government set-up, the regulatory agencies are often subjected to political pressures which sometimes result in biased decisions. It is necessary, therefore, to set up an independent and autonomous Environmental Protection Agency with, among others, the following functions:
- To review the environmental action plans of agencies involved with setting up power plants.
  - To adjudicate on controversies regarding the environmental impacts of power projects.
  - To appoint environmental appraisal and other expert committees for evaluation of power projects and of policies and programmes related to power generation, distribution and consumption.

- To monitor the implementation of stipulated mitigation plans and compliance with conditions of environmental clearances.
2. In addition to EIA, appropriate zoning is required to ensure that power projects do not impact on ecologically or socially vulnerable areas. The whole country should be zoned in terms of its ecological and social vulnerability and areas where power projects can be allowed to come up, should be clearly indicated. Even in these zones, the technology acceptable, the levels of effluents and emissions allowed and the number of units possible should be clearly specified. To provide incentive for being in compliance with the prescriptions for each zone, rules and laws should be amended so that a less detailed clearance is required where a power project is in conformity with the prescriptions. The fact that, in the present system, there are huge delays and costs involved in steering through the process of getting environmental clearances would help in the success of the zonation system.
  3. At present, adequate expertise might not available in the country to carry out the required carrying capacity studies for developing a proper system of zones. Therefore, initially the zones might basically be exclusion zones, specifying the types of activities not permissible in each zone. Meanwhile, a major programme should be taken up, if necessary though collaboration with institutions outside the country, to develop indigenous ability and manpower to carry out comprehensive carrying capacity studies. These carrying capacity studies must lead to and form the basis of a rational and scientific land use plan for the country.
  4. Research efforts, especially with regards to issues critical for the proper identification and management of ecologically and socially vulnerable areas, are sadly lacking in India. Regeneration and restoration methods for ecologically fragile areas must be urgently developed. For the purpose, centres of research must be set up within existing institutions, each working on one or two types of fragile ecosystems. The research should be aimed at developing better techniques for protecting, monitoring and restoring fragile ecosystems.
  5. As accurate and objective EIAs are essential for the wellbeing of the environment and the project, the funding of consultants who are to prepare

the environmental impact statements, must be from an independent source. This is necessary to ensure that the statements are accurate and objective.

6. Once projects get cleared, most often there is little or no ability to ensure that they meet their environmental and social obligations. As such, it would be better if environmental clearances are given only for two years at a time and the project is required to seek extension after every two-year period. Such an extension should be given only if the project has complied with the stipulated environmental and social conditionalities.
7. In a country like India, where one major objective of development is to promote equity, it is not enough to subject power projects to just a cost-benefit analysis. They should also be subjected to a class-benefit analysis. A class benefit analysis should determine which classes of people are paying the costs and who are getting the benefits. Even if a project has a very favourable cost benefit ratio, if it involves the poor primarily paying the costs, for the benefit of the rich, then it should not be considered viable. The converse should also be true.

***Specifically for thermal power stations***

8. As the possible locations of thermal power projects are known well in advance, these sites should be assessed from the environmental and social angle well before the project is to be constructed. Such an assessment should indicate which of these sites are acceptable, and under what conditions. This would allow advance planning and minimise delays to the projects, due to the need to fulfil environmental requirements.
9. The use of fly ash should be a priority. Power projects should be set up both to generate electricity and to produce the fly ash which, given current technology, can prove to be a valuable economic resource.