ENVIRONMENTAL ASPECTS OF LARGE DAMS IN INDIA: PROBLEMS OF PLANNING, IMPLEMENTATION, AND MONITORING

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ENVIRONMENTAL ASPECTS OF LARGE DAMS IN INDIA: PROBLEMS OF PLANNING, IMPLEMENTATION, AND MONITORING[1]

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SUMMARY: *Large dams in India, as elsewhere, have entailed massive incursions into natural ecosystems and human settlements. Dam proponents assert that the impacts of these incursions can be minimised by appropriate steps, including Environmental Impact Assessment and preventive ameliorative measures. India does in fact have a systems of environmental clearances, monitoring and evaluation, which should in theory be able to do what dam proponents are claiming.*

Overwhelming evidence, however, points to the contrary. Environmental impacts have rarely been fully anticipated or understood, let alone prevented or ameliorated. A national assessment of the state of dams cleared in the 1980s and 1990s shows that in 90% of cases, the environmental conditionalities under which clearance was given by the central government, have not been fulfilled by the project authorities. This is not just a matter of lack of implementation, but points to a series of systemic failures.

Such failures are part of India's development planning process in general, but they have very serious implications in the case of large projects like big dams than in the case of smaller projects. Analysis of the ground situation with regard to environmental planning, implementation, and monitoring, suggests that these systemic faults may be inherent and difficult, if not impossible, to remove. If this is the case, making big dams environmentally viable may simply not be possible.

1. INTRODUCTION: ENVIRONMENTAL IMPACTS OF LARGE DAMS IN INDIA

Large dams in India, as in several other countries of the world, have been accompanied by significant alterations in the upstream and downstream physical and biological environment. There is no comprehensive audit of these impacts, but some available facts and figures indicate the magnitude and severity:

- the creation of reservoirs in the more than 1500 major river valley projects, has flooded over

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[1] This submission to the World Commission on Dams should not be taken to be, in any way, a plea for foreign intervention in India's river valley development planning. It is presented, rather, in the spirit of openness and with the desire to benefit from mutual exchanges with all those affected by, or concerned about, the impacts of large dams in the world. Ultimately, however, India's communities need to chart their own course as regards the use of their water resources, while learning from the strengths and weaknesses of such use by other communities and countries.

500,000 ha. (5000 Sq.km) of forest land;

- waterlogging and/or salinisation affects perhaps half the canal irrigated land in the country, with varying degrees of severity;
- malaria has seen a resurgence in the last decade or so, especially in the command areas of irrigation projects and around reservoirs;
- several species of wild animals and plants (such as the River dolphin *Platanista gangetica* and the fish *Hilsa ilisha*) have been pushed into threatened status by dams and associated impacts;
- salt-water ingress in the coastal areas of states with a major dam-building history, such as Kerala, is severe, affecting drinking water and agricultural lands for several kilometres inland.

Supporters of large dams point out that big dams do not have only negative impacts, but also positive ones. Once again, however, the evidence is scanty in this respect. The alleviation of water scarcity could certainly lead to improvement in the health standards of people, including the reduction in diseases caused by a shortage of potable water. Availability of water can also lead to significant greening of barren lands. Yet another benefit often cited is the creation of habitats for waterbodies; many of India's bird sanctuaries are located on and around artificial reservoirs.

However, positive spin-offs of dams usually also come with negative consequences. Greater availability of water also entails the spread of waterborne diseases (as mentioned above in the case of malaria); the greening of lands could come at the cost of the displacement of dryland crops, farming systems, and flora/fauna species (e.g. in the deserts of western India); where today lake sanctuaries exist, there may have at one point been significant grassland or forest wildlife (the grasslands of Corbett Tiger Reserve, today covered by the Ramganga Reservoir, were once home to several threatened species such as the Bengal florican *Eupodotis bengalensis*).

I will not dwell any longer on the environmental impacts of large dams per se in this submission, but rather on the conditions which perpetuate a faulty planning process, which in the first place allows for projects with such major impacts.

Whatever the negative and positive impacts, one striking fact of India's river valley projects is the absence of comprehensive impact assessments, both pre- and post-construction. No one in India is today in a position to provide a balance sheet: dams have caused this much damage, brought this many benefits. When one brings in the equity factor --- who has paid the cost and who has benefited --- the database is even weaker. Why is this so, and what are the implications for the future of river valley projects in India?

There are three essential steps that are necessary for any river valley project to be considered environmentally sensitive.

1. A complete **environmental impact assessment** should be conducted before the project is considered for clearance, and the results of the analysis should be used to judge the viability and desirability of the project; this would also entail the tentative costing of the impacts and

of the preventive/ameliorative measures, as this would have a bearing on the economic/financial viability of the project.

2. If the project is considered viable and desirable on social, economic, environmental, and technical grounds, it is necessary to take **preventive and ameliorative measures** related to the negative environmental impacts. This requires the formulation of precise and comprehensive workplans, and their implementation.
3. Finally, once the project is commissioned, it is critical to **monitor** the environmental impacts, and the progress of the preventive and ameliorative measures being taken to address these impacts. At this stage it may even be necessary to **redesign** the project, if environmental, social, or economic imperatives demand it.

Are India's dam projects actually following these steps? Experience over the last decade and a half, since the system of environmental clearances was instituted, suggests strongly that they are not. Indeed, close analysis suggests that there are aspects of large projects which make it rather difficult to take these steps with an acceptable degree of adequacy. My analysis below is based on the following:

1. A detailed pre-construction assessment of the environmental impacts of the Narmada River Valley projects, in particular the Sardar Sarovar Project in Gujarat (see attached, *Environmental Aspects of the Sardar Sarovar Project*, Kalpavriksh, 1994).
2. A short-term post-construction evaluation of three other major projects: Hirakud in Orissa, Ukai in Gujarat, and Indira Gandhi Canal in Rajasthan, conducted with two other colleagues (see attached, 'Re-Evaluating Multi-Purpose River Valley Projects', *Economic and Political Weekly*, Vol. XXXIII No. 6, February 7, 1998).
3. Involvement over a year and half (1994-95) as a member of the Environmental Assessment Committee for River Valley Projects of the Ministry of Environment and Forests, Government of India.

The last involvement was eye-opening, for it gave me the opportunity to study data from across the country, for a large number of dams which had been given environmental clearance by the MoEF. In particular, the EAC assessed information relating to the fulfillment of the conditions under which clearance was given, and came up with rather shocking results (see below, section on 'Preventive and Ameliorative Measures', and attached article, 'Project Shocks: The Environmental Clearance Farce', *Frontline*, August 11, 1995). The analysis below builds in some of these results, as also information from the other two studies mentioned above.

2. PLANNING AND ENVIRONMENTAL IMPACT ASSESSMENT

The need to consider environmental aspects at the stage of planning of river valley projects has been felt for well over two decades now. In 1975, the Central Water Commission (CWC), Government of India, issued guidelines for conducting investigations regarding major irrigation and hydro-electric projects (CWC 1975). The chapter on environment in this document clearly states that:

"The planning, construction and operation of irrigation/ hydroelectric/ multipurpose projects have considerable impacts on navigation, fish culture, wild life, recreational aspects and overall

ecology of the affected regions. Some of these aspects on the ecology of the region as well as the overall environment are irreversible in nature. It is, therefore, necessary that a careful evaluation is made of these impacts, whether good or bad...."

The CWC guidelines then demarcated the "minimum surveys and investigations required", including

- Effects on fishing downstream;
- Area of reserve forest...as also the estimates of the wildlife population in the area proposed to be submerged, and indications for the possible alternative proposals for relocation of the affected wildlife;
- Waterlogging potential, and steps to be taken to mitigate this problem;
- Silting/scouring of the river bed;
- Impact of flood problems (presumably relating to flash floods caused by sudden releases from the dam); and
- Salinity of flow in the river channel (including, presumably, saltwater ingress)

Though these directions existed, they were not backed by any clear set of guidelines Environmental assessments of dams therefore remained haphazard and vague, and were purely incidental components of the planning process.

In 1980, clearance of large projects from the environmental angle became an administrative requirement, to the extent that the Planning Commission and the Central Investment Board sought proof of such clearance before according financial sanction. Five years later, the Department of Environment and Forests, Government of India, issued **Guidelines for Environmental Assessment of River Valley Projects** (DOE 1985). These guidelines specified the various studies which are necessary as part of an EIA, including impacts on forests and wildlife in the submergence zone, waterlogging potential, upstream and downstream aquatic ecosystem and fisheries, water-related diseases, climatological changes, and seismicity

However, the clearance procedure continued without any direct legal backing. It was only in 1994 that the Ministry of Environment and Forests (MoEF) issued a notification under the Environment Protection Act of 1986, making environmental clearance mandatory for specified kinds of projects. Large dams were amongst those listed for clearance.

The MoEF set up, after this notification, an Environmental Appraisal Committee (EAC) to screen proposals for dams. The EAC is supposed to be composed of eminent experts in the fields relevant to the EIA of a river valley project. It considers all the available information on the proposed project, and recommends it for clearance or rejection to the MoEF. If suggested for clearance, it may also recommend conditions which the project authorities have to comply with, such as compensatory afforestation for forests lost under submergence, treatment of catchment areas of the proposed reservoir, mitigatory measures for wildlife, preventive measures against waterlogging, etc.

The MoEF then clears or rejects the proposed project (it may over-rule the advice given by the EAC, if there are sufficient grounds for doing so); if it clears, it imposes the conditions

mentioned above, seeks detailed workplans, and then institutes a systems of monitoring of the fulfillment of these conditions. Regional offices of the MoEF carry out such monitoring.

On paper, this procedure appears to be sound, and if properly fulfilled, it should result in adequate consideration of environmental aspects in the planning of a river valley project. The true spirit of the exercise is that environmental aspects of a proposed project are as important as the technical and financial, and that they should contribute to the decision on

- whether a project should be built at all or not (i.e. whether it is viable and desirable or not),
- if it is to be built, what kind of measures would be required to prevent or mitigate negative environmental impacts, and
- what costs have to be built into the project for the above measures.

However, there are serious faults in the whole system, which undermine a sound procedure. These include the following.

1. ***Inadequacy of data***: In almost no instance is a comprehensive understanding of the ecosystems and species, which a dam might impact upon, available. Impact assessment of, say, the submergence of a forest is dependent on the availability of data regarding the species composition, ecological functioning, etc. of that forest; such baseline data is scarce in India.
2. ***Inadequacy or non-availability of expertise***: Presuming that the project authorities and the government want a comprehensive EIA done, this is dependent on the availability of experts who can carry such assessments out. While considerable expertise does exist in India, it is perhaps not nearly enough for the scale and number of projects which at any given time are needing assessments, and even where it exists, it is often not easily available to project authorities, or they do not make a serious attempt at locating such expertise.
3. ***Imperfection of the EIA approach***: There is still considerable lack of clarity about how a number of non-quantifiable, or essentially intangible impacts of a dam are to be factored into an EIA. The forced rationality of the EIA process militates against the consideration of impacts such as the loss of ancestral homelands and spiritually valuable landscapes and landscape elements, the decline of a species, the loss of aesthetic values, etc. In the Narmada Valley, residents ask whether it is right to chain "Mother Narmada", which by ancient legend has always resisted attempts to bind it down; in the parlance of modern ecological ethics, this would translate into the question of whether a river has the right to "run free". (Of course, project proponents also argue that providing water to a water-deficient area is a spiritual act, and that the benefits of this cannot be quantified; however, this approach posits the benefit of one section of society as being necessarily dependent on the sacrifice made by another section, a fundamental defect of the modern developmental paradigm. I will not go into these questions here.)
4. ***Doctored EIAs:*** In a distressing number of cases, project authorities simply get hold of a consultancy agency which is happy to prepare an EIA which gives a clean chit to the project. It was interesting that almost every one of the EIAs that were submitted to the Environmental Appraisal Committee during the time I was a member, concluded that the proposed project would have a negligible effect on the environment; many argued that the net effect would be beneficial. In virtually every case, the EIAs stated that there were no threatened wildlife species in the submergence or other impact zones, despite the fact that many of the proposed projects were in ecologically sensitive areas like forests. Even more disturbing, project authorities

managed to get the relevant government institution, such as the Zoological Society of India or the Botanical Society of India, to also certify that the project would have no adverse consequences. The situation was considered so bad that the EAC actually discussed the need to blacklist consultancy agencies, which were found to be providing distorted EIAs to suit the project authorities. Another suggestion made was to institute an independent fund for conducting EIAs, so that the funding would not come from the project authorities. It is not known if the MoEF has actually taken this advice subsequently.

5. ***Construction first, EIA later:*** In a large number of cases, we found that the project authorities had started construction or large-scale pre-construction works, before even obtaining clearance. When confronted with awkward questions regarding the environmental impact, these agencies would plead that already so much money has been spent, how could they stop the project now? In the case of Sardar Sarovar Project, Gujarat, considerable expense had already been incurred in the first half of the 1980s, and the World Bank in a shocking violation of its own guidelines had already agreed to fund the project, well before environmental clearance was accorded (in late 1986). Even when clearance was given, it was conditional to the completion of several specific environmental impact studies and the formulation of workplans; in other words, even the information necessary to take a sound decision on its environmental viability did not exist at the time of clearance (see attached booklet, *Environmental Aspects of the Sardar Sarovar Project*). In the case of Bisalpur Project, Rajasthan, construction was nearly completed without any environmental clearance; our EAC recommended complete halt to the construction and punitive action against the project authorities, but this was never heeded. Such examples have made a mockery of the environmental planning process for dams.

6. ***Vague EIA guidelines:*** The 1985 guidelines for EIA, issued by the MoEF, being the first detailed set of guidelines on such projects, were full of loopholes and unclear instructions. For instance, they asked for an assessment of the impacts of a dam in the downstream area, without specifying exactly what is needed under this. Project authorities have often interpreted this to mean an assessment of the impact on commercial fisheries downstream, and have ignored the effects on other fauna and on aquatic flora, on estuarine areas, and on land adjacent to the river. After receiving the EIA, the MoEF would ask for further details, and this process would often go on for months, even years, till the state government simply gave up or applied political pressure and got the project cleared.

7. ***Inadequate capacity at the centre:*** Conditions in the MoEF itself are hardly conducive to handling a large number of projects for clearance purposes. The EAC, however expert its members, cannot possibly know the ground situations in every project that they are screening, and have to per force rely on EIAs, independent accounts if available, and interviews with project authorities. An occasional field trip may be taken, but this is necessarily very short and cursory. The unit handling the clearances in the MoEF itself, had at one point only two people handling hundreds of projects; it has now reportedly been expanded, but is still woefully short of time and expertise for the job.

8. ***Political interference:*** Even solid environmental assessments and planning can be undermined by political forces. In the case of Sardar Sarovar and Narmada Sagar Projects in the Narmada Valley, for instance, the MoEF's experts had cautioned against environment clearance, as adequate studies had not been completed and there was considerable prima facie evidence of negative impacts. However, powerful chief ministers of the concerned states (in particular Gujarat) were able to pressurise the then Prime Minister to accord clearance; the backdrop of a disastrous spell of drought in 1985-86 added to this pressure.

9. ***Lack of indicative workplans:*** Even where EIAs are conducted, they often do not contain an indication of the kind of inputs necessary to prevent/ameliorate negative environmental impacts, and of the costs these inputs would need. This sort of exercise is obviously necessary to factor into the cost-benefit analysis of the project. Too often, however, this is left to be done after the environmental clearance has been given, at which stage the project proponents might find it more convenient to simply ignore or give less attention to tackling the environmental impacts.

10. ***Mismatch between different clearances:*** At the MoEF itself, project authorities are required to take two separate clearances for projects which affect forest lands: a clearance for diversion of forest lands for non-forest purposes (under the Forest Conservation Act), and the environmental clearance (under the Environment Protection Act). There are instances where, having obtained one, project construction starts without the second, thereby putting pressure on the MoEF to quickly grant the second also even if expert opinion is against it.

The result of these systematic failures is that more often than not, indeed in perhaps the vast majority of cases, the environmental viability of a large dam has simply not been established before its construction started. This is not to say that each of these dams is an environmental disaster, but to assert that the planning failure is very grave indeed, especially considering the potentially large-scale impacts that big dams have.

The situation has undoubtedly improved over the last few years, as greater expertise is available, public scrutiny is increasing, donors are getting more sensitive, guidelines are improving, and so on. Our EAC finally convinced the MoEF of the need for a complete overhaul of the EIA guidelines, and drafted a new set. It is not clear whether this has been accepted or not as yet. However, the attitude (especially amongst project proponents, but also amongst other government agencies, and most donors) still remains one of EIA being an irritating formality rather than an essential part of project planning, and critical systemic gaps remain. This attitude carries forward into the second step of project planning vis-à-vis the environment, that of formulating and implementing detailed, specific preventive and ameliorative measures.

4. PREVENTIVE AND AMELIORATIVE MEASURES: THE CONDITIONAL CLEARANCE EYEWASH

At the time of clearing a project, the MoEF may impose certain conditions, which would help to prevent, or at least minimise and ameliorate, the negative environmental impacts of the project. Typically, these are of the following kind (this is not an exhaustive list):

- Compensatory afforestation where forest land is being lost/diverted;
- Treatment of the catchment areas, to prevent premature silting and other impacts;
- Measures to prevent or minimise waterlogging and salinisation in the command area and around the reservoir;
- Measures to prevent or minimise negative health impacts;
- Safeguards against the ill-effects of seismicity;
- Provision of alternative fuels to project labour, to avoid cutting nearby forests;
- Ways of saving and translocating wild plants and animals;
- Ladders for migrant fish to cross over the dam.

The planning process has come a considerable way in the last couple of decades, in attempting to build such workplans and measures into the system. However, the enormity of the problem comes home when the following facts are considered.

Data emerging from the records of the Government of India, collected by the regional offices of the MoEF, suggests that ***in a shocking 90% of cases, project authorities had not complied with the conditions which their projects had been cleared under.*** In other words, preventive and ameliorative measures had not been taken, or taken inadequately. This does not mean that all such projects were violating all the conditions of their clearance; nor does it mean that the non-fulfillment was in every case serious. However, even if half of the cases of non-fulfillment were serious, the story is still one of an epic scandal.

The most commonly violated conditions were: treatment of catchment areas, command area development, compensatory afforestation, and provision of fuel to labourers on the project site. Of these, the first two are serious from the point of view of affecting the direct viability of the project itself, and are shocking given the well-known facts that premature siltation and loss of effectivity affects a large number of India's dams, and that lack of command area development has led to severe instances of waterlogging and salinisation.

Some examples would be illustrative:

- The Telegu Ganga Project of Andhra Pradesh, cleared in 1988, had till 1995 not implemented its resettlement and command area plans, and the construction parameters had been changed without referring back to the MoEF...a bit like a film-maker inserting some objectionable sequences into a film after obtaining the censor's certificate!
- The Chamera hydro-electric project authorities in Himachal Pradesh dumped 4 million cubic metres of construction waste into the Ravi river, and refused to answer the MoEF's queries on why they did this.
- At the Sharavathi Tail Race Project in Karnataka, project authorities unilaterally declared several environmental conditions to be irrelevant, including the construction of a fish ladder, securing a corridor for wild elephants, and ensuring the 'nistar' (forest use) rights of local communities.
- The Man Project authorities in Madhya Pradesh reduced, on their own without referring the matter to the MoEF, the resettlement package for affected people, arguing that the Chief Engineer had the power to do so!

As in the case of planning and EIAs, there are systemic faults which cause the above:

1. ***Workplans after clearance:*** As not only the detailed but also the indicative workplans are usually made after clearance is obtained, project authorities do not have the same level of interest in completing them as they have with completing EIAs to obtain clearance; workplan formulation is therefore often considerably tardy, or half-heartedly done;
2. ***Vagueness of conditions:*** Till recently, the conditions imposed on project authorities have often been vague, not specifying precise parameters or time schedules. For instance, the compensatory afforestation proviso did not often specify the region in which the operation was to be carried out, the kind of plantation to be done so as to approximate what was lost. Project

authorities therefore interpreted this in their own way, often planting quick-growing exotics in monocultures far away from the submergence site, which can hardly be called compensation for the loss of mixed natural forests in an area. Nor was, often, the time limit specified: by when was each condition to be met? This has now been rectified by the imposition of the *pari passu* clause, in which environmental measures are required to be taken simultaneously with the construction, but here too there is lack of clarity about what measure, in what amount, is to be taken up at what phase of construction. Successive EAC's have tried to hone the conditions into more specific, time-bound ones, but there is still a long way to go before a match takes place between what is expected by the MoEF and what the project authorities understand, or do.

3. ***Ignorance of conditions:*** Regional officers of the MoEF have often found that the project authorities on the site are ignorant of the environmental conditions imposed on their project. The clearance letters specifying these conditions have not reached the site; the northern regional office of MoEF reported that they had to personally deliver the clearance letters to each of 30 project sites, since the original letters from MoEF were nowhere to be found! Implementation of environmental measures in such circumstances is obviously out of the question, or likely to be severely delayed and inadequate.

4. ***Lack of expertise/resources/coordination:*** Project authorities, even where serious about implementing environmental measures, often lack the relevant expertise or experience, or the necessary resources. Severe problems exist in the level of coordination that is required for such measures. For instance, compensatory afforestation is to be undertaken by the Forest Department. Project authorities complain that the Department is uncooperative, stating that it has its own priorities; the Department on its part complains that release of funds by the project authorities is tardy, or that the provision of land by the revenue or other authorities for the afforestation takes a long time. Meeting time schedules is therefore impossible. There is little attempt by state governments to sort out these inter-departmental problems, a reflection of the low importance given by these governments to environmental aspects of development projects. Amongst the most difficult is catchment area treatment, as this involves having to coordinate and resolve differences between different government departments, several different districts and sometimes states, and private parties. Finally, there is little attempt to tap non-governmental expertise and resources, due both to bureaucratic hurdles and to sheer apathy or lack of imagination.

5. ***Unilateral changes in conditions:*** The EAC of which I was a member came across shocking cases where project authorities had unilaterally changed the conditions under which they were granted clearance, without even informing the MoEF! Such acts came to light only when the MoEF's regional officers started monitoring the project. The examples of Sharavathi Tail Race Project in Karnataka and Man Project in Madhya Pradesh, cited above, are illustrative. Such blatant distortions are fortunately not common, but even a few cases can be quite serious.

6. ***Impossible to compensate some losses:*** Even where full preventive and ameliorative measures are taken, there are some negative impacts of dams, which are impossible to prevent or compensate for. Once again, compensatory afforestation is an example: where the dam is submerging a good natural forest (as stated above, over 500,000 ha. of forests have been lost to dams over the last 3 decades), a plantation of a few species being grown in its place cannot really qualify as 'compensation'. The same can be said about the loss of a species of wild plant or animal (provided no rehabilitation measures are possible). It is not yet a part of the developmental ethos of India that, if such inevitable impacts are predicted, the dam's viability is itself questioned.

7. ***Corruption, inefficiency, and lack of motivation:*** The ubiquitous problems plaguing governmental functioning, such as corruption, inefficiency, and a lack of motivation, often undermine the implementation of environmental workplans and measures too.

Given the above factors, it is not surprising that in the overwhelming number of cases, fulfillment of environmental conditions is simply not satisfactory, and in many cases it is abysmal. Overall, less than half the compensatory afforestation that was to be done in the country has been carried out; siltation in a large number of reservoirs is far above the level anticipated during project planning, indicating that catchment treatment is not working (or, as in earlier projects, was not done at all); project sites continue to ravaged for workers' fuel and other needs; etc.

5. MONITORING, EVALUATION, AND REAPPRAISAL

The final steps in the sound planning and management of river valley projects are those of monitoring, evaluation, and reappraisal. After a project is given the green signal, relevant central and state government agencies have to monitor and evaluate whether the project authorities are complying with the various conditions imposed on them or not. In the process of monitoring and evaluation, if certain project parameters need reappraisal and revision to enable environmental conservation, these too must be enforced.

Our EAC assessed the state of monitoring and reappraisal of the dams cleared by the MoEF in the 1980s and 1990s. As stated above, the MoEF has regional offices, which are manned by scientists, and administrators who are assigned the task of monitoring every one of the developmental projects that are cleared by the MoEF. They regularly assess the progress with implementation of environmental conditions, and report back to the head office if irregularities are found. The MoEF is then supposed to take action to bring the erring project authorities to task. The most shocking fact that our EAC found was that, despite being told of the huge scale of defaulting was taking place, MoEF rarely took stringent action; indeed, on no occasion had it used its powers to halt construction and prosecute concerned officials even in cases of extreme violations of conditions.

It is evident that the substantial and often heroic efforts put in by the monitoring teams at MoEF's central and regional units were often undermined by a host of systemic faults. These include the following:

1. ***Lack of humanpower:*** Both the central and the regional offices of the MoEF, which are mandated to carry out monitoring, are substantially understaffed. A handful of staff has to handle literally dozens of cases at a given time. Field visits to verify the fulfillment of conditions are therefore few and far between --- at best once in six months; some projects get left out altogether. Queries from these offices to project authorities (or other relevant government agencies) are often not responded to, or given only vague responses. In the case of the Singur Irrigation Project, Andhra Pradesh, the Collector in charge of rehabilitation of people never responded to the regional office, so the latter had no basis to judge fulfillment of related conditions.
2. ***Lack of information:*** The general paucity of information that afflicts the planning process also affects monitoring. It starts with the shocking fact that apart from the clearance letter,

regional offices are not supplied with the detailed project documents by the MoEF. All such documents remain in the MoEF's Delhi office, so regional officers have very little information to base their monitoring on. Collecting further information, especially from uncooperative government agencies, can also be painfully slow and unproductive. The net result is that monitoring is often based on incomplete information, which makes its validity somewhat suspect.

3. ***Lack of support from central office:*** Weaknesses of information flow are only one aspect of the poor support that regional offices often get from their central office, or the feedback that the central office gets from the regional units. Another major shortcoming that several regional officers reported to us is that after they send in a report of violations to the central office, very often there is no response, or no positive action taken by the MoEF. Project authorities get emboldened by this, and are able to ignore regional offices even more. Demoralisation amongst the regional officials is a common result of such lack of central support.

4. ***No automatic withdrawal of clearance:*** It stands to reason that, in the case of conditional clearance, if the conditions are being consistently violated, the clearance should be withdrawn. There is however, no automatic withdrawal procedure; it is entirely up to the discretion of the MoEF whether clearance is revoked or some other action taken.

5. ***Inaction by central government:*** Though it has the mandate and power, the MoEF has almost never exercised its right to revoke clearance, or punish the offending project authorities and state government officials/agencies, in cases of violation of environment conditions. The few cases we came across where the MoEF had revoked clearance, were related to other violations or technical difficulties; but on environmental grounds, no project in the country had been stopped and the appropriate agencies punished. Considering the serious nature of some of the violations (e.g. pertaining to threatened species of wildlife, or to rehabilitation of people, or the unilateral changes made in the environmental conditions), such inaction by the MoEF is inexcusable. At most, warning letters have been sent by MoEF to erring agencies, including the threat to withdraw clearance and halt construction. Yet this power has never been used. Such inaction or weak action only encourages project authorities to continue behaving in an irresponsible way.

The Environmental Appraisal Committee of which I was a member recommended strong steps against erring state governments and project agencies (including central government agencies, if any). 10 projects with the gravest violations were singled out for immediate action, including revocation of clearance and halting the construction. Another list of projects, which required close monitoring in the immediate future, was drawn up. Some members also felt that each defaulting state government should be told that no further projects would be cleared till the backlog of environmental measures on the ongoing projects is plugged. There was also a strong feeling that concerned officials in the case of projects with repeated and serious violations, should be punished in some way.

Unfortunately, these recommendations, as far as I know (the EAC was reconstituted very soon after this, and I was not taken as a member for the new one, hence obtaining internal information has been hard in the last 2-3 years), have not been followed up in letter and spirit by the MoEF. Warnings have been issued to several project authorities and state governments, but no stern action, either in terms of revocation of clearance and halting of work, or in terms of punishment of the erring officials, appears to have been taken (I would stand corrected if any has in the last 2-3 years).

6. CONCLUSION: IS ENVIRONMENTAL SUSTAINABILITY POSSIBLE FOR LARGE DAMS?

Given the above situation, is it possible to make the process of river valley planning more environmentally sensitive and sustainable?

I believe that certain reforms are certainly possible within the given system. These include the following (many of which were recommended by the EAC to the MoEF in 1995):

1. More precise and comprehensive EIA guidelines;
2. Blacklisting of consultants known to distort EIAs to suit project authorities, and listing of credible agencies to whom independent EIAs could be commissioned with funds which are independent of the project;
3. Public hearings and other ways of involving the potentially affected populations in the environmental planning and decision-making;
4. Changes in the clearance letter format and contents, especially to introduce time-bound and more target-oriented conditions (and explanatory notes for these where necessary);
5. Strengthening of the central and regional units handling environmental clearances and monitoring, by provision of full information, increasing personnel, training in monitoring, etc.;
6. Formulation of guidelines for monitoring and evaluation by regional offices of MoEF;
7. Creation of panels of independent experts to help in assessment, monitoring, and evaluation, especially at state/regional levels;
8. Coordination of the clearance procedures under Forest Conservation Act and Environment Protection Act;
9. Automatic revocation of clearance if violations persist, with stoppage of construction until conditions are fulfilled.

While the above steps will go a certain way in making river valley projects more ecologically sensitive, there are still some fundamental reasons why such steps may never be taken, or why large dams may remain unviable from environmental points of view. Amongst these reasons are the following:

1. All public expenditure such as is made on a development project, should be made under public scrutiny. It is an inherent feature of large, centralised projects such as big dams, that this scrutiny is difficult or even impossible. Affected populations in a country like India are more often than not already disprivileged, and would find it rather tough to follow the highly technical details, which are part of an EIA process. All the problems of planning and implementation mentioned above are significantly greater in the case of a large project than a small one, and hence more difficult for the affected public or others to address.
2. As mentioned above, certain impacts of big dams are irreversible, and cannot be compensated for, often because of the sheer scale of the ecological intervention being made.
3. The information base on which to build an EIA, or a workplan, is very poor, and this will remain the situation in many project sites for a long time to come. Again, the scale of information required to make a sound decision about a big dam is much greater than that of

smaller projects, thus compounding the problem immensely. Local community information is almost irrelevant in the case of large-scale development projects, thus increasing reliance on outside, formal 'expert' knowledge

For these and other reasons, the day when environmentally sound planning and decision-making will take place with regard to big dams in India does not seem to be near. Were these projects relatively innocuous in terms of their environmental and social impacts, and overwhelmingly beneficial for human communities, one could argue that they should be allowed to carry on regardless, while attempts are made to improve their environmental performance. However, neither are big dams innocuous in their negative impacts, nor are their benefits so certain. And when it turns out that the negative impacts are often borne by either voiceless species and habitats, or by poor people, and that the benefits largely accrue to those already privileged in society (as is often the case), the justification for large dams becomes even shakier. And I suspect this is not just for India, but for much of the world.