EIA of the proposed midlands dam project: Mauritius

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ABSTRACT

The Midlands Dam project will, upon completion, constitute the largest reservoir in Mauritius, transferring water from a relatively wetter region to the drier northern districts. Four hundred and thirty eight hectares of predominantly forest/scrub land will be lost and about 250 squatter-residents will have to be relocated. In view of its wide ranging environmental impacts, both on-site and off-site, an impact assessment was prepared to enhance project acceptability and identify measures aimed at mitigating the negative impacts. The full EIA followed an earlier scoping exercise that identified the significant impacts. However, in the absence of reliable environmental baseline data, the assessment adopted a 'best professional judgment' approach. This paper highlights the main features of the project and the procedural context within which the EIA was prepared, and discusses some of the main issues that need to be addressed to improve the whole EIA process.

INTRODUCTION

The Midlands Dam project involves the construction of a 42 Mm3 reservoir in two phases (25 Mm^3 + 17 Mm^3) to enable the transfer of water from the relatively wetter central part of the country to the drier northern districts. As legislative requirements provide for the preparation of an environmental impact assessment for projects that may have adverse effects upon the environment, the proposed development was subjected to the statutory EIA process. The main objective was to provide for a formal mechanism to ensure that the proposed development is environmentally sound and sustainable and that the concerns of all affected parties were thoroughly addressed. It aimed at enhancing project acceptability by maximizing the benefits while minimizing adverse impacts. The process was also encouraged by aid donor agencies and countries as they are increasingly relying on ElAs to arrive at better informed decisions.

The reservoir project was initiated in response to the growing demand for water in the northern districts of the island. This region has in fact witnessed an above national average rate of urbanization over the past two decades and present water storage capacity needs to be increased to satisfy future

See Topic14

UNEP EIA Training Resource Manual

Strategic Environmental Assessment

water demand for residential, irrigation and industrial purposes. The dam will upon completion be the largest in Mauritius and will involve the construction of an embankment-type earth fill dam founded on natural ground, a spillway structure, an outlet canal, and a new road to replace those feeder roads that would be flooded. The project will also entail significant quarrying activities close by to provide for aggregates.

NATURE AND SCOPE OF ISSUES

The dam and reservoir sites involved represent little ecological interest, except as the last known natural habitat for an endemic plant, the *Crinum Mauritianum*, which has been the focus of research in cancer treatment. The sites also support the last few remaining natural populations of the rush (*Juncus Bulbosus*) in Mauritius. Water quality issues were, however, considered more significant taking into account national physical development planning proposals to allow urbanization of sections of the reservoir's catchment area. In terms of land conversion, the project was considered to be in line with government policy to convert land presently under tea to more profitable uses. Of the 438 hectares of land that would have to be flooded, 410 hectares are forest/scrub land. With adequate mitigatory measures, environmental protection policies would be largely satisfied. The most sensitive issue, however, related to the relocation of about 240 people, all squatters on an abandoned tea village that would be flooded. The off-site impacts were also considered to be significant enough to warrant investigation. Such impacts related to reduced water flows downstream, increased sewage volumes as a result of improved sanitary facilities, and increased agricultural production following increased availability of irrigation water.

PROCESS AND PROCEDURAL CONTEXT

After nearly two decades of unparalleled and sustained high rates of economic growth, there has been growing concern that the fragile environment of the island may have been severely degraded and that, if corrective actions are not introduced immediately, future economic development may be jeopardized. In the late eighties, the Government adopted an environmental action plan thereby committing itself to sustainable development. Such commitment was further stressed at international meetings and by actively participating in a number of international programmes. The Government's aims are, specifically, to:

- increase efforts to mitigate the adverse effects of environmental degradation;
- monitor environmental performance of industries, commercial concerns and the agricultural sector; take strong and pro-active action on emerging environmental issues facing the nation;

- build partnerships with community groups, non-governmental organizations, business and industries; and
- facilitate public awareness and provide educational opportunities for people to learn about conservation and sustainable human development.

The enactment of the Environment Protection Act (EPA) in 1991 was another milestone in the country's effort towards sustainable development. In line with provisions contained in Section 13 of the Act (as amended in 1993), ElAs are therefore being increasingly introduced into the national decision-making process and are basically aimed at alerting the decision-makers to the consequences of the proposed development for the environment. The process is also applied with regard to more vigorous policies enunciated by international funding agencies and aid donor countries who want to ensure that development projects they are funding do not conflict with local environmental protection objectives. This follows Principle 2 of the Rio Declaration on Environment and Development which stresses the responsibility of nations to avoid causing damage to the environments of other nations.

The impact assessment carried out in connection with the project under reference is furthermore structured along several internationally accepted principles which emphasize preventive, holistic, strategic approaches to environmental protection. It is thus guided basically by four principles laid down in the EU Programmes on the environment, namely:

- prevention is better than remedial measures;
- environmental damage should be rectified at the source;
- the polluter should pay the cost of measures taken to protect the environment; and
- environmental policies should form a component of other policies.

EC Directive 85/337 contains information on the methods used in environmental impact assessment. The guidelines laid down by the World Bank have also been extensively utilized to determine the significance of potential impacts of development projects. Finally the principles laid down by local regulations have been adhered to.

APPROACH TAKEN

The impact assessment followed a scoping stage undertaken by a different consultant. Though the findings of the scoping team enabled the EIA team to focus their attention on a certain number of issues, GIBB Environmental (UK) decided to carry out a full project screening exercise. Sessions were arranged with almost all interested parties, which included government departments, NGOs, individual scientists and other consulting firms. A report summarizing the meetings and the findings was produced and

circulated among a restricted group of interested parties. Once the Consultant was certain that no significant element was missing, the full EIA was prepared and a draft report produced. The Client was required to submit comments and once feedback was obtained, the report was finalized. As required by law, the final report was submitted to the Department of the Environment for approval. This process included a 21-day public consultation and comment period.

In preparing the report, the Consultant made use of a couple of local consulting firms. This is in line with recommendations of organizations like the World Bank which try to encourage greater participation of local expertise in major projects with a view to enhancing local capabilities. Other foreign teams were pulled in to constitute a multi-disciplinary team with varying experience and skills. As Mauritius does not have an established and easily accessible environmental base line data bank, the approach adopted was based on the 'best professional judgment' methodology. Such an approach makes the best use of each team member's experience and develops appropriate mitigatory measures to reduce any potentially significant impacts on the environment.

The project does not seem to have generated much controversy and approval was fairly easy to secure. More interestingly, somehow dams and reservoirs are not included in the scheduled list of undertakings requiring full fledged ElAs when the necessary legislation was prepared. Technically this project should not have gone through the EIA process and the Department of Environment was therefore rather confused in dealing with the report. It nevertheless decided to pass the report given that the funding agencies were expecting such an approval before giving their final OK.

RESULTS AND IMPLICATIONS

The EIA study concluded that the project was not in serious conflict with any major national physical or environmental protection policy. The on-site or off-site impacts identified were of varying significance and these could be adequately mitigated to reduce any threat to the environment. The three main areas of potential conflict that were identified are: protection of agricultural land against threat from other uses, protection of vulnerable habitats and rare species, and national physical planning policies that provide for urbanization of sections of the proposed catchment area of the reservoir.

The environmental management plan developed in the assessment specifically called for greater coordination among interested parties to try to monitor certain impacts. Deeper investigation was required to determine how the plant species that has an international importance and that is threatened can best be protected. The report assumes that the plant can be transferred to identical sites elsewhere and returned to the original site once the project is completed. But there is a chance that this procedure fails, in

which case the whole reservoir project may be jeopardized. This issue was not dealt with at the EIA stage and it appears that it was conveniently assumed that the plant can be easily propagated.

This is typical of many ElAs prepared worldwide. In fact, many surveys have gathered evidence to show that a large majority of environmental assessments are unsatisfactory. There are numerous explanations for this, but the main argument relies on the premise that the environment is so complex that it is virtually impossible to predict all the impacts of a project. Impacts, in fact, have four main characteristics: they can be on-site (affecting the site where they are generated), off-site (affecting sites away from source), intertemporal (manifesting themselves at a future time) or be a combination of all three. The paucity of data complicates matters and in the absence of reliable data on a number of environmental issues, it is difficult to use most of the methodologies developed so far in environmental impact assessment studies. Of all the environmental impact assessment methods developed so far, the matrix remains the most effective way of determining the significance of the impacts a project may have on the physical and socioeconomic environment.

The analysis of impacts is made with the help of a matrix including on one axis the actions which cause environmental impact and on the other existing environmental conditions that might be affected. This provides a format for comprehensive review to remind the investigators of the variety of interactions that might be involved. It also helps in the identification of alternatives which might lessen impact. Two aspects of each action come into play:

- the magnitude (degree, intensiveness, or scale) of the impact upon specific sectors of the environment; and
- the significance (weight) of the particular action on the environmental factor under analysis.

While the magnitude of an impact can be evaluated on the basis of facts, evaluation of the significance of impact will be based more on value judgments.

Assessments based on matrices therefore remain at best very subjective. In fact, significance has to be determined against accepted norms and standards. This implies the definition of a threshold, which unfortunately in Mauritius is yet to be precisely determined.

Furthermore the EIA relies on coordination and comprehensive decision making styles for its success. But one has to bear in mind that comprehensive decision-making is faced with two main sets of impediments: one is made up of constraints imposed by existing institutions and attitudes, while the second concerns limits imposed by the way decisions are made in both the government and private sectors. Current institutional biases and thinking run counter to principles of comprehensive

decision-making. Integrated environmental management is a multi-disciplinary exercise requiring inputs from a whole range of departments and experts.

Expertise means narrow and specialized expertise. A multi-disciplinary team of experts does not, therefore necessarily provide a comprehensive view of an issue. Only a few persons, by training, experience and predilection can engage and promote comprehensive environmental decision-making. The other problems concern the fragmented way in which individual policies evolve. Incremental decision making is considered a more pragmatic approach because of no clear evidence of man's capability for objective rationality. Problems are dealt with one at a time, through trial and error. Other government agencies/departments/ministries are trying hard to retain their independence to make individual decisions.

LESSONS LEARNED

The whole EIA process with the scoping exercise has proven to be rather inadequate in dealing with broader environmental management issues. The introduction of strategic impact assessment in the process would go a long way to providing the appropriate framework for project-specific assessments to be carried out. Issues related to cumulative effects, greenhouse policies and sustainable development are probably better addressed at the SEA level. The project-specific EIA is also unable to deal with matters such as the cumulative effects of a number of projects of different types. Since the inter-temporal nature of impacts is difficult to comprehend within the EIA of a single project, the introduction of regional environmental plans (REPs) can significantly contribute towards a better coordinated action in environmental management of a region. Such a REP process can also help establish a solid data base by coordinating the collection, storage and the dissemination of data, the paucity of which hinders the proper assessment of impacts due to the absence of an adequate environmental baseline.

Furthermore the local consultants should be more involved in the development of the methodology and the assessment of impacts as a whole. As it is, local expertise is used in marginal tasks only (as in data collection). Such an involvement does not contribute towards local capability development and this is contrary to accepted international principles.

LIST OF RELEVANT PUBLISHED PAPERS OR OTHER SOURCE MATERIALS

The Environment Protection Act (and its amendment of 1993).

Ministry of Environment & Quality of Life, 1992, The State of the Environment Report submitted to the Rio Earth Summit 1991.

Ministry of Energy, Water Resources, Postal Services, Scientific Research and Technology, 1995, Environmental Impact Assessment of the Proposed Midlands Dam Project – Final Report.

Ministry of Housing, Lands and Town & Country Planning, 1994, The National Physical Development Plan.

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