

CHAPTER 17

ENVIRONMENTAL MONITORING PROGRAMME

17.1 THE NEED

Monitoring is an essential component for sustainability of any water resources project. Monitoring of environmental indicators signal potential problems and facilitate timely prompt implementation of effective remedial measures. It is an integral part of any environmental assessment process. Monitoring becomes essential to ensure that the mitigation measures planned for environmental protection function effectively during the entire period of project operation. It will also allow for validation of the assumption and assessments made in the present study. Any water resources development project introduces complex inter-relationships in the project area between people, various natural resources, biota and the many developing forces. Thus, a new environment is created. It is very difficult to predict with complete certainty the exact post-project environmental scenario. Hence, monitoring of critical parameters is essential in the post-project phase. The data so generated can serve as a data bank for prediction of post project scenarios in similar projects.

17.2 ENVIRONMENTAL MONITORING CELL

An Environmental Monitoring Cell (EMC) will be formed in order to assess and review the progress of the various mitigation measures suggested in the Environmental Management Plan. The committee will consist of representatives of MoEF, experts from the concerned State Government Departments, representatives of project affected families/villages, local NGOs and NHPC. The committee will sit at predetermined intervals for verifying progress and reporting the same. The project authority shall depute a Senior Officer to coordinate with the monitoring committee.

17.2.1 Monitoring Mechanism

The project authority will engage neutral agency or organization for supervision and monitoring of the environmental management components as discussed below. The project authority will also depute a full time Sr. Officer to

look and co-ordinate the progress of the environmental management activities. The independent supervising agency will work closely with the project environmental cell and will carry out necessary laboratory analysis, collection of data's and information regarding the progress and will prepare the progress report in every two months and will present to the Monitoring Committee through the environmental cell. For any major comments or obstacles the independent agency may call a meeting where representatives from independent agency, project authority and environmental committee will be present and any issue may be discussed in the meeting. The major progress report will be with respect to:

- Progress of Catchment Area Treatment works, fish management etc.
- Status of protection measures, sausage / gabion walls etc. at the dumping and quarry sites.
- Whether dumping is done so as to avoid spillage of muck into the river, especially during rains.
- Levelling and slope stabilization works at dumping sites.
- Status of afforestation / turfing works on the dumping/quarry sites.

17.3 AREAS OF CONCERN

Based on the findings of the Environmental Impact Assessment study in various Environmental Management Plan the important parameter viz. Catchments Area Treatment, Biodiversity Conservation & Management, Public Health Delivery System, Fish Management, Restoration of Dumping Sites, Quarry areas, Landscaping and Restoration of Construction Area, Green Belt Development etc. have been proposed.

17.3.1 Catchment Area Treatment

The monitoring team has to keep in track about the progress of the various biological and engineering schemes suggested for the Catchment Area Treatment especially in the Directly Drainage Area. The physical target and quality wise completion of the various task has to be ensured by the monitoring team.

17.3.2 Water Quality

The surface water quality of the proposed reservoir and river Dibang should be monitored twice a year (one in a pre-monsoon and another in a post-monsoon season). The proposed parameters to be monitored are as follows:

Electrical Conductivity	Magnesium
Turbidity	COD
pH	Hardness
TDS	Temperature
Chlorides	Iron
Sulphates	Manganese
Total hardness	Fluorides
Phosphates	Nitrates
DO	Calcium
BOD	

The sampling sites shall be:

- 1 km upstream of the dam site.
- Reservoir water.
- 1, 3 and 5 km downstream of the confluence of the tail race discharge.

About 6 samples need to be analysed. At a rate of Rs.8,000 per sample, the total cost of analysis will be Rs. 96,000/- per year (6 samples x 2 x 8000). Therefore, an amount of Rs. **7.68 lakhs** is earmarked for this component for 8 years. This analysis shall be done up to the commissioning of the project. The analysis work can be conducted by internally or by reputed external agency or by recognized state pollution control authority.

17.3.3 Air & Noise Quality

Air Quality will also be monitored by the cell in terms of SPM, SO_x and NO_x quarterly so that degradation of ambient air quality if any is brought into notice in a particular period. This monitoring may be done half yearly on 24 hour basis during the construction period. The monitoring has to be carried out in three prominent places within the project site during the construction stage only as at operation stage there will not be much of dust emitting activities. A

total of Rs. **4,32,000/-** (Rs. 9000 X 6 sampling per year X 8 year). For monitoring of noise, a lumpsum provision of Rs. 60,000/- has been kept for procuring the noise meter.

17.3.4 Ecology

Status of afforestation programmes, changes in migration patterns of the aquatic and terrestrial fauna species soil erosion rates, slope stability of embankment, etc. should be studied. The study could be undertaken with a frequency of every 5 years till the commissioning of the project. The monitoring of ecological parameters will be done by the EMC till the satisfactory completion/implementation of various environmental management plans. After project commissioning/completion of the EMPs the responsibility of the monitoring and maintenance of the plans will lie with the State Government. However, a provision of in-house Impact Assessment studies to evaluate the environmental and social changes during pre- and post commissioning stages of the project (after every 5 years) is required to be kept by project authority.

A provision of Rs.12 lakhs in every five years can be kept. Therefore, a total of **24 lakhs** (Rs. 12 lakh x 2) will be earmarked for this component.

17.3.5 Public Health Delivery System

Identification of water-related diseases, sites, adequacy of local vector control and curative measures, status of public health are some of the parameters which should be closely monitored twice a year with the help of data maintained in the government dispensaries/hospitals. An expenditure of Rs. 3 lakhs may be earmarked for the same.

17.3.6 Fisheries

Monitoring of fish diversity/composition will be done by the EMC at frequency of once in 5 years. For this an amount of Rs. 8 lakhs shall be earmarked.

17.3.7 Rehabilitation & Resettlement

The process of rehabilitation and resettlement (R & R) has two distinct

components, viz., Resettlement and Rehabilitation. The resettlement package broadly includes assistance to PAFs for shifting to new sites and providing essential civic amenities and services. On the other Hand, the rehabilitation package is conceptualized around a development strategy with long-term perspective. The staff at the proposed unit of the Environmental Management Cell (EMC) can undertake the work of R& R. The basic thrust of this strategy is to bring about a socio – economic transformation of the PAFs so as to improve the quality of their life.

17.3.8 Dumping Site

Excavated material from other activities during dam construction, like power tunnel construction and road building, will also be relocated at the downstream dumping site. Necessary care should be taken by the contractors to avoid any flushing down of the excavated material in the river during monsoon, as it may significantly bring down changes in the aquatic ecosystem of the river and lead to destruction of habitats of aquatic flora and fauna including fish. The monitoring cell should monitor the proper restoration works of the quarry areas. In addition to above following parameters will also be monitored by the EMC:

- Status of protection measures, sausage/gabion walls etc. at the dumping and quarry sites.
- Levelling and slope stabilization works at dumping sites.
- Status of afforestation / turfing on the dumping/quarry sites.

17.3.9 Environmental Studies

An amount of Rs. 15 lakhs will be earmarked for in-house impact assessment studies or any other environmental studies required to evaluate the environmental and social changes during pre and post commission stages of the project.

17.4 COST IMPLICATIONS

<u>Parameters</u>		<u>Amount (Rs. Lakhs)</u>
Water Quality Monitoring	=	7.68
Air & Noise Quality Monitoring	=	4.92
Ecology	=	24.00
Public Health Delivery	=	3.00
Fish Management	=	8.00
Environmental Studies	=	30.00
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Total	=	77.60
		Say, 78.00
