

## CHAPTER 2

# METHODOLOGY

### 2.1 APPROACH

The study was initiated after signing the contract with NHPC. The study team of National Productivity Council interacted with the officials of NHPC to understand the basic features of the project and requirement of the study.

The initiation phase of the study is composed of literature survey and secondary data collection. The study team of National Productivity Council collected the data pertaining to the project area, which covers the catchment area and submergence area. The overall methodology of the study is composed of

- a) Pilot Survey
- b) Detail Survey

#### 2.1.1 Pilot Survey

As it is required to demarcate the catchment area and the submergence area, the demarcation is made with the help of SOI toposheets.

After analysis of the information collected the study team could get overall idea with respect to the project area, pertaining to aspects like flora, fauna, land use pattern, endangered species, seismicity, geology, meteorology and socio-economic status etc.

#### 2.1.2 Detail Survey

From the pilot survey the basic data requirement for the EIA study was assessed by doing the gap analysis. After enumerating all the information required, the actual detail survey was planned and carried out accordingly.

In the EIA study, baseline survey, based on the scoping matrix data on various aspects, were done to understand the environmental setting of the

proposed project site. The various parameters were classified into physical resources, ecology, human resources and quality of life values.

For environmentally sound water resources development, special attention needs to be given to ensure that to the extent possible, the proposed development does not foreclose other options for sustainable development. The final decision to proceed with the proposed project or to abandon the project would generally depend on a variety of factors like cost-benefit ratio, environmental assessment, and socio-political acceptability. The perceptions and value judgments of the decision-makers play an important part in the final selection of a specific alternative.

## **2.2 SUGGESTION OF ENVIRONMENTAL MANAGEMENT PLAN**

Based upon the baseline survey and subsequent impact prediction for various environmental components as discussed in EIA study suitable environmental mitigation measures are suggested as discussed below -

### **2.2.1 Catchment Area Treatment**

Considering topographic factors, soil type, climate, land use / land cover in the catchment area, various biological methods like the afforestation and engineering methods like brushwood check dams, loose boulder check dams, silt retention dams, contour bunding, gabion structure etc. is identified for rehabilitation of the degraded areas and control of soil & water conservation. Sub-watershed wise treatment measures are suggested based upon the stream drainage pattern, extent of forest cover, accessibility of the area, land use, soil profile and slope.

### **2.2.2 Biodiversity Conservation and Management Plan**

Management plan is suggested for protection of biological environment either in the terrestrial or in aquatic eco-system that may be affected by way of dam construction and its related activities like road construction, blasting for tunnel and power house, impounding of water in the reservoir, human population pressure, as identified in EIA. The plan includes rehabilitation plan and its financial involvement for rare and endangered species of flora & fauna (which

will be affected by submergence and construction activities).

### **2.2.3 Fish Management**

As a result of impoundment of rivers by dams the physical structure of riverbeds may change, physicochemical environment may get impacted, upstream - down stream linkages may get cut. In this plan various measures for management of fish species are suggested.

### **2.2.4 Green Belt Development**

Action Plan to create green belt around the reservoir periphery and direct drainage areas is formulated after identification of green belt requirement.

### **2.2.5 Geo Environmental Management Plan**

In order to ensure the safety and sustainable maintenance of the project, Geo-environmental management plan is evolved based upon detailed study of the project sites and the catchment area. In this plan various measures are suggested for control of landslides.

### **2.2.6 Muck Disposal Plan**

In this plan quantity of muck generated during the dam construction and allied activities is estimated and measures for its proper disposal at certain identified areas are suggested.

### **2.2.7 Restoration Plan for Quarry Areas**

In this plan restoration of various quarry sites by means of plantation, turfing and retention wall is drawn up.

### **2.2.8 Landscaping and Restoration of Construction Area**

As a part of various project related activities it is also proposed to develop nature parks, Children parks, gardens, and other recreation facilities near the project area once the construction activities of the project are over. During the construction of main features like Dam, Tunnels, Power House and other building structures of the project including residential and project roads, various slopes may be disturbed which require to be stabilized using bio-

engineering measures like benching and terracing and plantation of grasses, herbs, shrubs and trees.

### **2.2.9 Public Health Delivery System**

The identified possible health threat due to dam construction and other peripheral activities as identified in the EIA study were analysed and suitable measures are suggested for mitigating the threats. Recommendations for regular health check-up and programme for checking endemic disease is also suggested. Suggestion for health facilities and infrastructure is made and cost estimation for the same also is given.

### **2.2.10 Solid Waste Management and Sanitation Facilities**

Quantity of solid waste to be generated from the proposed project is estimated and the possible impacts from the solid waste generation are assessed in EIA study. Accordingly suitable mitigations measures are suggested in the EMP for the solid waste management. In this plan measures for sanitation of the project area are also suggested.

### **2.2.11 Energy Conservation Management Plan**

The possible pressure on the forest due to labour force in the near vicinity of the project is assessed in the EIA baseline study and suitable measures for preventing forest cutting and falling are suggested in the Energy Management Plan. Alternate fuel facilities also are suggested for the laborers who will be working in the project.

### **2.2.12 Resettlement and Rehabilitation Plan**

In this plan various measures for resettlement and rehabilitation for affected population due to project construction are suggested. Various schemes for their development are also provided.

### **2.2.13 Disaster Management Plan**

Modeling of Dam Break under different conditions is carried out for preparation of inundation map and assessment of risk to community at the down stream under different conditions. Subsequently a disaster management

plan for the potential inundation areas under habitation will be suggested.

Emergency action plan call for the assessment of following items:

1. Evaluation of the disaster, like advance knowledge of the likely occurrence of flood due to dam break
2. To identify the likely effects on life and property
3. Vulnerability analysis and hazard area mapping to identify the most common area prone to such disaster.
4. Indicate clearly the areas where the flood velocities are likely to be high.

#### **2.2.14 Maintenance of Air, Water and Noise Quality**

Due to project construction activities air, water and noise environment of project area may get disturbed. In this plan various measures for maintenance of air, water and noise quality are suggested.

#### **2.2.15 Environmental Monitoring Programme**

A post–project Environmental Monitoring Programme for critical parameters has been suggested as a part of the EIA study. The staff and equipment necessary for the implementation of this Programme and their estimated costs have also been indicated.

#### **2.2.16 Estimation of Financial Outlay with Year Wise Physical & Financial Targets for the Suggested Action Plan**

Estimation of the year wise financial outlay for the proposed activities and identification of the year wise physical targets for each component is also made.