

## **CHAPTER4 : Methodology**

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The environmental assessment in this project employed an iterative approach in which potential environmental issues have been examined in successive levels of detail and specificity at each step in the process. This chapter presents the methodology adopted for the EIA preparation for the MSRP II. This also describes, as a natural corollary, the mainstreaming of the environmental considerations in this project. Methodology for assessment of social impacts is dealt with in the R&IPDP.

### **4.1 ENVIRONMENTAL CONSIDERATIONS INCORPORATED IN THE STUDY**

The Environmental Screening of the project area of Mizoram State Roads Project was conducted to assess the magnitude of impacts due to the project and to ensure that environmental considerations are given adequate weight in the selection and design of proposed road improvements.

In order to achieve the objectives, the process began with the collection of primary and secondary data on existing environment, along with past trends on environmental quality. Sampling for air, water and noise quality was conducted along the priority route through the Mizoram Pollution Control Board for the project corridor. Consultations were carried out with affected people as well as other stakeholders.

Evaluation of the expected positive and negative impacts without mitigation measures revealed that roads to be taken up for upgradation have real negative impacts and mitigation measures are required. Along the roads to be taken up under maintenance work, impact is envisaged to be minor and limited to construction activity of the project roads only. It indicated that there would be no need for detailed EIA for the maintenance component.

### **4.2 ENVIRONMENTAL IMPACT ASSESSMENT**

The Environmental Impact Assessment (EIA) was prepared in accordance with the ToR, MOEF guidelines and requirements of the World Bank.

The Environmental Assessment process involves two key stages namely scoping & assessment. The purpose of scoping and assessment is to determine the potential magnitude

of impacts in order to suggest suitable measures to mitigate negative impacts and enhance positive impacts. The methodology followed and steps involved are outlined below.

#### 4.2.1 SCOPING

The temporal and spatial boundaries of the project were delineated as part of the exercise. The impacts were analysed for both the direct area in influence indirect area of influence of seven kilometres as per MoEF guidelines. The scope of the assessment for this study was determined by the Terms of Reference of the Consultants, the statutory requirements for the area of influence required by the Ministry of Environment & Forests and consultations with experts. World Bank Operational Procedures and guidelines, MOEF guidelines etc. were reviewed to carry out the EIA.

It is anticipated that since maintenance will be a much less intrusive activity, the impacts will be limited to the construction period and that too within the confined area adjacent to the project road only.

#### 4.2.2 ASSEMBLY AND ANALYSIS OF DATA

Relevant literature i.e. information on wildlife, biodiversity, flora, geology, geomorphology, pollution etc. pertaining to the project, were studied and reviewed.

Information has been collected by physical site assessment of the proposed alignment during the Environmental inspection. The data for land use, forest type, geology and other significant features along the full length of the alignment was collected on standard formats. Individual components of the biophysical environment were inventoried as described below:

- **Air** - In order to evaluate air quality and to design appropriate air pollution mitigation measures, ambient air quality data was collected along the upgradation corridor through the Mizoram Pollution Control Board.
- **Noise** – Noise levels along the upgradation corridor were monitored at five locations using a portable noise meter. Various land-uses were covered to establish the noise levels before the beginning of the project.
- **Water** – Water samples were collected from stagnant and flowing water bodies along the corridor to assess the present water quality. Tests for physico-chemical and biological characteristics were carried out and the results have been recorded to establish baseline conditions.

- **Bio-diversity** – A biodiversity assessment has been carried out with the help of experts well acquainted with the region.
- **Geomorphology** – A detailed geomorphological assessment has been carried out along the route to identify vulnerable locations and inventory weak zones before proceeding with the cutting for the proposed widening.

Standard statistical techniques were used for analysis of the socio-economic data, the tree count, etc. Qualitative analysis was preferred for more descriptive data.

#### **4.2.3 ANALYSIS OF ALTERNATIVES**

After analysing the data, different alternatives of design were considered to reduce the impact on environment. The alternatives considered are, with and without project, route options and widening options.

#### **4.2.4 ASSESSMENT OF POTENTIAL IMPACTS**

- The following environmental issues have been assessed to fully describe the potential impacts that may result from road construction. The assessment of impacts was carried out for all the three stages: design, construction and operation. Quantification has been difficult in light of the limited availability of data. However, magnitude of the impacts has been put into the proper perspective in most cases.

#### **4.2.5 INTEGRATION OF ENVIRONMENTAL ASSESSMENTS IN THE DESIGN PROCESS: “MAINSTREAMING THE ENVIRONMENTAL COMPONENT”**

The design and decision-making process integrated environmental, resettlement and rehabilitation issues and prompted the early identification of appropriate actions. Such actions included, for example, shifts in alignments based on awareness of the locations of community and biological resources.

#### **4.2.6 MITIGATION & ENVIRONMENTAL ENHANCEMENT MEASURES**

Measures have been formulated against the more severe of potential impacts and cover critical construction stage impacts such as natural drainage, landslides and slope protection measures, soil protection measures, water availability for construction, suitability of locations in hilly areas for contractor’s/workers camps, water harvesting structures with feasibility at

locations identified, construction plant and machinery locations and locations for disposal of debris / surplus excavated material as well as road safety measures.

#### **4.2.7 COMMUNITY CONSULTATIONS**

Public consultation has been taken up as an integral part of the social and environmental assessment process at various stages of the project. Initial consultations on important environmental issues i.e. sensitive features, impacts and remedial action with the stakeholders such as Govt. officials, Ministry, community representatives and local residents were carried out to improve EIA's relevance. It helped to identify the locally relevant issues. Further consultations were carried out at village level also to identify location specific issues under a designed format.

#### **4.2.8 PREPARATION OF THE ENVIRONMENTAL MANAGEMENT PLANS**

All proposed mitigation and monitoring measures during and after construction and operation phases have been worked out. The Environmental Management Plan (EMP) covers implementation of measures with costs, implementation responsibility and supervision responsibilities for all mitigation and monitoring measures worked out.

Monitoring plans for compliance at various construction stage and operation stage activities have been prepared. This will help in implementing the recommended mitigation measures and aid in taking necessary remedial steps to keep pollution levels in check.

Environmental and Social Management Plan (ESMP) was prepared for environmental protection works and manage