TERMS OF REFERENCE (TOR)
FOR
ENVIRONMENTAL IMPACT ASSESSMENT STUDY
OF HIDISING IRRIGATION PROJECT

The Environmental Impact Assessment document for Hidisingh Irrigation Project will comprise of the following study details and related environmental aspects; in conformity with the prescribed generic structure.( Appendix III/ MOEF Notification 14th September 2006)

1.0 INTRODUCTION:
The introduction chapter will comprise
• Project Background
• Objective of the project
• Environmental concerns
• Potential impacts that may change the environment due to construction of the project.
• Strategy of Govt. for project implementation.

1.1 SCOPE:
• Purpose of the EIA Study.
• Brief description of the nature, size and location of the project and its importance to the region / locality of the district.
• Identification of the project and project proponents.
• Status of statutory clearances
• Scope of study as per regulatory scoping criteria – EIA requirements.

1.2 PROJECT DESCRIPTION:
• Summary description of the project site based on the Feasibility Report (DPR).
• Provide location details through maps showing general location – specific location & project boundary.
• Based on study of Hydrology, Geology, Irrigation Demand, Cropping Pattern and related benefits supported by Maps /drawings/Schematic presentations.
• Alternatives considered for selection of site.
• Necessity of the project according to environmental sustainability related to pre & post project scenario.
• Assessment of land required for various project components i.e. land coming under projected submergence, construction of head works,
structures, water conveyance system canal and distribution system, staff colony and R&R colony etc.

2.0 DESCRIPTION OF ENVIRONMENT:

2.1 Existing environment of the proposed project:
- Description of the study area falling within 10 km radius of the project components.

2.2 Identification of environmentally sensitive areas:
Such study would include;
- Areas protected under International conventions / National / Local legislation for their landscape having ecological importance and cultural heritage.
- Existence of wet lands, forests, mountains, water bodies.
- Sensitive manmade land uses – Highly polluting sources / locations.
- Ecology at project site - Study comprising of existing species of Flora, Fauna & wild life, existence of rare and endangered species – wildlife corridors etc.

2.3 Policy, legal and administrative framework:
The Environmental Impact Assessment (EIA) study will be undertaken in a manner that the project will ensure compliance of prescribed environmental standards and social requirements conforming to the country’s legislative and administrative framework including the relevant policy guidelines of the state.

2.4 Methodology for EIA Study:
The methodology for environmental assessment, prediction of impact, mitigation measures against all adverse impacts and management plan etc. shall confirm to the relevant provision and guidelines prescribed by the Ministry of Environment, Forests and Climate Change (MoEF&CC) in their Environmental Notification, dated 14th September 2006 and its subsequent amendments. It would also ensure compliance to relevant provisions of LARR Act 2013 and state LARR policy 2015 read with subsequent amendments.

Based on the above principles, the Methodology of EIA study will broadly comprise the following procedures;

i) Conduct environmental baseline survey of the project for the existing environmental components and collection of primary data.

ii) Study of the existing land use – land cover soil type and drainage pattern etc. through satellite imagery maps.

iii) To mention methodology to be adopted and Agencies/ Instruments to be used for analysis of Soil, Air, Water & Noise etc.

iv) To conduct broad survey of the existing ecology at project site in terms of Flora, Fauna and Wildlife in the forest as well as aquatic species etc and to identify rare and endangered species, if any.
v) The collection of environmental data and information shall pertain to one season survey of the project components, preferably during the Non-monsoon season.

vi) To obtain detail information/data for the area under submergence, population affected, demographic profile of the affected families including extent of various losses etc. required for preparation of a R&R plan.

vii) Identification / prediction of Potential Impacts shall be carried out by using appropriate environmental matrices.

viii) Analysis of environmental data and likely alternatives for adverse impacts shall be done according to acceptable standards. An Environmental Management Plan (EMP) shall be prepared comprising of Mitigation measures & environmental safeguard measures.

ix) An environmental cost estimate shall be prepared for various project components compared to Budgetary provisions.

x) A competent environmental monitoring programme will be charted out to look after the effectiveness of mitigation measures and implementation of management plant, during the construction period as well as during the project operation.

2.5 APPROACH FOR EIA STUDY:
- Establishment of Baseline for valued environmental components by using baseline survey Data, Project records and secondary source information.
- Relevant maps showing environmental components, ie. Index Map, Location Map, Drainage Map & other Maps.

3.0 Environmental base line study:
The foremost approach for EIA assessment, deals with the Baseline study of the existing environment. These are briefed under Land Environment, Air Environment, Water Environment, Biological Environment and social Environment.

3.1 Methodology for Data collection:
- One season (Non-monsoon) Baseline survey will be carried out for Data collection.
- Sampling locations will be indicated in the Location map.
- Testing methods –methodology- instruments used shall be mentioned.

[A] Land Environment:
(i) Land for the Project:
The study of ‘land environment’ includes the survey of the land, connected to various project components i.e. land under submergence, project head works, and command area and colony locations. The study would include the following aspects;
• General physiography, Geology and Hydrogeology at site.
• Seismicity / Frequency of earth quakes, if any.
• Existing Land use and land cover pattern
• Explore presence of economically important mineral deposits, if any.
• Soil characteristics and determination of soil quality (physical and physico-chemical properties)
• One Season (Non monsoon) data would be used.
• Description of monuments of Archaeological and historical importance in the study area which may be influenced by the project.
• To locate areas which are prone to erosion and land slide around the reservoir periphery.
• To locate environmentally sensitive areas if exists within the Buffer zone i.e. areas protected under national convention or local legislation, state boundary, defense installations, water resources projects and major industries having high pollution load.

(ii) Climatic conditions:
Study will be undertaken to assess the existing climatic conditions which would include collection of Rainfall data and other meteorological information like temperature, cloud cover, relative humidity, wind speed and wind direction etc.

Information from credible secondary sources and IMD data will be utilized.

[B] Air Environment

(1) Air Quality / Noise level:
• Field level survey will be undertaken through Recognized Organization to determine ambient air quality and noise level, at strategic locations with mention of Instruments used, method & Frequency etc.

• Results of such study conforming to one season data will be documented with analytical interpretations with reference to CPCB/SPCB standards.

[C] Water Environment:
The study of water environment would contain information on the following aspects.

Surface water:

(i) Study of the river Basin, would include
• Study of basin characteristics, watershed erosion (control & conservation) measures & Riverine behaviour etc.
• Drainage pattern in the catchment and command Area.
• River Hydrology
• Frequency of floods and sedimentation criteria.
(ii) **Surface Water Quality:**
- Sampling of water will be done at strategic locations in the study area.
- One season sampling during non-monsoon period will be carried out.
- Water quality tests would include physical, chemical and bacteriological parameters.

(iii) **Competing water use:**
- Competing water use of the river flow, @10km downstream of the Dam will be assessed. This would also include identification of streams joining the river downstream of the project with relevant information on nature of flow quantity and approximate confluencing distances etc.
- Assessment of Riparian water requirement

**Ground Water:**
- Existing status of ground water table in and around the project area will be studied through site survey & local enquiry. For this purpose pre monsoon & post monsoon depth of water level data will be collected.
- Pre-project ground water quality will be assessed through one season sampling and laboratory testing.

[D] **Biological Environment:**
Study of ecology around the project location will be undertaken to prevent loss of threat categories of flora & fauna.

**Forest species - ‘Flora’**
- To conduct field survey and Consult Records of Forest Department to identify existent species of flora i.e. Trees, Herbs, Shrubs and climbers etc. and suggest appropriate measures to restore biological diversity.
- Threat categories, Rare and endangered species of flora / endemic species, medicinal plant species etc will be indicated along with suggestions for their conservation.

**Forest species – ‘Fauna’**
- The data on Forest species of Fauna will be listed out as per Forest Records Wildlife Warden of the state will be consulted for conservation measures in regard of Schedule-I species.
- Migratory route of wild animals (if any) as well as their migration pattern shall be mentioned,(Literature consultation)
- Existence of eco sensitive areas like National Park; wildlife sanctuary and Biosphere reserve etc. in the study area shall be identified and location shown in the Map with mention of areal distance from the project site.

**Aquatic Species:**
- The study will encompass identification of common type of aquatic species (Fish species) as well as existence of rare species (if any) in the reverine eco - system.
[E] Social Environment:

(i) Due to Reservoir Submergence:
Collection of Baseline data on Human settlements, community Health status, Existing Infrastructure for social welfare etc, including Loss of properties and sources of Livelihood etc in the project affected village under submergence.

- Further; Information of Historical, Cultural Religious activities in the affected villages will be collected.
- Basic survey Investigation Data of the project Authority shall be used as well as District Revenue and statistical Records may be consulted

(ii) Socio-economic Survey profile
- Socio-economic survey of the affected villages may be carried out as per guidelines of LARR policy of the state. Demographic profile, Economic structure, Development profile, Agriculture practices, infrastructure, Education facilities, Health and Sanitation facilities etc shall be considered for each project affected Households/families.
- Basic information are obtainable from statistical records for the purpose of Impact assessment.

(iii) Displacement of population:
- Out of the affected villages, the list of all displaceable families villagewise shall be prepared as per caste category. Their names education, Landholdings and other properties, occupation source of Income etc are required for preparation of R&R plan.
- Primary data from project records shall be used for Impact study & suggesting the Mitigation Measures.

4.0 ENVIRONMENTAL IMPACT ASSESSMENT [EIA]- PREDICTION OF IMPACTS, EVALUATION AND MITIGATION MEASURES:
- Both Negative & Positive impacts will be assessed on the basis of project activities and components.
- Evaluation of potential Impacts will be carried out according to their significance by using appropriate Matrices.
- All adverse impacts (Negative Impacts) will be discussed in details and mitigation measures / procedure to minimize negative impacts will be suggested, in the Environmental Management Plan.

This chapter will be structured with the following aspects

4.1 Environmental Impact Assessment [EIA]:

(i) Approach for Environmental Impact study
Impact prediction will be made in 4 phases of project cycle
- Impact due to project Location
• Impact due to project Design
• Impact due to project construction
• Impact after project operation

(ii) Evaluation of Impact
Appropriate matrices shall be used to evaluate the potential negative impacts both in the construction phase and operation phases.

4.2 Mitigation Measures:
Standard mitigation Measures against some potential Environmental Impacts shall be suggested both for the construction phase & operation phases.

4.3 Environmental Management Plan (EMP)
EMP with Mitigation Measures will be suggested for the following Environmental issues.

(i) Catchment Management:
Catchment Treatment Plan [CAT plan] will include study of erosion levels in the watershed- suggesting erosion control measures implementing agency and Action plan etc.

(ii) Command Area Development plan [CAD plan]
The command Area Development and water Management plan will follow prescribed guideline of CADA, GoO. Mitigation Measures for following impact will be suggested.
• Water logging and soil salinity
• Land leveling
• Weed Infestation in canals & water bodies
• Command area Drainage Management
• Fertilizer and pesticide Management
• Agro waste Management
• Soil quality & Nutrient Management
• Preventive Measures against disease vectors and public Health Delivery support.

(iii) Construction Area Management:
Under this section specific management procedure against some potential negative impacts related to various project activities during the construction period will be elaborated in Environmental components included are;

Pollution Management: (Both construction and operation phases)
• Includes Standard Mitigation measures to Restore water Quality, Air quality, Noise level and soil quality against pollution parameters
• Construction waste/Muck disposal Management
• Communication Management [Approach Roads/Haul Roads]
• Management of Natural Drain Crossings.
• Construction Labour camp/contractor camps Management
• Transportation and storage of construction Materials
• Management of construction Machinery & Equipment.
• Management against impact due to blasting operations.
• Accident and safety Management.
• Aesthetics and Landscape Management
• Environmental safeguard Measures

(iv) Management of Local Ecology:
Compensatory Afforestation, canal Bank plantation, Avenue plantation and Greenbelt plantation.

(v) Additional studies:
Includes
• Fisheries Management
• Drinking water supply
• Risks & Disaster Management
• R & R Management (R&R plan and Implementation of RAP)
• Welfare Management under corporate social Responsibility [CSR].

5.0 ANALYSIS OF ALTERNATIVES:
Project Alternatives “with component” and “without component” analysis will be made to conform the best alternative.

6.0 ENVIRONMENTAL MONITORING PROGRAMME:
An effective Monitoring Mechanism will be developed to address problems/shortfalls/Defect Rectification etc. while implementing the Management plan/mitigation Measures both during the construction phase and operation phases.

Period of Monitoring, staffing pattern, capacity building Budget and Schedule will be discussed in this section.

7.0 PUBLIC CONSULTATION / PUBLIC HEARING:
The project authorities will move the State Pollution control Board, Odisha to hold a public hearing meeting / public consultation according to the recommended procedure of MoEF in Appendix-IV / Paragraph-7 of Environment Notification dated 14th September, 2006.

The proceedings, comments and compliances will be documented.
8.0 **PROJECT BENEFITS:**
The project benefits in regard of the following will be discussed.
- Improvement of the physical infrastructure.
- Improvement in the social infrastructure.
- Employment potential.
- Other tangible benefits like increased crop production and financial benefit to farmers.

9.0 **ENVIRONMENTAL COST ESTIMATE & ANALYSIS OF BUDGET:**
- An Environmental cost estimate will be prepared to meet the expenditure for amelioration of Environment
- Analysis of Budget
- Environmental cost estimate will also reflect the connected expenditures for each scheduled item, budgetary provision, plan allocation etc as envisaged in the DPR.

10.0 **POLICY AND ADMINISTRATIVE SUPPORT FOR IMPLEMENTATION OF EMP**

11.0 **SUMMARY AND CONCLUSION:**
- Executive summary of EIA &EMP
- Overall justification for implementation of the project.
- Conclusion

12. **DISCLOSURE**
- Disclosure of consultants engaged.
I do hereby undertake that the data and information given in the application and enclosures are true to the best of my knowledge and belief and I am aware that if any part of the data and information submitted is found to be false or misleading at any stage, the project will be rejected and clearance given if any to the project will be revoked at our risk and cost.

Date: 16-11-2017
Place: Bhubaneswar

Signature of the Applicant
Er. Gopal Prasad Roy
C.E.P.P.F& Inv,
Secha Sadan
Bhubaneswar-I
Name and Full address
(Project Proponent / Authorized Signatory)