

EXECUTIVE SUMMARY

**MAJHGAON MEDIUM IRRIGATION PROJECT
DISTT. PANNA, MADHYA PRADESH**

Project proponent

Water Resource Division
Distt. Panna, Madhya Pradesh

Environmental Consultant



M/s. Enviro Infra Solutions Pvt. Ltd.
(Address: - 301, 302 & 305, SRBC, Plot No. INS-12, Sec.-9,
Vasundhara, GZB-201012)

1 EXECUTIVE SUMMARY

1.1 BACKGROUND

Keeping in view the irrigation potential of the state (10.22 Mha) vis-à-vis the created potential (up to 2013-14) 3.19 Mha which is hardly 31.21% of the irrigation potential and significantly below the national average of 38.75%, more and more identified irrigation projects need to be constructed.

1.2 NEED FOR THE PROJECT

The total percentage of irrigation of district Panna is very low (28.70%). To fulfill the demand of local people and to improve the percentage of irrigation, the project is proposed in this area. To harness the surplus water available in the Ken river during monsoon and flow of Bada nala, an assured source of surface irrigation is vehemently needed in the area.

1.3 LOCATION AND APPROACH

The proposed dam site is located near village Narayanchua across Bada Nala, a right bank tributary of the Ken, at latitude 24^o54'13.66"N & longitude 80^o10'1.0"E. The project site falls in Tehsil Ajaigarh. The command area under the main canal is spatially covered under SOI toposheet 63D-1,63D-5 and 63 C-8 respectively. It can be approached by traveling approximately 60 km from Panna via Ajaigarh through SH-49 up to Ajaigarh and thereafter through Ajaigarh-Simarda Link road.

1.4 PROJECT FEATURES

Project has been conceived with a view to impound 112.62 MCM of monsoon discharge of Ken river and Bada Nala. Of which 53.71 MCM shall be harnessed for providing irrigation facility to 9900 ha in its own command during Kharif and Rabi at 127.27% irrigation intensity, besides 40 MCM and 2 MCM for industrial and drinking water respectively. The project shall encompass the following components

- 6.228 km long water conductor System
- Composite dam comprising of 7567m long with maximum height of 33m homogeneous earthen dam.
- 127 m long spillway;
- 5m long Non-over-flow sections on its right and left respectively;
- Two pressurized piped canals, GM-1 and GM-2, each of 18 km and 22 km length respectively.

1.5 ENVIRONMENT IMPACT ASSESSMENT

M/s Enviro Infra Solutions Private Limited, 301,302 &305, SRBC, Plot No., INS-12, Sector-9, Vasundhara, Ghaziabad (NCR) -201012, has conducted the Environment Impact study, as per TOR issued by MoEFCC, vide letter No. No. J-12011/4/2017-IAI(R), Dated 16.05.2017.

1.6 METHODOLOGY

The methodology and techniques used for studying the various parameters of the environment viz. land, air, noise, water, flora, fauna and socio-economics in the study area are described as follows:

1.7 LAND ENVIRONMENT STUDY

- The Digital Satellite data IRS P6 LISS-III of project area was acquired from NRSA and evaluated on ERDAS Imagine Software.
- Toposheets on 1:50,000 scale of the directly draining catchment area were used for the study.
- Detailed field survey was conducted for study of soil characteristics of erosion prone areas and landslides in the reservoir area.

1.7.1 Air Quality Assessment

To generate, a database on the existing status of the pollutants, the study area was evaluated for setting up six locations to conduct air quality monitoring in respect of PM₁₀, SO₂ and NO_x.

1.7.2 Sound Level Measurement

The sound level was measured at six locations by sound level meter RS-232 (Digital-Instrument).

1.7.3 Soil Quality Assessment

Physical and chemical characteristics of the soil were studied in respect of six samples taken from the study area.

1.7.4 Water Environment Assessment

For evaluating physical, chemical and biological characteristics of surface and ground water samples were taken from thirty-five locations.

1.7.5 Aquatic Environment

Evaluation of the parameters related to aquatic environment has been done in respect of biological characteristics of river water.

1.7.6 Floral Study

It is based on extensive field survey of the area. Three seasons study has been conducted. In this the phytosociology of plants and diversity of the forest vegetation was determined.

1.7.7 Faunal Study

Various transects were identified along the villages to carry out faunal studies as the village trails were the best options to cover-up the complete area. Observer walked at a constant pace for their observation.

1.7.8 Socioeconomic Study

The data on socio economic and dependency aspects were collected. The process involved assessment of the study area to obtain an overall perspective of the project affected villages that were located in the submergence zone / 10 km radius from the dam including command area. In order to gather information on public perception of the proposed project the attitude/psychology survey was carried out which depicts the prevailing awareness and acceptance/no-acceptance about the project. Data collection from secondary sources has also been made to validate some of the information and to supplement the data on demographic aspects.

1.8 EXISTING STATUS OF ENVIRONMENT

1.8.1 Local Geology of Project Area

The rock at the dam site comprises of granite.

1.8.2 Land use/Land Cover

The dominating land use classes are agriculture land (86.90%), open forest (2.28%), dense forest (5.07%), scrub (3.97%) water body (1.28%) and settlement (0.82%)

1.8.3 Total Land Requirement for Construction of the Project

For execution of the project 1523.70 ha land, falling in Tehsil Ajaigarh of District Panna, shall be required of which the apportionment between State, Private and forestland shall be 166.197 ha, 930.80 ha, 426.763 ha respectively.

1.8.4 ARCHAEOLOGICAL / HISTORICAL MONUMENTS/SENSITIVE AREA

No archaeological monument of national importance lies either in the project area or in its submergence area. Panna National Park is located about 10.5km from nearest boundary of project. Panna (Gangau) Sanctuary is at a distance of 8.25 km and Ken Ghariyal Sanctuary at a distance of 5.25 km from the dam location

1.8.5 SOIL QUALITY

The results of the soil analysis show that the soil is neutral to slightly basic at all the locations having pH varying from 7.0 to 7.60. The texture of the soil varies from sandy clay loam to clay loam. Available nitrogen content in the surface soils ranges between 160.6 – 246.6 kg/ha thereby indicating that soils are low in available nitrogen content. Available phosphorus content ranges between 8.61 – 9.93 kg/ha) thereby indicating that soils are having low available phosphorus. Available potassium content in these soils ranges between 303.6- 332.90 kg/ha thereby indicating that the soils are medium in potassium content. The organic carbon varies from 0.43 % to 0.67% thereby implying that soils have low to moderate organic carbon

1.8.6 AIR AND NOISE ENVIRONMENT

The pollutants concentration in the air is well below the permissible limit as there are no industries in the area and the density of vehicular traffic is not alarming. The noise monitoring shows that day and night time noise levels are within the prescribed limits.

1.9 WATER ENVIRONMENT

The analysis results have been compared with the Tolerance limits for inland surface waters, Class – C as set forth in IS: 2296-1982. The results indicate that recorded pH values of all analyzed samples ranged between 7.6-8.2 and was within the permissible limit (6.5-8.5). The TDS levels ranged from 385 to 475mg/l and were well below the permissible limit of 1500 mg/l. The chlorides level in surface water samples ranged from 31 to 52.1 mg/l and were below the permissible limit of 600 mg/l. The sulphates level ranged from 16 to 40.6 mg/l and were below the permissible limit of 400 mg/l. The nitrate level ranged from 1.50 to 11.5 mg/l and were below the permissible limit of 50 mg/l. The fluorides level was lower than the permissible limit of 0.35 to 0.58 mg/l. The water is suitable for meeting drinking water requirements after conventional treatment and disinfection. The ground water had all parameters within the desirable limits.

1.10 STATUS OF BIOLOGICAL ENVIRONMENT

1.10.1 Flora of the Project Area

- During the surveys, an inventory of different plant groups found in the study area was prepared. In the study area, 121 species of plants were recorded. These include 45 trees, 09 shrubs, 20 species of herbs and 06 species of climbers.
- About 44 economically important plant species were recorded from the study area.
- About 8 important medicinal/ethnobotanical importance plant species were recorded
- No RET species falling under IUCN Red List was recorded/reported from study area.

1.10.2 Fauna

The faunal study for the proposed project was carried out in both the submergence and influence zone of both upstream and downstream

- 17 mammalian species were recorded /reported during the survey of which 2 belong to Schedule-1 of WPA, 1972.
- 22 bird species were observed /reported during the survey.
- As many as 11 species of herpetofauna were recorded /reported.
- Sixteen species of fishes were recorded.

1.11 SOCIAL AND CULTURAL BACKGROUND OF THE AREA

1.11.1 Demography of Project Affected Villages

As per the Census of India 2011, the total population of the project affected villages comprising of 3657 households' aggregates to 16896 of which male and female population is 8809 and 8087 respectively. The overall sex ratio is 918 females per thousand males. Total population of the scheduled caste and scheduled tribe is 2769 (16.4%) and 3717 (22%) respectively. The male and female literate population is 4619 and 2965 respectively, which implies that the total literacy rate of the project affected villages is 44.9 % of which the literacy rate of male and female is 27.33 % and 17.57 % respectively. The main workers are 4956 (29.33%) and marginal workers are 2310 (13.67%) respectively of the total population while the remaining 57% constitute non-workers.

1.11.2 Village-wise Details of Land to be acquired and PAF

| S.No. | Name of Village | Land To be Acquired (ha) | Project Affected Families | Displaced families |
|-------|-----------------|--------------------------|---------------------------|--------------------|
| 1 | Majhgaon | 363.53 | 250 | 156 |
| 2 | Kuwarpur | 286.07 | 993 | 692 |
| 3 | Banhari Kalan | 188.175 | 247 | 151 |
| 4 | Sabduwa | 1.43 | 12 | 0 |

| | | | | |
|--------------|------------|--------------|-------------|------------|
| 5 | Hanumatpur | 81.035 | 38 | 0 |
| 6 | Dugaraho | 5.03 | 87 | 0 |
| 7 | Bariyarpur | 1.13 | 33 | 0 |
| 8 | Bhapatpur | 4.49 | 36 | 0 |
| Total | | 930.8 | 1696 | 999 |

1.11.3 Agriculture

Agriculture is the main source of income and employment as more 90% of the population directly derive their livelihood from it.

1.12 IDENTIFICATION, PREDICTION AND EVALUATION OF IMPACTS

1.12.1 Impacts on the Micro-Climate of the Area

Due to construction activities, there shall be temporary and nominal effect on the ambient temperature and humidity. The operation stage project may not create any impact on the meteorology and climatology of the area.

1.12.2 Change in Land use / Land Cover

1.12.2.1 Construction Phase

The land use class of forest land, agriculture land (private land) and barren land (revenue) falling in submergence shall change into waterbody. The change shall be permanent and irreversible. The forest land cover within the submergence area shall reduce due to project during construction.

Due to submergence, the increase in water surface area due to creation of reservoir will result in increased evapo-transpiration and humidity.

1.12.2.2 Operational Phase

During the operation phase no change in land use is expected. Many of the redundant areas having no further usage will be brought under plantation.

1.12.3 Soil Erosion and Siltation

1.12.3.1 Construction Phase

Soil erosion due to excavation of different components of the project, construction of roads will accelerate soil erosion.

1.12.3.2 Operational Phase

Soil erosion due to project activities will not exist in the operation phase as the construction would be completed and landscape restoration work would also be implemented.

1.12.4 Impact on Geology

The intensity of anticipated environmental impact on geology of the area will be weak and extent of anticipated impact will be local. No impact is anticipated on the geology of the area during the operation phase.

1.12.5 Impact on Hydrology

The water requirement, during construction of the project, which shall be met from the river during monsoon and during non –monsoon from underground resources as well as from stored water pumped from river, would not bring about appreciable change in hydrology. Further, the existing drainage system in the area will not be modified or affected during the construction phase. Since the major water usage for construction will be mainly from the river water and from groundwater resource during non-monsoon season, some adverse impact (0.048MCM) on groundwater availability is expected annually.

It is manifest that against total net inflows of 451.96 MCM for 20 years the spill quantity was 216.71 MCM, which is almost 44% of the monsoon discharge. Since the river is ephemeral and flows in monsoon only in direct response to precipitation, it is essential that it must flow on downstream of the dam and carry about 30% of the monthly discharge

1.12.6 Environmental Degradation due to Labour Immigration

During the construction phase congregation of approximately 400 workers is likely to take place in the project area, which will increase pressure on land and water resource. Conflict between the migrants and the local population may occur for employment. Labour engaged in construction activity will also move away once the project work is completed; therefore, no additional impact is expected.

1.12.7 Impacts on Air Environment

Temporary changes in air quality during construction phase are expected due to emission of hydrocarbons from vehicles and gases from blasting operations. The predicted ground level concentration in air for PM₁₀ due to fugitive dust emissions from construction activities (excavation involving drilling and blasting) at the Dam complex has been found to be 25.70 µg/m³, while the resultant concentration shall be 72.7 µg/m³, which is within the limits. Due to increased transportation during construction phase at 25 m predicted concentration for PM₁₀ is 12.4 µg/m³ which reduces to 7.7 µg/m³, 3.4 µg/m³ and 1.4 µg/m³ at 50m, 150m and 500m respectively. Thus, the impact on the pollutant level (PM₁₀) due to increased traffic due to transportation of mineral shall be minimal. The increased GLC in respect of NO_x were insignificant being 0.13 µg/m³ up to 25m and 0.11 µg/m³ up to 50m and 0.10 µg/m³ up to 1km.

1.12.8 Impacts on Noise Environment

Temporary increase in noise levels are expected during construction phase only. The noise level of 91 dB(A) at the construction site gets highly attenuated to 38 dB(A) and 33 dB(A) about 200m and 400 m respectively from the point source (dam site).

1.12.9 Impacts due to Ground Vibration and Air over Pressure due to Blasting

Due to blasting (surface excavation), the resulting PPV shall be 1.26 mm/sec and 1.00 mm/s at Majhgaon and Dugaraho respectively which shall be considerably lower than the limiting values 5.0 mm/sec for excitation frequency less than 8 Hz, in case of temporary structures. Predicted air over pressure due to blasting at Majhgaon and Dugaraho shall be 106.8 and 104.9 dB(A) respectively.

1.12.10 Impacts on Water Environment

During the construction phase, the water environment of the river due to proposed project shall be impaired due to increase in silt rate from the discharge coming out open air works, batching and crushing plants and from the foundation works. Due to this minor impact on the water quality and aquatic fauna of temporary nature shall be experienced in the river water. The sewage generated at the labour camps and other residential areas may also bring considerable pollutants to river sections, if disposed in the river section without treatment.

In operation phase the flow of Bada Nala downstream of the dam shall be reduced to the volume (13.36 MCM) stored behind the dam for consumptive use. It is, therefore, proposed to release 0.8 MCM for environmental flows from the quantum reserved for the purpose besides 0.62MCM from drinking water allocation during June and July. This implies that about 0.27cumec discharge shall regularly flow d/s in these months.

1.12.11 Impact due to Change in Hydrological Cycle

The quantity of the water abstracted from the river for consumptive use for irrigation in command area and for domestic and industrial use, shall reduce the river flow downstream and thus bring change in hydrological cycle in context to the project absolutely.

1.12.12 Impact due to Acidification of Reservoir

There will be no acidification of reservoir due to the alkaline nature of the river water at dam site and upstream having pH vary between as 7.6 to 8.

1.12.13 Impacts on Flora

It is evident from the study that from the submergence and influence zone of the proposed project none of tree species, shrub, herb or any climber or grass species are either vulnerable or endangered. Interestingly the vegetation composition of the submergence zone is also widely distributed in the influence zone in abundance and there will be no significant loss to the habitat. However, any loss of riverine vegetation during the project activity period will be restored in the reservoir periphery in due course of time.

The floral abundance of the project area in post construction phase will increase by many folds as the plantation under catchment area treatment, reservoir rim treatment, green belt, restoration and landscaping will be completed.

1.12.14 Impacts on Fauna

As the project activity is not going to submerge all the major habitats, there is little concern for these niche birds. There will be no alteration to the existing habitat of endangered and threatened species. There is also no wildlife sanctuary, national park and biosphere reserve near the project area. As the project is having its submergence mostly along the river valley, the project is not likely to be a threat to any of the recorded butterfly species. Increase in temporary stress levels of wildlife during construction phase due to noise, human interference and reduction in present habitat. Threat due to poaching might increase. Due to reservoir creation, there will be improvement in the habitat for mainly water birds, reptiles, mammals, amphibians and plankton and Improvement in food chain of some reptiles, birds and carnivorous mammals due to creation of reservoir and increase in humidity level. The butterfly diversity in the area would be enhanced, as scrub habitat around the submergence

will receive substantial amount of moisture, which will help in natural regeneration of forest canopy.

1.12.15 Summary of Positive and Negative Impacts

The positive impacts are-

- Irrigation potential shall be created in area (9900 ha) in 34 villages.
- Better living Standards for famers of command area.
- Employment opportunities/to locals in project work and fisheries.
- Benefits to economy and commerce.
- Access to improved infrastructure facilities.
- Recreation and tourism potential may boost
- Improvement in environment through implementation of CAT, Compensatory Afforestation, Green belt Development and different other plans.
- Command Area Development.
- Better opportunities for cattle rearing.
- Increase in groundwater level

The negative impacts are -

- Eight villages shall be partially affected due to acquisition of land for project purpose.
- Due to project, 999 families shall be displaced.
- The loss of agriculture land (930.80 ha) and agriculture produce.
- Loss of livelihood and income.
- Loss of homestead and other assets over which the PAFs/DPs have developed affinity
- The change of river status from riverine to lacustrine regime
- The loss of forest due to construction of dam, reservoir and appurtenant works
- Likely decrease in agriculture and horticulture production due to air pollution
- Disturbance to the fauna of the study area during construction
- Pressure on the existing provincial / state road will increase.

1.13 IMPACT MANAGEMENT

To ameliorate the negative effects of the project construction and overall improvement of the environment following management plans are formulated for implementation concurrent to the project construction. The cost of the management plans is shown in **Table below:**

Summary of Total Cost Estimate

| S. No. | Plans | Cost (Rs. In Lakh) |
|--------|--|--------------------|
| 1. | Catchment Area Treatment Plan | 450.00 |
| 2 | Command Area Development Plan | 7492.00* |
| 3. | Compensatory Afforestation Scheme | 4477.00 |
| 4. | Wildlife and Bio-diversity Management plan | 25.00 |
| 5. | Fisheries Management Plan | 222.00 |
| 6. | Resettlement & Rehabilitation Plan | 6656.00 |

| S. No. | Plans | Cost (Rs. In Lakh) |
|--------------------|---|--------------------|
| 7. | Green Belt Development Plan | 36.00 |
| 8. | Reservoir Rim Treatment Plan | 25.00 |
| 9. | Muck Management Plan | 7.00 |
| 10. | Landscape and Restoration Plan | 4.00 |
| 11. | Restoration Plan for Quarry Sites | 25.00 |
| 12. | Disaster Management Plan | 8.00 |
| 13. | Water, Air and Noise Management Plan | 16.00 |
| 14. | Public Health Delivery Plan | 75.00 |
| 15. | Labour Management Plan | 18.00 |
| 16. | Sanitation and Solid Waste Management Plan | 54.00 |
| 17. | Local Area Management Plan | 180.00 |
| 18. | Environmental Safeguards During Construction Activities Including Road Construction | 20.00 |
| 19. | Energy Conservation Measures | 21.00 |
| 20. | Environmental Monitoring Plan | 30.00 |
| Grand Total | | 12349 |

N.B. The cost of works under CAD Scheme has been excluded, as it will be funded under Central Plan with State share in prescribed proportion.