

Table of Contents

Executive Summary	1
1. Introduction:	1
2. Project Setting:	1
3. Baseline Environmental Status:	3
3.1 Meteorological Data.....	3
3.2 Air Environment	5
3.3 Water Environment.....	5
3.4 Noise Environment.....	5
3.5 Land Environment	6
3.6 Biological Environment.....	6
3.7 Socio-Economic Environment.....	6
4. Impact Assessment and Mitigation Measures	6
4.1 Impacts on Water Environment	7
4.2 Impacts on Air Environment.....	8
4.3 Impacts on Noise Environment	8
4.4 Impacts on Land Environment.....	8
4.5 Impacts on Biological Environment.....	8
4.6 Impacts on Socio-Economic Environment	9
5. Analysis of Alternatives:	9
6. Environmental Monitoring Programme:	9
7. Additional Studies:	10
8. Project Benefits:	10
9. Conclusion:	11

Executive Summary

1. Introduction:

Environmental Impact Assessment (EIA) is a prerequisite for launching any major development project as per the guidelines of the Ministry of Environment and Forest (MoEF), Government of India. In compliance with this requirement, the Vidharbha Irrigation Development Corporation (VIDC), Nagpur, Government of Maharashtra retained the Pollution and Ecology Control Services (PECS), Nagpur to prepare the EIA report for the proposed construction of Pulgaon Barrage across the Wardha River in Tahsil Deoli & Dist. Wardha, Maharashtra to fulfill the demand of Industries and drinking water within Wardha and Amravati Districts.

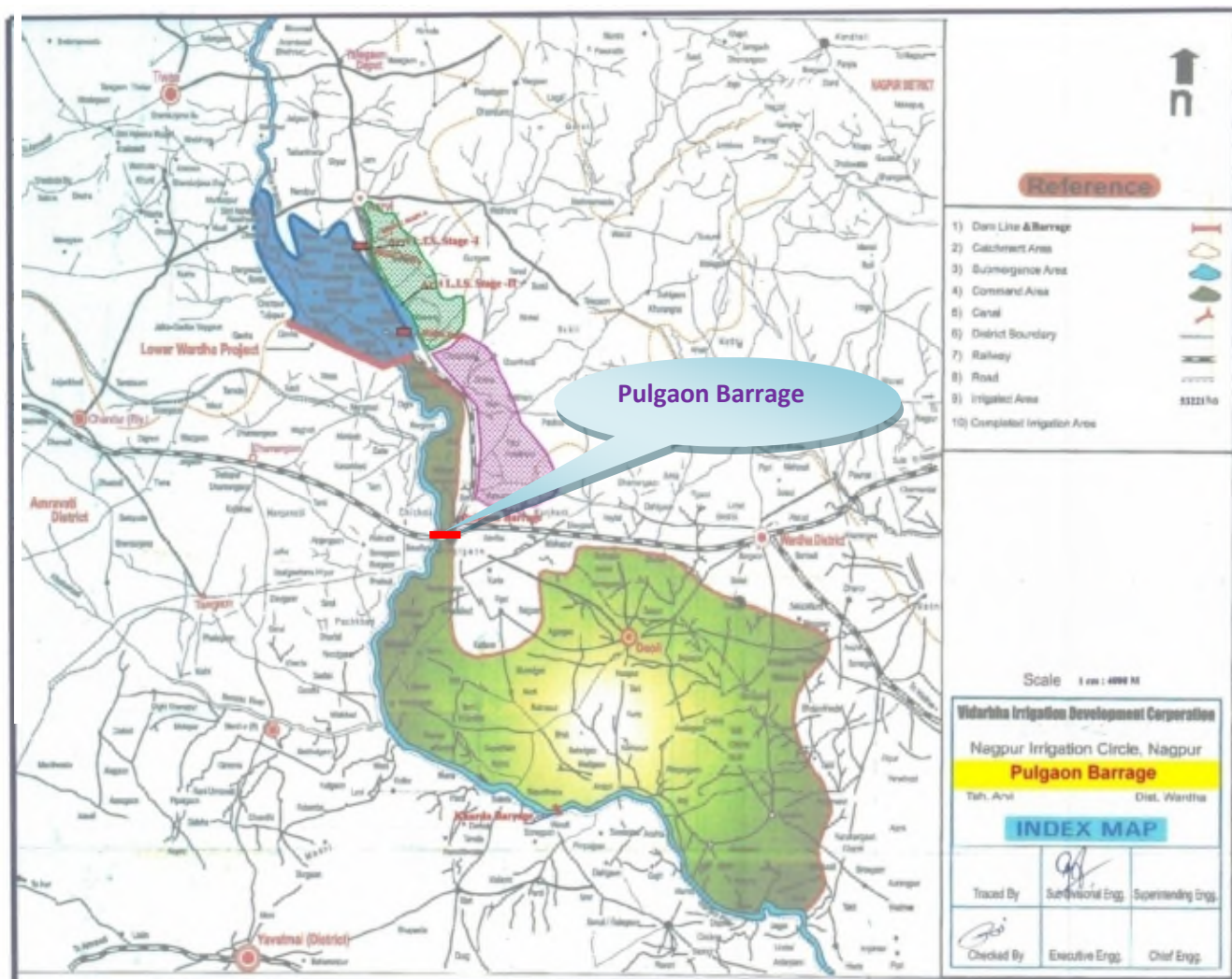
The VIDC, Nagpur, Government of Maharashtra had proposed construction of Barrage on Wardha River. Executive Director, VIDC, Nagpur had approved the project under Lower Wardha Project vide letter No. 5241/VIDC/T-2/ (1/2008) Dated 20/11/2008 in Marathi.

2. Project Setting:

The Pulgaon Barrage Site lies at Latitude 20° 43' 51" N and longitude 78° 18' 28.48" E in Topo-sheet no. 55 L/6. Major town Pulgaon is downstream at a distance of about 0.5Km and SH-244 is 0.5 kms from the project site. The barrage is proposed at Gunjakheda (Pulgaon). The left flank of river is in Wardha district and right flank of the river is in Amravati district. Barrage site is depicted as index map in **fig: 1**. The project envisages construction of barrage of 239 m length with 16 gates of 12 m x 6 m. size. The Project is proposed for storage of 10.80 Mm³ of water. The proposed barrage site identified is 24.13 Km downstream of the lower Wardha project.

Pulgaon barrage is designed as united part of Lower Wardha Project. Under this Barrage 10.80 Mm³ of water will be stored. The land requirement for the project is 1.62 Ha of Private Land and 1.66 Ha of Government land. The gross catchment area for the proposed barrage is reported to be 6530 km² along with 203 km² of Free Catchment area. The catchment area of Pulgaon barrage falls under two districts namely Wardha and Amravati involving three Talukas namely Deoli, Arvi and Dhamangaon Railway. No forest area is involved under the submergence of Pulgaon Barrage.

Fig 1: Index map



Proposed water utilization: Water resources from the reservoir were accounted for the following uses.

- Irrigation Use : Nil
- Domestic Use : 8.42 Mm³
- Industrial Use : 1.42 Mm³
- Evaporation Losses : 0.96 Mm³
- **Total** : **10.80 Mm³**
- **Total proposed utilization** : **9.84 Mm³ (except loss due to evaporation)**

The barrage construction was initially started in 2010 and the contractor has already erected temporary camp at the project site with the provision of drinking water in the form of bore well and waste water treatment prior to disposal by septic tank. However, for the point of environmental clearance all the construction activities are stopped and still stand from June-2013. Due to this the residence of Pulgaon city and nearby villages are worried about the speed of completion of the project and discussed project process with Hon. Minister of water resource Dept., at Nagpur during winter assembly session.

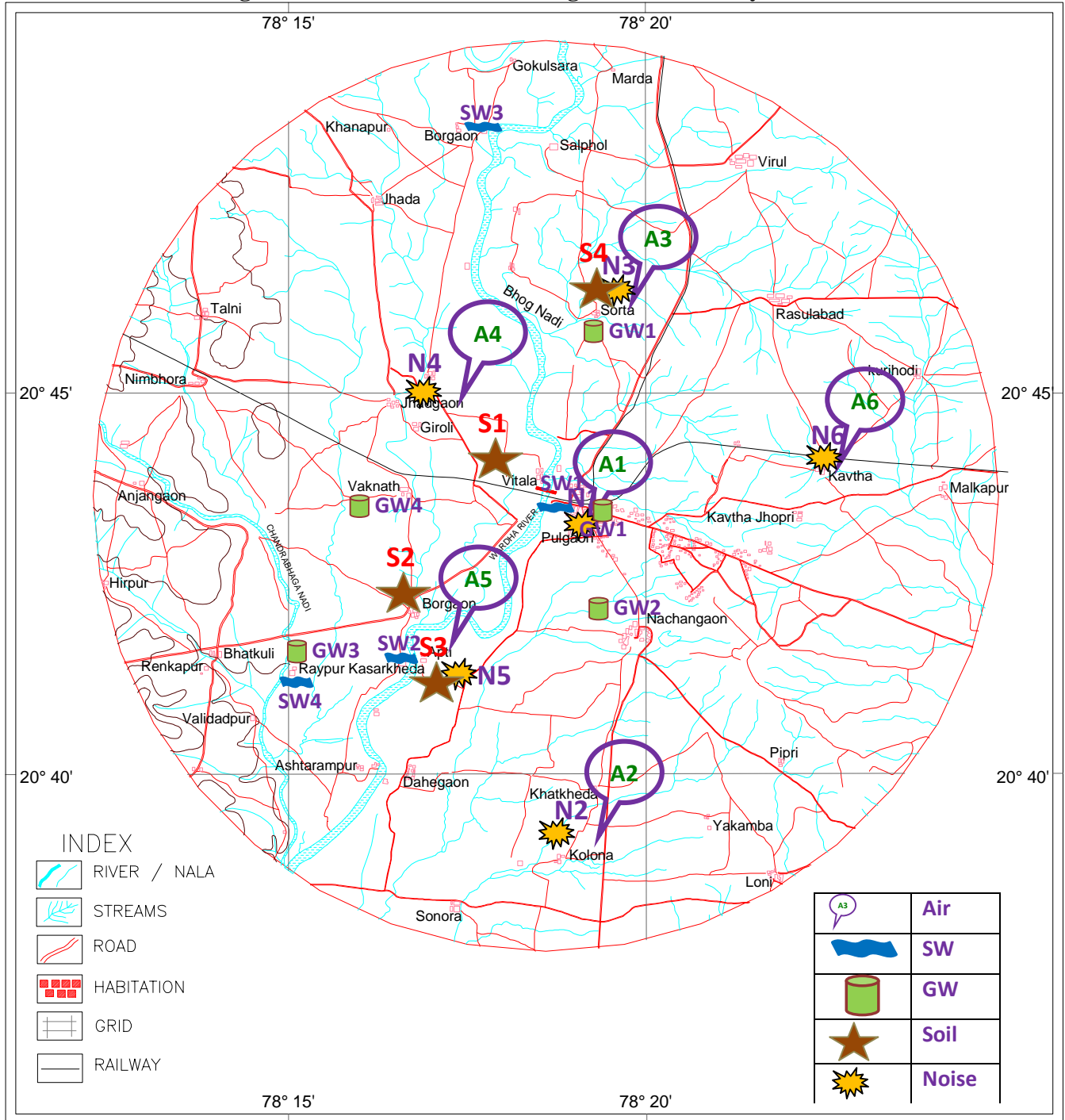
3. Baseline Environmental Status:

Basic purpose of Baseline Environmental study is to establish the existing environmental status, which will help in assessing the magnitude of potential impacts likely to occur due to the proposed Barrage project. The data collected by various functional area experts is based on primary and secondary sources and field survey/ investigation from the study area. A study area of 10 km radius with the proposed barrage at its centre has been considered for evaluation of various environmental attributes. The study area falls under the Wardha sub basin of Godavari main basin. The baseline environmental data has been collected during 1st March 2014 to 30th May 2014. **Fig. 2** shows the monitoring station for various Environmental attributes i.e. Air, Water, Noise and Soil in the study area of 10 km radius.

3.1 Meteorological Data:

The climate of Wardha district is characterized by hot summers and a general dryness throughout the year except during the south-west monsoon when the humidity is above 60%. During the May, the hottest month of the year; the average maximum temperature has been recorded at 42^oC and the average minimum at 28^oC. December is the coldest month with average maximum temperature of 28^oC and average minimum of 15^oC. The predominant wind directions are west (22%) south west (14%) as per wind rose.

Fig.2: Environmental Monitoring station on Study Area



Source: SOI Toposheet

3.2 Air Environment:

To assess the baseline ambient air quality, total 6 (six) air quality monitoring locations were selected. One air sampling station was identified at Pulgaon (core zone) and remaining five depending on meteorological conditions were located within Buffer zone. The average PM₁₀ and PM_{2.5} concentrations of all six ambient air quality monitoring stations were in the permissible limits. The average SO₂ and NO_x concentrations of all six ambient air quality monitoring stations are also low and within permissible limits. The concentrations of the gases like Ozone, Ammonia, CO and Toxic Metals (Mercury, Lead, Arsenic & Nickel) were found to be below detectable limit at all sampling stations.

3.3 Water Environment:

A total number of 08 (eight), including four surface water & four ground water samples were collected and analyzed. The water quality data was generated in March– 2014 for surface and ground water samples. . It was observed that the characteristics of the surface and ground water samples were found to be within the permissible limits of Indian Standards except the total coliforms in surface water samples which may be due to the human activities observed during sampling and requires disinfection before use for drinking purpose.

3.4 Noise Environment:

Noise levels were monitored hourly basis at six locations. Noise level monitoring was performed in March 2014. Noise level monitoring was carried out continuously for 24-hours with one hour interval starting at 0600 hrs to 0500 hrs next day. The noise levels were monitored on working days only. Sundays and Public holidays were not considered for monitoring. Recorded Noise Levels are in the range 31.1 to 51.5 dB(A) at all Six monitoring stations. Maximum levels of noise were recorded in day hours, Noise levels measured at all six stations (N-1, N-2, N-3, N-4, N-5 & N-6) are low and well within limit of either 65.0 dB(A) for Residential Area or 75.0 dB(A) for Industrial Area as given in MoEF Gazette notification for National Ambient Noise Level Standard.

3.5 Land Environment:

Samples were collected in second week of March - 2014 study area. Total four samples from four different locations of three different depths viz. 0-30, 30-60 and 60-90 cm below the surface, homogenized are sampled. Texture of all soil samples are silty-Loam in Texture Classification. The pH values are indicating nature of soil samples as between neutral to slightly alkaline. Characteristic of Barren land soil is a little deficient in nutrients concentration. Whereas, agricultural land soil is moderately suitable for cultivation of climatic crops and have good fertility.

3.6 Biological Environment:

To assess the impacts of Pulgaon barrage on flora and fauna, a baseline study was conducted during the month of July 2014. The field study was carried out at the project site of Pulgaon barrage and surrounding area in the 10 km radius. The flora in the project area comprised of 63 species including 30 trees, 14 shrubs and 19 herbs. The fauna in the study area comprised of 24 animals including 4 mammals, 18 birds and 2 reptiles. No any endangered species included in the Schedule I of Wildlife (Protection) Act, 1972, no any wildlife sanctuary or national park is present in this study area of Pulgaon barrage. As informed by the Department of Forest, Maharashtra State that no forest area is encompassed in study area therefore, there is no record of endemic, rare and endangered species of flora and fauna in this study area.

3.7 Socio-Economic Environment:

The study area comprises 17 villages of Arvi and Deoli Tahsils of Wardha District and 16 villages of Dhamangaon railway Tahsil of Amravati District. The villages have a population of 89560 comprising of 46242 (51.6 %) males and 43318 (48.3 %) females out of which 67020 (74.8%) are literate including 37173 (41.5%) male and 29847 (33.3%) female. Majority of workforce in the area are engaged in agriculture related activities as a labourer. Unemployment is a crucial problem, though literacy rate is good.

4. Impact Assessment and Mitigation Measures:

The impacts due to project activities are on mainly water, land and Socioeconomic environment. Air and noise impact are temporary during construction phase only. The various

project activities and associated potential environmental impacts on various environmental parameters are identified and summarized in a matrix. Construction Phase activities will mainly affect Employment, Socio-culture, Water quality, Air quality, Noise and Flora/Fauna of the project area. Operation Phase Activities will have impact on Hydrology, Employment, Socio-culture, Water quality, and Flora/Fauna in downstream of the river.

4.1 Impacts on Water Environment:

Construction excavation will disturb physical environment leading to increased barrage and river sediments. Obstruction in natural water course may also happen resulting into soil erosion particularly along the banks of Wardha River.

Water Quality during Construction phase: Use of integrated solid waste management system is adopted during construction phase viz; source reduction, recycling sanitary land filling and composting of organic matter etc. To Avoid the Impact of Sewage on River Water Quality septic tanks prior to disposal are already constructed at the proposed project site. The major impact on the water quality arises when the muck is disposed along the river bank therefore; muck disposal has to be done in line with the Muck Disposal Plan to avoid any negative impact. With the above reference the Muck disposal site is already selected at Government land survey No.1 of Mouza- Vitala. Thus, increase in turbidity of river water and associated impacts on water environment are minimum and do not pose any threat to water quality in the river.

Water Quality during Operation phase: In the proposed reservoir, insignificant reduction in D.O. level is anticipated and anaerobic conditions will not be developed as water will be replenished every year. In operation phase of project, problems of eutrophication, which is primarily caused by enrichment of nutrients in water, are not anticipated. Due to existence of upstream reservoirs, the anticipated sedimentation at Pulgaon barrage reservoir is negligible and may be less than 5%. River bed, downstream of barrage will remain stabilized and no major impacts are anticipated on this account. Yield available at proposed Pulgaon Barrage project site at 75% dependability is 27.98 Mcum as against the demand of 10.80Mcum. Thus there is no shortage of water on downstream project.

4.2 Impacts on Air Environment:

In a water resources project, air pollution occurs mainly during project construction phase. No major impact is anticipated on ambient air quality due fuel combustion in construction equipment. Dust will be generated during blasting. Blasting shall be carried out only during day time informing the surrounding villages. Marginal increase in Hydrocarbons, SO₂ and NO_x levels are anticipated for a short duration within limited area. Adverse impacts due to dust generation during muck disposal are not expected.

4.3 Impacts on Noise Environment:

Noise due to quarrying, blasting, vehicular movement will have some adverse impacts on the ambient noise levels in the area. Noise generated during drilling and blasting and other construction equipment varies from 80-100 dB(A) within a distance of 15 Km.

4.4 Impacts on Land Environment:

Insignificant changes in the land use are anticipated during construction as well as operation phase of the project.

4.5 Impacts on Biological Environment:

During construction of various components of the project trees will have to be cleared. Simultaneously tree plantation need to be undertaken by the contractor on the river banks.

Impacts on Terrestrial Flora: The project area and its surroundings are not reported to serve as habitat for wildlife nor do they lie on any known migratory route. Thus, no impacts are anticipated on wild life. However, no large-scale fauna is observed in the area. Thus, impacts on fauna are expected insignificant.

Impacts on avifauna: The reservoir banks will have wet environment throughout the year which can lead to proliferation of vegetation e.g. grass, etc. along the reservoir banks. Such conditions are generally ideal for various kinds of birds, especially, water birds. This is expected to increase the avi-faunal population of the area.

Aquatic Flora and Aquatic Fauna: The increased accessibility to the area can lead to increased human recreational activities in the form of illegal fishing, collection of non-timber

forest produce, etc. With the damming of river, the organisms like diatoms, blue-green and green algae may perish as a result of increase in depth and may flourish downstream. It is proposed that the artificial seed production in hatchery may be adopted which can be stocked in the river stretches downstream and upstream of the proposed barrage.

4.6 Impacts on Socio-Economic Environment:

A project of this small magnitude is likely to entail positive change on the socio-cultural fabric of the area. During construction and operation phases, a lot of allied activities will mushroom in the project area. During the construction phase a large labour force, including skilled, semi-skilled and un-skilled labour force of the order of about 50-60 persons, is expected to immigrate into the Pulgaon Village. It is felt that most of the labour force would come from other parts of the country. However, some of the locals would also be employed to work in the project. The business community as a whole will be benefited. The locals will avail these opportunities arising from the project and increase their income levels. With the increase in the income levels, there will be an improvement in the infrastructure facilities in the area. Adequate measures for supply of potable water and sewage treatment have been recommended.

5. Analysis of Alternatives:

Superintending Engineer (SE), Nagpur Irrigation Circle, Nagpur prepared a feasibility report of possible schemes to suffice the water requirement of the Barrage project on Wardha River. Proposed Pulgaon barrage construction is envisaged on the Wardha River near Pulgaon town. As per the discussion along with Assistant Engineer and Sub Divisional Engineer of the Pulgaon barrage project, there were no alternative site identified for the said project. The site finally selected is only Gunjkheda (Pulgaon) of tahsil Deoli, District Wardha. The selected site is 0.5 km from the Pulgaon Town.

6. Environmental Monitoring Programme:

The proposed Pulgaon barrage project may have some impacts on the biophysical environment, health and safety of its employees and the public. In general, the Tables outlines the anticipated potential risks on safety, health and environmental pollution which are associated with the project and, detail all the necessary mitigation measures, their financial costs, as well as the persons responsible for their implementation and monitoring. The EMP should be used as

checklist in project monitoring and future environmental audits. EMP is a continual activity and during operational phase also monitoring plan has been delineated in the EIA report.

7. Additional Studies:

Additional Studies include Silting of Dam, Risk assessment, Dam Break Analysis, Social Impact (R & R), Occupational health, Public Consultation. The magnitude of silt rate expected to be deposited would be negligible as the Sill Level of barrage is at river bed level. Land under submergence of the project is nil. The submergence area of the project is nil. Hence, resettlement and rehabilitation plan is not required. As per the land acquisition act, Irrigation department is the acquiring body through Revenue department. Necessary compensation for this land will be paid if required as per relevant section under L.A. Act 1894. The cost of land acquisition is borne by Irrigation Department.

8. Project Benefits:

The proposed project will provide during construction project direct employment to 50 workers of the area. Small market will be developed to feed daily demand of the people working for the proposed project. This project would transform lives of people in this area and enrich their quality of life. About 8.42 Mm³ water will be supplied for domestic purposes, 0.96 Mm³ of water will be provided to the industries of Wardha and Amravati District. The financial benefit from this project is along with the Lower Wardha Project. As mentioned earlier, the proposed project is taken unitedly as a part of Lower Wardha project. Apart from the aforementioned benefits, the submergence area will enrich in flora and Fauna due to environmental management plan to be adopted. Water availability in the reservoir throughout the year will increase flora along the banks of the River and will attract fauna including fishery development.

Pulgaon barrage is primarily beneficial to the people of Wardha District, as 9 villages of this district will get water supply for fulfilling their water requirements of domestic use. Secondly this scheme is beneficial to the government in terms of economy as; government of Maharashtra will get profit by supplying water to the Industries. Maharashtra government will get benefit in terms of economy as well as local people will get additional business opportunity in the industrial area due to water availability thus there will be improvement in the livelihood of local people. Therefore the proposed scheme is beneficial after considering all the aspects of the

project. The project gives positive cost benefit ratio i.e. 1.52 along with Lower Wardha Project as this project is the part of above said project. The monetary returns or the project are positive over the environmental losses and hence proposed for early clearance from environmental angle.

9. Conclusion:

The Lower Wardha Division, Vidharba Irrigation Development Corporation (VIDC) (formerly irrigation department), Nagpur, Government of Maharashtra undertaking has completed survey for construction of a dam across the Wardha river near village Pulgaon in Deoli Taluka of district Wardha. There will be no irrigation from this storage. An estimated cost of Rs. Rs. 92.98 Cr. (Year: 2008-2009) with benefit cost ratio of 1.52 along with Lower Wardha Project. The VIDC retained the Pollution and Ecology Control Services (PECS), Nagpur to conduct EIA for the project.

This EIA report presents the baseline status of environmental component in the project area, viz. air, water, land biological and social-economic aspects. A GIS technique was also used to study landuse/landcover classes and prediction of impacts. Significant potential impacts during preconstruction, construction and operational phases of the Pulgaon Barrage project have been identified, predicted and evaluated. An environmental management plan for mitigating adverse impacts and maximizing beneficial impacts has also been delineated.

From the detailed analysis of the environmental impacts and the remedial measures suggested / recommended, it can be concluded that no significant deterioration in the ecosystem is likely to occur due to measures to be taken up during construction and operation of the proposed project. On the other hand the project is likely to have several benefits like Improvement in Industrial Growth, drinking water supply to nine villages, and employment generation. The project will also help to boost the economic growth of the area, by way of improved infrastructure and better socio- economic condition.