



## **1.0 EXECUTIVE SUMMARY**

### **1.1 Introduction on Wasni Project**

Government of Maharashtra (GoM) has been giving utmost importance for developing the irrigation projects for transforming the underutilized dry lands into perennial green fields and enriching lives of people, particularly in the draught prone areas. The proposed Wasni Dam Project is one among such projects.

There have been persistent demands and agitations by farmers of the drought prone areas of Achalpur tahasil of Amravati district for assured surface-water irrigation facility, as their areas are totally dependent on mercy of monsoon and frequently facing severe droughts. In view of the fact there are no dependable water resources other than Sapan River; and groundwater is not suitable for irrigation on account of very higher concentrations of calcium carbonates, dissolved solids and hardness; and no other site is suitable for construction of a dam across Sapan River in downstream of the existing Sapan dam in foothills of Satpura ranges about 30 km from Wasni site; the only suitable site at Wasni Bk has been selected for construction of Wasni Dam. This project would provide safer irrigation facility to 4317 ha irrigable command in Achalpur, Daryapur and Anjangaon tahasils of Amravati district.

### **1.2 Benefits of Wasni Dam Project**

The following are the anticipated benefits from the Wasni Dam Project:

- With provision of assured and quality surface water for irrigating 4317 ha ICA, this project would transform the lives of about 20000 people in the drought prone area and enrich their quality of living;
- About 4.277 Mm<sup>3</sup> water will be supplied for drinking purposes in the nearby areas of the project;
- As the terrain has only gentle slopes without any major slight undulations, the shallow canal construction does not envisage deep cuttings or major embankments resulting in water seepage;
- Least drainage problems are anticipated as adequate ground slopes are available; and the groundwater tables will never pose problem as they are very deep;
- No reserved forests or ecologically sensitive areas exist in the project area, hence the issues related with losses of these areas are not involved;
- After completion, this would provide immense benefits to its command area and also would have multiplier effect in the region.

### **1.3 Necessity of EIA & EMP for Wasni Project**

Wasni Project is an irrigation project proposed for providing irrigation facility to 4317 ha; hence this requires an Environmental Impact Assessment (EIA) report and Environmental Management Plan (EMP); and environmental clearances from the Maharashtra State Environment Impact Assessment Authority (MSEIAA). In order to meet the statutory requirements, the EIA and EMP have been prepared by covering the following major aspects:



1. Establishing the existing environmental and socio-economic conditions in the proposed project area through review of literature and also conducting primary environmental monitoring, covering Post-monsoon season of year 2009;
2. Environmental Impact Assessment i.e. assessing the impacts of the proposed project on various environmental and socio-economic parameters;
3. Environmental Management Plan for outlining mitigation measures for limiting any likely adverse environmental and social impact due to the proposed project and to ensure the environmental conditions in the project area would improve further for environmentally sustainability and in no circumstances, these would deteriorate;
4. Social Assessment for assessing the Socio-economic status of the project affected persons and displaced persons from the submergence area;
5. Rehabilitation & Resettlement Plan for resettling the displaced persons from 3 villages
6. Developing a Command Area Development Plan;
7. Developing a Catchment Area Treatment Plan;
8. Identification of critical environmental and socio-economic attributes that required to be monitored and developing a suitable post-project monitoring program;
9. Providing a framework for institutional strengthening and implementation of the suggested mitigation measures.

#### **1.4 Baseline Environmental Status**

The existing baseline environmental conditions and social aspects pertaining to the project area have been established through review of secondary data and also through primary field surveys covering aspects related to land use, micro-meteorology, ambient air quality, water quality, soil quality, noise levels, aquatic and terrestrial ecology during Post-monsoon season of 2009.

##### **1.4.1 Physiography of the Project Area**

The command area of the project has gently sloping terrain and facilitates most irrigation by gravity from the distribution chamber. Minor irrigation tanks and ponds in the command area are totally absent.

##### **1.4.2 Geology**

The only geological formation in Wasni area is the Deccan basalt flows with intertrappean beds at places. The river banks are covered by alluvium, sand and silt. No minerals of economic importance are known to occur in any part of project area.

##### **1.4.3 Seismicity**

In the seismic zoning map of India as per IS 1893 (Part-I):2002, the Wasni Dam site falls in Zone-II, with a basic horizontal seismic coefficient of 0.029, which is not considered to be prone for severe earthquakes.



#### 1.4.4 Meteorology & Climate of Project Area

The climate of project area is characterized by general dryness throughout the year except during the southwest monsoon season. The project area falls in the 'Scarcity' Agro-climatic zone and the rainfall completely depends on vagaries of monsoon. This area frequently faces severe drought conditions resulting in partial or complete failure of crops and lead to scarcity conditions.

The Cold season prevails from December to the middle of February. This is followed by hot season which lasts till the end of May. June to September is the south-west monsoon season and the two months October and November, constitute the post-monsoon representing the retreating-monsoon.

In western parts the climate is pleasant with moderate temperatures and becomes hotter in the east. May is the hottest month while December is the coldest month. The lowest temperature recorded was at 5.3<sup>0</sup> C in February 2000 and the highest temperature was recorded at 46.6<sup>0</sup> C in June 2003

The command area remains dry during the pre-monsoon and winter, whereas during the monsoon and post monsoon season there is increase in the moisture levels in the air. The morning least relative humidity varied from 20% during pre-monsoon to the highest maximum of 97% during monsoon. The evening relative humidity ranged from least 14% to the highest of 95% during the pre-monsoon and monsoon seasons respectively.

The average annual rainfall of project area during 1997-2005 was 692.68 mm. The highest rainfall of 1000.7 mm was recorded in 1999 and the lowest 367.8 mm in 1997. The heaviest rainfall during any 24 hours duration was received on 14<sup>th</sup> June 2001 measuring about 194.8 mm.

Winds are light to moderate in other seasons and during south-west monsoon these become stronger. The mornings are calm as compared to the evenings.

#### 1.4.5 Soil Environment

Soils of the project area belong to the Purna alluvium and are deep blackish. These are good in fertility but contain very higher concentrations of calcium carbonate. Some patches of these soils may develop saline-alkaline conditions in the post-irrigation period, if these are not properly managed.

During the EIA period 6 soil samples have been tested once during Pre-monsoon of 2009. These showed slightly moderately alkaline conditions with reference to pH, which is a common phenomenon in this drought prone area. None of the soils samples showed acidic conditions. Organic carbon is low in these soils. Potassium is very high in soils while nitrogen is very low and phosphorus is low. The micro-nutrients associated with heavy metals in soils showed deficiency of zinc. The hydraulic conductivity is slow to moderately slow. This indicates that the area is free from pollution, but deficient in some micro nutrients.

#### 1.4.6 Water Environment

Sapan River and its tributaries Bichan and Pili Rivers are the important water courses in the project catchment area. All rivers are non-perennial and the flows are mostly confined to monsoon and some part of post-monsoon. During pre-monsoon season all rivers go practically dry.



The groundwater conditions in the command area are very poor with very higher levels of calcium carbonate, dissolved solids and hardness. Least groundwater table fluctuations have been reported in this area during the pre and post monsoon seasons due to alluvial soils. Very few wells are feasible in watersheds.

During EIA period, primary water table fluctuations have been measured at 10 open wells during Pre-monsoon of 2009. The water table fluctuations were reported to be marginal, however at very deeper levels ranging from 16-20 m below the ground level. The reported ground water fluctuations indicate that the area is not likely to experience drastic water table increase in a short duration; hence not likely to cause water logging problems associated with the higher water tables, in the post irrigation period.

For establishing water quality, 6 groundwater samples during the pre-monsoon season and 3 surface water samples during the post-monsoon season of the EIA period were collected and analyzed. The water quality of Sapan River at different locations revealed it is neutral. On account there is no intervention of chemicals and interference of industrial pollutants, heavy metals in water are within prescribed limits. However, fecal pollution in water is noticed due to the anthropogenic activities along the river. The Sapan River water is suitable for irrigation of saline tolerant crops; and suitable for drinking, but only after disinfection.

The groundwater quality reveals it is containing higher concentrations of dissolved solids, hardness hence not suitable for drinking or irrigation, particularly in the local alluvial soils having higher levels of calcium carbonates. It is anticipated, after introduction of irrigation in the area, due to percolation of Sapan River waters into the sub-surface, the dissolved solids and hardness in groundwater will be diluted to some extent; hence the prevailing generic problems will be marginally reduced.

#### 1.4.7 Noise Environment

Noise monitoring carried out in 5 locations of the study area in pre-monsoon season showed, at all locations noise levels were found to be 55.8 – 61.6 dBA which are within the permissible levels for rural and residential areas.

#### 1.4.8 Air Environment

The proposed Wasni Project is an irrigation project; hence the impacts related with air pollution would be minimum and would exclusively be confined to the construction phase only. The baseline air quality, conducted at 3 locations covering both banks of Sapan River and along the proposed canal alignment during Pre-monsoon of 2009, revealed that all air quality parameters such as SPM, RPM, SO<sub>2</sub> and NO<sub>x</sub> are within permissible limits and in conformity with the rural/residential norms of National Ambient Air Quality standards prescribed by CPCB.

#### 1.4.9 Land Use Pattern

It is revealed that crop land is the most predominant land use in the project command area as almost all lands are used for cultivation. The area under agriculture is followed by scrub land and barren land. No lands are left as fallows.



#### 1.4.10 Ecology

There are no natural forest growths in Wasni Project command area or submergence area. However, 24.37 ha land belonging to Forestry Department and having only degraded shrubs and bushes would get submerged under the reservoir. There are no wildlife sanctuaries or protected areas in the project area. Excessive biotic interference in the region has resulted in dry conditions hence xerophytic species are predominant.

The existing ecological conditions in the project area have been established based on review of secondary information and also conducting detailed primary ecological field surveys at 7 terrestrial sites and 7 aquatic sites during post-monsoon of 2009. These represented 3 types of physiognomic and habitat categories.

Altogether 376 species of plants have been recorded during the primary sampling studies. The vegetation studies showed highly degraded landscapes due anthropogenic disturbances. Although clear cutting was not observed in the sampling sites, disturbance in terms of heavy grazing is found to be common. The tree cover is sparse and mostly consists of exotic and invasive species. The submergence and command area does not contain any endangered or threatened species of plants having significant conservation value.

Aquatic ecological studies revealed the presence of different species of algae, phytoplankton and zooplankton in Sapan River. The biotic community composition reveals these are mesotrophic with neutral or moderately rich nutrients indicating absence of pollutants.

The fauna of the study area mostly consists of commonly occurring species and no endangered species are reported. About 74 bird species are reported from the area, mostly around the rivers. Most of the birds belong to Schedule IV. Only House crow is listed in Schedule V. No birds belonging to Schedule VI i.e. endangered, threatened, vulnerable categories are observed in the study area.

There are about 16 species of mammals in the area and most of them belong to Schedule-II to IV. Only House rat has been found to be in the Schedule-V category. About 13 species of reptiles belonging to Schedule-II and IV categories and about 24 types of fishes are reported from the project area. About 21 species of butterflies have been noticed in the study area.

#### 1.4.11 Healthcare Systems

The study area has a reasonable network of health facilities. Paratwada town has a Rural Hospital. Yesurna village has Primary Health Centre (PHC) and the larger villages have health sub-centres. Besides these regular medical services under the supervision of doctors and paramedical staff, some public institutions such as selected Gram Panchayats, Schools and Anganwadi centres also function as the Drug Distribution Centres for preventive health care. There are a few private clinics in bigger villages.

Malarial diseases are reported from the project area, and these are mainly due to the water storage habits of people in view of prevailing scarcity conditions. More occurrences of Malaria have been reported during pre-monsoon and post-monsoon months during May and November. No epidemics related with JE have been reported during the past five years.



Regular anti-malarial activities like spraying and also undertaking biological control measures by means of culturing Guppy fish hatcheries near the mosquito breeding places for preventing mosquitoes breeding are being practiced. Besides administering medicine to the patients, Passive Surveillance by collecting blood smears intensive mass surveillance activities are carried out regularly.

#### 1.4.12 Demography and Socio-Economics

As per 2001 Census the total population of Wasni command area was 19302. The total male population worked out to about 51.53% and the females to be about 48.47%. The sex ratio, which is expressed as the number of females per 1000 males, was observed to be about 940, which is considered to be low.

About 24.8% of the population in the command area belonged to Scheduled Castes (SC), while 4.57% of the population belonged to Scheduled Tribes (ST) thus indicating that socially backward castes constituted to about 29.37% of total population.

The command area experienced a moderate literacy rate of 75.02%. The male literacy rate, i.e. the percentage of literate males to the total literates worked out to be 80.38%. The female literacy rate, which is an important indicator for social change, was observed to be 69.32%.

As per the 2001 census about 48.87% of the population was engaged as workers in different occupations. The main workers and marginal workers constituted about 36.06% and 12.81% of the total population respectively. Cultivators and agricultural labourers were most predominant categories among the main workers as well as marginal workers. The main and marginal cultivators formed about 9.33% and 1.37% of total population, thus indicating that about 10.70% population belonged to category of cultivators. The main and marginal agricultural labourers formed about 23.12% and 10.38% of total population, thus indicating that about 33.50% population belonged to category of agricultural labourers.

The command area is devoid of any industry. Hence, only about 0.80% of population is engaged as the household industrial workers. About 0.55% of population is engaged as the main household industrial workers while about 0.25% is engaged as the marginal industrial workers.

#### 1.4.13 Land Acquisition & Resettlement Issues

About 437.31 ha private land presently used for cultivation or left as barren lands falling within the flood prone area along Sapan River would be acquired for the project. This land is owned by 409 landowners (PAFs). Due to land losses about 160 PAFs are likely to become landless.

On account of formation of reservoir, Bargaon Dori village will be totally submerged and Bargaon Talni and Bargaon Peth villages will be partially submerged. About 574 families from these villages will be displaced; hence these would be resettled in the proposed resettlement colonies outside the areas of submergence. Comprehensive rehabilitation & resettlement benefits will be provided to these displaced persons as per the provisions of the Maharashtra Project Affected Persons Rehabilitation Act, 1999.



#### 1.4.14 Places of Historical and Archaeological Importance

There are no temples or monuments notified by the Archaeological Survey of India as well as the Maharashtra State Archeology Department, in the submergence and command area of the project.

### 1.5 **Environmental Impact Assessment**

Wasni Project will provide immense benefits to the severe drought prone area by means of providing assured irrigation facility. This is not anticipated to cause major environmental impact due to its medium size and nature, though a few minor impacts related with land acquisition and drainage may take place, if appropriate management measures are not implemented.

#### 1.5.1 Impacts during Construction Phase

Levelling of site for construction of the dam, excavation of canals, transportation and stacking of excavated material from the project sites, etc. will be undertaken during construction phase, and all these will have some short-time impacts which will be confined to only to the construction phase.

During construction period, on account of blasting, drilling, operation of DG sets and plying of heavy earth moving vehicles, trucks and dumpers, the dust levels in the atmosphere will be increased. Also the gaseous emissions from vehicles and DG sets will cause for increase in gaseous pollutants at the project sites. Hence these would have some impacts on the ambient air quality in the area, though these will not be very high.

Burning of firewood/fuel by the construction workers for their cooking might cause some impacts.

#### 1.5.2 Impact during Operational Phase

During the post-irrigation phase all environmental impacts associated with the construction stage would be ceased. The only adverse environmental impact that may take place during this phase is the drainage problem, that too if proper drainage measures are not implemented in the command area. Increased use of fertilizers and pesticides causing adverse soil conditions in this phase may not be ruled-out.

##### 1.5.2.1 *Positive Impacts*

- Impact on Social Environment

During the operational phase Wasni Project would provide immense benefits to farmers of this drought prone area by means of dependable and assured irrigation facilities. This will enable the farmers who at present are hardly taking a single crop to take at least 2 crops with enhanced cropping pattern and crop yields. A large number of agricultural labourers who are getting wage labour only for a few weeks in a year at present will secure assured employment for about 6-9 months in a year. The fisheries development in the reservoir and rivers would lead to enhanced income to the fisher-folk having access to the fisheries. All these are positive impacts due to the project and would transform the living conditions of people in the command area and fisher-folk having approach to the reservoir.



Besides providing irrigation facility and direct employment to the entire command area, this project would indirectly create impetus to the development of agro based and allied ancillary industries and infrastructure development in the region and provide direct and indirect employment to a large number of people. This will lead for overall economic development with a multiplier-effect in the backward area and will enhance revenue accruals to the State exchequer.

- Impact on Land Use

The Wasni Project will transform large extent of dry lands in the severe drought prone areas into lush green irrigated fields by providing assured irrigation facilities. Besides economic development, this project would also enhance the scenic beauty in the command area with lush green fields. The proposed tree plantations around the dam and along the canals will improve aesthetic beauty.

- Impact on Surface & Groundwater Resources

As only the allocated water for the project would be utilized, this would not cause any adverse impact on the downstream water resources, competing water users or riparian-rights of the downstream areas.

Due to presence of water in river and canals; and command area fields, percolation of water into the sub-surface will take place and this will recharge the groundwater table which is very low at present. This is a positive impact due to the project.

- Impact on Groundwater Quality

With application of surface water for irrigation in the soils having generic adverse conditions with higher concentrations of calcium carbonates; percolation of water to the sub-surface will take place and this may dilute the prevailing pollutants in soils and groundwater substantially, and improve soil and groundwater quality in the command area. This will lead to cultivation of healthier crops and higher crop yields, which are positive impacts due to the project.

- Impact on Ecology and Bio-Diversity

Due to formation of reservoir and storing water in the submergence area, ecological conditions of the river will be improved with presence of aquatic life. The terrestrial ecological conditions along the river banks will be substantially improved by providing fodder and nesting facilitate for the wildlife. Also due to the anticipated groundwater recharge, vegetation in the area will be enhanced, which is a positive impact. Availability of water in the reservoir and canals and plantations around the dam and along canals would attract more birds and enhance presence of avifauna in the region.

There are no rare or endangered fauna and migration-routes of avifauna in the project area. Hence impacts related with these sensitive aspects are not involved in this project. No adverse impacts are anticipated on downstream aquatic life in the river, as controlled water flows will be maintained.

After construction of dam and formation of reservoir the prevailing habitats of local wildlife will be affected to some extent, however temporarily. The reservoir will inundate only a smaller area and huge areas suitable for habitats of wildlife outside the submergence area are available in the river valley; hence after





formation of reservoir, the affected wildlife will shift to other areas outside the submergence area. As habitat requirements of the local fauna are general and can be served by the areas adjacent to the reservoir, no significant impact on wildlife will be occurred.

- Impact on Climate

On account of presence of water for more duration in the reservoir, rivers, canals and irrigated fields the relative humidity in atmosphere will be increased and the temperature levels would be fallen to some extent in this summer-scorch region.

- Impact on Water Resources

By storing the water which otherwise was draining-out to the downstream areas, this project will enhance water resources in the region. The annual net available yield of Sapan River at Wasni Project is about 31.250 Mm<sup>3</sup>. As only the allocated yield will be utilized, this project will not create any adverse impact on the downstream users.

- Impact on Aesthetics

Construction of dam and formation of reservoir and canals will create water fronts in the area and will improve the aesthetic values in this otherwise dry area. The reservoir may facilitate boating and water sports. The proposed tree plantations around the dam and canal, and development of gardens at the dam-foot will enhance scenic beauty in the project area. These will serve as picnic spots in the region and may attract many tourists; which are positive impacts due to the project.

#### *1.5.2.2 Likely Adverse Impacts*

- Impact on Soil

Major extent of the command area has moderate slopes and soils have moderate infiltration rates. The ground water tables in the entire command area very deep; hence major problems associated with water logging and the resultant soil salinity are not anticipated. Even if these would be resulted, these can be mitigated with suitable surface and sub-surface drainage arrangements.

- Impact on Noise Levels

The major noise generating activities during Dam and canal construction phase would be the drilling, excavation, operation of construction equipment, plying of construction vehicles and blasting. During the construction phase, the construction activities would have some noise impact on people and wildlife. The anticipated noise levels would be around 80-90 dBA at the project site during the peak hour construction period. Blasting would have some impact on Wasni Bk and Wasni Khurd villages and wildlife in the submergence area. This may cause for temporary shifting of wildlife in vicinities of dam to other nearby areas.

During the post-construction phase of the project all noise generating activities will be ceased. The only major noise generating activity during this phase is operation of dam gates, that too only when the reservoir is full.



- Impact on Ambient Air Quality

During the construction phase of the project, due to operation of construction and excavation equipment and DG sets, some gaseous pollutants would be resulted. These impacts would be of short-term and purely temporary in nature. No village including the nearest Wasni Bk and Wasni Kh will be affected due to air pollution, as these villages are located at about 300 m from the dam site. During the operation phase of the project, no air quality impacts would be involved.

- Impact on Wildlife

During construction period the prevailing wildlife at the proposed dam site and its vicinities will move away from their habitats due to disturbances, which will be an adverse impact. After formation of reservoir the wildlife in the submergence area will move to other nearby areas, as the habitat requirements of the local wildlife are general; and ample numbers of suitable sites for their habitats are available in the nearby areas. Though this is an adverse impact this would occur only have only a temporary impact.

In the initial days of canal excavation, due to dissection of the area by the canal, the excavated canals may act as barrier for free movement of people and animals. These would however cross the canals above the constructed bridges, after construction of the bridges. Hence, the impacts will be temporary.

- Impact due to Excess Use of Fertilizers and Pesticides

In the post-irrigation scenario, farmers may tend to use more fertilizers and pesticides, and excessive use of these may result in soil and water pollution. Hence, it should be essential to use the fertilizers and pesticides in a judicious manner without causing soil and water pollution.

- Impact on Human Health

With presence of water for more duration, the humidity levels in the atmosphere will be increased and this may lead to some water related vector borne diseases. Also due to possible proliferation of mosquitoes and snails, some water borne diseases are likely to be resulted during the monsoon and post-monsoon seasons in the command area.

## **1.6 ENVIRONMENT MANAGEMENT PLAN**

Wasni Project would have some social and environmental implications though they are anticipated to be the minimum. To further minimize the environmental losses and negating adverse impacts to the possible extent through technical judgment and implementation of appropriate mitigation measures, an Environmental Management Plan has been developed.

### **1.6.1 Environment Management Plan during Construction Phase**

The following mitigation measures during construction period would be needed:

- Undertaking excavations and construction activities at the project sites with utmost care to the environmental aspects and safety measures;
- Using the generated muck from project sites for constructing the earthen dam if suitable, or filling the low-lying areas;



- Stacking the surplus material in identified muck disposal sites away from the project site, with appropriate slopes, in a systematic manner;
- Compacting of muck dumps, covering them with topsoil excavated from construction sites and undertaking plantations on them for minimizing erosion;
- Adopting appropriate measures for minimizing vibrations and noise levels during blasting;
- Carrying out construction activities only during daytime in order to avoid noise impacts on the surrounding areas;
- Undertaking dust control measures such as water sprinkling on the haul roads;
- Maintaining the diesel powered construction vehicles properly for minimizing smoke emissions;
- Providing noise protection devices like earmuffs and earplugs to the workers operating the high noise generating equipment;
- Providing adequate numbers and sizes of road bridges wherever the canal severs the existing road/cart tracks;
- Providing footbridges wherever the traditional paths are severed due to canal construction;
- Provision of cooking fuel to construction workers through contractors to prevent felling of trees for fire wood for their cooking; and
- Provision of separate and adequate sanitation facilities for male and female workers and providing septic tanks to toilets at construction camps.

#### 1.6.2 Management Plan during Operational Phase

The following mitigation measures would be required during the operational phase of the project:

- Undertaking tree plantations at the dam-foot, around the dam and along the canal;
- Growing grasses on the muck dumps formed along the canals for their strengthening, and preventing from erosion;
- Nurturing the plantations through the Social Forestry Department, at least for 3 years till the plants become self-sufficient;
- Providing sub-soil drainage at places where water logging is anticipated;
- Imparting training to farmers for optimal use of fertilisers and pesticides as per the actual requirements of crops based on scientific evaluation of fertility status; and preventing their excessive use, which otherwise may adversely affect the crops;



- Implementing crop-cycling for improving organic matter in soils and giving slight inputs of nutrients to enhance the crop pattern and crop yields;
- Undertaking periodic water quality testing of Sapan River, and if the water quality is not meeting the standards, appropriate treatment measures would be undertaken for ensuring proper water quality;
- Ensuring no illegal felling of trees takes place in the vicinity of project sites;
- Minimizing movement of project vehicles and excessive blowing of horn and lighting during night time to avoid disturbances to wildlife in project area;
- Undertaking strict law enforcement measures for conservation of wildlife near the dam and along canal;
- Undertaking appropriate measures for development of fisheries and aquatic life in the reservoir;
- Preventing excessive growth of aquatic weeds in reservoir for controlling nutrition levels, and to allow free-flow of water in canals;
- Creating fisheries hatcheries and culturing fish in existing tanks of the command area and reservoir for creating employment to people and improving water quality in water bodies; and
- Undertaking catchment area treatment plans and soil conservation measures in critical areas prone to soil erosion by means of watershed management plans by the Soil Conservation wing of Agriculture Department and Forest Department of Government of Maharashtra for minimizing sedimentation in reservoirs and other water bodies.

### 1.6.3 Command Area Development

The command area development programmes encompass integrated development of water resources, judicious method of water application, suitable soil and crop management practices and scientific scheduling of irrigation. They mainly include:

- Adopting suitable conservation measures like land development or land shaping, smoothening, grading and forming earth bunds and land levelling;
- Construction of field drains with appropriate sizes;
- Providing efficient surface drainage for removal of excess water which may occur due to heavy rains/ seepage from canals or excessive irrigation;
- Providing efficient sub-soil drainage for removing the excess water from the sub-soil areas;
- Stabilizing, strengthening and deepening the existing main drains to the possible extent to for enabling them to carry excess water from fields, rapidly; and
- Restoring soil quality with gypsum or chemical treatment if these are affected due to water logging.



## **1.7 Public Health Management**

Public Health management measures include:

- Undertaking adequate curative and preventive measures for eliminating the risk of outbreak of any water borne and parasitic disease in the area;
- Strengthening the existing healthcare facilities by appointing adequate number of medical and paramedical staff;
- Maintaining good environmental, health and sanitation conditions at the construction camps; and
- Carrying out regular surveillance and health improvement programs by the Health Department for preventing health disorders in command area.

## **1.8 Post-Project Monitoring and Management**

During post-project monitoring stage, for effective environmental management soil and water quality in some critical areas of the command area needs to be monitored. Developing an Environmental Management Program under the Coordination Committee of the Water Resources and Agriculture Departments and implementing the identified mitigation measures in environmentally problem areas would safeguard environmental conditions in the project area.

## **1.9 Organization for Environment Management**

The Superintending Engineer of Akola Irrigation Circle would implement the proposed Environment Management Plan in coordination with various departments of GoM.

## **1.10 Budgetary Allocation for Environmental Measures**

The total cost of Wasni Project is estimated to be about Rs. Rs. 10281.80 lakhs. Of this about 16.673 lakhs will be used for tree plantations in vicinity of dam and along the canal. It is presumed that about 25% of the CCA would require land drainage; and the costs of implementing drainage measures have been estimated to be about Rs. 275.00 lakhs at the rate of Rs. 25,500 per ha.

## **1.11 Conclusions**

The proposed Wasni Project will provide assured surface water irrigation facility to about 4317 ha ICA. With its immense benefits to the severe drought prone areas of Amravati district, this project would lead for overall socio-economic and infrastructure development of the region. By supplying considerable quantities of food and non-food products, this project would be beneficial even to the other areas. **With impressive Benefit Cost Ratio of 1.584 and least environmental and social impacts; the proposed Wasni Project is justifiable.**