

Environmental Monitoring & Impact Assessment of Wasni (BK) Dam

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Abstract— Maharashtra is one of the Indian states mostly relying on agriculture. The Government of Maharashtra has been giving utmost importance for developing irrigation green fields. Under its efforts, the State has formulated a few Irrigation Development Corporation (VIDC) has been formulated for increasing irrigation potential of Vidharbha region of Maharashtra. VIDC has undertaken a few major, medium and minor irrigation projects based on the yields from catchment areas of respective projects. For the urban Indian, the word 'irrigation' conjures up images of first Prime Minister of India, Jawaharlal Nehru, and the Bhakra Nangal Dam (Temples of Modern India) and the tribal ousts of the Narmada dam. These are diverse perspectives on the story of large irrigation infrastructure in India. In fact, in popular public perception, irrigation connote 'large irrigation infrastructure' rather than provision of irrigation services. Agriculture is the backbone of Amravati district, in which the command area of Wasni project is an integral part. Most of the people are poor and economically backward. The proposed command area or its vicinities are devoid of any assured irrigation facility, through Sapan River potential for a medium project flows just adjacent to these areas, with its waters being unutilized. Because of the scarcity of the water there is a need to do socio-economic impact of Wasni(BK) dam.

Keywords- *Socio-economic impact ; Dam ; Wasni (BK) Dam*

I. INTRODUCTION

Agriculture is the backbone of Amravati district, in which the command area of Wasni project is an integral part. Most of the people are poor and economically backward. The proposed command area or its vicinities are devoid of any assured irrigation facility, through Sapan River potential for a medium project flows just adjacent to these areas, with its water being unutilized. Other than Sapan River Project constructed in foothills of Satpura hill ranges, no other dam or barrage has been constructed across Sapan River so far; and even Sapan project does not provide irrigation facility to the proposed command area of Wasni Medium Project or its vicinities. Due to non-harnessing of river discharges for irrigation, waters of this river are flowing down onto Chandrabhaga River, and farmers are devoid of any assured irrigation facility and their fate is merely dependent on vagaries of monsoon and at their worst times, some farmers committed even suicides while unable to sustain the irrecoverable crop losses. Even in good times, farmers having private irrigation facilities are growing Rabbi Crops.

Geologically the project area falls in Purna alluvial region having poor groundwater associated with higher concentrations of dissolved solids and hardness while rendering the groundwater un-suitable for irrigation. This situation becomes rather worst, as soils in the region have higher concentrations of calcium carbonates and heavy metals by making the soils not congenial for irrigation with the prevailing poor quality groundwater as the source. Even this groundwater is available only in limited quantities that too in

wells and bore-wells having 15-25 m depth below the ground level. Hence the groundwater is rarely used for irrigation in this area. Though the soils are not well-suited for irrigation with the local groundwater as the source, these are found to be suitable for irrigation with the surface water resources having their origin outside the project region. In view Sapan River originates in Satpura hills near Chikaldara, outside the alluvial region, surface waters of this river are most suitable for irrigation on the poor quality soils of the region; hence this project will be of immense use for socio-economic development of the region. For adequately addressing to the long-pending issue of harnessing Sapan River waters for mitigating the scarcity of irrigation and drinking water in the drought prone area of Wasni region, and optimally utilizing the available water, the Wasni Medium Project across Sapan River is proposed. This project will provide assured irrigation facility by supplying good quality Sapan River water to about 4317 ha irrigable command area, which at present is not being irrigated with groundwater as the source due to adverse groundwater and soil conditions. This project will facilitate farmers to take double crops and helps in boosting their agricultural income while resulting in enrichment of their lives. Wasni Project will also augment civic water supplies in the region presently experiencing inadequate civic water supplies. As a whole this project will boost the all-round prosperity in the region with a multiplier effect and contribute for increase in the Gross National Product. In view of the above immense benefits, the Executive Director of VIDC had

accorded Administrative Approval to Wasni Project on 14.02.2008.

II. OBJECTIVES

1. To study the construction of dam site project of Wasni dam.
2. To identifying the baseline environmental status of the proposed dam site.
3. To find out and analysis of the environmental impact assessment and environmental monitoring program during the construction phase.
4. Construction management studies & benefits of the project of the Wasni dam.
5. To define environmental management plan.

III. METHODOLOGY

1. Studying all available literatures for the project under consideration.
2. Selection of dam site for detailed case study.
3. Analysis of observations made from the case studies.
4. Synthesis of the lessons learnt and recommendations for best practices.
5. Collecting questionnaire and required data.
6. Collecting data regarding training from sites.
7. Applying / suggesting revised incentive and training scheme on site.
8. Drawing conclusion.

IV. THEOROTICAL CONTENTS

A. Brief Description and Major Components of Wasni Medium Project

Detailed description of the project is provided in Chapter-2. The main components of Wasni Project are a rolled-filled earthen dam, concrete spillway, right bank main canal and distribution network throughout 4317 ha command area. The total length of this dam is 2100 m including 137 m concrete dam. The maximum height of dam is 19.765 m. The gross and live storages of dam at its Full Reservoir Level (FRL) are 22.591 Mm³ and 19.657 Mm³ respectively. The Full Reservoir Level (FRL) and Top Bund Level (TBL) of dam are 337.90 m and 340.00 m respectively. The submergence ratio of this project is 10.61%. The annual utilization is 31.520 through a 13.24 km long, Right Bank Canal (TBC). This will feed branch canals and minor for distributing water to 4317 ha command area. For the project 434.94 ha private land owned by 407 private owners and 2 charitable trusts will be acquired. While about 249 PAFs will lose only part of their lands, about 160 PAFs are likely to lose their entire land; and are likely to become landless. About 5.0 ha barren land and 136 ha E Class land under water bodies of Sapan, Pili and Bichan rivers will be submerged, hence this will be transferred from revenue

Department of GoM to Water Resources Department of GoM. About 24.37 ha forest on banks of Sapan River and Pili Nadi land having zudpi jungle will be submerged. The Ministry of Environment and forests (MoEF), Government of India has already accorded Forest Clearance and transferred this forest land for Wasni Project purposes against transfer of equivalent extent of revenue land to Forest Department in Vishroli village of Chandur Bazar tehsil in Amravati district; and payment of Net Present Value (NPV) by the project authorities. Due to this project Borgaon Dori village will be totally submerged and major extent of Borgaon Talni village will be submerged. Hence all displacing families from these villages will be resettled in alternate new gaothans (resettlement colonies). Borgaon Peth village will be partially submerged hence only the displacing families of this village will be resettlement in the new gaothan. Altogether about 574 families from these three villages will be displace. All displaced families will be resettled in the proposed new resettlement colonies in accordance with the Maharashtra Project Affected persons Act, 1999. The land affected PAPs will be provided alternative lands as per the Government of Maharashtra norms.

The project command area is on a gently sloping terrain having good network of drainage pattern, hence not likely to experience irrigating induced water logging after irrigation is provided. Also, the canal does not pass through deep cuttings or major embankments causing major environmental impacts associated with seepage from the canal. Accordingly the adverse impacts during the operational phase of the project will be bare minimum.

The project cost was estimated at Rs. 102.82 crores lakhs in year 2008 but subsequently approved for Rs. 197.82 crores on 15.01.2009. the cost per Mm³ gross storage of water is about Rs. 875.641 lakhs. The cost per 1.0 ha irrigable area is Rs. 4.579 lakhs. The Benefit Cost Ratio is estimated to be 1.584 i.e. more than the desirable BC Ratio 1.5. Hence this project is financially viable.

B. Need for EIA and EMP

As this project will submerge considerable extent of land this is likely to cause some environmental and social impacts in the project area. In order to mitigate any anticipated adverse impacts due to implementation of this project and further improve the prevailing environmental conditions, Environmental Impact Assessment (EIA) & Environmental Management Plan (EMP); Social Assessment (SA) and Rehabilitation & Resettlement Plan; Risk Assessment & Disaster Management Plan (Emergency Action Plan) are essential.

Through the proposed Wasni Project may cause minimum environmental and social impacts, this project requires Environmental Clearance from the Maharashtra State Environmental Impact Assessment Authority, as it falls in 'Category – B' from the environmental angle; and necessitates an Environmental Impact Assessment (EIA) report for assessing the likely environmental impacts due to the project implementation and Environmental Management Plan (EMP) for suggesting appropriate mitigation measures for their execution for mitigating the likely adverse impacts, if any.

C. Definition of Project Affected Families (PAF)

For this study, a 'Family' or 'Household' is defined as a group of persons who are affected to the project commonly live together and take their meals from a common kitchen and stay under the same roof, unless the exigencies of work would prevent them from doing so. Accordingly, a household may comprise persons related by blood or unrelated persons or both.

Another important parameter considered in this study for defining a displaced Family and PAF is the land ownership record. In many cases, through the members of a family live together and stay in the same house while sharing the same kitchen, the ownership of different landholdings was registered with more than one member of the family. This may be due to many reasons such as security in the old age, fear of land grabbing by close relatives in case of death of the family head and fear of losing the land through the Land Ceiling Act, etc. If partition of landholdings has taken place at the household level, however, not registered with the appropriate authorities; it is considered that the affected land belonged to the person in whose name the land is being held. In all cases, every individual land loser in whose name the land unit was registered was considered as a Project Affected Person (PAP) irrespective of the number of landholdings he is losing through land acquisition. Similarly the displaced families have also been identified based on house ownership records. Wherever there is more than one PAP in the same family, however sharing the same kitchen along with others, these are clubbed together as one Project Affected Family (PAF). The demographic and socio-economic aspects of all members of the PAFs were studied with reference to the entire family. The survey has generated a comprehensive database on the baseline conditions of PAFs with reference to their social, religious, economic aspects including landholding pattern, livelihood and their perception and opinion about the project, as detailed in the following sections.

D. Socio-Economic Household Surveys

In the Socio-Economic Household Survey, 290 PAFs were contacted for establishing their baseline socio-economic conditions. In each selected household, the head of the family or any available adult member having knowledge about all particulars of the family were interviewed. Most questions were addressed to him/her. However, in the process of interviewing, wherever possible all the family members were also included since, the questionnaire was designed with the "family" as a unit for inquiry.

For carrying out the socio-economic surveys of the PAFs, the field investigators were recruited from the local area based on the criteria of ability to communicate and take notes during interview, mobility and a minimum qualification of graduation. The selected candidates were given training, on conducting interviews and coding the responses. Senior supervisors having adequate experience in supervising the surveys were deployed for supervision of survey process. The collected data was verified on a sampling basis and necessary corrections were carried out, wherever necessary.

A socio-economic survey questionnaire was designed and pre-tested through a pilot survey in villages prior to conducting the detailed survey. Based on findings of the pre-testing, the

questionnaire was modified and canvassed before conducting detailed surveys.

E. Applicable Administrative & Environmental Regulations for Wasni Project

Wasni project is an irrigation project not involving construction of a huge dam or formation of huge reservoir. Through this proposed project falls under the category of medium irrigation project, this does not involve any complicated works which may alter the environmental conditions substantially; which would not have major environmental impact.

Wasni Project being an irrigation project, this is governed by the Environmental Impact Assessment Notification, 2006 which notifies that any irrigation project having considerable culturable command area shall not be undertaken or expanded in any part of India Unless it is accorded Environment Clearance by the SEIAA. Accordingly this project requires environmental clearance from Maharashtra SEIAA.

Besides the EIA Notification, some of the other applicable legislations and guidelines pertaining to the project may include the following:

- Air (Prevention and Control of Pollution) Act, 1981, as amended in 1987;
- Water (Prevention & Control Pollution) Cess Act, 1977 as amended in 1991;
- Forest (Conservation) Act, 1980 and the Rules framed thereunder;
- Forest (Conservation) Rules, 1981, later amendments, Notifications & Guidelines issued there-under.

In order to assess the anticipated adverse impacts due to Wasni Project and suggesting appropriate mitigation measures an Environmental Impact Assessment/Environment Management Plan are essential. In order to secure approval for the proposed mitigation measures from the environmental statutory authorities for their implementation and secure environmental clearances for the proposed project, these EIA/EMP reports have been developed. The questionnaire the following aspects:

- Family size and status;
- Religion/caste;
- Migration;
- Age structure;
- Sex ratio;
- Marital status;
- Literacy levels;
- Special skills possessed;
- Occupational structure;
- Land ownership pattern;
- Crops yields;
- Irrigation facilities;
- Asset ownership pattern;
- Shelter profile;
- Infrastructure facilities;
- Income and expenditure patterns;
- Health status;
- Present Income Generation Schemes giving benefit to the PAFs;
- Aspirations of PAFs for better life after Land Acquisition;
- General suggestions for overall development of the region.

V. RESULT & DISCUSSION

Besides causing some minor environmental impacts, Wasni project would have some adverse impacts on the socio-economic conditions of the land losers (PAFs) for the project. In order to assess the likely impacts of the Wasni project on the socio economic conditions and lifestyles of PAFs, a Social Assessment has been carried out in this study and the descriptions are provided in respective sections.

After its completion, Wasni Project will provide immense benefits and positive socio-economic impacts to the command area people, however may cause some insignificant adverse impacts due to acquisition of a smaller extents of lands from the PAFs. In order to review the impact of the project on various aspects after its completion and to compare whether the project created positive or negative impacts on living standards or people at a future date, establishment of the present day socio-economic conditions of the people is necessary; hence the baseline socio-economic studies were conducted and Social Assessment of the PAFs has been done and the outcome of these is presented below.

In this study, the enquiry was focused on the following main indicators of the socio economic development.

- *Family*

In the survey, it was focused to find out the number of families affected due to acquisition by VIDC. The study may indirectly throw some light on the social aspects that may change due to land acquisition.

- *Income, Expenditure and Standard of Living*

Perhaps the most important effect of land acquisitions would be on the income, expenditure and standard of living of the affected families. This was in detail for understanding the present situation and recommending various improvement measure for the economic upliftment of the PAFs after land acquisition.

- *Aspiration for Better Life*

In this survey, people's perceptions on the land acquisition and the anticipated changes in their lives likely to lead to the better or worse, has also been studied.

VI. CONCLUSION

With completion of Wasni Project, some drought prone area of Amravati district will be transformed into lush green irrigated fields while bringing immense socio-economic benefits to the cultivators, agricultural labourers and other service providers in the region. This project will have a multiplier effect on development of the command area and beneficial to the region, Maharashtra State as well as the nation.

This dissertation aims at studying the causes and factors leading to cost and time overrun in irrigation projects. Cost and time is most important part of any construction project and influence each other significantly, often overruns are being reported in most of the irrigation projects. Many contributing factors has been identified, the critical of them is being sorted out by carrying out data analysis of seven Irrigation projects for cost and time overruns.

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