



POST PROJECT EVALUATION STUDY OF UJJANI PROJECT, MAHARASHTRA

TERMS OF REFERENCES (TOR)

1. Background: In Maharashtra, many major irrigation projects have been built incurring huge investment with a view to increase the irrigated area and thus sustaining the livelihood of farmers. While there are multitudes of positive attributes of irrigation projects, there is also a possibility that the benefits were overestimated and the costs and associated negative impacts were underestimated at the project planning stage. It is therefore necessary to have a clear and objective evaluation of such large scale public irrigation projects using improved methodology. With the aforesaid premise, Maharashtra Water Resources Regulatory Authority (MWRRA) intends to take up a post project evaluation study of Bhima (Ujjani) major irrigation project. The construction of Ujjani dam commenced in 1965 and completed in 1979. The live storage capacity of the reservoir is 53.57 Mcum and dead storage as 63.68 Mcum. An irrigation potential of 2, 27,708 ha (Cropped area) has been created by 2011.

The project was designed for eight monthly crop pattern (kharif 84%, Rabi 65% & two seasonal 3%) with irrigable area of 147800 ha. comprising the LBC (96,000 ha) and the RBC (51,800 ha), a government operated lift irrigation scheme namely Sina-Madha LIS covering about 15,000 ha irrigable area.. There is large number of private lift irrigation schemes developed on backwater having an irrigable area of 34883 ha.

. The canal network consists of LBC (126 km), RBC (132km) and Branch canals of 290 Km each with Distributaries and Minors in the command area. Sugarcane is a major crop and is grown on about one lakh ha.

Apart from irrigation it provides water for drinking purpose to 10 towns including Solapur, Pandharpur, Barshi, Sangola, etc. and to 416 villages covering total population of about 35 lakh. The project also supplies water for many industries in MIDC Baramati/ Loni-kalbhor/ Tembhurni. In addition power is also generated to the tune of 22 million units in the 12 MW

Power House at the dam foot. Thus, it has multi-purpose benefits. However, this needs to be compared with that envisaged in the project report. The total cost incurred for the project was more than Rs 1000 Crore.

Public irrigation projects are constructed to provide assured supply of water to crops so as to increase crop productivity and farmers' income and thereby achieving poverty alleviation of rural population. In past, some 4 socio-economic surveys were carried out by different agencies viz., Gokhale Institute of Economics and Politics, Pune (1978-79), Agri. University, Rahuri (1984-86), Marketing & Economic Consultancy Services (METRICS), Pune (1995-96), and WAPCOS, New Delhi (2003). Recently, MWRRA has also conducted evaluation study of Sina - Madha LIS that included socio-economic survey. However, there is no comprehensive report providing an overall evaluation of the project taking into account various direct and indirect benefits and achievements as compared to what was planned in the project report in its revised version.

2. Objectives: The Government of Maharashtra constructed Ujjani project with the multiple objectives of providing irrigation to rainfed areas, water supply to drinking and industrial purposes, besides power generation. The irrigation is also said to create multiplier impacts on the state economy. The main objective of the present study is to carry out a comprehensive post project impact evaluation of Ujjani project covering technical, social, economic, and environmental aspects. The study aims to know whether and how much the envisaged benefits considered at the time of planning of the project have been achieved or otherwise after almost three and half decades of the project operation. The specific objectives are as follows;

- To compile and compare reservoir yields and magnitude of silting with the design assumptions,
- To assess water allocation and use for irrigation and non irrigation purposes,
- To determine/ estimate irrigated area development achieved through flow irrigation, lift irrigation, and groundwater,
- To evaluate spatial equity achieved in water distribution (head, middle, and tail reaches) across the command area,
- To evaluate performance of the project in terms of adequacy of irrigation, water use efficiency, O & M costs, and cost recovery,
- To evaluate status of participatory irrigation management
- To assess the cropping pattern and its intensity, crop productivity evolved over the years,
- To assess groundwater development in the project command,

- To appraise the status of rehabilitation/ resettlement of project affected persons/ families,
- To assess the primary/ direct economic and social benefits like increase in farm income, increased employment, better nutrition, and poverty reduction especially of poor and marginal farmers,
- To evaluate environmental impacts (positive and negative) due to projects,
- To assess secondary and other indirect benefits due to the project,
- To work out benefit-cost analysis using modern approaches (like NPV, ERR, IRR) besides the impact on poverty reduction of the poor,
- To highlight the technical, economic, social, and institutional constraints in achieving the envisaged benefits of the project, if any,
- To prepare guidelines/framework document for a comprehensive evaluation of other major public irrigation projects in the State.

3. Scope of Work: The scope of the study covers collection of primary and secondary data, analysis and synthesis. The suggested data to be collected is given separately as Annex1.

3.1. The concerned project authorities will assist in collection of primary data. The list of parameters categorized under different sub heads for data collection from Departments/Institutes and village level is shown as Annex 2 for reference.

3.2. Analysis of Data: The Consultant will analyze the collected data and derive the following

- (i) Retrospective and prospective financial analysis with pre and post project economic cost benefit analysis based on post project actual crop pattern and gross & net benefits, as per actual implementation and O&M costs.
- (ii) Financial analysis to get a sense on the sustainability of the operation of the Scheme. This exercise is to review from the stage of inception of the projected investment outlays and projected returns over the life of the project and the progress of actual realization of returns in terms of NPV, IRR and discounted payback period.
- (iii) Social & Economic benefit cost analysis with primary benefits (agriculture, horticulture, domestic etc.), secondary benefit (pisciculture, poultry, piggery, dairy, sugar mills, ethanol, co-generation.etc.) and tertiary benefits (canning, food processing, agricultural equipment and machinery etc.) converted in monetary terms using factual figures. This will improve the conventional cost benefit analysis.

- (iv) Post project socio economic indicators of typical farm families giving net annual income increase, access to consumer goods, children's education, roads, hospitals, water supply, ownership of property etc. to assess spread of benefits to various economically and socially differentiated groups.
- (v) Evaluate water use efficiency (physical and economic) at various scales including field/farm level and project level

3.3. Interaction with Farmers: The scope of work will also include interaction with farmers through an appropriately devised questionnaire. The sample size selected should be a mix of villages from head, middle and tail reaches of the command, reservoir backwater with farmers from small, marginal and large categories on few selected distributaries of RBC, LBC & Branch canals. The questionnaire should elicit response of the farmers to their perceived benefits of the scheme, shortcomings in its operation, etc. No socio economic survey is required to be carried on Sina-Madha LIS.

4.0. Reports and Time Schedule: The period of study will be initially for 15 months, extendable to 6 months as per requirement. Schedule of preparation of various reports and their submission will be as under:

1)	Inception Report :	Includes details of staff engaged, methodology of work indicating approach to the proposed study including sampling methodology and identification of additional data to be collected and format of a questionnaire, besides an outline of first interim report	Within three Months
2)	First Interim Report :	Includes status of work at the end of 3 months of all activities included in the inception report along with outline of second interim report	Three months after inception report
3)	Second Interim Report :	On completion of almost all data collection with outline details as per TOR, and interaction with farmers combined for all schemes under the project with primary analysis along with outline of draft final report.	Three months after first interim report
4)	Draft Final Report:	Will include data analysis/ evaluation of the objectives listed in para 2 & 3.2 giving full outline and details of final report, for review by the authority.	Three months after second interim report.

5)	Final Report:	Will include all required details considering/ complying all the points raised by the Review Committee on the draft final report, to be submitted at least one month before the final report on completion of work.	Three months after draft final report
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The consultant shall provide five copies of each of the inception report, interim reports, and the draft final report. The Consultants shall provide 15 copies of the final report.

After conclusion of the study, documents, soft copies of the report, field pictures, maps, sketches, and other data procured and analyzed by the consultants for this study shall be handed over to the Secretary, MWRRA, Mumbai.

5.0. Details of deliverables & payment Schedule:

Sr. No.	Deliverables	Cumulative Period	Payment as % of Contract Value
1.	Inception Report	3 months	10 %
2.	First Interim Report	6 months	10 %
3.	Second Interim Report	9 months	15 %
4.	Draft final Report	12 months	25 %
5.	Final Report	15 months	25 %
6.	Approval of Final Report	Within 45 days on submission of final report in required copies	Balance 15% payment

Note: 1. For Sr. No.1 to 4 submissions should be at the end of the specified period.

2. Security Deposit 5 % from each bill to be recovered and to be released with final bill (at Sr. No. 6 above).

6.0 Review Committee: Review committee will comprise Hon. Chairman, Member (Economy), Member (Engineering) and Secretary, MWRRA. The concerned project superintending engineer will be special invitee to help the review committee who will provide ground realities of different issues of evaluation process. The payment at each stage will be released after approval to report submitted by the consultant.

7.0. Supervision arrangements: Secretary of MWRRA would be the officer in-charge of supervising the consultancy work.

8.0. Data, Local Services, Personnel & Facilities to be provided by the Authority: The Consultant should collect the required data in from concerned field Officers. For collecting data in requisite format from small, marginal and large farmers in head, middle and tail reach of command of distributaries within LBC, RBC & Branch canals Consultant will have to use his technical supervisors. Any assistance required for co-ordination with field Officers will be provided by the Authority. Evaluation Report of Sina-Madha LIS will be provided by MWRRA.

9.0 Key Personnel : The Consultant's study Team will comprise following technical staff -

- (i) Team leader – He should be post graduate preferably Doctorate in Agricultural Economics/ Engineering, and should have at least 25 years professional experience in Agro Economic Sector.
- (ii) Engineer in Charge – He should have Degree in Civil/Agricultural Engineering, and should have at least 20 years professional experience in Irrigation Sector.
- (iii) Socio-economic expert - He should have post graduate degree either in sociology/social sciences or economics, and should have at least 15 to 20 years professional experience in Irrigation Sector.
- (iv) Field Engineers / Technical Supervisor – Consultant will have to engage adequate number of Field Engineers / Technical Supervisors for collecting requisite data. They should have degree or diploma in Civil Engineering and acquainted with Irrigated Agriculture and similar disciplines.

Address for communication :

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DATA TO BE COLLECTED

1. Salient features of the scheme - location, river basin / sub basin, stages, pre and post project crop pattern, Climatic data, rainfall, whether drought prone area.

2. Water Utilization Planned & Actual	{	<ul style="list-style-type: none"> Irrigation - Total water use for flow and lift irrigation including conveyance losses, total number of beneficiary farmers. Domestic - Total water use for cities/towns and villages with population dependent on project – on back water, command and river. Industrial - Total water use for various types of industries with number of persons for whom employment generated within the project. Cultural - Cultural water releases for Pandharpur.
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3. Actual inflows against the dependable yield considered for design.
4. Actual reservoir siltation rates against the design siltation
5. Status of scheme - completed / ongoing, year of completion / likely completion, phasing of balance potential creation.
6. The cropping pattern in the command against the designed cropping pattern
7. Year wise potential created & utilized
8. Indirect benefits, secondary benefits (pisciculture, poultry, piggery, dairy, sugar mills, ethanol, co-generation etc.) and tertiary benefits (canning, food processing, agricultural equipment and machinery etc)
9. Total no. of beneficiaries SC/ST, land holding size distribution, Status of project affected persons (PAPs) with rehabilitation and resettlement status.
10. How the difference between levy & collection of water charges is met.
11. Method of calculation of rotation wise charges

12. Pre project cost benefit analysis including farm budgets considering approved crop pattern at the time of administrative approval.
13. Ground water recharge – pre and post project rising water levels in wells and deduction of energy cost of groundwater pumping for irrigation and drinking.
14. Development of rural markets / urban markets.
15. Previous socio economic reports stated in the background above.
16. Fisheries Development with fish production in metric tone and employment generated.
17. Tourism Development with employment generated.
18. Data required for assessing current socio-economic status:
 - (i) Population distribution
 - (ii) Income level
 - (iii) Pre-occupation structure
 - (iv) Infrastructure facility
 - (v) Livestock data etc.

PARAMETERS FOR DATA COLLECTION

Engineering :-

1. Planned Storage
2. Actual Storage
3. Planned command area
4. Actual command area
5. Actual irrigated area
6. Water delivery efficiency
7. Water use efficiency at scheme level
8. Water use efficiency at distributary level
9. Water use efficiency at WUA level
10. Transit Losses in Canals main branch canals
11. Conjunctive use of surface & groundwater

Environmental:-

12. Area affected by salinity
13. Area affected by water logging
14. Depth of groundwater table
15. Health hazards

Maintenance Performance & Cost Recovery :-

16. Actual Maintenance costs at scheme level
17. Actual Maintenance costs at distributary level
18. Actual Maintenance costs at WUA level
19. Collection of water charges and assessed annual water charges
(Scheme level)

Agricultural Production & Household Socio-Economic :-

20. Household demographics including education levels of individuals and household social status (caste) and region.
21. Crop production – area and yields
22. Cropping patterns and cropping intensity
23. Drainage status
24. Ownership of wells and pumps
25. Use of inputs (fertilizer, seeds, pesticides etc.)
26. Adoption of water saving technologies
27. Payment of water charges

28. Household incomes (Farm and non-farm)
29. Household asset ownership
30. Level of investments in farm equipment and on-farm improvements
31. Land distribution and tenurial arrangements
32. Credit and indebtedness
33. Land markets – land values and transactions
34. Access to Extension
35. Access to Marketing
36. Cost of cultivation of major crops
37. Generations
38. Migration
39. Ownership of livestock /fisheries.

Village Level :-

40. Access to infrastructure (including roads, schools, hospitals, credit institutions, Markets and agricultural processing centers) in the village.
41. Village demographics including fraction of population belonging to different Social groups (castes) and regions.
42. Farm size distribution of households in the village (number of landless, number of small farmers, number of medium farmers, and number of large farmers).
43. Area cultivated by season
44. Area irrigated by source
45. Number of WUAs and the level participation in WUAs.
46. Views on irrigation service delivery.
47. Number of Water Users Associations participating in
 - a) Planning works up to the minor level
 - b) in collecting water charges.
 - c) taking responsibility for O&M for minors of canal systems.
 - d) Farm wages.
48. Types of disputes on water sharing and how they are resolved.
49. Water quality of both drinking and irrigation water.
50. Public health indicators : prevailing water related diseases and the incidence of these diseases.
51. Depth of the groundwater table and variation in levels.

Institutional :-

52. Skill of the Field Staff of the Water Resources Department (WRD)
53. Assessment and collection of water charges
54. Capital and O&M expenditures.