

# PERFORMANCE EVALUATION OF IRRIGATION PROJECTS

REETA JOSHI, Dr ROHIT BHATI, JAGDISH KANDPAL

<sup>1</sup>Reeta joshi, Assistant Professor, Dept. of Civil Engineering, Quantum University, Uttarakhand, India

<sup>2</sup>Dr Rohit Bhati , Assistant Professor, Dept. of Agricultural Studies, Quantum university, Uttarakhand, India

<sup>3</sup>Jagdish kandpal, Assistant Professor Dept. of Mechanical Engineering, Rit Roorkee, Uttarakhand, India

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**Abstract** - Performance evaluation irrigation projects is aimed to look in to water use efficiency resources sustainability for economic escalations ,social equity and environmental sustainability modern technology such as remote sensing and GIS helps in data collection and analysis of on going projects .performance evaluation leads to benchmarking of the system this in turns helps in analyzing the projects comparing its performance of a projects and many projects comparing its performance of a projects and many projects across various agro climatic zones this paper highlights the basic concept of performance evaluation benchmarking, benchmarking procedures and lesson learned from some studies conducted in the northern India.

**Key Words:** Projects, Benchmarking, Performance, Many, Comparing

## 1. INTRODUCTION

India is blessed with many precious natural resources , water resource being one of them .water resources is however unevenly distributed in time and space .Therefore ,water resources structure have been conceived since the beginning of the civilization to harness this for the well-being of the human civilization. Prior to independence water resources of same of the river basin in India were harnessed by diverting river water through weirs/ barrages for irrigation purpose but this was not sufficient to feed the growing population of the country .therefore, a large no of major medium and minor irrigation projects were undertaken in various five year plans resulting into self-sufficiency in food grain by way of green revolution in the country. total irrigation potential created by all sources in the country prior to independence was about 22.6 million hectors .this has been increased to about 97.00 million hectors utilization of this potential being to the tune of 82.30 million hectors .However it has been seen that most of the projects in operation are not performing as per the targets conceived at the planning stage .Hence it is considered essential to evaluate the performance of irrigation projects in operation.

In addition to performance evaluation of a particular projects, it is also felt to compare it with the performance of another projects in the same agro-climatic region .This concept is termed as benchmarking of irrigation system .Although this activity concerning benchmarking in irrigation system started since 2002.since then seven regional workshops have been carried out

The concept of benchmarking in irrigation systems and various indicators considered for this purpose vis-à-vis evaluation of irrigation projects are discussed in this paper as followed:

### 1.0 PERFORMANCE EVALUTION STUDIES:

Performance evaluation studies may be carried out with the following objectives:

1. Measurement of gaps between set target and achievements
2. Identify reasons for shortfalls and remedial measures
3. Assessment of impacts on environment
4. Selection of best practices and processes
5. Rectification of assumptions
6. Assessment of performance with respects to set objectives
7. Identification of shortfalls
8. Impacts on agro-economic and socio-economic status of command
9. Irrigation induced land degradation such as water logging alkanity and salinity effects land
10. Recommendations for closing performance gaps and improving overall effenciency of the system

### 1.2 ASPECTS OF PERFORMANCE STUDIES

Performance evaluation of irrigation projects may be carried out considering 2 level performance parameters tabulated in table1

S.NO	LEVEL 1	S.NO	LEVEL2
1	System performance	1.1	Physical achievement
		1.2	Hydrology
		1.3	Distribution network
		1.4	Command area development
		1.5	Irrigation efficiency
		1.6	Competing demand
		1.7	Conjunctive use of SW and GW
		1.8	Drought
		1.9	

			mitigation Management issues
2	Agro Economic Impacts	2.1 2.2 2.3 2.4 2.5 2.6 2.7 2.8 2.9 2.10	Changes in cropping pattern Land use land distribution Land holding Agro based industries Extension services Micro land credit facilities Farming practices Ancillary land credit facilities Ancillary income generation sources Rotational water management
3	Socio-economic impact	3.1 3.2 3.3 3.4 3.5 3.6 3.7	Farm employment Non-farm employment Infrastructure and institutional facilities Demographic impact Literacy Health care and family planning Poverty alleviation
4	Environmental impact	4.1 4.2 4.3 4.4 4.5 4.6 4.7 4.8	Ground water level water quality ecology wild life Drainage and water logging Soil salinity and alkalinity Forest and land use Flora and fauna

## 2. SUGGESTION BASED ON PERFORMANCE EVALUATION STUDIES:

Performance evaluation studies of major and medium irrigation projects suggest following measures for optimizing the benefits from these projects

1. Rehabilitation and restoration of damaged , silted canal system
2. Adequate maintenance of system
3. Selective lining of canal system
4. Realistic and scientific operation of system
5. Revision of cropping pattern
6. Restoration and provision of appropriate control structure
7. Efficient and reliable communication network
8. Adequate water measuring system
9. Conjunctive use of ground and surface water
10. Regular revision of water rate
11. Encouragement for formation of water users associations
12. Setting up farmers water school
13. Setting up micro-credit facilities
14. Setting up agricultural extension services
15. Encouragement to farmers for livestock's growth
16. Increasing non-farming employment avenues

## 2.0 BASICS OF BENCHMARKING IN IRRIGATION SYSTEMS

The best performance sub-system in an irrigation projects or the system as a whole is considering as a benchmark and other sub-system in a particular irrigation system or other irrigation projects when compared with the best performance is termed as 'Benchmarking of irrigation system'. Thus, benchmarking process may be undertaken in two ways i.e.

- 1) Internal benchmarking or process benchmarking
- 2) External benchmarking and metric benchmarking

In the case of internal benchmarking the comprising is accomplished with various with various sub-systems of a project where as in external benchmarking various projects located in almost similar agro-climatic zones are compared. In case of projects located in different agro-climatic zones are compared .in case of projects located in different agro-climatic zones ,weighted parameter are considered for various indicators off benchmarking process As per the different of benchmarking for the irrigation industry coined by Australian national commission on irrigation and drainage (ANCID), Benchmarking is a process whereby organization pursue enhanced performance by learning about their own organization through comparison with their historical performance and with the practices and outcomes of others.

### 3.1 PRINCIPLE OF BENCHMARKING

Benchmarking is a accepted means of improving performance learning from others and applying techniques to increase efficiency ,cost saving and competitiveness .The best performance considered as a 'benchmark 'and other projects is required to be brought to that performance level. One project may not be best in all respects .The various benchmarks are set up for various indicators for benchmarking activities .It is a dynamic process and thus the benchmarks changes from time to time as the competition for improving efficiency of projects goes on.

### 3.2 ADVANTAGES OF BENCHMARKING:

This activity, by way of competitive sprit, improves performance of a projects by identifying baseline for improvement .It also brings out various bottlenecks coming in the path of measures through learning from the experience of others. By improving performance of a projects, financial sustainability can be maintained. The best performer gains publicity in its field .it becomes easy to convince planner and policy marker's by presenting the results of benchmarking studies.

### 3.3 PERFPRMANCE INDICATORS

Currently in India 20 indicators in common use to evaluated the performance of irrigation projects.

Table 3 performance Evaluation Indicators

S.NO	PARAMETERS	PERFORMANCE INDICATORS
1	System performance	<ul style="list-style-type: none"> <li>Water delivery capacity index</li> <li>Total annual volume of irrigation water supplied</li> <li>Field application efficiency</li> <li>Annual relative irrigation supply (cum/ha)</li> <li>Annual irrigation water supply per unit irrigated area(cum/ha)</li> </ul>
2	Agricultural productivity	<ul style="list-style-type: none"> <li>Output per unit command area (Rs /ha)</li> <li>Output per unit irrigated area-tonnes/ha crop wise ,Rs /ha</li> <li>Output per unit irrigation supply (Rs/cum)</li> <li>Output per unit crop water demand (Rs/cum)</li> </ul>
3	Financial performance	<ul style="list-style-type: none"> <li>Cost recovery ratio</li> <li>Total O &amp;M cost per unit area (Rs/ha)</li> <li>Total cost per person employed on O &amp; M works (Rs/person)</li> <li>Revenue collection performance</li> <li>Revenue per unit volume of irrigation water supplied (Rs/cum)</li> <li>Maintenance cost to revenue ratio</li> <li>Staff members for O&amp;M per unit area (persons/ha)</li> <li>Total O&amp;M cost per unit of water supplied (Rs/cum)</li> </ul>
4	Environmental aspects	<ul style="list-style-type: none"> <li>Average depth to water</li> <li>Water quality (PH, alkalinity)</li> </ul>

### 3.4 PROCEDURE FOR BENCHMARKING OF IRRIGATION PROJECTS:

#### 3.4.1 COLLECTION OF REQUIRED DATA

In case of internal performance benchmarking, data relating to various sub-system of the project in collected and compiled .if external benchmarking is to be carried out, data concerning all the projects participating in the process and located in the similar agro-climatic zones, proper weights are to be assigned to such projects so as to bring them,

theoretically, in the similar agro-climatic zones. As may be seen from the list of indicators illustrated in preceding paragraphs, following data is required to evaluate various indicators:

1. Designed discharging capacity of canal to cater peak crop water requirement and actual carrying capacity
2. Crop water requirement to meet evapo-transpiration needs of the region
3. Culturable command area of the projects

4. Amount of water supplied to various sub-systems or projects
5. Actual area irrigated
6. Staff engaged for running and maintenance of the system and expenditure being incurred on them
7. Detailed of recovery of water charges
8. Detailed about crop production
9. Water table details
10. Details of water quality

### 3.4.2 ANALYSIS OF DATA

Sometimes data for a particular parameters is not directly available in such cases the data is estimated considering all relevant facts and figures. Since benchmarking is continuous process, proper formats and programme are to be devised to handle the voluminous data. Proper checking and scrutiny is also essential to avoid erroneous results. Adequate infrastructure may be provided to collect, compile, scrutinize, analyse and process the desired data. If some important data is continuously missing arrangement for observing such crucial data is also required.

### 3.4.3 COMPUTATION OF PERFORMANCE INDICATORS

A programme may be devised to carry out all desired calculation for working out various performance indicators as desired in para 6.0 so that by feeding relevant data, the value of respective performance indicator is evaluated. Once various indicators are known, PERFORMANCE BENCHMARKING OF IRRIGATION PROJECTS can be taken up.

### 3.5 FUTURE PROGRAMMES/ STRATEGIES:

A core group has been constituted under the chairmanship of member (water planning and projects), Central Water Commission to Facilitate State Govts. To carry out performance benchmarking of irrigation systems in various parts of country. So far six meetings of the core group have been convened. Technical and financial assistance is being provided by the Ministry of Water Resource, Govt. of India and Central Water Commission to various State Govts./project Authorities for Promoting this activity. It has also been decided by the core group that work pertaining to studies for 'Benchmarking of Irrigation Projects' may be awarded to all WALMIs/IMTIs, for some specific projects involving Project Authorities so after that some time they may be able to carry out such studies independently.

### CONCLUSION

In India many of the recent irrigation projects are none the century old for example upper Ganga canal projects. In the beginning the cost benefits ratio was the prime index for the monitoring of the irrigation projects over the period the concept has enveloped the environmental factors, socio-economic factors, agro-economic factors in addition to system factors in the present digital era it becomes essential to develop indicators/indices for monitoring and evaluation of

the projects various indicators for performance evaluation leading to benchmarking have been described an ideal approach and parameters for benchmarking has been listed it is expected that this will help in making road map for performance evaluation

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