

Benchmarking for Irrigation Projects in Maharashtra, India
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ABSTRACT Benchmarking is a very powerful management tool for analysing and improving the performance of water resources projects. Government of Maharashtra has undertaken the benchmarking exercise in the State since 2000-01. For evaluation and improvement in performance of water resources projects, Benchmarking of selected projects under different areas has been done every year. Maharashtra is the first State in India, which has introduced the Benchmarking technique for Irrigation Projects. Other States are also adopting it. In this paper the methodology and main performance indicators adopted for Benchmarking, performance of projects and guidelines issued by Government of Maharashtra for preparation of benchmarking report are discussed.

INTRODUCTION

Benchmarking can be defined as a systematic process for securing continual improvement through comparison with relevant and achievable internal or external norms and standards. Benchmarking is a very powerful management tool for analysing and improving the performance of water resources projects. It is widely accepted all over the World. Since 2000, IPTRID, IWMI, ICID, World Bank & FAO are promoting the use of benchmarking. Maharashtra is the first State in India, which has introduced the Benchmarking technique for Irrigation Projects & now with our experience and Central Water Commission's follow-up other States are also adopting it.

METHODOLOGY

The methodology and main performance indicators for Benchmarking are adopted as per the guidelines issued by Indian National Committee on Irrigation & Drainage (INCID) in 2002. In Maharashtra State, India, the Benchmarking of Irrigation projects were initiated in the year 2001-02. The exercise was conducted for 84 projects in 2001-02 with 10 indicators. The number of projects increased to 254 in 2002-03 with 11 indicators. Every year the Maharashtra state governments publishes **Benchmarking of Irrigation Projects** a report based on information collected from each of the circle in-charge of the project. Following 11 indicators are selected for benchmarking in 2009-10.

Performance Indicators

The performance indicators are grouped under five domains, mentioned below.

- a. System Performance
- b. Agricultural Productivity
- c. Financial Aspects
- d. Environmental Aspects
- e. Social Aspects

1.0 System Performance

Providing facility of water for irrigation and other purposes is the main function of the project authorities. The water distribution system is influenced by physical, climatic, economic and other factors. In particular, the prevailing climatic conditions largely determine both, the available water resources and the crop water requirements in any season. The main task of the project in-charge is to manage the system so as to optimise the use of available resources in order to meet sanctioned quota in an effective and efficient manner.

1.1 Annual Irrigation Water Supply per Unit Irrigated Area

Annual irrigation water supply per unit irrigated area is the total quantity of water supplied for irrigation in all the seasons of a year compared to the total area irrigated in Kharif, Rabi & HW on canal, reservoir and river during irrigation year. Annual irrigation water supply per unit irrigated area varies with water availability, cropping pattern, climate, soil type, system conditions, system management etc. As a measure of efficiency of irrigation system, State target of 7692 m³/Ha is set for major and medium projects and 6667 m³/Ha for minor projects.

1.1 a Annual Area irrigated per unit of water supplied (Ha./Mm³)

Area irrigated per unit of water supplied during Rabbi season as Ha/Mm³ and during H/W season is 110 Ha/M m³ is set as target.

1.2 Potential Utilised & Created

This is the ratio of potential utilised (crop area measured) to created irrigation potential of the project. Crop area irrigated on canal, reservoir, wells, river in the command area is considered as potential utilisation. The irrigation potential created through large investments should be fully utilised. However, the utilisation is governed by the availability of water in the reservoirs. Therefore, calculation of effective irrigation potential is made proportionate to availability of water for irrigation in that year.

2.0 Agricultural Productivity

In Maharashtra, more than 55% population depends on agriculture, thus production per unit area as well as per unit water is vital for State's economy. For this domain the indicators chosen are

- 1) Output per unit irrigated area.
- 2) Output per unit irrigation water supply.

2.1 Output per Unit Irrigated Area

Output per unit irrigated area is the output in rupees of agricultural production from irrigated area. Here the area irrigated means potential utilised. As the population grows, the land holding per capita goes on reducing. Secondly, there are some constraints to bring additional lands under irrigation. Thus it is important that the output per unit area has to be increased with efficient water and land management, improved seeds and adoption of latest Agriculture technology. The efforts have to be made to increase

output by diversification of cropping pattern, better farm practices and judging the market needs. However, water is the only input in agriculture on which service provider has control. Therefore to have an

idea about trend of production in the command, which depends upon timely supply of water in adequate quantity, this indicator has been adopted. The yield data for the year of various crops is collected from agriculture department. The market prices are obtained from Agricultural Produce Market Committees located in each taluka. In respect of sugarcane, prices are obtained from sugar factories in the command area and for cotton, from Cotton Federation. The prices of 1998-99 are considered as base prices for all the remaining years & output is worked out accordingly.

2.2 Output per Unit Irrigation Water Supply

Output per unit irrigation water supply is value in Rupees of agricultural production from irrigated area compared to total quantity of water supplied for irrigation. The output per unit irrigation water supply is an indicator of optimal use of water.

3 Financial Performances

Any system is to be termed as economically self-sustainable if the yearly operation and management **O&M** expenditure incurred on the project is met from its own revenue. In Maharashtra, the water charges are recovered for all uses to encourage efficient water use. Presently, the practice of volumetric supply is in use for WUA, Domestic and Industrial water supply. The indicators chosen for financial performance are given below.

- 1) Cost Recovery Ratio
- 2) Total O&M Cost per unit area
- 3) Total O&M Cost per unit Volume of Water Supplied
- 4) Revenue per unit water supplied
- 5) Assessment Recovery Ratio (Irrigation & Non Irrigation)

3.1 Cost Recovery Ratio

It is the ratio of recovery of water charges to the cost of providing the service. Recovery of water charges and O&M cost incurred during the period of irrigation year i.e. 1st July 2009 to 30th June 2010 is considered. Secondly the operation cost includes the salary of technical & ministerial staff working on irrigation management irrespective of its establishment type (i.e. Regular Temporary/Converted Regular Temporary/Work Charged/Daily rated). It is imperative to devise water rates and mechanism for recovery of water charges for irrigation use in such a manner to meet, at least, annual cost of management, O&M of system and recovery of some portion of capital investment on the projects in order to make the system self sustainable. Theoretically the cost recovery ratio should be at least equal to one. Due to the efforts taken at all levels the recovery of water charges has improved and the O&M cost is comparatively low. This has resulted in enhancing the cost recovery ratio more than one.

3.2 Total O&M Cost per Unit Area

Total O&M cost per unit area is the ratio of total O&M cost incurred for management of the system and area irrigated (potential utilised) during the irrigation year. The total O&M cost includes cost of maintenance as well as all types of establishment charges. The annual maintenance cost incurred does not include cost of modernisation and special repairs. Establishment charges include salary paid

to staff working up to a management section. The O&M cost per unit area should be as minimum as possible. Government of Maharashtra **GOM** has prescribed yearly O&M norms per hectare excluding establishment cost. The O&M cost per unit area is more in projects where there is less irrigation compared to created potential.

3.3 Total O&M Cost per Unit Water Supplied

Total O&M cost per unit water supplied is obtained by dividing total O&M cost by total quantity of water supplied for irrigation and non-irrigation use during the year. Total O&M cost per unit volume of water supplied should be as minimum as possible to achieve economy in supply.

3.4 Revenue per Unit Water Supplied

It is the ratio of total revenue and quantity of water supplied for irrigation & non irrigation use during the irrigation year. Revenue per unit volume of water supplied is very important measure as every drop of water is to be used efficiently and economically. The ratio also gives an idea about revenue realised against actual water supplied. The indicator will have more importance once the water is supplied on volumetric basis.

3.5 Assessment Recovery Ratio

This indicator is split up into two components viz

a) Irrigation

b) Non Irrigation

In case of both the uses, there are arrears of water charges in many projects due to some or other reasons, one of the reasons being postponement of recovery during draught years. It is the ratio of recovery of water charges during the irrigation year 2009-10 and assessment of charges for Kharif & Rabbi of 2009-10 for irrigation and for Hot Weather of 2008-09. For non-irrigation purpose assessment for water used during the year 2009-10 is considered. The purpose of introducing this indicator is to check whether the water charges assessed during the irrigation year (1 July to 30 June) are totally recovered or not. For this indicator, recovery of arrears is not considered.

4 Environmental Aspects

4.1 Land Damage Index

Land damage index is expressed as percentage of land damaged to irrigable command area of the project. The lands under irrigation become saline or waterlogged due to excessive use of water resulting in low productivity. This problem is faced in areas where high water intensive crops are grown year after year with unscientific methods of irrigation like flooding. Water logging and salinity occur in soils with poor drain ability. In Maharashtra, black cotton soil, which is highly impervious, is found on extensive area. Directorate Irrigation Research & Development, Pune is regularly monitoring & taking remedial measures for reclamation of damaged lands in commands of projects.

5 Social Aspects

5.1 Equity Performance

Most of the schemes are gravity systems with canals and distribution system. The command area is divided equally as head, middle & tail reaches. Equity performance means ratio of sum of actual area irrigated in all three seasons (canal flow and lifts on canal) to projected irrigable command area in head, middle and tail reaches. It is expressed as percentage. This indicator gives clear picture as to whether or not the irrigation facility is provided equitably to head; middle & tail reach farmers in command area. The benefit of irrigation should be given to the beneficiaries in head, middle & tail reach equitably. Ideally for equity, this ratio should be equal to one for head, middle as well as tail reaches.

CONLUCSION

Benchmarking process involves number of steps, right from Indicators selection to monitoring of results obtained through action taken on deficiencies in last year's performance. Where the Benchmarking of irrigation projects has been a routine process of performance evaluation, preparation of a comprehensive, problem specific action plan for every individual irrigation project based on the outcome of last year's performance & its effective implementation plays an important role in securing the desired improvement.

REFERENCE

1. GOM(2011), Report on Bencharmaking of Irrigation Projects in Maharashtra, available on web mahawrd.org/downloads/bm0910.pdf