

Reforms Initiatives in Water Resources Sector in Maharashtra State

Mr. S. V. Sodal

Secretary

Maharashtra Water Resources Regulatory Authority

9th Floor, WTC – 1, Cuffe Parade, Mumbai,

Maharashtra State, India 400 005

Phone No. 91- 22-22152249

Email : sureshsodal@rediffmail.com

Paper prepared for the workshop entitled 'Legal Aspects of Water Sector Reforms'
to be organised in Geneva from 20 to 21 April 2007 by the International
Environmental Law Research Centre (IELRC) in the context of the
Research partnership 2006-2009 on water law sponsored by the
Swiss National Science Foundation (SNF)

Reforms Initiatives in Water Resources Sector in Maharashtra State

Abstract

Maharashtra State, which is third largest state in India, has created an irrigation potential of 4 mha. Irrigation utilizes 70-80% of the total water use in the state. However, the sector has been affected badly by the problems of low utilization of created potential, conflict within various categories of users and unsatisfactory levels of water use efficiency and cost recovery. There was thus a pressing need to tackle the situation from consideration of productivity, equity and sustainability.

A holistic approach has therefore been adopted by the state involving policy reforms, legal enactment, capacity building and stakeholder participation. Subsequent to framing of a State Water Policy in 1993, two important legal measures were taken in 2005 viz. enacting the Management of Irrigation Systems by Farmers Act and Water Resources Regulatory Authority Act.

The reforms initiatives in water sector have received general acceptance. Its successful implementation has resulted in remarkable improvement in water use efficiency. The reforms have also improved financial performance of irrigation projects with O&M expenses being covered through water charges.

With all-round reforms in water resources management and its successful implementation, Maharashtra State has emerged as one of the best performing state in India.

1.0 Introduction

Maharashtra State is situated in the southwest of India. The geographical area of state is 30.8 mha, with cultivable area of about 22.5 mha. It is the third largest state in India. As per 2001 census, the population has touched 100 million.

Agriculture has been the prominent occupation to provide food and fibre to the growing population of the state. About 60% of the population is dependent upon rural agriculture. Surface irrigation facility is regarded as the key element of irrigated agriculture. The modern agriculture and irrigation practices play a key role in alleviating rural poverty.

1.1 Climate and Rainfall

The state has a tropical climate. The annual rainfall varies from 400 mm to 6000 mm. The average rainfall of state is around 1300 mm of which 88% occurs during June to September and remaining between October to December. This uneven distribution of rain fall has an important bearing on the states water resources planning.

1.2 Surface water resources

The geographical area of the state is divided into basins of Krishna, Godavari, Tapi, Narmada and narrow basins of west flowing rivers of Konkan. The average annual availability in above basin is anticipated as 163.82 BCM, out of which permissible use as per inter-state tribunal award is 125.94 BCM.

1.3 Irrigation potential created

The ultimate irrigation potential, through both surface water and ground water resources, has been estimated as 12.6 mha. Surface irrigation potential to the tune of about 0.27 mha was created in the state during pre plan period i.e. prior to 1950. Since agriculture is prominent occupation of the rural population, the state has concentrated on construction of irrigation projects. There was thus a manifold increase in irrigation potential creation, The state has created 4.0 mha surface irrigation potential using surface water resources by 2005. The state has constructed almost 2700 major, medium and minor irrigation projects, around one half of the country's total population of dams.

1.4 Scenario of irrigation management in Maharashtra (Upto 2000)

The irrigation management was done wholly by Irrigation Department. Collection of water demand, distribution of water and collection of water charges was responsibility of Irrigation Department. Over the years, the funds available for maintenance of irrigation work have also been less than requirement. There was very little participation of farmers in irrigation management. This led to poor maintenance and consequent deterioration of irrigation system.

In spite of manifold increase in potential creation, the utilization of irrigation potential remains low. Table-1 shows year-wise creation of irrigation potential and its utilization.



Fig.1 Map of India showing location of Maharashtra

Table-1 Status of potential creation and utilisation

Sr. No.	Year	Cumulative Potential created mha.	Potential utilized mha.*
1.	1997-1998	3.228	1.202
2.	1998-1999	3.416	1.225
3.	1999-2000	3.500	1.286
4	2000-2001	3.706	1.298
5	2001-2002	3.769	1.250
6	2002-2003	3.812	1.318
7	2003-2004	3.863	1.244
8	2004-2005	3.913	1.257
9	2005-2006	4.003	1.617

* This does not include irrigated area on wells in command of projects which is about 0.48 mha.

Reasons for low utilization can be attributed to fewer yields in reservoir due to consecutive droughts, diversion of more water to non-irrigation use than planned, higher conveyance losses due to deferred maintenance resulting into less water use efficiency. Thus, to reduce gap between potential created and utilisation, there is need to improve water use efficiency in irrigation sector. The water conserved can be used for bringing more land under irrigation or catering of need of other sectors. Thus conservation of irrigation water is indispensable.

1.5 Status of irrigation assessment and recovery.(upto 2000)

It is advisable that for efficient management of system, full O&M expenditure and part of capital investment should be met out through recovery of water charges. Non irrigation water charges are charged on volumetric basis depending on it's use for industrial, domestic and other use. Irrigation charges are based on crops sown and area under crops and have no relation with actual use of water. There is no incentive for saving of water. Table 2 shows year wise status of irrigation assessment, O&M cost and recovery.

Table -2 Status of irrigation assessment, O&M cost and recovery. (upto 2000)

Rs. In Billion					
Sr.No.	Year	Total assessment (Irrigation & non-irrigation)	O&M cost (Establishment + Maintenance & Repairs)	Total Recovery	% of Recovery with O&M cost (5/4*100)
1	2	3	4	5	6
1.	1995-96	1.220	4.340	0.8	18.25%
2.	1996-97	1.320	4.390	0.9	20.50%
3.	1997-98	1.173	4.308	0.8	18.95%
4.	1998-99	1.951	3.790	1.135	30.00%
5.	1999-00	2.762	4.326	1.729	40.00%

It can be seen from the above table that even O&M cost is not met fully through recovery of water charges. To make irrigation management sustainable, it is imperative to improve upon financial performance of irrigation project.

2.0 Measures initiated to improve performance of irrigation project

In above context, to improve the performance of irrigation projects, all-round measures, viz. policy reforms, legal reforms, institutional reforms, administrative reforms and capacity building, technological and management interventions are planned and implemented systematically. The measures were initiated since 2001 after taking broad review of the water sector, are broadly categorised as below:

- Policy reforms, Legal reforms & Institutional reforms.
- Administrative reforms
- Application of State of Art Technology
- Capacity building and public awareness campaign

2.1 Policy reforms, Legal reforms & Institutional reforms.

2.1.1 State Water Policy

The state has prepared state policy by removing the major weakness which were existing in water sector in 20th century and to meet the challenges of the 21st century i.e. growing demand of the water by various sectors. The state is among few states to have its own water policy. The policy emphasises on Integrated Water Resources Management (IWRM), the need for watershed management, ground water management, aquifer management is also stressed. The policy advocates river basin management. It also duly addresses drought management and measures to mitigate it. The use of new technology is encouraged in water resources management. The policy has innovative features such as water auditing, benchmarking of water resources projects, water entitlements etc.

2.1.2 Maharashtra Management of Irrigation Systems by Farmers Act 2005 (MMISF)

Maharashtra has an age old tradition of participation of farmers in irrigation development, for example Ex-malgujari tank in eastern Vidharbha and phad system in Northern Maharashtra. In recent times also, the Maharashtra state is

pioneer in Participatory Irrigation Management (PIM). There are successful examples of Water User Associations (WUA) in various parts of the state. With this background, Maharashtra Government has made it mandatory to the irrigation beneficiaries to form WUA

To empower the users and provide justice to tail-enders and weaker section of society, GoM has recently enacted the MMISF Act 2005.

Salient features of MMISF are as follows.

- 1) Water will be supplied only to WUAs'.
- 2) Water supply to WUA will be only on volumetric basis
- 3) WUAs' will have freedom for cropping pattern
- 4) Tail-enders is assured about supply of water.
- 5) Women's representation is made obligatory in WUA.

With the formation of WUA and transfer of irrigation management to users, the job of irrigation department would remain as facilitator. This is a major break-through in water resources management where users are adequately empowered and are center of reforms.

2.1.3 State Water Resources Regulatory Authority

A regulatory, institutional frame work to regulate, allocate, plan for sustainable development and management of water resources for various category of uses in a judicious and equitable manner, was necessary to overcome the problems in water sector. Accordingly Maharashtra Water Resources Regulatory Authority Act 2005 has been enacted and Water Regulatory Authority has been established in 2005. This regulatory authority consists of a panel of experts from water resources management, economics, and river basin representatives and is headed by retired Chief Secretary. It is first such attempt in the country.

It will regulate mainly

- i) Sectoral allocation i.e. deciding entitlements for various category of uses
- ii) Bulk water rates for various category of the use
- iii) Monitoring of the State Water Plan

All these policy issues were first discussed in group with experts in water resources management, agriculture, economy, social science, NGO, WUA and farmers. The draft policy was also discussed at regional and state level conferences involving stake-holders, Municipal Corporation, industrial users, WUAs', people representative, environmentalist, and farmers. Media gave wide coverage, enabling the various section of society, to share their opinion by mail or other means of communication. Necessary amendments were made in draft policy considering views, suggestions during conference and after. Finally in May 2005, Maharashtra Water Resources Regulatory Authority (MWRRA) Act 2005 has been enacted.

All these reforms are progressive and will set a benchmark in management of water resources.

2.2 Administrative reforms

2.2.1 Water auditing

Comprehensive water accounting method is devised; with water accounting at project level as well as at last manageable unit the water account covers minute details giving complete account of water use for various categories of the use and actual information about evaporation losses and transmission losses on each project. After each season, the season-wise water account is prepared, and then at the end, annual water account is compiled. The water use efficiency arrived, is compared with the targeted one. The water auditing of the each projects gives information about shortcomings in the irrigation system which is resulting into inefficient performance of the project i.e. affecting on the water use efficiency. In order to have effective implementation, an independent organisation has been set up for water auditing. The organisation can carry out water auditing annually and the report is published and made available to all stake holders for their comments.

2.2.2 Water pricing

It is necessary for the system to be self-sustainable; the water rates for both irrigation and non-irrigation should be such that annual water charges accrued should meet the yearly O & M expenditure fully. To achieve this objective, the water rates were enhanced in 2001 by about 2 to 2.5 times of earlier water rates. The increase in water rates is first discussed with water users and their association. Accordingly, enhancement in water rates was successfully implemented from September 2001 onward with built-in provision of 15% increase in water rates every year. The water rates for non irrigation use are again increased in 2006.

2.2.3 Manual for operation and maintenance of irrigation system

A manual on operation and maintenance of irrigation system is under preparation which will provide systematic approach to O&M. It would be a comprehensive document, providing detailed guideline for better O&M of irrigation system.

2.2.4 On-farm development (OFD) manual

For better on-farm efficiency, OFD works plays an important role, thus proper construction and maintenance of OFD works leads to better water conservation. To provide state of the art knowledge on OFD works, a manual of OFD works has been prepared.

2.2.5 Project Monitoring Cell

Monitoring cell which has been set up will facilitate and guide field personnel in real time operation, to improve upon performance of irrigation projects.

2.3 Application of State of Art Technology

2.3.1 Irrigation status report

Irrigation Status Report is a complete document providing up-to-date information about creation of irrigation potential, water availability, season-wise irrigation, irrigation / non-irrigation water use, water use efficiency, cropped area and crop yields, assessment, recovery, status of formation of WUAs etc. for all projects in the state. The purpose is to have brief summary of the status of irrigation and to initiate action to minimize the gap between irrigation potential created and utilization. Over the last five years, the report has been published every year on 15th September and the same is made available to stake holders. This Report provides increased transparency amongst stakeholders, accountability amongst department personnel leading to improvement in overall water use efficiency.

2.3.2 Benchmarking report

Benchmarking is a management tool normally used in private sector for improving the system performance and productivity. The state has been actively working on benchmarking of irrigation projects for improving the performance of irrigation projects. The state is publishing report on benchmarking of irrigation projects annually. Maharashtra is the first state after Australia who is publishing report on benchmarking. The benchmarking report 2001-02 & 2002-03 comprises study of 84 irrigation projects from different regions of the state. The regions have variation in climate, soil, cropping pattern and social condition. To have a comparison on better footing, comparison is first made with various projects within the region and then externally, with the project outside the region, within the state. In 2003-04, the benchmarking was carried out for 261 irrigation projects. The benchmarking is carried out with system performance, agricultural productivity, financial performance and social performance indicators. From 2004-05 onwards, bench marking of all major and medium project is carried out

Benchmarking exercise has provided insight and competitive spirit to project authorities enabling them to improve the performance of the irrigation projects.

2.3.3 Promotion of water conservation technology

With advances in technology, use of sprinkler and drip irrigation methods would conserve water to the tune of 30 to 50% respectively. Use of sprinkler and drip irrigation in command area of project is encouraged. A special assistance is provided for use of sprinkler and drip irrigation systems in command area through project funds since 1999-2000. It has resulted in increased adoption of technology.

2.3.4 Use of remote sensing for assessment

The weak link in irrigation assessment is measurement of crop-wise area in each season. This is not only time-consuming but there have been also instances of omissions in assessment. To have correct assessment of area, use of satellite imageries for assessment of area under crops like sugarcane has been practiced since last few years.

2.3.5 Use of information technology

Today is the age of information. Thus to provide up-to-date information on water storage of dams, irrigation rotation schedule, irrigation assessment & recovery, water users association (WUA) and relevant information, a web-site www.mahagovind.org was hosted. The web-site is in English as well as in local language.

2.3.6 Research and Development

For sustainable growth of any sector, it should be backed by active R &D. The State has its own Water and Land Management Institute set-up at Aurangabad in early 80's to deal with challenges in water sector.

In recent years, a major thrust has been given on R&D to provide solutions to problems faced by field personnel and farmers, especially improving water use efficiency, water saving practices, conjunctive use of water, drainage etc. Numbers of technical publications have been brought out to disseminate the knowledge. 'Sinchan', a quarterly journal is published, to provide information about R&D, case studies from field and development in the water resources management. To improve the performance and keep pace with international standards, the concerned organisations are under-going ISO 9001:2000 certification.

2.4 Capacity building and people awareness campaign

2.4.1 Capacity building of Irrigation personnel

To bring about any positive change in organisation, it is of utmost important that the personnel who are involved in implementation must be well versed with the objectives and mission. There should be clarity in aims and means. This can be achieved through proper training.

A massive thrust has thus been given on training activity through WALMI at Aurangabad. It has been also decided that irrigation personnel should undergo training for minimum period of 3% of his/her total service period.

2.4.1.1 Study groups (Quality circles)

Various study groups involving top officials, field officers, agriculture experts, socio-economic experts, are evolved within the department to study and provide in-depth report on crucial topics of irrigation management.

2.4.1.2 Workshops/Conferences

State level as well as National level conferences are organised at WALMI, Aurangabad to share the experience and knowledge from various parts of the country.

2.4.2 Capacity building of farmers

The trust and mutual understanding between farmers and irrigation personnel are of utmost importance. Thus capacity building of farmers is very important. It can be achieved through various training at WALMI, Aurangabad. Various innovative means and methods used to reach the goal. Some of the measures are listed below.

- i) Farmer's training
- ii) On-farm farmer's training
- iii) Farmer's camps
- iv) Exhibitions
- v) Study tours

vi) WUA Awareness week

2.4.3 WUA formation

As stated earlier, Maharashtra State is pioneer in PIM implementation. The pilot studies conducted so far show that the WUA functioning resulted into sustainable development. The success of PIM has resulted in general acceptance of WUA. The master plan for the formation of 12462 WUA has been prepared. It is proposed to hand over all command to WUA in a period about 6 years under World Bank Assistance Project. So far 1100 nos. of WUA on 0.35 mha. are functioning satisfactorily, and over 1730 Nos. of WUA on 0.65 mha. are under various stages of formation. Thus with WUA coming in action, role of irrigation department will remain as a facilitator.

2.4.4 Involving non government organisations

The involvement of NGO would facilitate participation of farmers in irrigation management. Participation of NGOs is encouraged to raise awareness of common people in water management. A conducive atmosphere is created at state level as well as at field level to work together with NGO in order to make reforms fruitful.

2.4.5 Educational empowerment

Water is basic for human survival, but the resource is a limited one. In order to inculcate good habits in the new generation, a timely education to the youth is very necessary. An initiative is taken to design curriculum for water and its important aspects for primary to higher school.

2.4.6 Industry-institute partnership

To build positive relationship between academic institution and field, active interaction between field and institution is encouraged. Field problems are referred to nearby engineering institute, to take up as study project. Engineering colleges, agricultural universities are also involved in carrying out socio-economic study of irrigation projects. All these efforts would result into building better partnership with educational institute in community development.

2.5 Canal cleaning movement

A massive campaign for canal cleaning was launched. The systematic planning and deployment of 75 machinery units with timely monitoring has made the campaign a complete success. The campaign has enabled best use of machinery for productive work. Sugar factories in command area also participated in the canal cleaning movement.

The massive campaign involving users, NGOs, people's representative resulted into "Shramdaan" (Voluntary physical work) on 30 major, 27 medium & 193 minor irrigation projects in various parts of Maharashtra State. The important aspect of "Shramdaan" was that the users developed a sense of belonging to the system.

3.0 OUTCOME OF REFORM INITIATIVES

The all-round measures initiated as discussed above have resulted in improvements in performance of irrigation projects. This can be manifested from facts and figures given below.

3.1 Improvement In Water Use Efficiency

Water use efficiency is a very important parameter in performance evaluation of irrigation projects. As the irrigation sector consumes 75%-80% of water resources, an increase in water use efficiency will make water available for other sectors. Table-3 show details of irrigated area, water use and water use efficiency

Table 3 - Status of water availability, actual irrigation and water use

Sr. No	Year	Designed water storage Mm3	Water availability on 15 Oct. Mm3	% available storage with designed	Water used for irrigation Mm3	Irrigated area * on canal mha	Water use efficiency ha/Mm3
1	1999-00	26716	22715	85	16037	1.286	80
2	2000-01	26748	18947	71	13575	1.298	96
3	2001-02	28062	17817	63	12346	1.250	101
4	2002-03	28715	18936	66	12965	1.318	102
5	2003-04	28840	16941	59	10569	1.244	118
6	2004-05	28889	18298	63	10603	1.257	119
7	2005-06	29110	24860	85	13689	1.617	118

* This does not include area irrigated on wells in command of the projects which is about 0.48 mha.

3.2 Improvement in financial performance

As discussed earlier, O&M expenses are reduced through various efforts of downsizing establishment and participation of mechanical organisation, sugar factory and users in maintenance of canal system. With the increase in water rates,

simultaneous efforts were made for effective assessment and recovery of water charges. Table-4 below shows status of O&M assessment and recovery of water charges.

Table-4 Present status of irrigation assessment, O&M cost and recovery

Rs. in Billion					
Sr. No	Year	Total irrigation assessment	O&M cost (Establishment +M&R)	Total Recovery	% Of recovery with. O &M cost
1	2000-2001	4.37	4.90	1.95	40
2	2001-2002	4.54	4.50	2.52	56
3	2002-2003	4.44	3.70	3.78	102
4	2003-2004	4.53	3.33	3.79	114
5	2004-2005	4.97	3.76	4.48	119
6	2005-2006	4.18	4.53	4.13	91

It can be seen from the table that during last five years, O&M cost including establishment cost is fully recovered through water charges, which is a step in the direction of sustainable development. It is first such example in the country to meet O&M cost through recovery of water charges.

4.0 Maharashtra Water Sector Improvement Project (MWSIP)

The transferring of irrigation management to farmers is very crucial for the improving irrigation efficiency, productivity of water as well as sustainability. Before transferring canal system to WUAs, it is necessary to carry out rehabilitation of the system, which requires huge funds. World Bank has provided financial assistance to MWSIP for rehabilitation of old irrigation system and transferring the management to WUA. The project would also support the reform initiative put forth by GOM.

With initial success in performance improvement of irrigation project in state, it will go long way in improving scenario in water resources management in the state.

5.0 Conclusion

To improve the performance of water sector, which was hither to wholly control by the government, a total approach has been adopted. An approach involving policy reforms, technological and managerial interventions have been undertaken. All-round measures which includes capacity building of personnel as well as institutions and also public awareness campaign to promote participation of users, have been undertaken.

The reforms in irrigation sector have received general acceptance. Its successful implementation has resulted in improvement in performance of irrigation projects. The reforms have also improved financial performance of irrigation project, with O&M expenses being recovered through water charges.

With all-round reforms in water resources management and its successful implementation, Maharashtra State has emerged as one of the best performing state in India. It is expected that with the establishment of Regulatory Authority in the water sector in Maharashtra, PRODUCTIVITY, EQUITY & SUSTAINABILITY will be achieved in water sector in the years to come. The Maharashtra State will become a role model in water resources management in the country.