# Irrigation status Report

## Maharashtra State-INDIA

(Period 2003-2004)

**Executive Summary**

### 1.0 OVERVIEW OF IRRIGATION SECTOR :-

Maharashtra State (the State) is situated in the south- west of India. The geographical area of the State is 30.8 Million hectares (Mha.), with cultivable area of about 22.5 Mha. It is the third largest State in India as per 2001 census. Its population has touched the figure of 100 Million.

Agriculture sector plays an important role in the State economy. According to the population census 2001, the total number of workers in the State was 42.10 Million, of which cultivator and agricultural labourers together were 55.41 per cent. It shows that majority of the population has been dependent on agriculture and allied activities. It is therefore, agriculture and allied activities plays an important role in the State economy. However, the share of Agriculture and Animal Husbandry in the Gross State Domestic Product has remained comparatively low, around 13 per cent. It is therefore necessary to increase the agriculture production and productivity of the crops, which forms the major basis of the rural development.

Adequate, timely and guaranteed irrigation is of para-mount importance in agriculture production. Irrigation facility is regarded as a key element of agriculture sector. Dams and canal systems are the main components of irrigation system. The irrigation facility enables the farmers to grow at least two seasonal crops on a piece of land.

### 2.0 AGRO CLIMATIC ZONES AND RAINFALL

The Agriculture Department has divided the State into 9 different agro- climatic zones depending upon the climate, foliage, topography, soil and cropping pattern. The annual average rainfall in these zones ranges from 500 mm to 6000 mm. These nine agro-climatic zones are important for providing irrigation facilities, water use and cropping pattern.

The State receives rains from South-West and North-East monsoon. The average rainfall of the State is around 1300 mm. of which 88% is received during June to September and remaining between October to December

### 3.0 SURFACE WATER RESOURCES: -

There are around 400 rivers in Maharashtra. Their total length is around 20000 km. The Geographical area of the State is divided into 5 river basins viz. Krishna, Godavari, Tapi, Narmada and narrow basin of West flowing rivers of Konkan.

Storing water whenever heavy rainfall occurs and keeping at hand a system entailing its use, is the only reliable way for bringing "prosperity" from available water resources. Presently the storage capacity and the benefited area is decided on 75% dependability basis.

For the better planning, these five basins are further divided into 25 sub-basins. The basin-wise average annual water availability is given in the table below.

## TABLE - I

**Basin-wise average annual availability of water - ($Mm^3$) :-**

| Major basins | Average annual availability (Mm3) | 75% Dependable Yield (Mm3) |
|---|---|---|
| Godavari | 50880 | 37300 |
| Tapi | 9118 | 6977 |
| Narmada | 580 | 315 |
| Krishna | 34032 | 28371 |
| West flowing basin (Kokan) | 69210 | 58599 |
| **STATE (Total )** | **163820** | **131562** |

**4.0 AVERAGE SURFACE WATER AVAILABILITY AND WATER USE: -**

Average surface water availability is 163820 Mm3. Notwithstanding this, the inter-state river water implications, call for water allocated for use in the State, is of the order of 126387 Mm3. After diverting the water for non-irrigation use, the average water available for irrigation is of the order of 112568 Mm3.

**5.0 ASSESSMENT OF IRRIGATION POTENTIAL OF THE STATE: -**

After formation of the State, the first irrigation commission was constituted in 1962 for assessing water resources and suggesting long term policy for optimum utilisation of available resources. Subsequently, Government of Maharashtra constituted " Maharashtra Water and Irrigation Commission. " in 1995 (the Commission), to study the problems related to irrigation and development of water resources. The Commission submitted its report in 1999.

While assessing basin-wise irrigation potential in the State, the Commission defined the area under irrigation as the area where at-least two seasonal crops (Kharif and Rabi) can be grown with the available irrigation facility. According to the Commission the irrigation potential of the State can be increased upto 12.6 Mha., considering water availability in river basins, cultivable land, augmentation of ground water, ground water recharge facilitated through watershed area development, modern irrigation techniques and improvement in water application system on farms together. It has also been anticipated by Commission that through surface irrigation 8.5 mha. area can be irrigated.

**6.0 STATUS OF IRRIGATION FACILITY IN THE STATE (1997-98 TO 2003-2004) :-**

The planning & development of irrigation facilities in the State is entrusted with Irrigation Department (ID) and Rural Development & Water Conservation Department (RD&WCD). I.D. is entrusted with survey, planning & design, construction & management of major, medium and minor projects having Culturable Command Area (CCA) 250 ha. and more. Whereas survey, planning, construction & management etc. of minor projects below 250 ha. CCA is entrusted to RD&WCD. In addition to this, planning, construction & management of Kolhapur type weir, lift irrigation, diversion weir, percolation tanks and village tanks and minor irrigation tanks below 100 ha. CCA is also with a local body at district level called Zilla Parishad under Rural Development Department.

By the end of June 2003, there were 53 major, 212 medium and 2445 minor project s (state sector) on which irrigation potential was created. Also 2276 minor (local sector) projects were completed in the State. Besides this, 48203 KT weirs, diversion weirs etc. were also completed. The irrigation potential created in the State by the end of June 2003 through all these major, medium & minor projects (state & local sector) taken together is 5.08 Mha. comprising of 3.86 Mha. from State sector and 1.22 Mha. from local sector.

The irrigation potential likely to be created through completed and on-going and planned projects from State sector and Local sector is about 8.59 Mha. The figures of irrigation potential likely to be created, shows that planning & efforts are being made to achieve the target of ultimate irrigation potential estimated by Commission.

### 7.0 PROJECTED WATER STORAGE & STORAGE AS ON 15TH OCTOBER (STATE SECTOR)

Over a period of last 43 years or so, the State has created a large number of major, medium and minor storages with a vast distribution network for irrigation. With the ever-growing urbanization and industrialization, the non-irrigation use of water has also increased. This has resulted in reduction of the irrigation potential created for some projects.

Based on inflows and storage's in the reservoir, on 15th of Oct., water use planning is done, every year. Water storage and water use for the last 7 years ending with 2003-2004 for the major, medium and minor (State sector) projects are presented in the table below : -

**TABLE - II**

**Projected live water storage & water use (1997-98 to 2003-2004)**

Water Storage in **$Mm^3$**

| Sr. No. | Year | Projected/ designed storages | Storage as on 15th Oct. | % of availabl e water | Water use for irrigation | Water use for non irrigation | Total water use | % of total water use to available storage |
|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 = 4/3 | 6 | 7 | 8 | 9 = 8/4 |
| 1 | 1997-98 | 25528 | 16615 | 65 | 10639 | 3267 | 13906 | 84 |
| 2 | 1998-99 | 26712 | 23285 | 87 | 12347 | 3033 | 15380 | 66 |
| 3 | 1999-00 | 26716 | 25271 | 95 | 16037 | 3595 | 19632 | 78 |
| 4 | 2000-01 | 26748 | 18947 | 71 | 13575 | 3858 | 17433 | 92 |
| 5 | 2001-02 | 28062 | 17817 | 63 | 12346 | 3980 | 16326 | 92 |
| 6 | 2002-03 | 28715 | 18936 | 66 | 12965 | 4236 | 17201 | 91 |
| 7 | 2003-04* | 28840 | 16941 | 59 | 10569 | 4790 | 15359 | 91 |

*Ref. table no. 27 page no. 87 of the Irrigation Status Report 2003-04 ( Marathi)

It is seen from the above table that the projected storages of the major, medium and minor (State sector) projects has been increased from 25528 Mm3 in the year 1997-98 to 28840 Mm3 in the year 2003-2004. However, as compared to design storages, the actual storages as on 15th Oct. are within the range of 59 to 95 % . In the year 2003-04, the actual storage as on

15th October is the lowest in comparison to last five years. The percentage of total water use is in the range of 66% to 92%.

## 8.0 WATER USE:-

### 8.1 WATER USE FOR IRRIGATION :-

The water used for irrigation from 1997-98 to 2003-2004 was in the range of 69 to 82 % of the total water used. In the year 2003-2004, it was lowest (69%) as compared to earlier 6 years.

### 8.2 WATER USE FOR NON-IRRIGATION: -

The water storage in the reservoir is used for irrigation, as well as non-irrigation purpose. Further the water for non-irrigation is being used for industries and domestic purpose. Due to industrialization and urbanization the non-irrigation use is continuously increasing considerably.

The water used for non irrigation from 1997-98 to 2003-04 was in the range of 18% to 31% of the total water used. In the year 2003-04, out of the total water used 31% (4790 Mm3) water has been utilised for non-irrigation purpose. and Out of the total non-irrigation water use (4790 Mm3), 64% is used for domestic purpose, and industrial and other use together is 36%. Water supply to drinking and industry has priority over irrigation as per the state's water policy. Increase in demand for these purposes results in less water availability for irrigation.

## 9.0 IRRIGATION POTENTIAL CREATED :-

Large number of major, medium and minor (State sector) irrigation projects have been taken up by the ID of the State, to maximise area under irrigation. By the end of June 2003, there are 53 major, 212 medium and 2445 minor projects, in the State, partly or fully completed.

Hardly 0.274M.ha. Irrigation potential was created in the State prior to independence. By the end of year 1960, 0.386Mha. irrigation potential was created. During the Five Year plans, the State has created an additional irrigation potential of 3.477 Mha. by the end of June 2003.

**TABLE - III**

**Potential created through major, medium & minor projects in the State ***

Area in M ha.

| Sr.No. | Year | Total potential created (cumulative) | | |
|---|---|---|---|---|
| | | Major & Medium projects | Minor projects | Total |
| 1 | 2 | 3 | 4 | 5 |
| 1. | 1960 | 0.314 | 0.072 | 0.386 |
| 2. | June, 1997 | 2.466 | 0.762 | 3.228 |
| 3. | June, 1998 | 2.632 | 0.784 | 3.416 |
| 4. | June, 1999 | 2.665 | 0.835 | 3.500 |
| 5. | June, 2000 | 2.813 | 0.893 | 3.706 |
| 6. | June, 2001 | 2.856 | 0.913 | 3.769 |
| 7 | June, 2002 | 2.882 | 0.930 | 3.812 |
| 8 | June, 2003 | 2.907 | 0.956 | 3.863 |

*Ref. table no. 2 to 8 page no. 46 to 59 of the Irrigation Status Report 2003-04 ( Marathi)

The irrigation potential created in the State by the end of June 2003 t hrough major, medium & minor State sector irrigation projects taken together was 3.863 M. ha. The share of major, medium projects and minor projects in the total irrigation potential created is 75.3 % and

24.7% respectively (Table -III). By the end of 2003 the ultimate irrigation potential of total 2710 major, medium & minor (State sector) irrigation projects in the State is estimated to 4.417 M.ha. Out of which the irrigation potential created by the end of 2003 is 3.863 M.ha. (87%).

**10.0 NET AREA SOWN AND POTENTIAL CREATED:-**

During 2002-03, the net area sown in the State is 17.579 M.ha. The irrigation potential created by the end of June 2002 through major, medium & minor State sector was 3.812 Mha. which amounts to 22% of the net area sown in the State.

**11.0 IRRIGATED AREA :-**

Irrigated area is an index of achievement for utilisation of potential created. Area irrigated on the canals and wells in the command area together during 1997-98 to 2003-04 is presented in the table below -

**TABLE - IV**

**Area irrigated for the year 1997-1998 to 2003-04* (State Sector Projects)**

Area in M ha.

| Sr.No. | Year | Irrigation potential created by end of June | Area irrigated | | | % of area irrigated to potential created. |
|---|---|---|---|---|---|---|
| | | | Canal | Wells | Total | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 1 | 1997-98 | 3.228 | 1.202 | 0.475 | 1.677 | 51.95 |
| 2 | 1998-99 | 3.416 | 1.225 | 0.471 | 1.696 | 49.65 |
| 3 | 1999-00 | 3.500 | 1.286 | 0.584 | 1.870 | 53.43 |
| 4 | 2000-01 | 3.706 | 1.298 | 0.466 | 1.764 | 47.60 |
| 5 | 2001-02 | 3.769 | 1.250 | 0.458 | 1.708 | 45.32 |
| 6 | 2002-03 | 3.812 | 1.318 | 0.524 | 1.842 | 48.32 |
| 7 | 2003-04 | 3.863 | 1.235 | 0.441 | 1.676 | 43.39 |

*Ref. table no. 9 to 15 page no. 60 to 73 of the Irrigation Status Report 2003-04 ( Marathi)

It is seen from the above table that the irrigated area on canals and wells in the command area taken together during 2003-04 is 1.676 Mha. (43.39%) as against the potential of 3.863 Mha. created by the end of June 2003. It is further revealed from the figures that the irrigated area for the year 2003-04 is substantially decreased (10%) as compare to 1999-2000. The main reason for this decrease in irrigated area is due to less storage in the reservoir and more reservation of water for drinking. In the year 1999-2000 the water storage of 15$^{th}$ October was 25271 mm3 whereas in the year 2003-04 the water storage of 15 $^{th}$ October was 33% less (16941 mm3) than the year 1999-2000.

Further it is pointed out here that though the water used for irrigation on canal in the year 2003-04 (10569 Mm3) is comparatively less than the year 1997-98 (10639 Mm3) the irrigated area in the year 2003-04 is more by 33 thousand ha. than that of the year 1997-98

(1.202 Mha.). It shows an improvement in the water use efficiency. The irrigation utilisation is average 50% compared to potential created.

The overall reasons for less utilisation are as follows: -

(i) Low water yield in the reservoir.(ii) Diversion of irrigation water to non-irrigation uses. (iii)Taking more percentage of crops that require more water like paddy and sugarcane. (iv) Thin and scattered irrigation, resulting in low efficiency. (v) Low utilisation during Kharif (Rainy) season. (vi) Reduction in the storage capacity due to silting. (vii) Poor/approximate assessment of the irrigated area in the command. (viii) Non accounting of irrigated area out side the command. (influence area). (ix) Poor maintenance of the infrastructure due to financial constraints.(x) Non participation of beneficiaries.

**12.0 IRRIGATED AREA AND CROPPING PATTERN:-**

Season-wise irrigated area is one of the indicators for assessing the cropping pattern existing in the project area. Utilisation in Kharif season basically depends on the amount and distribution of rains. Demand in Kharif is expected only when rains are less or irregular. So variation in irrigated area in Kharif season is not desirable for consideration. The variation in irrigated area during rabbi, hot weather season, two seasonal and perennials is a function of cropping pattern being practiced in the area and the storage position.

In order to have an idea about the cropping pattern being practiced in the project area of major, medium and minor projects, season wise data of the irrigated area for the year 1997-98 to 2003-04 is presented in the following table.

**TABLE-V**

**Season-wise irrigated area on canal of the major, medium & minor projects**

Area in M ha.

| Sr.No. | Year | Season-wise irrigated area * | | | | | |
|---|---|---|---|---|---|---|---|
| | | Kharif | Rabbi | Hot weather | Two seasonal | Perennial | Total |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| 1. | 1997-98 | 0.369 (30.7) | 0.398 (33.1) | 0.166 (13.8) | 0.058 (4.8) | 0.211 (17.6) | 1.202 (100.0) |
| 2. | 1998-99 | 0.336 (27.4) | 0.425 (34.7) | 0.182 (14.9) | 0.052 (4.2) | 0.230 (18.8) | 1.225 (100.0) |
| 3. | 1999-00 | 0.343 (26.6) | 0.493 (38.3) | 0.155 (12.1) | 0.047 (3.7) | 0.248 (19.3) | 1.286 (100.0) |
| 4. | 2000-01 | 0.423 (32.6) | 0.478 (36.8) | 0.075 (5.8) | 0.050 (3.9) | 0.272 (20.9) | 1.298 (100.0) |
| 5. | 2001.02 | 0.365 (29.2) | 0.478 (38.2) | 0.122 (9.8) | 0.041 (3.3) | 0.244 (19.5) | 1.250 (100.0) |
| 6. | 2002-03 | 0.372 (28.2) | 0.548 (41.7) | 0.106 (8.0) | 0.052) (3.9) | 0.240 (18.2) | 1.318 (100.0) |
| 7. | 2003-04 | 0.407 (32.9) | 0.506 (41.0) | 0.081 (6.6) | 0.051 (4.1) | 0.190 (15.4) | 1.235 (100.0) |

**Note :** Figures in brackets indicate percentages. *Excludes area on wells in command *Ref. table no. 9 to 15 page no. 60 to 73 of the Irrigation Status Report 2003-04 (Marathi)

During 2003-04, the total irrigated area was 1.235 Mha. Out of this, the percentage of irrigated area in rabbi season is highest (41.0%) followed by kharif (32.9%) and perennial

(15.4%). The percentage of irrigated area in the hot weather and two seasonal was 6.6 and 4.1 respectively. It is seen that, in the year 2003-04 the perennial and hot weather crops have been reduced by 50 thousand ha. and 25 thousand ha. respectively, whereas kharip crops have been increased by 35 thousand ha. than that of the year 2002-03. It shows that cultivators are growing more rabi or kharip crops, instead of perennial and hot weather crops.

**13.0 WATER USE EFFICIENCY :-**

The area irrigated per Mm3 of water is one of an important indicator to assess the water use efficiency. At the time of project planning, it is estimated that the average irrigated area per Mm3 of water would be 140 to 150 ha.in rabi and 110 to 120 ha.in hot weather season.

The useful storages achieved in all major, medium & minor (State sector) reservoir in the State as on 15th Oct.2003, is 16941 Mm3. Out of the total water available during 2003-04, 10569 Mm3 water was used for irrigation purpose. On account of water use for irrigation, 1.235 Mha. area on canals was irrigated whereas irrigation on wells was 0.441 Mha. The total area irrigated by these two sources together was 1.676 Mha. The water use efficiency in terms of ha ./Mm3 comes to 117 ha. per Mm3 for the canals irrigation and considering the both sources it will come to159 ha. Per Mm3 of water. The efficiency of water use during 2003-04 was significantly higher than that of the year 2002-03 (canal 102 ha. mm3 and canal and well together 142 ha. mm3).

**14.0 ASSESSMENT AND RECOVERY OF WATER CHARGES FOR IRRIGATION AND NON-IRRIGATION USE TOGETHER.**

During 2003-04 the assessment of the water charges for irrigation and non-irrigation water use together is Rs. 4532.9 million. Which is about four times than that of the assessment in the year 1997-98 (1172.9 million). The total recoveries of the water charges for the irrigation and non-irrigation water use together is Rs. 3776.3 million during the year 2003-04.

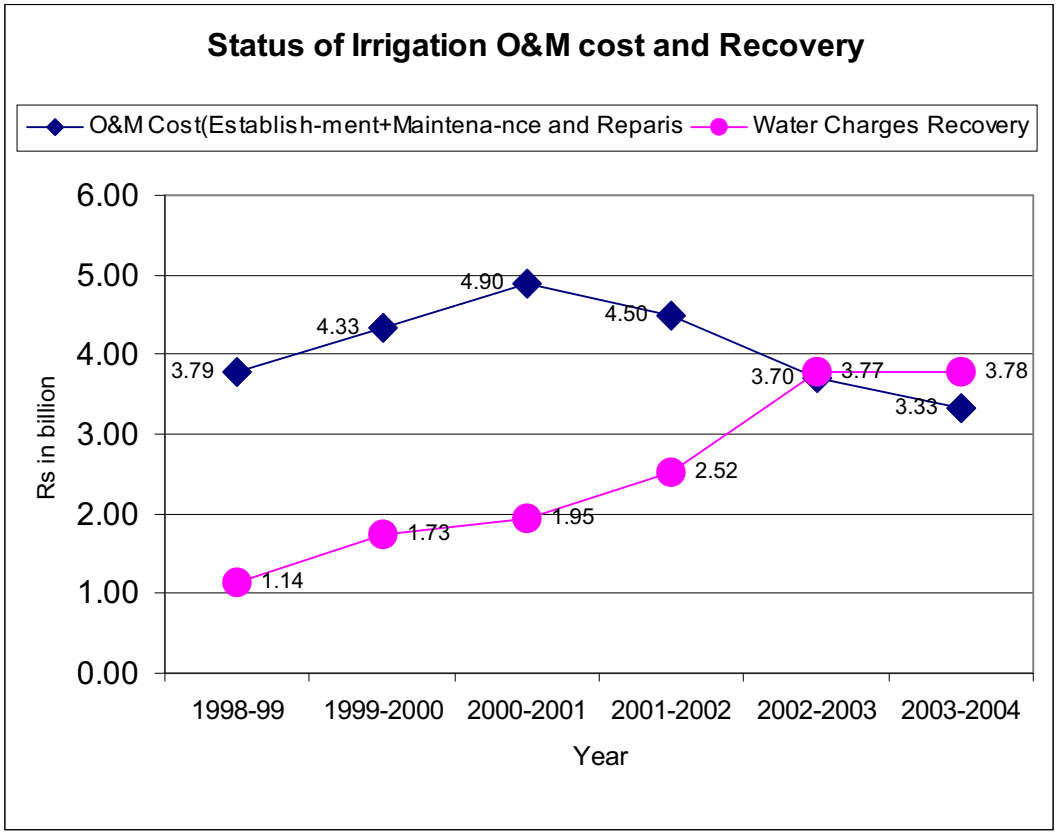
**14.1 ASSESSMENT & RECOVERY OF WATER CHARGES FOR IRRIGATION USES:-**

The assessment of water charges for irrigation was Rs.410.7 Million in 1997-98. It is increased to Rs.930.3 Million in 2003-04. it means the percentage increase in the assessment of water charges during the intervening period is slightly more than doubled. The recovery against the total assessment of irrigation water charges and outstanding together in the year 1997-98 was Rs.246.5 Million. The same is increased to Rs.428.90 Million in the year 2003-04.

**14.2 ASSESSMENT & RECOVERY OF WATER CHARGES FOR NON IRRIGATION USE :-**

The assessment on account of water charges for non-irrigation uses during 1997-98 was Rs.762. 2 Million. During 2003-04, it increased by 373% to Rs.3602.6 Million. The recovery effected out of total outstanding and the assessments together, on account of water charges for non-irrigation uses in the year 1997-98 was Rs.569.6 Million. Recovery to the extent of Rs.3347.4 Million is realised in 2003-04. (Ref.Table No.22 Pg.82 of the Irrigation Status Report 2003-04-Marathi).

**15.0 WATER CHARGES RECOVERY AND O&M COST**




The expenditure on irrigation management for the year 2002-03 and 2003-04 was Rs. 3700 million and Rs. 3330 million respectively. Whereas the total recovery of the water charges pertains to irrigation and non-irrigation water use was Rs. 3775 million and Rs. 3776 million respectively. These figures shows that since last two years the expenditure on irrigation management is 100% met through recovery of water charges (Ref. Table No.24.Pg.84 of the Irrigation Status Report 2003-04-Marathi).

**16.0 WATER USERS' ASSOCIATION ON IRRIGATION PROJECTS :-**

The State Government has taken policy decision on 23rd July, 2001 on formation of Co-operative Water Users' Associations (WUAs) and handing over the area for the irrigation management to WUAs, on all irrigation projects. The policy seeks (i) to reduce the gap between irrigation potential created and actual area irrigated, (ii) to increase water use efficiency of irrigation management, (iii) to restrict expenditure on maintenance and repairs of irrigation system and (iv) to recover water charges effectively.

By the end of 2001-02, in all 283 WUAs were in full operation with operational area of 101.00 thousand hectares(Th.ha.). In addition to this, 281 WUAs have came into operation, by the end of 2003-04. As a result, at the end of 2003-04, total 564 WUAs were in operation, which covered an area of 165.00 Th. ha. Besides this, number of WUA's, which have been registered and entered into agreement, was 158, covering an area of about 56.15 Th.ha. By the end of 2001-02, the number of registered WUAs was 414, which was increased to 1009 by the end of

2003-04. It is proposed to cover an area of 359.4 Th. ha. by these 1009 WUAs. (Ref.Table No.25. Pg.85 of the Irrigation Status Report 2003-04 - Marathi).

**17.0 POLICY DECISIONS AND MEASURES TAKEN BY STATE GOVERNMENT TO INCREASE AREA UNDER IRRIGATION: -**

There is a large gap between the potential created and actual area under Irrigation. In order to overcome the reasons of under utilisation the State Government has initiated following steps/administrative and policy reforms in the irrigation sectors.

**17.1 POLICY REFORMS: -**

**(a) MAHARASHTRA MANAGEMENT OF IRRIGATION SYSTEMS BY FARMERS ACT 2003**

The National Water Policy (2002) lays down that efforts should be made to involved farmers, progressively, in the various aspect of Management systems. The Commission (1995) has also recommended that statutory provisions may be made for Management of Irrigation systems by providing water from public canal systems to Water User's Associations (WUAs) on volumetric basis.

In order to bridge the gap between irrigation potential created and its actual utilisation and also to optimise the benefits from proper use of surface and ground water through an increased efficiency in distribution, delivery, application and removal of excess water, the State Government has taken a policy decision to provide a legal recognition to the contribution and operation of Water Users Associations .Accordingly, the Maharashtra Management of Irrigation Systems by Farmers Act -2003 has been prepared and approved by the State cabinet . The bill of this act has been placed before the State Legislature for approval.

**(b) STATE WATER POLICY :**

As per the recommendation laid down in the National Water Policy and Maharashtra Water and Irrigation Commission Report, the State water policy has been framed by Maharashtra State in July 2003.

The objective of the Maharashtra State water policy is to ensure the sustainable development and optimal use and management of the State's water resources to provide the greatest economic and social benefit for the people of the State of Maharashtra in a such manner that maintains important ecological values within the rivers and adjoining lands. The policy has innovative features such as water audit, benchmarking of water resources projects, water entitlement etc.

**(c) WATER RESOURCES REGULATORY AUTHORITY:-**

With growing population and water scarcity, there is growing competition among various sector of water users. This leads to conflict amount them. To overcome this, a quasi-judicial body will be established at State level. The regulatory authority will be a panel of three experts, viz. one in water resources management, one economist and headed by retired High Court judge.

It will regulate (i) Sectoral allocation (ii) Water rates; (iii) changes in water use/ diversion of water use; and (iv) compensation for such changes in water use.

The State cabinet has been approved the draft of Maharashtra Water Resources Regulatory Authority Act. The bill of this authority has been placed before the State Legislature for approval.

**17.2 ADMINISTRATIVE REFORMS:-**

**(a) REVISION OF THE WATER RATES:**

The Maharashtra State is the only State in India today, which has revised water rates w.e.f. Sept.2001, these water rates have been revised in such a way that it meets 100% O&M cost and some 22 to 25% of interest on capital borrowing for water infrastructure. In addition, there is in-built provision of 15% automatic increase per year in the rates applicable from Sept.2001.

**(b) WATER AUDITING:**

The water is considered as a national wealth, it is therefore necessary to have optimum and proper use of the available water. Considering this aspect the Government has issued instructions in the year 2001 to maintain the project-wise water account. This process was further circulated in detail in the year 2003. By executing water-auditing process, it is expected that the area irrigated per Mm3 should be at least 150 ha. in Rabi season and 110 to 120 ha. in hot weather season.

| Sr.No. | Year | Water Use Efficiency in ha. ( Ha. /Mm3 ) |
|---|---|---|
| 1 | 2001-02 | 101 |
| 2 | 2002-03 | 102 |
| 3 | 2003-04 | 117 |

Since the water auditing is initiated from the year 2001-02 the water used efficiency has been increased in the last two years.

In order to have effective implementation, an independent organisation is set up for water auditing. (Ref. GR No.MIS 1003 /(73/ 2003)/ CAD (EST) dated 28 th July 2004) The organisation can carry out water auditing annually as well as mid-term, if needed. It is placed directly under the Government to have direct control and feedback.

**(c) BENCH MARKING OF IRRIGATION PROJECTS:**

Benchmarking is very powerful management tool for analyzing and improving performance of irrigation projects. It gives insight to improve the performance of irrigation projects. The Government Maharashtra has already initiated process of benchmarking at project level. The Government of Maharashtra has decided to take wide spread measures to strengthen the benchmarking process by setting mechanism to deal with effectively. Such process has been completed in the year 2002-03 in respect of 49 Major, 142 Medium and 63 Minor (State Sector) projects in the State. The report has been published in the month of March, 2004.

**(d) CANAL CLEANING THROUGH MECHANICAL WING OF IRRIGATION DEPARTMENT:**

The canal clearing is being done by the mechanical wing of the irrigation department. The work done by mechanical wing till the end of June, 2004 works out to Rs. 121.1 million.

**(e) MAINTENANCE WORKS THROUGH USER'S PARTICIPATION**

State Government has taken policy decision to make Participatory Irrigation Management mandatory in July, 2001. In view of this, Irrigation Department has taken decision in September, 2002 to execute maintenance works of distribution system through SHRAMADAN with participation of beneficiaries voluntary organisations, high school and college students under National Social Scheme, Co-Operative Sugar Factories in the command. Very overwhelming response has been received from all above organisations. The maintenance work of distribution system through Shramdan during 2003-04 works out to Rs. 7.1 million.

**18.0 IMPACT OF REFORMS IN WATER SECTOR**

The Sate Government has initiated several policies and administrative reforms for development in Water Sector. Due to above reform initiatives, irrigation efficiency has been increased from 101 ha./$Mm^3$ to 117 ha./$Mm^3$ and revenue in the last three year has been substantially increased. As a result of this, Government of Maharashtra has become first State in the country to met out 100% O&M expenses from water charges only.

A beginning in performance improvement in irrigation sector will go long way in making water sector of the State self sufficient and sustainable one in years to come.

The international commission on irrigation and drainage (ICID) has taken the cognizance of the reforms/ initiatives in water resources sector and awarded " Watsave Award 2004" to Shri S.V.Sodal, Secretary (CAD), Irrigation Department, Maharashtra.