Chapter 5

Project Performance

5.1 Introduction

Irrigation projects are capital intensive and therefore, it is necessary to maintain them properly to achieve long term benefits. For improving the performance of water resource projects, WRD conducts benchmarking of projects[117] on various indicators like area irrigated per unit of water, agriculture productivity, operation and maintenance cost per unit of area irrigated *etc*. Water audit is also conducted to determine the water usage in different sectors, loss due to evaporation and leakages, canal conveyance, efficiency of main canals, cropping pattern *etc*.

Audit findings

5.2 Project Performance

As per the State Water Policy, 2003, the benchmarking of all the projects was to be done in a phased manner so as to cover all the projects in a period of five years. Benchmarking of projects was done annually by the Maharashtra Water Resource Development Centre (MWRDC), Aurangabad since 2000-01 MWRDC also prepares water audit reports. Audit observed that:

- Benchmarking and water audit reports were prepared by MWRDC only up to 2010-11. Moreover, only 1,335 projects were covered for benchmarking as against 3,712 completed/ongoing projects.
- The benchmarking report of 2010-11 pointed to lack of an integrated action plan on the part of project authorities to improve the performance.

Audit also observed inadequacies in maintenance of dams, canals and distributaries, evaporation losses and leakages, inefficiency in canal conveyance and supply of water to perennial crops (cash crops) *etc.* which eventually led to poor utilisation of IP. The audit findings are indicated in the succeeding paragraphs.

5.2.1 IP creation and utilisation

As per the Economic Survey Report of Maharashtra for the year 2011-12, the total geographical area of the State is 308 lakh ha of which gross cropped area[118] is 226 lakh ha (2010-11). The IP projected to be created, IP created and IP utilised in respect of total projects handed over by GoM and new projects taken up by IDCs (1,613 projects as referred to in **Table 3.1** of **Chapter 3**) is given in **Appendix 5.1.** The overall position of IP projected to be created, IP created and IP utilised in the State during the period 2000-2012 is given in **Appendix 5.2**. Audit scrutiny revealed the following :

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[117] It is a powerful management tool for analyzing and improving the performance of projects

[118] Gross cropped area is the net cropped area including the area sown more than once

- As against IP of 32.44 lakh ha created (June 2013) from the projects handed over by GoM to IDCs and projects taken up by the IDCs, the IP utilised as on June 2012 was 17.04 lakh ha (52.53 *per cent*) (**Appendix 5.1**). In the 87 test checked projects, as against IP of 4.37 lakh ha created (65 projects), the IP utilised was 1.22 lakh ha (27.92 *per cent*) (**Appendix 3.1**). One of the reasons for shortfall in IP utilisation is seepage through *unlined* canals, as also discussed in **paragraph 5.2.4**. The Government may examine the suitability of adopting new canal lining technologies to arrest seepage through canals.
- IP created increased by 11.20 lakh ha between 2000-01 and 2011-12 *i.e.* an increase of 30.22 *per cent* in 12 years or, an annual average increase of 2.52 *per cent* and the percentage of total IP utilisation to IP created increased from 47.60 *per cent* to 67.36 *per cent*, while the IP utilisation through canals to total IP utilised decreased from 73.58 *per cent* to 62.84 *per cent* (**Appendix 5.2**). The Principal Secretary stated that GoI has appointed IIM, Bangalore to study the gap in IP utilization and that created to reduce the gap. It was further stated that Government is contemplating to promote micro irrigation[119] in those area where there are water intensive crops.

The Secretary of WRD during exit conference held in July 2013 stated that in Maharashtra there is no laid down definition as to how IP created is to be measured but once the dam and the distribution network up to the outlet is ready as per the project, it is considered that the IP is created. Though, project-wise data of IP creation under different IDCs is compiled and published in Irrigation Status Report (ISR) every year there is no data regarding distribution network relating to creation of IP in the ISR. In the exit conference, the Principal Secretary, WRD accepted that there may be cases where a project was showing IP created though the distribution network remained incomplete. The Government stated (October 2013) that instructions have been given to all the CEs to collect data of field channels constructed and area covered for inclusion in the ISR.

- While preparing the irrigation project reports, WRD does not take into account the IP projected to be created through wells as it is not possible to predict the number of wells that would come up in future in the command area of the projects. However, scrutiny of ISRs for 12 years (2000-01 to 2011-12) revealed that the total IP utilized from irrigation projects included IP utilized through canals, rivers as well as wells as shown in **Appendix 5.2**. Test check of data in the ISRs for the period 2007-08 to 2009-10 revealed that the IP utilized through wells was in the range of 31.39 to 34.88 per cent of the total IP utilised through canals, rivers and wells indicating that the total IP utilized was inflated to that extent. The Government stated (November 2012) that ground water in the command area of irrigation projects gets recharged due to circulation of water in the command area and if there is no irrigation, the nallas or streams or wells in the command will not get recharged.

[119] A system of tubes and drippers which deliver water directly to the base of each plant or crop to use water with much greater efficiency than that provided by conventional sprinkler systems

The reply is not acceptable as the Economic Survey Reports for the period 2007-08 to 2009-10 revealed that the total average area irrigated in the State from wells was 21.42 lakh ha whereas, during the same period, the average area irrigated from wells located in the command areas of irrigation projects (both State and local sectors) was 12 lakh ha indicating that an area of 9.41 lakh ha was still irrigated from wells located outside the command area of irrigation projects.

Audit scrutiny of Nandur-Madhmeshwar major irrigation project under GMIDC revealed that as per the ISR of WRD for the year 2010-11, the project created an IP of 38,230 ha which was 84.72 *per cent* of projected IP to be created of 45,124[120] ha. The project involved construction of four dams[121] and an express[122] canal of 128 km. The total requirement of live storage of water for the project was 288.99 mcum. However, till March 2013, only two[123] of the four dams were completed and a storage capacity of only 56.50 *per cent* had been created, of which, 44.5 *per cent* of available water was reserved during the period 2008-2012 for non-irrigation use by Nashik Municipal Corporation (as per HPC's[124] decision of November 2003). As a result, the availability of water reduced to 31.36 *per cent*[125] of the total requirement of water for the project. Thus, IP of 84.72 *per cent* reported to be created under the project appeared to be doubtful.

5.2.2 Usage of water for non-irrigation purpose

The water stored in the reservoirs is recorded on 15 October each year. The stored water is then utilised till the start of the rainy season of the following year. The use of water for irrigation and non-irrigation purpose during 2007-12 is detailed in **Table 5.1**.

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120 Ahmednagar 1,562 ha; Aurangabad 42,298 ha; and Nashik 1264 ha

121 Mukne, Bhavali, Bham and Waki

122 A canal for distribution of water from end to end point without any intermediate distribution network

123 Mukne completed in 2006 and Bhavali in 2009 with live storage capacity 122.48 mcum and 40.79 mcum respectively

124 Allocation of water for non-irrigation purpose by more than 25 *per cent* was to be referred to a High Power Committee headed by the Minster (Water Resources), Minister (Finance), Minister (Water supply and Sanitation), Minister (Industries), Minster (Agriculture) and Minister of State (Water Supply). The Additional Chief Secretary, (WSSD) and the Secretaries (Irrigation/Command Area) were the permanent invitees as per GR of January 2003

125 44.5 *per cent* of 56.50 *per cent* (storage created) = 25.14 *per cent*
56.50 *per cent* - 25.14 *per cent* = 31.36 *per cent*

Table 5.1: Use of water for irrigation and non-irrigation purposes (volume in mcum)

Year	Live storage (15 October)	Water used for Irrigation	Percentage water used for irrigation to live storage	Water used for non-irrigation purpose				
				Drinking	Industrial	Other use (*per cent* to total)	Total	Percentage of total water used for non-irrigation purpose to live storage
1	2	3	4 (3/2)	5	6	7	8 (5+6+7)	9 (8/2)
2007-08	25489.18	16412.75	64.39	2801.80	581.90	2156.94 (38.93)	5540.64	21.74
2008-09	24802.74	15517.18	62.56	3444.72	575.43	1755.32 (30.39)	5775.47	23.29
2009-10	19365.78	12113.64	62.55	3151.41	610.31	1001.47 (21.03)	4763.19	24.60
2010-11	27309.26	15446.60	56.56	3260.22	656.11	1959.93 (33.35)	5876.26	21.52
2011-12**	23730.92	18283.13	77.04	2708.59	388.41	980.01 (24.04)	4077.01	17.18

Source: Figures for 2007-08 to 2010-11 from Irrigation Status Report of WRD and figures for 2011-12 consolidated from latest available ISR of the six regions in the State.
** Data for 2011-12 excludes data of Konkan region due to data inconsistency

The use of water for non-irrigation purpose under the category 'other use' was significant and ranged between 21.03 *per cent* (2009-10) and 38.93 *per cent* (2007-08) of the total water used for non-irrigation purpose during the period 2007-11. Considering this high percentage of water under 'other use'[126] it is necessary to classify it further for the sake of transparency.

The Government stated (October 2013) that instructions have been issued in August 2013 to field offices for further classification of usage of water under 'other use'.

5.2.3 Evaporation losses

The State Water Policy, 2003 envisaged that measures to control evaporation from water bodies should be taken and efforts made to make the process more cost effective.

The evaporation loss in the State during 2007-12 is given in **Table 5.2**.

Table 5.2: Evaporation loss in the State (Volume in mcum)

Year	Live storage as on 15 October	Evaporation loss	Percentage of evaporation loss to live storage.
1	2	3	4 (3/2)
2007-08	25489.180	4481.240	17.58
2008-09	24802.740	4074.320	16.43
2009-10	19365.780	3972.110	20.51
2010-11	27309.260	5383.100	19.71
2011-12	26938.183	5298.353	19.67

Source: Figures for 2007-08 to 2010-11 from Irrigation Status Report of WRD and figures for 2011-12 consolidated from latest available ISR of the six regions in the State

As seen from the table above the evaporation loss increased from 17.58 *per cent* in 2007-08 to 19.67 *per cent* during 2011-12.

In the four test-checked regions of Konkan, Pune, Aurangabad and Nagpur regions, audit noticed increase in the percentage of evaporation losses to live storage between 2007-08 and 2011-12 as detailed below in **Table 5.3**.

[126] Other use include water released as per the demand of local people as well as direction of district authorities for the purpose of Ganesh festival, drinking water for live stocks *etc*

Table 5.3: Region wise evaporation losses during 2007-12

Region	Range of evaporation loss between 2007-12		Remarks
	Minimum	Maximum	
Konkan	5 *per cent*	11 *per cent*	The evaporation losses in the region ranged between 5 and 11 *per cent* during 2007-12 and in fact more than doubled during the last five years.
Pune	12 *per cent*	15 *per cent*	The evaporation losses in the region ranged between 12 and 15 *per cent* during 2007-12. Evaporation loss in minor projects of Pune Region was consistently high which increased from 20 *per cent* in 2007-08 to 30 *per cent* in 2011-12.
Aurangabad	19 *per cent*	37 *per cent*	The evaporation losses in the region ranged between 19 and 37 *per cent* during 2007-12. Evaporation loss in nine medium projects in each year was more than 50 *per cent*. No justification was provided by the Regional office for such high evaporation losses.
Nagpur	9 *per cent*	20 *per cent*	The evaporation losses in the region ranged between 9 and 20 *per cent* during 2007-12. Evaporation loss in seven[127] medium projects in 2010-11 and four[128] medium projects in 2011-12 *was* more than 25 *per cent*. The CE, WRD (Nagpur) stated that the losses were high due to clubbing of evaporation losses and transit losses. Thus, due to clubbing of losses the Department could not identify the extent of each loss for taking remedial measures.
Source: Regional Irrigation Status Report up to 2007-12. RISR for 2012 -13 not prepared by the WRD			

The data furnished in Water Account[129] of individual irrigation projects are compiled in ISR of the region, which is further consolidated in the ISR of the State. Scrutiny of Water Accounts in respect of three selected projects (Bhatsa, Ujjani and Wadivale) revealed discrepancies in water accounts of the project and ISR of the region, as indicated in **Table 5.4**.

Table 5.4: Discrepancies in evaporation losses of Bhatsa, Ujjani and Wadivale projects (Volume in mcum)

Year	Evaporation loss as per water account of the project			Evaporation loss as per ISR of Region			Difference		
	Bhatsa	Ujjani	Wadivale	Bhatsa	Ujjani	Wadivale	Bhatsa	Ujjani	Wadivale
2007-08	24.638	433.580	5.184	24.000	450.680	4.040	0.638	17.100	1.144
2008-09	30.835	415.800	4.582	27.986	425.200	4.050	2.849	9.400	0.532
2009-10	25.978	358.000	4.813	22.338	380.070	5.320	3.640	22.070	0.507
2010-11	26.717	319.220	4.790	23.728	323.910	4.810	2.989	4.690	0.020
2011-12	29.304	385.470	4.800	29.304	412.730	4.800	0.000	27.260	0.000
Source: Water account of the three project and regional ISR									

Further analysis of data for the period 2007-11, based on which water audit reports were prepared, revealed that evaporation loss in 17 projects was more than 200 *per cent* and ranged between 201.63 and 10,066.67 *per cent* with reference to the live storage of water on 15 October (**Appendix 5.3**), indicating incorrect assessment/compilation of data on evaporation losses.

The Government stated (October 2013) that to avoid data discrepancies necessary steps are being taken.

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127 Sangrampur, Pakdiguddam, Surna, Lablansarad, Dham, Kalpathri and Chandani

128 Dham, Kalpathri, Dongargaon and Madan: The Chandani medium project (2010-11) and Madan medium project (2011-12) have recorded the evaporation losses of more than 50 *per cent i.e.* 62.01 *per cent* and 53.55 *per cent* respectively

129 Water Account is the primary data of a project, prepared by the Division executing the project and containing information about the water storage, its utilisation and balance existing as on end of June each year

Further, losses on account of seepages were not available for major and medium irrigation projects in the water audit reports as also in the ISR prepared annually by WRD. The water audit reports also did not indicate loss in transit, pilferage *etc*. in canals separately.

WRD should identify projects with high evaporation losses and take remedial measures to control the losses as envisaged in the State Water Policy, 2003.

As per the guidelines issued by GoM from time to time, pan-evaporimeters were to be installed at every project having Culturable Command Area (CCA) of more than 1,000 ha for correct assessment of evaporation losses. Audit scrutiny revealed that pan-evaporimeters were installed only in five out of 16 major projects in Nagpur Region, 15 out of 27 major projects in Aurangabad region and 11 out of 23 major projects in Pune Region[130], having CCA of more than 10,000 ha. In the absence of pan-evaporimeters, the evaporation losses were recorded from the nearest pan-evaporimeters or estimation made in the project reports as per Government Resolution of March 2001. This method of assessment of evaporation losses was not scientific and susceptible to errors, resulting in failure to identify the exact cause and quantum of loss for taking corrective action.

The Government stated (June 2013) that installation of pan-evaporimeters requires lot of funds and needs proper care and maintenance. Hence, within the constraints of funds and manpower, attempt shall be made to install as many pan-evaporimeters as possible. The Government further stated (October 2013) that instructions have been issued (August 2013) to Chief Engineers to install pan-evaporimeters in all major and medium projects from available funds and carry out its regular maintenance.

Discrepancies in the data of evaporation losses, assessment of evaporation losses in absence of pan-evaporimeter and non-quantification of loss on account of theft, pilferage and transit losses indicated lack of a robust system in WRD to identify the nature and extent of loss to allow remedial measures to be taken.

The GoM directed (June 2003) that SEs of the respective maintenance circles should obtain the annual water accounts from the divisional offices and submit the same to CE, Maharashtra Water Resources Development Centre, Aurangabad (MWRDC), who is responsible for audit of these accounts as well as issue of audit paragraphs on such accounts.

Scrutiny of water audit reports for the period from 2007-08 to 2010-11[131] revealed that the water accounts were not received in respect of 35.82 *per cent* of the dams each year, resulting in non-audit of water accounts to that extent.

Scrutiny of records in five circles revealed that out of 1,620 audit paragraphs on water account, only 369 paragraphs (23 *per cent*) were closed and 1,251 paragraphs (77 *per cent*) were outstanding for the period 2003-11 in respect of both Aurangabad and Nashik regions.

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[130] In Konkan Region pan-evaporimeters were installed in all the projects

[131] As against 13,480 water accounts during 2007-11, 4,829 water accounts were not received. Water audit reports from 2011-12 onwards were not prepared

The Government stated (July 2013) that instructions have been issued to the CEs of all the regions[132] for submission of water accounts to MWRDC, Aurangabad on time. The Government further stated (October 2013) that instructions are being issued to all the regions for early compliance to water account paragraphs.

5.2.4 Poor maintenance of dams and canals

The norms for incurring expenditure on maintenance and repairs (M&R) of irrigation projects were last revised by GoM in July 2002. The expenditure on M&R ranged between ₹ 118.97 crore (2008-09) and ₹ 246.19 crore (2010-11) during 2007-13. In the absence of updated norms for M&R expenditure, Audit was not able to assess the adequacy of funding under M&R. A study report submitted[133] (2008) to WRD by Water and Land Management Institute (WALMI), Aurangabad recommended revision in the M&R norms in view of price escalation. The Government stated (October 2013) that proposal for revision of norms has been approved by Finance Department and GR issued in August 2013.

Instances of poor maintenance of irrigation projects due to insufficient allocation of funds or delay in taking up repair works are discussed below.

5.2.4.1 Bhatsa major irrigation project, Thane

The last RAA to the project was accorded in October 2007 at a cost of ₹ 768.10 crore. Despite an expenditure of ₹ 498.44 crore on the project as on June 2013, the average IP utilized against IP created was only 13.38 *per cent* during 2007-12. The Dam Safety Organisation pointed out (June 2003) the leakages through the body of the dam and recommended precautions to be taken to arrest leakages. Joint visit (December 2012) conducted by audit along with the officials of WRD revealed leakages through the dam walls and spillways damaged canals and growth of grass and shrubs in the canal bed and the off taking distributary from the main canal, thereby affecting the flow of water. The cross regulator[134] and lifting device at chainage 26/765 km and 21/500 km were not functioning as regulators were stuck due to which the flow of water could not be regulated.

Grass in main canal bed

Off taking distributary blocked at chainage 32/985

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[132] Amravati, Nagpur, Pune, Konkan, Aurangabad and Nashik regions
[133] The study report was commissioned by Water Resource Department and MWRRA
[134] Gates fixed in the canal to regulate the flow of water for repairs or any eventuality

Non-functioning cross regulators at chainage 26/765

Non-functioning cross regulators at chainage 21/500

The Government stated (August 2013) that efforts would be made to reduce the leakages.

5.2.4.2 Rajnala medium irrigation project, Raigad

Audit observed that as against the IP of 3,190 ha created, the IP utilisation decreased from 69 *per cent* in 2007-08 to 60 *per cent* in 2009-10 and became nil during 2010-12. This was due to heavy leakages through rusted iron gates and damaged RBC, LBC and canal bed of Palipotal canal. Audit further observed the following:

- The Department decided (April 2006) to execute special repairs to the three canals (RBC, LBC and Palipotal) but AA was accorded only in June 2008 (after a delay of 25 months) for works relating only to LBC at a cost of ₹ 4.81 crore. However, as the lining work of the canal was not considered in the initial estimates, a revised AA for ₹ 53.59 crore was accorded (March 2011) for special repairs[135] to all the three canals five years after the decision to undertake special repairs was taken.
- Work order was issued in June 2011 and the work was stipulated to be completed by June 2013. However, till June 2013 only 75 *per cent* of work was completed after incurring an expenditure of ₹ 58.98 crore.

The Government stated (August 2013) that the work was under progress and would be completed in due course.

5.2.4.3 Hetawane medium irrigation project, Raigad

It was observed that the loss of water from the dam increased from 21.82 *per cent* during 2009-10 to 39.48 *per cent* during 2011-12 on account of damage to the rubber seal of the emergency gate.

The Government stated (August 2013) that the work of replacement of damaged rubber seal and changing of wire ropes of emergency gates were in progress.

5.2.4.4 Khadakwasla major irrigation project, Pune

It was noticed in audit that:

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[135] Special repairs included clearing and removal of grass in canals, constructing embankment, providing concrete lines to bed and sides of the canals *etc.*

- There was transit loss of water of 70.79 mcum *per annum* due to non-maintenance of RBC of Khadakwasla project passing through Pune city.
- The embankment of the canal was damaged but maintenance was difficult due to encroachment along the canal and the need to maintain constant water supply in it, as Pune Municipal Corporation was lifting water for drinking purpose from the canal.

The Government stated (August 2013) that after the work of closed piped water system from Khadakwasla dam to Parvati Treatment Plant undertaken by Pune Municipal Corporation is completed, repairs to the canal would be undertaken to prevent the loss.

5.2.4.5 Wadivale medium irrigation project, Pune

The work of construction of the dam was completed in 1995 and the canal work was completed in 1999 at a cost of ₹ 6.68 crore. However, IP of 1,876 ha created through canals could not be utilised since 1999 due to the following reasons.

- Irrigation through canals was abandoned from 1999 onwards due to heavy leakages from both the canals (RBC and LBC). This was also pointed out in the Report of the Comptroller and Auditor General of India for the year 2004-05 of GoM.
- Instead of repairing the canals to avoid leakages, it was decided (May 2008) to irrigate the area through pipes at a cost of ₹ 21.80 crore.
- The work of laying RCC pipes on RBC has not yet commenced while the work on LBC was in progress. As of March 2013, an amount of ₹ 34.56 crore has been spent on the project.

The Government stated (October 2013) that irrigation was done through water stored in KT weirs and lifted through water pumps and that the work of pipelines of LBC was nearing completion. The fact remained that irrigation through canals has not been done since 1999.

5.2.4.6 Kukadi major irrigation project, Pune

Kukadi, an ongoing major project, has a capacity to store 1,054.67 mcum of water, with a CCA of 2.05 lakh ha covering Pune (0.74 lakh ha), Ahmednagar (0.99 lakh ha) and Solapur (0.32 lakh ha) districts. Till June 2013, an expenditure of ₹ 1,928.60 crore has been incurred on the project. Audit observed that out of 0.32 lakh ha CCA in Solapur district, CCA of 0.19 lakh ha was developed by March 2008. However, the command area of Solapur district was not irrigated during 2008-12 as the lining work on the tail end of the LBC of Kukadi Project was not taken up.

The Government stated (October 2013) that lining work could not be completed due to shortage of funds.

5.2.4.7 Ujjani major irrigation project, Solapur

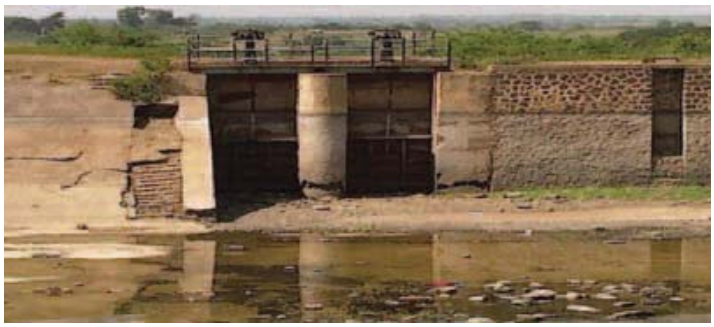
Ujjani, an ongoing major project, was taken up in 1969 with projected IP to be created of 2.6 lakh ha. The work was still in progress and an expenditure of

₹1,274.30 crore had been incurred on the project up to June 2013. Audit observed the following:

- The DSO in 2009 noticed leakages of 100 cusecs (approximately 2,832 litres per second) from the four sluice gates[136] of the dam. However, necessary repairs were not carried out which resulted in leakage of 89.31 mcum of water *per annum* resulting in reduced IP utilisation, which ranged between 76 and 85 *per cent* during 2007-12.
- Technical sanction for repair to one gate at an estimated cost of ₹ 46.38 lakh was accorded only in May 2012.

Leakages in Ujjani dam

- During joint visit (October 2012) conducted by audit along with the officials of WRD, it was observed that the canal was heavily damaged between chainage 0/00 km and 2/00 km of its length.



Damaged pillar at the entrance of minor nearest to Ujjani LBC

[136] A barrier sliding in grooves that are set in the sides of the waterway to allow water flow under it

Damaged lining of Ujjani LBC

The Government stated (August 2013) that the repair to sluice gates would be completed by December 2013. It added that the LBC was not heavily damaged between 00 to 02 km and there were only meagre loss. It stated that repairs were carried out as per the availability of funds. The fact remained that there was loss of water and repairs have not yet been carried out. Further, the canal efficiency was only 42 *per cent* (LBC) and 30 *per cent* (RBC)[137] during rabi season for the year 2011-12.

5.2.4.8 Sirsinala minor irrigation project, Nagpur

Joint visit conducted (September 2012) by audit along with the officials of WRD revealed that due to faulty head regulator there was leakage of water and vegetation growth in the canals.

Vegetation growth and water leakage from head regulator in canal, Sirsinala Project, Nagpur

The EE, MPD, Nagpur attributed (September 2012) the poor condition of canals to non-availability of funds and manpower for maintenance. The Government stated (October 2013) that repairs to head regulator would be carried out by the Mechanical Organisation and the vegetation growth in the canal has been removed.

[137] As per the water account of Ujjani project for the year

5.2.4.9 Jambnala minor irrigation project, Yavatmal

The dam work of Jambnala project was completed (June 1999). The maximum utilised IP was 275 ha against the created IP of 750 ha (36.67 *per cent)* in the year 2007-08. During joint inspection (September 2012) by audit and officials of WRD, the following observations were made:

- There was leakage from the head regulator and the gate of the head regulator could not be operated as the shaft rod[138] was stolen.


Absence of shaft rod and leakage of water in the canal in Jambnala project, Yavatmal

- The thick vegetation and heavy siltation in the entire length of main canal up to three km did not allow for full discharge of water.


Thick vegetation and heavy siltation in canal

- The trough[139] to carry water at chainage 1.020 km was also full of vegetation. On water being let in the canal, the same could not pass through the trough due to blockage and resulted in wastage of water as it leaked from the sides.
- Outlet in minor[140] No. 1 was found to be damaged. The field channels for minors between km one to six km were not completed.

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138 It is a rotating rod which through its motion operates the gate of head regulator
139 A bridge on the canal for passage of water
140 Minor is a branch of the distributary of any canal

Broken outlet and non-functional structure

The Government stated (October 2013) that the rod of head regulator has been fixed, vegetation and siltation in the main canal up to three km removed, trough at chainage 1.020 km cleaned and field channels are being completed.

5.2.5 High siltation in reservoirs

Siltation occurs when rivers bring silt to the reservoirs during monsoon and a significant proportion of the silt settles down in the reservoir, reducing the water storage capacity and benefits from the projects.

Scrutiny of Water Audit Report for the year 2009-10 revealed that:

- The rate of siltation in six[141] of 12 dams was more than the designed rate[142] based on sedimentation studies conducted by Maharashtra Engineering Research Institute (MERI), Nashik during 2007 and 2008 through Remote Sensing Technique.
- The loss of live storage of water due to siltation in these six dams worked out to 189.134 mcum sufficient to irrigate 24,587 ha[143] of land during Rabi and hot weather season. As silt removal is costly, maintenance works need to be undertaken to reduce siltation by adopting appropriate catchment area techniques like plantation, check dams[144] *etc*.

5.2.6 Allocation of water

As per the National Water Policy of 2002, water was to be allocated in the following order of priority (i) drinking water (ii) irrigation (iii) industries. GoM in its State Water Policy, 2003, prioritised the allocation of water amongst (i) drinking water, (ii) industry and (iii) irrigation. However, irrigation was assigned second priority in place of industries by GoM in May 2011. The sectoral reservation of water was fixed for drinking water (15 *per cent*), industries (10 *per cent*) and irrigation (75 *per cent*). As already mentioned in **paragraph 5.2.1**, allocation of water for non-irrigation purpose

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141 1) Veer – 30.384 mcum, 2) Bhatgar – 108.590 mcum, 3) Varasgaon – 2.122 mcum, 4) Karanjwan – 8.598 mcum, 5) Lower Wunna – 9.190 mcum and 6) Mula 30.250 mcum

142 The annual designed rate at which siltation occurs in dam storage

143 189.134 mcum x 130 ha = 24,587 ha (considering the average standard of 130 ha/mcum fixed by GoM during rabi and hot weather season)

144 A check dam is a small dam which can be either temporary or permanent to reduce erosion and allow sediments and pollutants to settle

by more than 25 *per cent* was to be referred to the High Power Committee headed by the Minister, Water Resources. Further, any change in reservation of water by more than 25 *per cent* for non-irrigation purpose was subject to recovery of restoration charges at the rate of ₹ 0.50 lakh per ha (revised to ₹ one lakh from April 2009) from non-irrigation users on account of curtailment of irrigable area. Analysis of the water account data for the year 2008-10, furnished by MWRDC, Aurangabad revealed that in 54 out of 293 projects, the use of available water for irrigation purpose was less than 75 *per cent*.

Audit observations on three out of 54 projects, where restoration charges were not recovered, are discussed in the succeeding paragraphs.

5.2.6.1 Gangapur-Darna major irrigation project, Nashik

HPC approved (August 2007) reservation[145] of water (399.63 mcum per year) up to the year 2041 to Nashik Municipal Corporation (NMC) on the condition that 65 *per cent* of the water would be released subsequently into Godavari river after treatment. An agreement was to be executed within three years failing which the allocation approved by HPC was to lapse automatically.

- Agreement for the allocation approved by HPC in August 2007 was not executed by GMIDC with NMC except agreement for earlier allocation[146].
- NMC used 491.27 mcum[147] of water for urban drinking purpose during 2008-12. In the absence of agreement, recovery of restoration charges by WRD on account of curtailment of irrigation area was not done though the water allocated for non-irrigation purpose was more than 25 *per cent*.

The Government stated (October 2013) that in view of its poor financial condition, the NMC requested for payment of restoration charges of ₹ 151.73 crore in instalment, due to which, the issue was pending.

HPC also approved in March 2008 (i) reservation of 39.60 mcum of water per year to MIDC, a Statutory Government Corporation for Sinnar Industrial Area; and (ii) reservation of 43.80 mcum of water per year to India Bulls Mega Power Plant (IBMPP). The requirement for IBMPP was to be met from 65 *per cent* of water that was to be released into Godavari river by NMC after treatment, as per the reservation approved (August 2007). Audit scrutiny further revealed the following:

- An agreement was to be executed within three years of grant of approval failing which, the allocation approved by HPC was to lapse. The reservation of water to MIDC, was cancelled in March 2011 due to non-execution of agreement.
- Similarly, though the validity of approval granted to IBMPP expired in March 2011, GoM granted (June 2011) extension of time up to May 2012 for execution of agreement. Accordingly, IBMPP executed an agreement

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[145] Up to 2011- 140.85 mcum per year; up to 2021- 203.31mcum per year; up to 2031 - 287.89 mcum per year and up to 2041-399.63 mcum per year

[146] Earlier, quota of 64.76 mcum was sanctioned April 1996 and agreement executed in April 2006 for the period 2005-11

[147] 2008-09: 119.428 mcum; 2009-10: 114.399 mcum; 2010-11: 129.569 mcum; and 2011- 12: 127.874 mcum

with the WRD in January 2012. The grant of extension after the validity of HPC approval was not in order and also showed disparity in implementation of HPC recommendations in both the cases (MIDC and IBMPP). The Government stated (October 2013) that IBMPP signed an agreement before the expiry of the extended period (May 2012). The fact remained that extension was given after the validity of the initial approval by the HPC had expired.

- Restoration charges of ₹ 26.37 crore on account of loss of irrigation potential of 5,120 ha for diversion of 43.80 mcum of water to IBMPP was recovered in January 2012 at ₹ 50,000 per ha instead of ₹ one lakh per ha, resulting in short-recovery of restoration charges to the extent of ₹ 25.60 crore.

5.2.6.2 Pawana medium irrigation project, Pune

Pawana project had a gross storage capacity of 305 mcum with live storage of 274 mcum. Audit observed that:

- The agreement between Khadakwasla Irrigation Division, Pune and MIDC Chinchwad for supply of 59.128 mcum of water from Pawana dam was renewed in October 2010 for six years. However, restoration charges of ₹ 32.49 crore for loss of IP of 3,249 ha at ₹ one lakh per ha was not recovered at the time of renewal of agreement. The Government stated (October 2013) that Pawana dam does not have canals and distribution network, as such, there was no loss of IP and the question of recovery of restoration charges did not arise. The reply is not acceptable as ISR of 2010 indicated that IP of 6,370 ha was created as on June 2011 and thus, restoration charge was recoverable.
- On the basis of sanction[148] granted by Khadakwasla Irrigation Division, Pune, Pimpri Chinchwad Municipal Corporation was lifting 137.094 mcum of water. However, restoration charges of ₹ 37.66 crore for lifting 137.094 mcum of water and consequent loss of IP of 7,533 ha was not recovered.
- Scrutiny of Water Account of Pawana project (2011-12) revealed that 53 consumers lifted 28.940 mcum of water during 2011-12, against the sanctioned quota of 32.438 mcum. The billing was done on the basis of 90 *per cent* of the sanctioned quota even though consumption was less than 90 *per cent*. There was no condition in the agreement to reduce the sanctioned quota on the basis of actual use so that unutilised water could be re-allocated to those who required this scarce resource.

5.2.6.3 Hetawane medium irrigation project, Raigad

Due to increase in demand for water for non-irrigation purposes, it was decided (December 2007) by the HPC that more than 25 *per cent* of the total storage of water be reserved for non-irrigation purposes. Accordingly, revised reservation of water (48.640 mcum) for non-irrigation purpose was made by KIDC to CIDCO, ISPAT, Tata Power and drinking water for Vashi village. In

[148] October 1985- 49.932 mcum, December 1996 - 49.932 mcum and October 2004 - 37.23 mcum

addition, 26 million litres per day was reserved for MahaMumbai SEZ (MSEZ) for five years. It was observed that:

- The restoration charges for loss of IP were to be recovered before execution of formal agreements with these agencies and the reservations would stand cancelled if the allotted water was not lifted by the concerned agencies within three years of allotment. KIDC, however, did not specify the period within which the charges were to be recovered and agreements executed.
- In the absence of any specific time period, the reservations continued for three years without recovery of any charges and execution of agreements.
- The water was also not lifted by these agencies. The reservation of CIDCO was cancelled automatically after lapse of three years, while reservations in remaining cases were cancelled only in September 2011.

The Government stated (October 2013) that since the agencies did not use the sanctioned water, the restoration charges were not recovered. The fact remained that in the absence of any definite time frame for execution of agreements and recovery of restoration charges the reservation continued for three years without any benefit accruing to WRD. Further, the unutilised water under reservations was also not used for irrigation purpose.

5.2.7 Performance of irrigation system

Irrigation system performance is measured in terms of the area irrigated per unit of water used. To measure the efficiency of the irrigation system the average irrigation system performance was considered at 130 ha/mcum of water by WRD. This was based on the standard efficiency of 150 ha/mcum of water for Rabi and 110 ha/mcum of water for hot weather.

The Benchmarking Report revealed poor efficiency of the projects as under:

- During 2009-10, in 30 of the 50 major projects and 78 of the 166 medium projects, the areas irrigated were less than 130 ha/mcum of water (ranging between five and 129 ha/mcum). In 32 out of 108 projects, the area irrigated per mcum of water was shown as nil.
- During 2010-11, in 34 of the 50 major projects and 88 of the 171 medium projects, the area irrigated was less than the benchmark of 130 ha/ mcum of water (ranging between 10 and 124 ha/mcum). In one project, the area irrigated per mcum of water was shown as nil.

Audit scrutiny of water accounts in four test-checked canals (Bhatsa RBC, Ujjani LBC, Ujjani RBC and Neera RBC) revealed that the efficiency of irrigation system during 2007 to 2012 was poor (**Appendix 5.4**) and ranged between 24.65 ha/mcum and 140.35 ha/mcum during Rabi and 39.90 ha/mcum and 113.59 ha/mcum during hot weather.

The Government stated (October 2013) that that the efficiency in respect of Ujjani project during Rabi season ranged between 128 ha /mcum and 341 ha/mcum and between 89 ha/mcum and 154 ha/mcum in hot weather during 2007-12. The reply is not acceptable as the water account of Ujjani project for the year 2007-12 clearly showed lower efficiency of 48.56 ha/mcum and

101.84 ha/mcum during Rabi and 39.90 ha/mcum and 82.86 ha/mcum during hot weather, as indicated in **Appendix 5.4**.

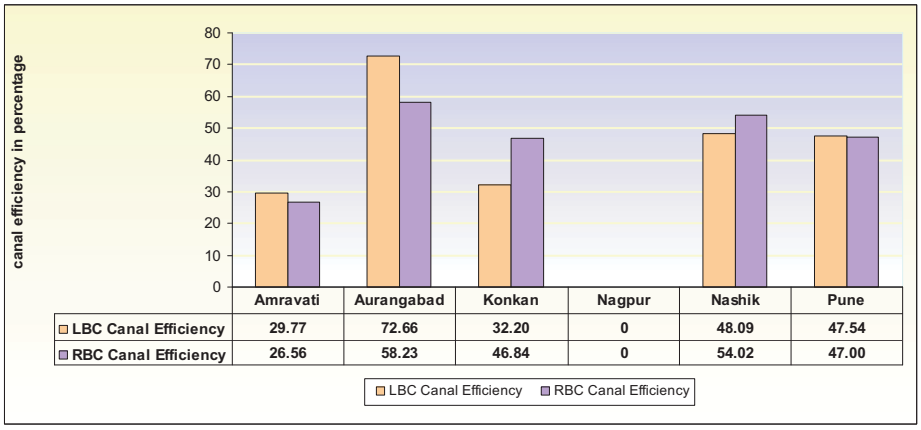
The Government attributed (October 2013) the poor efficiency in Bhatsa RBC and Neera RBC to cultivation of paddy requiring high volumes of water, high percolation losses due to soil permeability, old distributary system, cultivation of perennial crops like sugarcane etc. The fact remained that the efficiency was less than the average target fixed by Government.

The poor performance of the irrigation system was due to poor canal conveyance efficiency or change in cropping pattern involving use of more water for perennial crops. These are discussed below.

5.2.7.1 Canal conveyance efficiency

The conveyance efficiency of main canals is measured by the ratio of water released in main canal to the sum of water supplied to distributaries and lifts. Test check of data in respect of major projects in the six regions as per the database of water account for the period 2007-10 relating to conveyance efficiency of canals **(Appendix 5.5)** is depicted in **Graph 5.1**.

Graph 5.1: Average canal conveyance efficiency of LBCs and RBCs in six regions



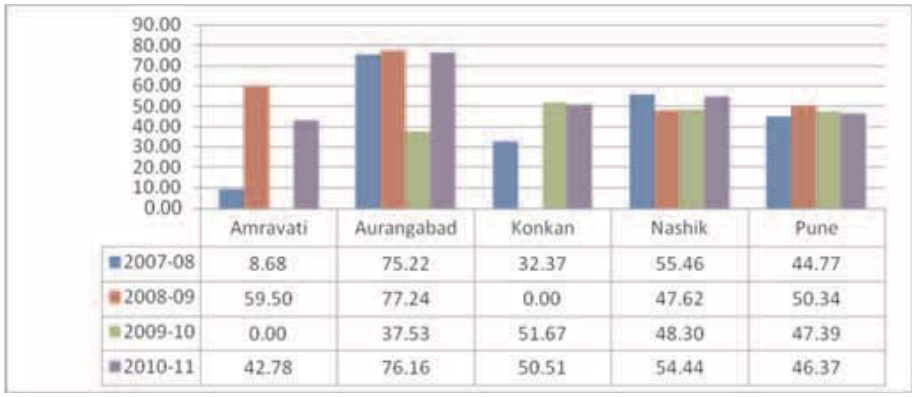
	Amravati	Aurangabad	Konkan	Nagpur	Nashik	Pune
LBC Canal Efficiency	29.77	72.66	32.20	0	48.09	47.54
RBC Canal Efficiency	26.56	58.23	46.84	0	54.02	47.00

Source: Water Accounts of the projects

As can be seen from the graph above, the canal efficiency of the projects in Amravati region was the lowest as compared to other regions. In Nagpur region, even though water was released in the canals, the efficiency was shown as Zero. The average canal conveyance efficiency of Konkan and Pune region was less than 50 *per cent*.

The year-wise analysis of canal conveyance efficiency of five regions is detailed in **Graph 5.2**.

Graph 5.2: Year-wise analysis of canal conveyance efficiency



	Amravati	Aurangabad	Konkan	Nashik	Pune
2007-08	8.68	75.22	32.37	55.46	44.77
2008-09	59.50	77.24	0.00	47.62	50.34
2009-10	0.00	37.53	51.67	48.30	47.39
2010-11	42.78	76.16	50.51	54.44	46.37

Source: Water Accounts of the projects
*Data was not available for Konkan Region (2008-09) and Amravati Region(2009-10)

It can be seen from the above graph that there were significant variations in the percentage of canal conveyance efficiency of projects.

The Government stated (August 2013) that the conveyance efficiency of canals depends upon a number of factors, such as, water released after a long gap in two rotations, maintenance and canal repair. As regards zero conveyance efficiency in Nagpur region, the Government stated that due to non-furnishing of data in the prescribed format by the field offices computer analysis showed zero value. It added that care would be taken to ensure accuracy of data. It was not clear as to why the Government allowed Nagpur region to continue furnishing data in a format other than the one prescribed for so many years.

5.2.7.2 Change in cropping pattern

Irrigation projects are planned considering the type of crops grown in the command area[149], type of soil, requirement for non-irrigation purpose *etc*. The cropping pattern in turn is largely influenced by the type of soil, availability of water and the climatic condition of the region.

An analysis of the cropping pattern envisaged at the time of project planning and the actual cropping pattern followed showed wide variations, which had adversely impacted the efficiency of the project. The Water Audit Report for the year 2009-10 recommended irrigation reduction of area under water-intensive crops to improve the efficiency of the projects as water intensive crops require more water. Audit findings on Ujjani major project are stated below:

Ujjani major irrigation project

The Ujjani dam has a gross storage capacity of 3,320 mcum with a live storage capacity of 1,517 mcum. The water projected for irrigation was 1,182.36 mcum *i.e.* 78 *per cent* of live storage. The planned cropping pattern for Ujjani project was approved by GoM (1993). An overview of the cropping pattern

[149] Command area of any project is the area brought under cultivation through irrigation project

planned and actual cropping pattern in respect of Ujjani Project is depicted in **Appendix 5.6** and revealed the following.

- Against the total projected cropped area of 2,73,298 ha[150], the area actually cropped during 2007-12 ranged between 64 *per cent* and 70 *per cent*.
- The cropped area actually irrigated using one mcum of water under the project ranged between 90.61 ha and 114.77 ha only during 2007-12, against 231.15 ha[151] per mcum envisaged under the project.
- The actual area cultivated under perennial[152] crops ranged between 73,665.5 ha and 82,121 ha during 2007-12 which was significantly more than 3,690 ha per year planned under the project. These crops being water intensive, required more water for the sown area thus, reducing the efficiency of the project (less area irrigated per mcum of water used).

The use of water from Ujjani Dam during 2009-12 for rabi and hot weather crops was planned every year in meetings chaired by Minister, WRD. The use of water planned and actual water use during 2009-12 was as given in **Table 5.6**.

Table 5.6: Planned and actual use of water in Ujjani dam

Year	Water use as per plan for Rabi and Summer[153] (mcum)	Actual Water use during rabi and summer (mcum)	Excess use of water (in *per cent*)
2009-10	1180.25	1617.98	37
2010-11	1410.18	1739.67	23
2011-12	1795.29	1867.74	4
Source: Water Account and Minutes of meetings for planned use of water; Water Account for 2012-13 was not prepared.			

The above table shows that the actual water use was more than that planned during all the three years (four to 37 *per cent*).

The Government stated (August 2013) that the main reason for low utilisation of IP was due to deviation in cropping pattern *vis-à-vis* what was envisaged in the project report particularly because of the sugarcane cultivation.

5.2.8 Schemes to improve IP utilisation

To bridge the gap between IP created and utilized, the Department is implementing three Schemes *viz.* (i) Command Area Development (CAD) works (ii) Maharashtra Water Sector Improvement Project (iii) Repair, Renovation and Restoration of Water Bodies. The audit findings in respect of these three Schemes are discussed below:

5.2.8.1 Command Area Development works

The Command Area Development works were undertaken by WRD under a Centrally Sponsored Scheme. The Scheme was restructured and renamed by

[150] The cropped area for Ujjani Project *i.e.* 2,73,298 ha (Command area: 2,24,656 ha and Reservoir: 48,642 ha) was calculated as per the approved cropping pattern for the project

[151] As per the project report it was planned that 1,182.36 mcum of water was to irrigate 2,73,298 ha of cropped area *i.e.* an average of 231.15 ha per mcum expected to be irrigated

[152] Perennial crops are planted once and live for years producing many consecutive harvests

[153] Including use for non-irrigation purpose

GoI (April 2004) as Command Area Development and Water Management Programme (CADWMP). The CADWMP includes various components of works *viz.* survey, planning and design and construction of field channels, on-farm development (OFD) works, construction of field intermediate and link drains, training of farmers *etc*. The GoI funding in the form of grant was limited to 50 *per cent* of actual expenditure for all components except training/monitoring component for which the funding was limited to 75 *per cent* of actual expenditure.

An expenditure of ₹ 169.86 crore was incurred on nine projects[154] under CADWMP during 2007-13. The targets and achievement in respect of two components (construction of field channels and construction of field intermediate and link drains) taken up under CADWMP during 2010-13 is given in **Table 5.7**.

Table 5.7: Target and achievement under CADWMP

Component of work	Target (in ha)	Achievement (in ha)	Shortfall percentage
Construction of field channels	87484	34926	60.07
Construction of field intermediate and link drains	43052	23220	46.07
Source: Progress reports of each project			

Audit observed the following:

- The shortfall in construction of field channels ranged between 30 and 76 *per cent* during 2010-13. The shortfall in construction of field intermediate and link drains ranged between 56 and 63 *per cent* during 2010-13 **(Appendix 5.7)**;
- During the period 2005-06 to 2009-10, 23 land development works awarded at a cost of ₹ 2.92 crore (Kukadi project) for development of 3,098.42 ha of CCA between March 2007 and December 2010 were incomplete. The delay in completion of the works deprived the beneficiaries of irrigation benefits.
- As per para 5.3.4 of OFD Manual, the construction of field channel finds utility when these are constructed just ahead of first arrival of canal water. A long time gap between construction of field channels and actual use damages the channels and renders the same unserviceable. Audit noticed that 27 field channels and structure works under CAD were completed in 2010 after incurring an expenditure of ₹ 2.63 crore covering 195.17 ha of command area in Solapur district (Kukadi project). However, the non-lining of LBC and consequent non-release of water into the distribution network *i.e.* from canal to distributaries to minors and field channels for feeding the command area, led to growth of trees and grass thereby rendering the field channels unusable.

[154] Khadakwasla, Kukadi, Krishna, Chaskaman, Dhom Balkwadi, Bhima, Nandur Madhmeshwar, Lower Wuna and Upper Penganga

Minor 86 under Kukadi LBC

- Wasteful expenditure of ₹ 28.80 lakh was incurred on outlets and field channels which were not traceable and as a result, water could not reach the farmers (Kukadi and Chaskaman projects). This was noticed in joint inspection (March 2013) by audit with the officers of WRD.

Field Channel on outlet left I of Minor 86 on Kukadi Left Bank Canal

Field Channel on outlet right of Sub-minor 3 on Minor 90 of Kukadi Left Bank Canal

Field Channels to Direct outlet 10 on Distributary 22 of Chaskaman left bank canal

5.2.8.2 Maharashtra Water Sector Improvement Project

Completed irrigation projects often suffer from poor IP utilisation due to various reasons such as, non-maintenance of dams and canals and high siltation. In 2001, WRD identified 2,243 completed irrigation projects having an IP of 26 lakh ha with poor IP utilisation, for rehabilitation under Maharashtra Water Sector Improvement project (MWSIP) in three phases. The

rehabilitation of the projects involved works for improving the water service delivery by rehabilitation/repair of main canals, distributaries, minors *etc.*

The first phase of the project in 2005 aimed at structurally rehabilitating 236 projects[155]to ensure the shift in responsibility of management of irrigation systems from being solely that of the Government to a system where water distribution below the head works[156] are managed by Water Users' Associations (WUAs). In order to finance the said project with non-budgetary resources, GoM through GoI signed (August 2005) an agreement with the World Bank. The overall project cost was ₹ 1,859 crore with a loan component of ₹ 1,534.30 crore from the World Bank and ₹ 36 crore was to be contributed by the participating WUAs at ₹ 500 per ha. The residual cost ₹ 288.70 crore was to be borne by GoM from its own resources. The time frame for completion of the project was six years ending 30 September 2011. Audit scrutiny revealed the following:

- In terms of Section 205 of Articles 11 of the agreement, GoM was liable to pay to the World Bank 'Commitment Charges' at the rate of three fourth of one *per cent* (3/4th of one *per cent*) *per annum* on the principal amount of the loan not withdrawn from time to time. Due to delay in award of the contract for canal rehabilitation and dam safety works and formation of WUAs, the projects could not be completed within the stipulated time. Due to slow pace of construction the GoM could utilize only ₹ 1,391.42 crore leaving a balance of ₹ 142.88 crore (9.31 *per cent*) unutilized till June 2013. As a result, GOM had to bear avoidable commitment charges of ₹ 17.91 crore during the period 2005 to 2013 as per provisions of the agreement. WRD stated (April 2013) that works were required to be carried out without affecting the irrigation rotations and there were difficulties in availability of construction material, especially sand, which affected the progress of works. Hence, loan disbursement was not as per schedule and commitment charges had to be paid.
- The WRD revised (August 2012) the estimated cost from ₹ 1,859 crore to ₹ 2,031.77 crore due to non-completion of projects within six years as planned, resulting in increase in cost by ₹ 172.77 crore to be borne by GoM. The project period was extended up to March 2014 by the World Bank on the request of GoM.
- As of July 2013, 1,677 WUAs were formed out of the projected formation of 1,708 WUAs in respect of these 236 projects. As per project agreement, total contribution of ₹ 36 crore was to be recovered from WUAs, but WRD could recover only ₹ 19.70 crore till July 2013. WRD stated (June 2013) that efforts were being made to recover the balance amount from the WUAs.
- As per the Status Report of WRD on MSWIP ending October 2013, of the total 236 projects, canal rehabilitation works were completed in 183 projects (three major, seven medium and 173 minor projects), covering a culturable command area of 3.14 lakh ha (October 2013).

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[155] Culturable Command Area of 6.69 lakh ha

[156] A term used for any structure at the head or diversion point of a waterway

5.2.8.3 Repair, renovation and restoration of water bodies

The GoI, Ministry of Water Resources launched (2005) a Centrally Sponsored Scheme for Repair, Renovation and Restoration (RRR) of Water Bodies which included restoration of lost/reduced irrigation potential. As per the guidelines, water bodies having culturable command area up to 2,000 ha could be taken up under this Scheme[157]. At the district level, a District Level Implementation and Monitoring Committee (DLIMC) under the chairmanship of District Collector was to be constituted for implementation and supervision of the projects under the Scheme.

Scrutiny of records revealed the following:

- Proposals for 741 projects at an estimated cost of ₹ 399.10 crore under phase I of the Scheme was sent by GoM to GoI in October 2010. In anticipation of receipt of GoI share, GoM released lump sum grant of ₹ 100 crore to the IDCs on 31 March 2011 with instructions not to incur any expenditure till further orders.
- GoI's share of ₹ 80.53 crore for 258 projects[158] was released to GoM in October 2011. The AA to these 258 projects, with the objective of restoring irrigation potential of 54,369 ha, was accorded by GoM in November 2011 at an estimated cost of ₹ 135.09 crore (GoI share: ₹ 119.35 crore and GoM share: ₹ 15.74 crore) and orders for utilising ₹ 87.24 crore (out of ₹ 100 crore released in March 2011) was issued in May and June 2012. Work on only 24 out of 258 projects (under the jurisdiction of TIDC and VIDC) had commenced and an expenditure of ₹ 3.97 crore incurred (March 2013). Phase II of the project has not yet commenced.

The Government stated (June 2013) that funds were released in anticipation of approval by GoI and the delay in issuing orders for release of funds was on account of Grampanchyat and Nagarpalikas elections in the State. The reply is not acceptable as release of funds before AA was irregular and resulted in funds being parked with the IDCs and the stated objective of restoring the IP created could also be not achieved. Further, the delay in issuing order for release of funds on account of Grampanchyat and Nagarpalikas elections is not acceptable as the elections were held between February and March 2012. The release of ₹ 100 crore to the IDCs on 31 March 2011 was made to avoid lapse of budgeted fund.

5.2.9 Equity in distribution of water

The command area of a project is divided equally as head, middle and tail reaches. The benefit of irrigation should equitably be given to the beneficiaries in all the reaches to ensure fair distribution of water. The equity performance of the project is measured in terms of actual area irrigated to projected irrigable command area in these reaches.

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[157] For special category States and for projects benefitting drought prone/tribal/naxal affected areas, the funding pattern is 90:10 between the Centre and the State and in others, the funding pattern is 25:75 between the Centre and the State

[158] Approvals for balance 483 projects were not received from GoM

Scrutiny of benchmarking report for the year 2009-10 in 2010-11 revealed that:

- In 31 of 50 major projects and 104 of 191 medium projects, the distribution of water was not equal (2009-10) in all the reaches. Further, during 2010-11, in 31 of 50 major projects and 122 of 177 medium projects the distribution of water was not equal in all the reaches.
- In five of 50 major projects and 36 of 191 medium projects there was no distribution of water to the beneficiaries in the tail reaches (2009-10). In one of 50 major projects and 31 of 177 medium projects there was no distribution of water to the beneficiaries in the tail reaches (2010-11).

One of the reasons which could be attributed to inequity in the distribution of available water was inefficiency in the canal conveyance as discussed in **paragraph 5.2.7.1** of this Report.

The Government stated (October 2013) that a workshop on Benchmarking Reports, Water Audit Reports and ISRs was conducted in September 2013 and based on the outcome of the workshop necessary action would be taken to streamline the issues.

5.2.10 Water Quality

As per the State Water Policy 2003, the quality of water resources of the State shall be protected to preserve their usability in a sustainable manner for the people of the State.

Ujjani dam with a gross reservoir capacity of 3,320 mcum was completed in 1980 and the water was being utilised for irrigation and non-irrigation purposes for Pune, Ahmednagar and Solapur districts. Untreated domestic effluents of Pune city were drained into Mutha and Mula rivers while effluents of Pimpri-Chinchwad city were drained into Pawana river. The effluents of these rivers flow into Ujjani dam, thereby polluting its dam water. Several villages[159] situated alongside the banks of the backwater of Ujjani dam were utilising the dam water for irrigation and non-irrigation including drinking purpose. Total quantities of untreated water drained from Pune and Pimpri-Chinchwad cities are detailed in **Table 5.8**.

Table 5.8: Water drained without treatment from Pune and Pimpri-Chinchwad cities

City/ Corporation	Total quantity of waste water generated (in MLD)	Total quantity of waste water treated (in MLD)	Quantity of waste water drained without treatment (in MLD)
Pune	744	527	217
Pimpri-Chinchwad	290	180	110
Total	**1034**	**707**	**357**
Source: Information furnished by the Maharashtra Pollution Control Board			

A project taken up by Pune Municipal Corporation to recycle the effluents before release into New Mutha RBC was incomplete due to which untreated water continued to be released into the Mula and Mutha rivers. The high level of pollutants could adversely affect the Ujjani dam.

[159] Villages towards the upstream of Karmala, Indapur, Barshi, Kurduwadi and at downstream towards Pandharpur, Mangalwedha, Sangola and Solapur area are using water for domestic purpose

The test reports (September 2009) of water samples collected (September 2009) by Maharashtra Pollution Control Board (MPCB) at four[160] places indicated that the alkalinity and pollutants were beyond permissible limits, rendering the water unfit for domestic consumption unless properly treated by respective local bodies.

The MPCB filed (2009-10) a criminal suit against the two[161] local bodies and three industries for pollution, under Water Pollution Act, 1974 and submitted (August 2010) the Bhima River Pollution Control Action Plan through the Pune Collector to the Environment Department, GoM. Notwithstanding the action taken by MPCB, discharge of effluents continues to pollute the Ujjani dam.

In the exit conference, Principal Secretary (CADWM) stated (July 2013) that MPCB has conducted basin-wise study of Bhima river and that Pimpri Chinchwad and Pune Municipal Corporations were taking necessary measures.

The Government stated (October 2013) that the Environment Department, GoM is being requested to take necessary measures.

[160] Diksal, Khanota, Kumbhagaon and Pargaon villages in the backwaters of Ujjani dam
[161] Pune and Pimpri-Chinchwad