

CHAPTER - 13

WATER RESOURCES

13.1 Rajasthan is the driest state having only 1.16 percent of country's surface water. Average rainfall is 531 mm against national average of 1200 mm. 2/3 part of the state is desert where average rainfall is only 380 mm. Total surface water available at 50% dependability is 21.71 BCM, out of which only 16.05 BCM is techno economically utilizable, but storage capacity generated as yet is 11.29 BCM only, which is about 71%, rest of the water is yet to be harnessed. Rajasthan is receiving 18.08 BCM water as per interstate agreements. Irrigation potential of 34 lac. ha. has been created against the ultimate potential of 51 lac ha.

13.2 Condition of ground water is precarious. The ratio of ground water exploration to annual replenishment was 35% in 1984, has reached a level of 125% in 2004. Out of 237 development blocks in the state, only 32 blocks are considered safe. In absence of surface water, reliance on ground water is excessive as such water table is depleting at alarming rate in most of the area except in canal command area.

13.3 Objective & priorities of XI Plan will be as follows:

1. Utilisation of available surface water by harnessing 3.5 BCM and creating a CCA of 9.33 lac ha., contributing substantially to Bharat Nirman target of 10 m.ha. Efforts will be made to complete ongoing major/medium projects in first two years and 7 major, 7 medium & 100 minor projects shall be taken up.
2. Optimal utilisation of water by
 - Completion of RWSRP costing Rs. 734 cr. aimed to rehabilitate 91 canal systems and 16 dams covering 6 lac ha. during first year of XI Five Year Plan including RMC of Chambal System.
 - Rehabilitation of 415 minor scheme costing Rs. 612 crores under JBIC funded project.
 - Taking other schemes under extension, rehabilitation & modernization project.
 - Encouragement of Participatory Irrigation Management, formation of WUAs and their capacity building.
 - Encouraging farmers towards less water consuming crops by formation of technical support groups for all irrigation schemes.
 - Launching of a long term sustainable water campaign to create awareness towards water scarcity and water conservation.

3. Minimising Gap in potential created & utilisation by:
 - On-going CAD works at IGNP, Chambal, Nohar Sidmukh shall be completed during the Eleventh Five Year Plan and new CAD works at Amarsingh Jassana, Bisalpur and Narmada projects shall be taken up.
 - Using pipelines instead of earthen water courses to save water.
4. Efficient use of water by using sprinkler system. Sprinkler system has been made mandatory at Narmada Canal System and its use in Bisalpur Project and IGNP lift canal system shall be introduced.
5. Reaching Ground Water by constructing a large number of water harvesting structures for all urban buildings and collection of rain water from pavements.
6. Efficient Project Planning by setting up an efficient management information system from the funds under RWSRP, providing adequate funds for survey & investigation of new projects, procurement of hydrometereological equipment under SPP, updating Water Resources Plan by using modern technology.
7. Irrigation water rates shall be rationalized to cover O&M costs.

13.4 During the Tenth Five Year Plan, work on six major projects namely Narmada, Mahi, Bisalpur, Ratanpura Distributary, Modernization of Gang Canal, RWSRP and seven medium projects namely Chauhi, Panchana, Bethali, Chhapi, Sukli, Bandisendra and Gardada were executed. Three major projects namely Mahi, Bisalpur and Ratanpura Distributary, four medium projects of Panchana, Chhapi, Chauhi, Bethali and 139 minor projects are likely to be completed during the Tenth Five Year Plan, which would create additional CCA of 278.16 ha. Likely expenditure is Rs. 2909.70 lakhs. Likely physical & financial achievements during the Tenth Five Year Plan are as follows:-

(Area in 000, ha.)
(Rs. in crores)

S. No.	Type of Project	Target		Likely Achievement	
		Physical	Financial (Revised)	Physical	Financial
1	Multipurpose Works LOTC	-	14.10	-	2.68
2	Major Projects	40.00	928.46	64.68	1404.78
3	Medium Projects	55.30	342.40	22.79	276.89
4	Minor Irrigation Works	50.00	289.55	29.26	301.95
5	Augmentation of Traditional Water Sources/ WHS	-	40.00	-	170.81
6	Flood Control Works	-	0.24	-	0.50
7	Water Management Services	-	116.33	-	47.82
8	Modernisation	-	0.60	-	0.24
9	Ratanpura Distributary	9.00	16.00	18.00	13.48

S. No.	Type of Project	Target		Likely Achievement	
		Physical	Financial (Revised)	Physical	Financial
10	Modernisation of Gang Canal	-	350.00	-	265.00
11	Ghaggar Flood Control	-	21.76	-	34.50
12	Bisalpur	63.00	114.95	63.35	186.53
13	Mahi	10.00	132.00	23.55	194.13
14	Indira Gandhi Nahar Project	353.00	880.00	213.09	841.90
	Total	209.30	3232.29	278.16	3741.21

13.5 Provision of Rs. 6807.21 crores and Rs. 924.00 crores have been proposed for irrigation sector for the Eleventh Five Year Plan & the Annual Plan 2007-08. Major-headwise outlays and physical targets are as follows:-

S. No.	Category of Project	(Area in 000, ha.) (Rs. in crores)			
		XI Plan 2007-12		Annual Plan 2007-08	
		Physical	Financial	Physical	Financial
1	Multipurpose Works LOTC	-	1.30	-	0.20
2	Major Projects	224.43	2652.00	80.00	350.00
3	Medium Projects	50.30	845.00	12.20	72.00
4	Minor Irrigation Works	70.47	985.85	15.00	118.50
5	Augmentation of Traditional Water Sources/ WHS	-	275.00	-	50.40
6	Flood Control Works	-	14.50	-	1.00
7	Water Management Services	-	126.65	-	9.80
8	Ratanpura Distributory	-	3.30	-	1.10
9	Modernisation of Gang Canal	38.75	87.63	38.75	40.00
10	Ghaggar Flood Control	-	22.00	-	7.00
11	Bisalpur	-	43.98	-	23.00
12	Mahi	-	130.00	-	20.00
13	Isarda Project	-	190.00	-	1.00
14	Indira Gandhi Nahar Project	332.00	1430.00	55.00	230.00
	Total	933.52	6807.21	200.00	924.99

Project-wise details are as follows: -

Multipurpose/ Major Irrigation Projects

Left Over Technical Committee's Works

13.6 The works included in this head are left over the decision of the technical committee. The LOTC works are shareable between M.P and Rajasthan on matching basis. A provision of Rs.1.30 crores has been proposed for the Eleventh Five Year Plan, out of which Rs. 0.20 crores is for the Annual Plan 2007-08.

Narmada Project

13.7 Narmada Canal Project was taken up to utilize 0.5 MAF of Narmada water allocated to Rajasthan. This water will be available to Rajasthan from Sardar Sarowar Project, under construction in Gujrat.

The share of water will be delivered at Rajasthan-Gujrat boarder through 458 Km long Narmada Main canal (NMC). 358 Km of this canal is complete in all respect and the work in last stretch of 100 Km is in progress. The canal system in Rajasthan would provide irrigation in 2.46 lac ha. by adopting improved method of irrigation i.e. sprinkler irrigation system which is mandatory in this project. This project would provide drinking water facility to 1107 villages & 2 towns. The Revised cost of this project is estimated as Rs. 1541.36 Crores. This cost includes Rs. 222.57 Crores as share of PHED for providing the drinking water to the command area and outside the command area. Financial outlay for this project in the X plan is 278.00 Crore against which the likely expenditure would be 880.26 Crore. The physical target of this project is 21.57 thousand ha. against which it is anticipated that 21.57 thousand-ha. will be achieved up to 2006-07.

13.8 A provision of Rs. 305.00 crores is proposed for the Eleventh Five Year plan, out of which Rs. 140.00 crores is for the year 2007-08. Narmada project is scheduled to be completed by 2012.

Mahi Project:

13.9 Mahi Bajaj Sagar is an interstate project between the States of Gujrat & Rajasthan for the development of irrigation & power generation. This project would provide irrigation in 80 thousand ha. land. The work on main components of the project was started in the year 1972-73. The estimated cost of this project is Rs. 834.88 Crore. Likely expenditure on the project upto 2006-07 is Rs. 865.37 crores, which includes Rs. 194.13 crores during the Tenth Five Year Plan.

13.10 The project will be completed in year 2007. A Provision of Rs. 130.00 crores is proposed for the Eleventh Five Year plan, out of which Rs.20.00 crores is for the year 2007-08.

Bisalpur Project:

13.11 Bisalpur project is a irrigation cum drinking water supply project. The dam is constructed across river Banas near village Bisalpur in district Tonk to provide irrigation facility in an area of 81.8 thousand ha. and to provide drinking water to Jaipur, Ajmer, Beawar, Kishangarh, Nasirabad & other enroute villages. The revised estimated cost of the project is Rs 657.91 Crore. Likely expenditure on the project upto 2006-07 is Rs. 636.84 cr. including Rs. 186.53 cr. during the Tenth Five Year Plan. This project is taken up under NABARD assisted RIDF. The physical target of this project in the Tenth Five Year Plan was envisaged as 63 thousand ha. against which anticipated potential creation would be 65.55 thousand ha.

13.12 A provision of Rs. 43.98 crores is proposed for the XI Five Year plan, out of which Rs. 23.00 crores is for the year 2007-08.

Isarda Drinking cum Irrigation Project

13.13 Isarda Dam is proposed across the river Banas near village Isarda. The project cost is Rs. 360 crore. A coffer dam has also been proposed to be constructed in upstream portion of the Isarda Dam for supplying drinking water to Tonk District. Estimated cost of this dam is Rs. 16.50 crore. This coffer-dam will also be useful during the construction of Isarda Dam.

13.14 A provision of Rs. 190.00 crores is proposed for the Eleventh Five Year Plan, out of which Rs. 1.00 crores is for the year 2007-08.

Ratanpura Distributary:

13.15 Ratanpura distributary work was started in the year 2000-01 to provide irrigation facilities to cultivators of left over area of Sidhmukh & Nohar Irrigation Project. The estimated cost of the project is Rs. 27.53 crore and ultimate potential is 18 thousand ha. The lining in 64 Km has been completed and the balance work of distributary is in progress. It is being constructed under NABARD assisted RIDF. Likely expenditure on the project upto 2006-07 is Rs. 23.54 crores including Rs. 13.48 crores during the Tenth Five Year Plan.

13.16 A provision of Rs. 3.30 crores is proposed for the XI Five Year plan, out of which Rs. 1.10 crores is for the year 2007-08.

Rajasthan Water Sector Restructuring Project (RWSRP):

13.17 The project was conceived for the improvement of selected surface irrigation system to improve performance efficiency. The project envisages strengthening of the existing irrigation projects up to designed standards. The Water User's Association (WUA) will do the management of the project, after completion of all rehabilitation work. The cost of this project is Rs. 733.60 crores, out of which the assistance from World Bank would be of the tune of Rs. 590 crores. It is proposed to rehabilitate 91 projects covering an area of 619.95 thousand ha. This project also envisages to take up remedial works of 16 identified large dams, which are in distress. The work on this project was started in the year 2002-03. The project is likely to be completed by 2007-08 and likely expenditure during the Tenth Five Year Plan is Rs. 519.61crores

13.18 A provision of Rs. 207.00 crores is proposed for the Eleventh Five Year Plan, out of which Rs.207.00 crores is for the year 2007-08

Gang Canal Modernization:

13.19 The Gang Canal project is under operation since 1927 to provide irrigation in Ganganagar district. The canal system had deteriorated over the years. The project was prepared for the lining of Bikaner canal in the Punjab and canal system in Rajasthan portion. The project was started in 2000-01. Likely expenditure on the project upto 2006-07 is Rs. 348.45

crores, out of which Rs. 265.01 crores is during the Tenth Five Year Plan against the outlay of Rs. 350.60 crores.

13.20 A provision of Rs. 87.63 crores is proposed for the Eleventh Five Year Plan, out of which Rs. 40.00 crores is for the year 2007-08

Yamuna Water Project (NABARD)

13.21 Two separate projects viz Yamuna Water Project for Bharatpur and Yamuna Water Project for Jhunjhunu & Churu have been prepared for utilisation of 3198 cusec Yamuna Water allotted to Rajasthan by the Upper Yamuna River Board. The projects are under consideration for approval. Rajasthan has to pay its share of Rs. 30.00 cr. to the Upper Yamuna River Board for which a provision of Rs. 24.95 cr. has been kept in Annual Plan 2006-07.

13.22 A provision of Rs. 360.00 crores has been proposed for the Eleventh Five Year Plan, which includes Rs. 0.50 crores for the Annual Plan 2007-08.

Medium Irrigation Projects

Chauli

13.23 Chauli Irrigation Project has been constructed on Chauli river, which is a tributary of Kalisindh river near village Himmatgarh in Tehsil Pidawa of Jhalawar district. The project would provide irrigation in an area of 9 thousand ha. The project was started in 1994.

13.24 The estimated cost of the project is Rs. 98.55 crores. Likely expenditure on the project upto 2006-07 is Rs. 98.60 crores which includes Rs. 55.43 crores during the Tenth Five Year Plan against the outlay of Rs. 32.57 crores. The physical targets on this project were 8 thousand ha, while the anticipated achievement of potential by the end of 2006-07 would be 9.75 thousand ha. The project has been completed as envisaged in the Tenth Plan in the year 2005-06.

13.25 A provision of Rs. 0.90 crores is proposed for the Eleventh Five Year plan, out of which Rs. 0.70 crores is for the year 2007-08 for clearance of pending liabilities.

Sukli Selwara

13.26 Sukli Selwara Irrigation Project is under construction on river Sukali, which is a tributary of river West Banas. The dam site is located near village Selwara in district Sirohi. The project would provide irrigation in an area of 5.6 thousand ha. The project was started in 2003. The estimated cost of the project is Rs. 42.9 crore. The financial outlay in the Tenth Five Year Plan was Rs. 24.23 Crore and it is anticipated that Rs. 31.95 Crore will be spent up to 2006-07. The physical targets on this project were 4 thousand ha, while the anticipated achievement of potential by the end of 2006-07 would be nil as the dam is under

construction and the canal system is yet to be constructed. The project is scheduled to be completed by 2007-08.

13.27 A provision of Rs. 11.90 crores is proposed for the Eleventh Five Year Plan, out of which Rs. 5.00 crores is for the year 2007-08

Gardada

13.28 Gardada Irrigation Project is under construction on river Mangli Dungari & Ganesh Nallah, which is a tributary of river Chambal. The dam site is located near village Polaspura in district Bundi. The project would provide irrigation in an area of 9 thousand ha. The project was started in 2003. The estimated cost of the project is Rs. 83.41 Crore. The financial outlay in the Tenth Five Year Plan was Rs. 55.5 crore and it is anticipated that Rs. 53.16 Crore will be spent up to 2006-07. The physical targets on this project were 9 thousand ha., while the anticipated achievement of potential by the end of 2006-07 would be nil as the dam is under construction and the canal system is yet to be constructed. The project is scheduled to be completed by 2007-08.

13.29 A provision of Rs. 30.70 crores is proposed for the Eleventh Five Year Plan out, of which Rs. 27.00 crores is for the year 2007-08

Bandi Sendra

13.30 Bandi Sendra Irrigation Project is under construction on river Bandi, which is a tributary of river Luni. The dam site is located near village Sendra in Tehsil Bhinmal district Jalore. The project would provide irrigation in an area of 4.6 thousand ha. The project was started in 2003. The estimated cost of the project is Rs. 37.03 crore. The financial outlay in the Tenth Five Year Plan was Rs. 30.67 crore and it is anticipated that Rs. 32.04 crore will be spent up to 2006-07. The physical targets on this project were 5 thousand ha. The project is scheduled to be completed by 2007-08.

13.31 A provision of Rs. 6.60 crores is proposed for the Eleventh Five Year Plan, out of which Rs. 2.00 crores is for the year 2007-08

Flood Control

13.32 The major flood problem in Rajasthan is due to Ghaggar river in Ganganagar & Hanumangarh, Bharatpur, Alwar, Dholpur, Dausa & Jaipur districts. The estimated cost of the scheme is Rs. 101.61 crores. Likely expenditure on the project upto 2006-07 is Rs. 79.72 crores which includes Rs. 35.00 crores during the Tenth Five Year Plan against the outlay of Rs. 22 crores

13.33 A provision of Rs. 36.50 crores is proposed for the Eleventh Five Year Plan, out of which Rs. 8.00 crores is for the year 2007-08

Surface Minor Irrigation Projects

13.34 Minor irrigation Projects have low cost and are completed in short gestation period. Such works create potential in arid and semi arid region of the State, where scope of surface water is limited and the scope of exploitation of ground water is very limited. Besides completion of ongoing works, new projects were taken up in the Tenth Five Year Plan. It was targeted that Rs. 248.00 crore will be spent on these projects. The achievement is more than the target by spending Rs. 289.77 crore on such works. The physical target was set to create irrigation potential of 50 thousand ha. The achievement against this is anticipated as 29.26 thousand ha. 139 works are likely to be completed out of the 196 works taken up during the Tenth Five Year Plan. The physical achievements are low as in some of the projects, the dam work is complete and the work on canal is in progress. The potential will be created after the completion of the canal system.

13.35 A provision of Rs. 415.00 crores is proposed for the Eleventh Five Year Plan, out of which Rs. 63.00 crores is for the year 2007-08.

Minor Irrigation Improvement Scheme

13.36 For Rehabilitation of the deteriorated minor irrigation tanks in the state, a project has been prepared for 1198 Minor Irrigation tanks. The project has been posed for JBIC Assistance. The objective of the project is to restore about 4.6 lac ha. CCA and to increase about 0.64 lac ha. CCA of 1198 MI tanks by reducing water losses in conveyance system.

13.37 A provision of Rs. 550.00 crores is proposed for the Eleventh Five Year Plan, out of which Rs. 50.00 crores is for the year 2007-08.

Water Harvesting Structures

13.38 About 48000 structures have been identified in the state for consideration of the scarce rainy water and augmentation of traditional water resources. 3202 water harvesting structures costing Rs. 296.60 crores have been sanctioned, so far. Out of which 1707 WHS have been completed upto October, 2006. These projects are taken up under NABARD assisted RIDF project.

13.39 A provision of Rs. 275.00 crores is kept for the XI Five Year plan out of which Rs. 50.40 crores kept for the year 2007-08.

GROUND WATER DEPARTMENT

13.40 The scarce ground water resources in the state are depleting at an alarming rate. Out of 237 blocks, 140 blocks have been come under "over-exploited" category and 50 blocks under "critical" category. This scenario envisages an urgent need to replenish the ground water resources. As such, it is proposed to take up artificial ground water recharge activities on a mass scale for sustainable management of

ground water resources in the state. With this priority in view following activities are proposed for the Eleventh Five Year Plan.

- Construction of sub-surface barriers/sub surface dykes etc. in the "overexploited" & "critical" category blocks.
- Construction of Roof Top Rainwater Harvesting Structures in all government & semi government buildings in urban areas and prominent buildings in rural areas.
- Storm Rain Water Harvesting along roads pavements in the prominent cities of the state.
- Recharge of wells in the fields of farmers by diverting the field water received from monsoon rainfall.
- Strengthening & monitoring network by replacing shallow wells by deep piezometers.
- Increasing frequency of water level monitoring, ensuring availability of realistic data. Post irrigation monitoring be done in addition to existing pre & post monsoon monitoring to enable correct assessment of ground water draft from the aquifers.
- Mass Awareness Programme by publication and distribution of booklets/pamphlets regarding the water conditions in the concerned villages.

13.41 Provision of Rs. 585.00 lakhs has been proposed for the Eleventh Five Year Plan which includes Rs. 100 lakhs for the Annual Plan 2007-08. Schemewise allocation proposed for the Eleventh Five Year Plan & Annual Plan 2007-08 are as follows:-

(Rs in lakhs)

S. No	Scheme	Proposed Allocation	
		XI Plan 2007-12	Annual Plan 2007-08
1	Survey & Research	108.00	10.60
2	Civil Works	323.00	54.60
3	Purchase of Machinery & equipments	154.00	25.80
	Total	585.00	91.00

13.42 Out of the provision proposed for the Eleventh Five Year Plan, Rs. 100.00 lakhs is for completion of ongoing works and Rs. 485.00 lakhs for new schemes. Rs. 45.00 lakhs will be utilized on ongoing construction of office building at Bikaner costing Rs. 144.90 lakhs. Following new items/works are proposed to be taken up during 2007-08.

(Rs. in lakhs)

	Scheme	Amount
1	Replacement of 40 external upset drill/pipe size 3.5" x 20'	13.10
2	Replacement of two stage Rotation Motor	9.00

	Scheme	Amount
3	Replacement of 3 submersible pumps	0.90
4	Purchase of 3 Demineralization Plant	0.90
5	Purchase of 3 Servo Voltage Stabilizer 4 KVA	0.45
6	Purchase of 3 Servo Voltage Stabilizer 2 KVA	0.30
7	Purchase of 3 Servo Voltage Stabilizer 1 KVA	0.15
8	AMC for 2 Atomic Absorption Spectrophotometer	1.00
9	Raising of compound wall at HQ Jodhpur	2.00
10	Construction of compound wall & other miscellaneous works for office building at Jhunjhunu	2.00
11	Construct of office building at Bhilwara (Total cost Rs. 25.00 lakhs)	5.60
12	Construction of 10 Piezometres	10.60
	Total	46.00

INDIRA GANDHI NAHAR DEPARTMENT

13.43 It is proposed to complete the Indira Gandhi Nahar Project stage I & II during the Eleventh Five Year Plan by lining of 1330 km and creating 223 thousand ha. of irrigation potential.

13.44 The main priority is to provide drinking water in the command area as well as the adjoining & enroute villages & towns of western Rajasthan besides irrigation. The level of water for drinking, industrial, military and energy purposes will be kept to 1.35 MAF instead of 0.87 MAF at present. The following changes are proposed to improve the overall irrigation efficiency of IGNP.

- Use of Sprinkler Irrigation for reduction in water losses.
- Introduction of Participatory Management through formation of Water User Associations.
- Encouraging to adopt crops requiring less water.
- Provision for upgradation & renovation of main canal & distribution system.
- Enhancing water tariff for irrigation, drinking & industrial use so that O&M cost is recovered.

13.45 During the Tenth Five Year Plan, a provision of Rs. 880.00 cr. was kept for the project against which likely expenditure is Rs. 841.90 crores. It is anticipated that 1026 km. long canals would be completed by which 200 thousand ha. additional irrigation potential would be created.

13.46 A provision of Rs. 1430 cr. has been proposed for the Eleventh Five Year Plan, out of which Rs. 230 cr. is for the Annual Plan 2007-08. 1330 km & 200 km canals are proposed to be constructed during these plans.