CHAPTER - 12
WATER RESOURCES

12.1 Water is most important natural resource. Its development and management plays a vital role in various sectors. Integrated water management is vital for poverty reduction, environmental sustenance and sustainable economic development. The State suffers from a disproportionately poor availability of water when compared to its potential large users, people, animals and agriculture. The severity of this can be best realized by the following table:

Table 12.1

Parameter	Share of State in Nation (in %)
Area	10.41
Population	5.49
Livestock	18.70
Cultivable area	13.88
Surface water	1.16
Ground water	1.70

12.2 The situation has worsened over time due to a rapid increase in use-related parameters. The population growth rate of the state is among the highest in the country. Demand for water from hitherto insubstantial uses such as industry, tourism and recreation, as well as sanitation and environmental purposes has been growing apace. Nearly a-third of the State is arid and another 30 per cent semi-arid, which implies that nearly two-thirds of the state suffers from recurrent water scarcity. Mansoon rail is also lesser in Rajasthan due to parallel alignment of Aravalli hills with mansoon. Heavy and rather indiscriminate reliance on ground-water extraction, possibly to compensate for the paucity of surface water, has led to declining ground water availability and falling water tables in large areas.

12.3 The State is faced with peculiar topographical extremities - hostile desert, rough Aravalli ranges, practically no perennial river, tribal/hilly area and recurring famine conditions due to scanty rainfall. There are 15 defined river basins in the State. The available surface water in the State is 21.7 BCM which is mainly confined to south and south-eastern parts of the State. There is a large area in western part of the State which does not have any defined drainage basin. Thus the water resources in the state are not only scarce but have highly uneven distribution. Out of the total available surface water, 16.05 BCM water is economically utilizable and the State has harnessed 11.55 BCM till date.

12.4 The ground water also plays an important role especially in agriculture and drinking water supply. The situation of ground water exploitation is also not satisfactory as in areas where surface water is used for irrigation purpose. There is a tendency of not using ground

water for agriculture which creates problem of water level rise and even water logging. On the contrary, in large areas of the State, ground water is being over exploited and the water level is depleting at alarming rate in most of the area except in canal command area. The steady decline in the number of blocks with safe levels of exploitation of ground-water and the corresponding increase in critical and over-exploited categories clearly indicate over-dependence on ground water among all the 236 blocks (excluding Taranagar):

Table 12.2 Ground Water Status of Blocks

(No. of Blocks)

Category	1984	1988	1998	2001	2004	2008
Over-Exploited (>100%)	12	44	41	86	140	164
Critical (90 to 100%)	11	18	26	80	50	34
Semi Critical (70 to 90%)	10	42	34	21	14	8
Safe (<70%)	203	122	135	49	32	30

12.5 The above background leads to the following priorities and activities for water resources development and management:

- Development of all utilizable water resources to the maximum possible extent, including surface water - local and imported - groundwater and waste water, for optimal economic development and social well-being.
- Assuring an integrated and multi-disciplinary approach to planning, evaluation, approval and implementation of irrigation and drainage projects, including river basin management.
- Optimum utilization of water resources to maximize production in all user sectors.
- Providing flood protection and drainage facilities, as well as assuring minimal supplies during drought periods.
- Ensuring proper functioning of existing structures, conveyance systems and other assets through adequate maintenance and operation.
- Minimizing adverse impacts of water resources development on the natural environment and on population affected by project implementation works.
- Promoting beneficiaries' participation in all aspects of water planning and management, with particular emphasis on Water User Associations intended to manage and maintain irrigation systems, both physically and financially.

- Advancing the technological and scientific level of all the staff in the water sector through intensification of applied research, technology transfer, training and education.
- Facilitating private initiative in development, operation and management of water projects.

12.6 The State Government has laid emphasis on harnessing of maximum water resources by investing funds during all Plan periods. Irrigation potential has increased from 4.00 lakh hectares (before 1951) to 36.46 lakh hectares (March, 09) with the construction of 118 major and medium and 3295 minor irrigation works up to March, 2009. Work on 3 major irrigation projects (RWSRP, Gang Canal Modernisation and Narmada), 5 medium irrigation projects (Gardada, Takli, Piplad, Lhasi & Gagrin) and 47 minor irrigation works are in progress.

Eleventh Plan and Annual Plan Outlays:

12.7 Against an outlay of Rs. 7302.05 crores for the XI Five Year Plan, an expenditure of Rs. 1713.90 crores has been incurred during 2007-08 and 2008-09 and Rs. 741.77 crores is likely to be spent during 2009-10. An outlay of Rs. 860.67 crores is proposed for Irrigation & Flood Control Sector for Annual Plan 2010-11 as per details given below:

Table No. 12.3

(Rs. in crores)

S. No.	Category	XI Plan Outlay	Anti. Exp. 2009-10	Proposed Outlay 2010-11
1.	Irrigation	5509.86	548.54	557.25
i.	Multi-purpose Projects	131.30	0.30	0.30
ii.	Major Projects	4319.28	467.59	470.50
iii.	Gang Canal (Modernisation)	87.63	20.00	20.00
iv.	Medium Projects	845.00	50.00	55.00
v.	Water Management Services	126.65	10.65	11.45
2.	Minor Irrigation	1266.70	132.27	211.68
3.	Command Area Development	488.04	58.96	89.74
4.	Flood Control Works	36.50	2.00	2.00
5.	Colonisation	0.95		
Total		7302.05	741.77	860.67

12.8 Project-wise details are as follows:

Multi-purpose Projects - LOTC Works

12.9 The LOTC works are shareable between MP and Rajasthan on matching basis. A provision of Rs. 30 lakhs is proposed for the Annual Plan 2010-11.

Narmada Project (AIBP)

12.10 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 Gujarat. The share of water will be delivered at Rajasthan-Gujarat border through 458 Km long Narmada Main canal (NMC). The water of river Narmada reached in Rajasthan in the month of March, 08. The canal system in Rajasthan would provide irrigation in 2.46 lac hectare by adopting improved method of irrigation i.e. sprinklers irrigation system which is mandatory in this project.

12.11 This project would provide drinking water facility to 1107 villages & 2 towns. The project was cleared by Planning Commission in the year 1992. The sanctioned cost of the project is Rs. 1541.36 Crores as approved by Planning Commission. 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. The latest estimated cost of the project is Rs. 2538.37 crore out of which an expenditure of Rs. 1370.31 crore has been incurred up to March, 2009. An expenditure of Rs. 175 crores is likely to be incurred during 2009-10. A provision of Rs. 200.00 crores is proposed for the Annual Plan 2010-11.

12.12 The canal system would provide irrigation in 2.46 lac hectare on completion. Out of which CCA in 1.33 lac hectare has been created up to March, 2009 and CCA in 0.42 lac hectare is likely to be created during 2009-10. The target for the year 2010-11 is creation of 0.30 lac hectare.

Bisalpur Project

12.13 Bisalpur project is irrigation cum drinking water supply project. The dam has already been constructed across river Banas near village Bisalpur in district Tonk to store 38.70 TMC water. At 75% dependability, 33.15 TMC water is available at Bisalpur Dam site. After accounting evaporation & other losses, the net usable water available is 24.2 TMC. Out of which 16.2 TMC has been allocated for drinking water to Jaipur, Ajmer, Beawar, Kishangarh, Nasirabad & other enroute villages and 8 TMC has been allocated to provide irrigation facility in an area of 81.8 thousand hectare land of Tonk district.

12.14 Dam along with intake structure for water supply to Ajmer and Jaipur districts has already been completed. Construction of RMC (51.64 Kms) and LMC (18.65 Kms) has also been completed. The work of distribution system on both the canals are in progress and out of 633 km lengths, the work in 630 km lengths has been completed up to March, 2009. Around 72 km remodeling work has been completed against the 85 km.

12.15 Total 68 villages land and property shall be affected due to submergence of the dam out of which 25 villages are fully submerged and

43 villages are partially submerged. Compensation of the land and properties of villages submerged up to 311 m has been paid except a few disputed cases. Compensation of the land and properties of villages submerged from 311 m to 315.5 m (full reservoir level) is under progress and likely to be completed in 2010-11. For oustees rehabilitation and resettlement, against the development of 112 Nos rehabilitation colonies, 104 colonies have been completely developed and development work of 8 colonies are under progress.

12.16 Out of the ultimate CCA of 81800 hectare, CCA in 81500 ha has been opened up to December, 09.

Rajasthan Water Sector Restructuring Project (EAP)

12.17 This major project was conceived for the improvement of selected surface irrigation system to improve performance efficiency through the involvement of Water User's Association (WUA). The revised cost of the project is Rs. 740 crores and 89 projects are to be rehabilitated covering an area of 619.95 thousand hectare which are in distress. The work on this project was started in the year 2002-03. An expenditure of Rs. 585.36 crores has been incurred up to March, 09. An expenditure of Rs. 103.00 crores is likely to be incurred during Annual Plan 2009-10. A provision of Rs. 13070.01 lakh is proposed for the project for the year 2010-11.

Indira Gandhi Nahar Project

12.18 The Indira Gandhi Nahar Project is a very typical and one of the most gigantic projects in the world aiming to de-desertify and transform desert waste land into agriculturally productive area. For the convenience of the administrative control & construction, the project has been divided in two stages. The 204 KM. long feeder and main canal up to 189 km along with its distribution system (except Sahwa Lift system) falls under Stage-I. Indira Gandhi Main Canal downstream 189 km to tail (i.e. 445 km) along with distribution system (including Sahwa Lift System) falls in Stage-II. By the end of March, 09 expenditure incurred on Stage-I is Rs. 475.56 crores and on Stage-II is Rs. 2970.26 crores. Re-revised estimates are under preparation.

12.19 The Indira Gandhi Nahar Project will provide irrigation facilities in 19.63 lac hectares. In view of availability of water for the project, State Government decided to complete ongoing works on priority by completion of which total 16.17 lac ha CCA will be available for irrigation (excluding 0.50 lac ha CCA opened in Shahgarh area of Jaisalmer being acquired by Army) – 5.46 lac ha in Stage-I and 10.71 lac ha in Stage-II. 15.73 lac hectares cultivable command area has been opened for irrigation up to March, 2009; and 17500 ha area is likely to be opened in 2009-10.

12.20 Total length of distribution system is 9413 km (3454 km in Stage-I and 5959 km in Stage-II) out of which 8107 km (3270 km in Stage-I and 4837 km in Stage-II) has been constructed up to March, 09.

12.21 Apart from above, works for improving efficiency of the system has also been taken in hand under Twelfth Finance Commission grants. This includes pilot project for sprinkler irrigation in 28700 ha CCA, computerization of control structures of project from head to tail, atomization of gates of control structures, construction of balancing reservoir etc. On completion, these will result in saving of water and better water distribution management. These works are likely to be completed by March, 10.

12.22 It is proposed to open 2500 hectares CCA in the year 2010-11 with the expenditure of Rs. 130 crores.

Modernization of Gang Canal

12.23 The Gang Canal project is under operation since 1927 to provide irrigation in Ganganagar district. The canal system has deteriorated over the years. Therefore, the modernization 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. The estimated cost of the project is Rs. 445.79 crore which is proposed to revise to Rs. 713.85 crores, out of which an expenditure of Rs. 473.53 crores has been incurred up to March, 09. An expenditure of Rs. 20.00 crore is likely to be incurred in the year 2009-10. A Provision of Rs. 20.00 crores is proposed for the year 2010-11.

12.24 An additional irrigation potential will be created in 96.51 thousand hectares, out of which 72.76 thousand hectares has been created up to March, 09. The target for CCA creation for the year 2009-10 is 11000 ha.

Yamuna Water Project

12.25 Two separate major projects have been prepared for utilization of 3198 cusec Yamuna water allocated in the 22nd meeting of Upper Yamuna River Board namely (i) Yamuna Water project for Bharatpur district and (ii) Yamuna Water Project for Jhunjhunu and Churu districts. A provision of Rs. 30.00 lac is proposed for the year 2010-11.

12.26 Parwan major irrigation cum drinking water project is proposed to be constructed in Jhalawar District on Parwan River near village Akawad for providing irrigation to 138239 hectare land of Kota, Baran, Jhalawar districts. The total cost of this project is Rs. 1114.00 crores. A provision of Rs. 50.00 lacs is proposed for the year 2010-11.

Medium Irrigation Projects

Gardada Medium Irrigation Project

12.27 Gardada medium 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 hectare. The work on this project was started in 2003.

12.28 The approved estimated cost of the project is Rs. 147.04 crores, out of which an expenditure of Rs. 114.98 crores has been incurred up to March, 09. An expenditure of Rs. 9.09 crores is likely to be incurred during 2009-10. A provision of Rs. 17.68 crores is proposed for the project for the year 2010-11. Additional irrigation potential of 950 ha has been created up to March, 09.

Takli Medium Irrigation Project

12.29 Takli irrigation cum drinking water supply project is under construction on river Takli, which is a tributary of Amjar River as well as Kalisindh River. The dam site is located near village Dhankya in Kota district.

12.30 The project would provide irrigation facility in an area of 7,386 hectares and drinking water facility to 4 villages and 2 town of Ramganjmandi Tehsil, Kota district. The estimated cost of the project is Rs. 51.81 crores, out of which an expenditure of Rs. 11.36 crores has been incurred up to March, 09. An expenditure of Rs. 7.00 crores is likely to be incurred during 2009-10. A provision of Rs. 5.00 crores is proposed for the project in Annual Plan 2010-11.

Piplad Medium Irrigation Project

12.31 Piplad irrigation project is under construction on river Piplad which is a Tributary of Ahu River. The dam site is located near village Sulia Chowki in tehsil Bhawanimandi in Jhalawar Distt.

12.32 The project would provide irrigation in an area of 4,688 hectares in 19 villages of Pachpahar Tehsil. The estimated cost of the project is Rs. 33.64 crores, out of which an expenditure of Rs. 15.87 crores has been incurred up to March, 09. An expenditure of Rs. 7.00 crores is likely to be incurred during 2009-10. A provision of Rs. 5.00 crores is proposed for the project in the Annual Plan 2010-11.

Gagrin Medium Irrigation Project

12.33 Gagrin medium irrigation project is under construction on river Ahu, which is a Tributary of Kalisindh river. The dam site is located near village Kalapipal of tehsil Pachpahar of Jhalawar district.

12.34 The project would provide irrigation in an area of 7243 hectare. The estimate cost of the project is Rs. 80.12 crores, out of which an expenditure of Rs. 25.46 crores has been incurred upto March, 09. An expenditure of Rs. 6.00crores is likely to be incurred during the year 2009-10. A provision of Rs. 4.00 crores is proposed for the year 2010-11.

Lhasi Medium Irrigation Project

12.35 Lhasi medium Irrigation Project envisages construction of earthen dam on river Lhasi near village Khajuria Tehsil Chhipabarod district Baran.

12.36 The project would provide irrigation in an area of 5,755 hectare. The estimated cost of the project is Rs. 44.73 crores. An expenditure of Rs. 30.19 crores has been incurred upto March, 09. An expenditure of Rs. 5.00 crores is likely to be incurred in year 2009-10. A provision of Rs. 3.00 crores is proposed for the project for 2010-11.

Manoharthana Medium Irrigation Project

12.37 Manoharthana medium irrigation cum drinking water project is proposed to be constructed in Jhalawar district on Parwan river near village Manoharthana for providing irrigation to 9,800 hectares land of Jhalawar District. The estimated cost of the project is Rs. 93.10 crores. A token provision of Rs. 0.01 lacs is proposed for the year 2010-11.

Hatiyadeh Medium Irrigation Project

12.38 Hatiyadeh medium irrigation project envisages construction of earthen dam on Hatiyadeh Nalla near village Karwari Khurd, tehsil Kishanganj District Baran for providing irrigation to 6885 hectares land of Baran District. The estimated cost of the project is Rs. 70.66 crores. A token provision of Rs. 0.01 lacs is proposed for the year 2010-11.

Rajgrh Medium Irrigation Project

12.39 Rajgarh medium irrigation cum drinking water project is proposed to be constructed in Jhalawar district on the confluence poing of Ahu and Kanthari rivers near village Rajgarh for providing irrigation to 8634 hectares land of Jhalawar District. The estimated cost of the project is Rs. 98.40 crores. A token provision of Rs. 0.01 lacs is proposed for the year 2010-11.

Andheri Medium Irrigation Project

12.40 Andheri medium irrigation project envisages construction of earthen dam on river Andheri near village Mundkiya, tehsil Chhipabaroad district Baran for providing irrigation to 7700 hectares land of Baran District. The estimated cost of the project is Rs. 87.53 crores. A token provision of Rs. 0.01 lacs is proposed for the year 2010-11.

Minor Irrigation Projects

12.41 The 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 groundwater is very limited. An expenditure of Rs. 94.52 crores is likely to be incurred on minor irrigation projects in

the year 2009-10; Rs. 95.00 crores is proposed in the Annual Plan 2010-11. Out of this Rs. 30.00 crores have been kept for AIBP projects in desert/tribal areas.

Water Harvesting Structures

12.42 For conservation of the scarce rainy water and augmentation of traditional resources of water in the State. 2684 water harvesting structures costing Rs. 250.15 crore has been sanctioned till now; 2388 works has been completed. An expenditure of Rs. 19.00 crores is likely to be incurred on Water Harvesting Structures. A provision of Rs. 15.00 crores is proposed for these works in the Annual Plan 2010-11.

GROUND WATER DEPARTMENT

12.43 A provision of Rs. 53.61 lakhs is proposed for the year 2010-11 for construction of on-going office building at Bikaner.

COMMAND AREA DEVELOPMENT

Command Area Development & Water Utilization Department

12.44 The Command Area Development Programmes aims to bridge the gap between irrigation potential created and its early utilization. This is achieved through the efficient soil, agriculture and water management. Two Command Area Development Authorities of Chambal & IGNP were set up in 1974. The main objectives of CAD Programmes are as follows

- Efficient utilisation of water, minimizing of water losses through lining of canals, increasing canal capacity, installation of control structures, dissemination of improvement techniques.
- Minimizing gains from water use through On Farm Development Works, constructing improved and wider road network, improved agriculture techniques brought about by adaptive research and its dissemination through agriculture extension.
- Equitable distribution of water through warabandi and greater control over canal system as a whole.
- Involvement of farmers in management of irrigation system through Participatory Irrigation Management by their active involvement.

IGNP, BIKANER

12.45 Construction of lined water courses, agriculture extension, adaptive research, soil survey, anti water logging and land reclamation works are taken under Command Area Development. OFD works are funded under CSS on the matching basis.

12.46 Against the likely expenditure of Rs. 2594.94 lakhs during the year 2009-10, a provision of Rs. 2382.04 lakhs is proposed for the annual plan 2010-11.

12.47 A target of construction of lined water courses in 5000 hectare area @ Rs. 22000/- per hectare in the command area of IGNP and 8000 ha in Gang Canal Project is proposed for the year 2010-11. The farmers are also being benefited through Agriculture Extension, Adaptive Trials & Soil Survey, Water Logging & Land Reclamation, Abadi Planning, subsidy on Diggi & Sprinkler etc.

CAD CHAMBAL, KOTA

12.48 The Chambal Valley Development Scheme is a joint venture of MP & Rajasthan States. Water of the Chambal River has been harnessed for the scheme in three phases i.e:

- Construction of Gandhi Sagar Dam, Kota Barrage, Chambal Right Main Canal and Chambal Left Main Canal.
- Construction of Rana Pratap Sagar Dam between Gandhi Sagar & Kota Barrage.
- Construction of Jawahar Sagar Dam.

12.49 Chambal Right Main Canal off-takes from right side of the Kota barrage and run 124 kms in Rajasthan and 248 kms in MP. The Right Main Canal is irrigated by 7 branches, 27 distributaries and minors. It irrigates land of Kota and Baran districts. Chambal LMC off takes from the left side of the Kota Barrage and its length is 2.59 km which further bifurcates in two branches, Bundi Branch Canal and Kapren Branch Canal. Three branches, 27 distributaries and 180 minors of the LMC irrigates 1.02 lakh ha land of Kota and Bundi districts.

12.50 Against a likely expenditure of Rs. 2000.00 lakhs during the year 2009-10, Rs. 2000 lakhs is proposed for this project for the year 2010-11.

12.51 Till 2008-09, OFD works have been completed in 1,02,925 ha out of which area treated with Model #7 is 88,947 ha while 13,978 ha land is treated with Model #2. It is proposed to complete OFD works in 6000 hectare area during the Annual Plan 2010-11.

CAD Bisalpur

12.52 Bisalpur drinking water cum irrigation project has been included under the Centrally Sponsored Schemes in 2006. Against the target of completing OFD works in 81,800 hectare area, OFD works has been completed in 3041 ha up to March, 09 and in 12500 ha is likely to be completed during 2009-10. It is proposed to construct OFD works in 12000 ha during 2010-11 for which provision of Rs.1418.50 lacs is proposed in the Annual Plan 2010-11.

Sidhmukh Nohar Irrigation Project

12.53 Sidhmukh Nohar Irrigation Project (SNIP) is included under CSS by Central Government. The total area of this project is 114379 ha. 99

villages of Hanumangarh and 14 villages of Churu District will be benefited by this project.

12.54 CADA started the construction of lined water courses in this project area in the year 2004-05 and upto March 2009, work were completed in 73698 ha. Lined water courses in 15000 ha are likely to be constructed during the year 2009-10.

12.55 For construction of lined water courses in 16400 ha a provision of Rs. 1800.00 lakhs is proposed for the year 2010-11.

Amar Singh Sub Branch Project

12.56 Amar Singh Sub Branch Project (ASSB) is included under CSS by Central Government. The total area of this project 50702 ha. CADA started the construction of lined water courses in this project area in the year 2005-06 and upto March 2009, work were completed in 13387 ha. Lined water courses in 10000 ha are likely to be constructed during the year 2009-10.

12.57 For construction of lined water courses in 12000 ha, a provision of Rs. 1320.00 lakhs is proposed for the year 2010-11.