

## **9.11 IRRIGATION, COMMAND AREA DEVELOPMENT AND FLOOD CONTROL**

*"He who provides water deserves two Nobel Prizes,  
One for Peace and the other for Science "*

- John F. Kennedy

Water is vital for realising the full potential of the agriculture sector and the country's development. Optimum development and efficient utilisation of water resources, therefore, assumes great significance.

### **National Water Policy**

The National Water Policy, of 1987 was reviewed and updated in light of the issues and challenges emerging in the Water Resources Sector, and the National Water Policy - 2002 has been adopted by the National Water Resources Council in its meeting held on 1<sup>st</sup> April 2002. The National Water Policy 2002 has recognised that water is a prime natural resource, a basic human need, and a precious national asset. Water is part of a larger ecological system. Realising the importance and scarcity attached to the fresh water, it has to be treated as an essential environment for sustaining all life forms.

The National Water Policy lays emphasis on integrated water resources development and management for optimal and sustainable utilisation of the available surface and groundwater. Creation of well-developed information system, use of traditional methods of water conservation, non-conventional methods for water utilisation and demand management have been recognised as important inputs in the revised Policy. It integrates quantity and quality aspects as well as environmental considerations for water through adequate institutional arrangements. The involvement of beneficiaries and stakeholders in the project planning and participatory approach in water resources management has been focused in the Policy.

The National Water Policy envisages that each State shall formulate its own State Water Policy backed with an operational Action Plan in a time-bound manner say in two years to achieve the desired objectives of the Policy. The Ministry of Water Resources has formulated an Action Plan for implementation of the National Water Policy - 2002, which was deliberated upon with the Non-Governmental/Voluntary Organisations and experts during August - October 2002. The Action Plan, as finalised after deliberations, was put up in the Conference of Water Resources and Irrigation Ministers of States/UT Administrations held on 5<sup>th</sup> February 2003 wherein the same was adopted.

### **State Water Policy**

The Tamil Nadu State Water Policy 1994 (G.O. Ms. No. 716, PWD, dated 13-7-1994) was formulated based on the National Water Policy, 1987. Taking into account the National Water Policy 2002, the State Water Policy has been re-drafted emphasising the need for utmost efficiency in water utilisation and public awareness of the importance of its conservation. The State Water Policy covers Information System, Water Resources Planning, Institutional Mechanism, Water Allocation Priorities, Project Planning, Ground Water Development, Provision of Drinking Water, Irrigation Planning, Resettlement and Rehabilitation, Financial and Physical Sustainability, Participatory Approach to Water Resources Management, Private Sector Participation, Water Quality, Water Zoning, Conservation of Water, Flood Control and Management, Land Erosion by Sea or River, Drought Prone Area Development, Monitoring of Projects, Performance Improvement, Maintenance and Modernisation, Safety of Structures, Science and Technology, Training and Water Pricing.

According to the draft State Water Use Policy 2002, in the planning and operation of systems, water allocation priorities should be broadly as follows:

- a) Drinking Water
- b) Irrigation
- c) Hydro Power
- d) Ecology
- e) Industries
- f) Navigation and other uses

The above order of priority follows the scheme laid down in the National Water Policy 2002.

### **Pattern of Rainfall**

Tamil Nadu with 7% of population of the country is endowed with only 3% of water resources of India. The State's water resources are dependent on monsoon rainfall. The annual precipitation in the inland plains is 848 mm., 946 mm. in the coastal plains and 1666 mm. in the hilly regions. The State receives rainfall in two distinct seasons, viz., S W monsoon (June to September) and NE monsoon (October to December). The winter season lasts from January to February and the hot summer season from March to May. The average distribution of rainfall in the year is about 46% during the north-east monsoon, 35% during the south-west monsoon, 14% in the summer and 5% in the winter.

The rainfall situation is very uncertain and therefore the dependability of major sources of irrigation. The actual rainfall registered during the last five years (1999-2000 to 2003 - 04) has been far less than the normal rainfall.

According to an IMD (Pune) study analysis of decadal rainfall data from the year 1901, the decades 1921-30 and 1931-40 were the best during the 20<sup>th</sup> century for Tamil Nadu & Pondicherry in terms of rainfall. [The average annual rainfall of Tamil Nadu is 1,267 mm.] During the 10-year period of 1921-30, the rainfall recorded was the highest ever of 1,314.5 mm. average. The rainfall values for each decade on an average started declining from the decade 1961-70, with a drastic fall experienced during 1981-90. The 1980s saw an all time low rainfall during the entire 20<sup>th</sup> century with annual rainfall of a meagre 525.5 mm. and the second lowest of 601.1 mm. recorded in the State.

The pattern of rainfall during the past 30 years (1970-71 to 1999-2000) shows that the average rainfall of the State is 923 mm. with 455 mm. in NE monsoon and 318 in SW monsoon. The coefficient of variation for the annual rainfall is 17.80. It is as high as 31.82 % for NE monsoon.

**Coefficient of Variation in rainfall of TN from 1970-71 to 1999-2000**

Sl. No.	Year	SW Monsoon	NE Monsoon	Winter period	Hot weather period	Total
1	1970-71	318.0	420.2	27.4	152.6	918.6
2	1971-72	323.3	488.5	4.6	153.2	968.8
3	1972-73	303.9	607.7	0.2	80.5	902.3
4	1973-74	332.7	406.7	9.7	93.1	842.2
5	1974-75	326.2	177.5	10.5	133.2	647.4
6	1975-76	419.7	339.8	1.4	96.3	857.9
7	1976-77	314.7	440.4	24.7	162.1	941.4
8	1977-78	332.7	682.4	11.7	96.9	1123.7
9	1978-79	261.2	582.2	43.6	62.8	949.8
10	1979-80	361.1	604.6	0.2	125.4	1091.3
11	1980-81	196.4	337.0	10.5	125.4	669.3
12	1981-82	406.1	449.0	0.2	97.4	952.7
13	1982-83	216.7	352.0	0.2	93.7	662.6
14	1983-84	398.8	483.7	169.7	170.3	1222.5
15	1984-85	330.7	300.2	93.6	66.9	791.4
16	1985-86	381.9	376.7	95.8	96.7	951.1
17	1986-87	271.6	330.6	8.5	90.2	700.9
18	1987-88	271.3	525.4	3.7	182.4	982.8
19	1988-89	376.4	217.7	2.0	112.7	708.8
20	1989-90	348.8	340.7	90.2	136.7	916.7
21	1990-91	239.3	372.6	30.3	72.3	714.5
22	1991-92	331.8	484.9	4.1	78.1	898.9
23	1992-93	316.2	477.0	5.6	63.2	862.0
24	1993-94	305.2	709.9	35.5	121.3	1171.3
25	1994-95	220.3	479.0	27.2	203.3	929.8
26	1995-96	347.5	248.3	10.5	115.2	721.6
27	1996-97	454.8	541.1	13.0	112.3	1121.2
28	1997-98	286.0	782.3	5.5	78.4	1152.2
29	1998-99	340.1	602.4	21.5	116.4	1080.4
30	1999-00	199.9	499.5	119.5	77.9	896.8
	<i>Mean</i>	<i>317.78</i>	<i>455.33</i>	<i>29.37</i>	<i>112.23</i>	<i>914.71</i>
	<i>SD</i>	<i>64.21</i>	<i>144.88</i>	<i>41.87</i>	<i>36.68</i>	<i>162.78</i>
	<i>CV</i>	<i>20.21</i>	<i>31.82</i>	<i>142.56</i>	<i>32.68</i>	<i>17.80</i>

**Total Water Potential**

The total water potential of the State including ground water is 46,540 MCM (1643 TMC). The total surface water potential of the State is 24,160 MCM (853 TMC) including the contribution (7391 MCM or 261 TMC) from the neighbouring States, viz., Kerala, Karnataka and Andhra.

**Total Water Potential**

Sl. No.		MCM	TMC
<b>1</b>	<i>Surface Water Potential</i>		
	Within State	16769	592
	From neighbouring States	7391	261
	Sub-Total	24160	853
<b>2</b>	Ground water potential	22380	790
	<b>Total</b>	<b>46540</b>	<b>1643</b>

The major problem in water is the conservation of rainfall received. Surface run off, evaporation, infiltration and deep percolation account for the total volume of the rainfall received. The run off coefficient of a basin normally depends on the mean temperature, humidity, pattern of rainfall, intensity of rainfall, vegetation, topographical features of the basin etc. The runoff coefficient was found to vary

between 0.40 and 0.55 in Tamil Nadu. The normal annual surface flow works out to 6.071 MHM but the utilizable runoff is calculated as 2.33 MHM. The non utilizable flow is due to lack of storage and unsuitable distribution of supply, evaporation and other losses. The total utilizable water resource of the State i.e., both surface and ground water worked out to about 5 million hectares metre (MHM). With the limited supply of water it is necessary to improve the conservation of water and efficiency of water use.

Water is a serious limiting factor as the State has harnessed the available surface water potential. Of the total annual water potential of 46,540 million cubic metres (MCM) in the State, surface flows accounts for nearly half. Of the two major resources of irrigation water in the State namely, surface and ground water, the surface water potential of about 2.4 million hectares (24,160 MCM) has almost been fully (more than 95%) tapped since late sixties. Ground water resource is, therefore, the only alternative source for further development.

According to the estimation based on the revised Ground Water Estimation Methodology - 1997 recommended by a Committee constituted by MOWR, GOI, the position is as follows:

	(as in January, 1998)
Total dynamic ground water resource in Tamil Nadu	23,070 M Cum
Net annual ground water availability	20,763 M Cum
Gross draft for irrigation	16,581 M Cum
Gross draft for domestic & industrial demand	646 M Cum
Allocation for domestic & industrial supply up to next 25 years	879 M Cum
Net ground water availability for future irrigation	3,303 M Cum

When this estimate is projected to January 2003, the balance ground water potential available for future development works out to 3,142.27 M Cum. This balance potential is distributed in 97 safe Blocks, 105 semi - critical Blocks & 37 critical Blocks. 138 Blocks are already over-exploited.

Sl. No.	Category of Blocks	No. of Blocks	
		January 1998	Updated for January 2003
1	Safe Blocks	137	97
2	Semi - Critical Blocks	70	105
3	Critical Blocks	35	37
4	Over - exploited Blocks	135	138
5	Saline Blocks	8	8
	<b>Total</b>	<b>385</b>	<b>385</b>

Source: Report on Dynamic Ground Water Resources of Tamil Nadu as on January 2003 - Government of Tamil Nadu, State Ground & Surface Water Resources Data Centre, PWD (WRO), & CGWB (GOI)

Tamil Nadu is occupied by Archean (hard rock) in 73.4% of area where ground water prospects are less. The number of safe Blocks has come down while number of semi-critical Blocks has gone up correspondingly. The over-exploited Blocks and critical Blocks require extensive ground water conservation to improve ground water storage.

### Ultimate Irrigation Potential & Utilisation

Irrigation increases productivity, stability and sustainability. The foremost issue is the availability of irrigation potential, its creation and utilization. Ultimate Irrigation Potential (UIP) corresponds to the gross area that could theoretically be irrigated in a year on the basis of the assumed cropping pattern and the given

probability of rainfall. Pushing the irrigation potential to the ultimate level available may be unsustainable in some cases. Tamil Nadu tops the list in terms of utilization of its created potential with almost full utilization.

#### Ultimate Irrigation Potential & Utilisation ('000 ha)

States	UIP	Potential created (97-98)	Potential Utilised (97-98)	% of potential created to UIP	% of potential utilised to potential created	Potential used to UIP (%)	Gross Irrigated Area (98-99)
AP	11260	6364	5888	58.52	92.52	52.29	5158
Bihar	13347	8507	7256	63.74	85.29	54.36	4579
Gujarat	6103	3379	3097	55.37	91.65	50.75	3779
Haryana	4512	3685	3384	81.67	91.83	75.00	4829
Karnataka	5974	3248	3005	54.37	92.52	50.30	2912
Kerala	2679	1179	1088	44.01	92.28	40.61	417
MP	17932	5477	4437	30.54	81.01	24.74	6527
Mah.	8952	5104	3802	57.02	74.49	42.47	3352
Punjab	5967	6007	5895	100.67	98.14	98.79	7487
Rajasthan	5128	5053	4756	98.54	94.12	92.75	6676
<b>TN</b>	<b>5532</b>	<b>3741</b>	<b>3731</b>	<b>67.62</b>	<b>99.73</b>	<b>67.44</b>	<b>3519</b>
UP	30499	30825	27738	101.07	89.99	90.95	17322
WB	6918	4756	4021	68.75	84.55	5.12	2491
<b>All India</b>	<b>139893</b>	<b>92742</b>	<b>82720</b>	<b>66.29</b>	<b>89.19</b>	<b>59.13</b>	<b>73007</b>

[Source: Atlas of the Sustainability of Food Security by MSSRF & WFP]

The second issue is irrigation efficiency. One way of improving the productivity of crops with the existing land base is to improve the irrigation efficiency. This is of two types: one, efficiency of irrigation system and two, crop use efficiency, i.e., improving crop productivity per unit of water. The third issue is increase in cropping intensity and irrigation intensity.

In as much as most of the available water resources have been almost fully exploited, special attention has to be paid to conservation, management and optimization of utilization of the available resources.

#### Area irrigated and Source of Irrigation

The net area irrigated rose from 21.11 lakh ha. in 1950s to 27.75 lakh ha. in 1990s. The State's per capita irrigation potential in per capita terms is 0.08 ha. compared to the all India average of 0.15 ha. Now the State is fully dependent on the ground water resources for providing irrigation to additional acreage and to stabilize the existing area under irrigation.

#### Area Irrigated Source-wise [annual average in lakh ha]

	Source	1950s	60s	70s	80s	90s
I	Net area irrigated					
a	Canal	7.92	8.83	8.94	8.23	8.23
b	Tanks	7.76	9.12	8.49	6.16	6.21
c	Wells	4.97	6.45	9.18	10.38	13.14
d	Others	0.46	0.39	0.35	0.19	0.17
	Total- Net area	21.11	24.79	26.96	24.96	27.75
II	Area irrigated more than once	6.19	7.87	8.26	6.19	6.41
III	Gross area irrigated	27.30	32.66	35.22	31.15	33.94
IV	Irrigation intensity	129.32	131.75	130.64	124.80	123.33
V	% of area irrigated to total cropped area	40.87	45.36	47.24	46.65	41.23

[Source: S & C Reports of Tamil Nadu]

The three main sources of irrigation in the State are rivers, tanks and wells. There are 39,202 tanks, 2,322 irrigation main canals & 18,26,906 irrigation wells in the State. The area irrigated by various sources in 2001-02 & 2002-3 is furnished in the table below.

#### Net Area Irrigated by different sources

(Area in hectares)

Sl. No.	Sources	Net Area Irrigated			
		2002-03		2001-02	
		Area	%	Area	%
1.	Canals	6,14,143	26.6	8,01,303	28.6
2.	Tanks	4,22,313	18.3	5,36,706	19.2
3.	Wells a) Tube wells	2,42,824	10.5	2,37,359	8.5
	b) Ordinary wells	10,19,936	44.2	12,11,264	43.2
	Total	12,62,760	54.7	14,48,623	51.7
4.	Others	10,674	0.4	14,325	0.5
	<b>Total</b>	<b>23,09,890</b>	<b>100</b>	<b>28,00,957</b>	<b>100</b>

[Source: Statistical Handbook of TN]

#### Net area irrigated source-wise in %

	Source	1950 - 1951	60-61	70-71	80-81	90-91	1999-2000	2002-03
a	Canal	42.48	35.82	34.10	34.59	32.43	29.18	26.60
b	Tanks	30.46	38.02	34.65	22.96	22.38	21.3	18.30
c	Wells	22.96	24.29	27.47	37.43	46.81	48.91	54.70
d	Others	4.10	1.87	1.35	0.93	0.59	0.61	0.40
	Total	100	100	100	100	100	100	100

Tanks are simple sources that bring sustainable benefits to the agricultural sector. There are more than 39,000 tanks in the State. The approximate storage capacity of the tanks is estimated as 9,840 MCM (347 TMC) (21% of the annual water potential), which is greater than that of the reservoirs. Tank irrigation system has deteriorated over time. Under EEC assistance, tank modernization was taken up.

The ground water potential in the State has been assessed both district wise and basin wise. The annual ground water recharge is 22,380 MCM (790 TMC) according to the assessment of the regional Directorate of CGWB, Chennai. The groundwater draft has already crossed nearly 60%.

Next to tank irrigation is lift irrigation through wells individually owned. In addition to serving as a regular source of supply, ground water plays a critical buffering role during periods of draught when surface flows are limited and unreliable. The fast rate of development of ground water is exhibited by the rate of energisation of irrigation wells after 1950. The number of wells, which in 1951 was only 14,400, increased to 15,28,800 by 1996 and to 18,26,906 in 2000. The development has been concentrated more in the districts of Salem, Coimbatore, Cuddalore, Villupuram, Kancheepuram and Thanjavur.

Agriculture is the single largest consumer of water in the State consuming 75% of the State's water resources. Despite having limited water resources, Tamil Nadu has a high percentage of net area sown that is irrigated (54%). The State has a net irrigated area of 3 million hectares (1999/00). Today the State is equally reliant on surface and ground water sources for irrigation although its reliance on ground water sources has been steadily increasing. In 2002-2003, nearly 27 % of the net irrigated area was irrigated by water from the canals; tanks irrigated an additional 18 % while wells irrigated about 55 %. The remaining area was irrigated by other sources such

as streams and ponds. Rainfed agriculture accounts for almost 50% of the net area sown of about 5 million hectares and approximately 25% of farmers in the State are engaged in rainfed agriculture. (There are variations in these figures from year to year linked to quantum of rainfall and availability of water).

The irrigation intensity (ratio of gross irrigated area to net irrigated area), which was 129.32% during the 1950s, went up to 131.75% in 1960s and then declined to 124.9% during the 1990s. The irrigation intensity has remained almost constant during the last two decades.

The area irrigated by canals marginally increased from 7.92 lakh ha. in 1950s to 8.24 lakh ha. in 1990s. However, the share of canal irrigation in the net area irrigated declined from 37.5 to 31.1 percent between 1950 and 1990s. Similarly, the net irrigated by tanks declined from 7.76 lakh ha. to 6.21 lakh ha. The net area irrigated during 1970s was 9.42 lakh ha. The share of tank irrigation to net area irrigated declined substantially from 36.7 percent in 1950s to 22.3 percent in 1990s. This shows the decline in the surface irrigation in the State in spite of money spent including the World Bank loans for this purpose. This might be due to failure of monsoon, reduction in the storage capacity of reservoirs due to silting, lack of adequate management of tanks and the supply channels and unscientific water management practices followed by farmers. To compensate the reduction in area irrigated by surface irrigation the farmers of the State have gone for utilization of the ground water on a very large scale. Net area irrigated by wells increased 4.97 lakh ha. in 1950s to 13.14 lakh ha. in 1990s. The share of net area irrigated by wells in the net area irrigated increased from 23.5 percent to 45.1 percent during the above period. This increase in the area irrigated by wells especially deep bore wells resulted in decline of the ground water table in almost all the districts drastically. In the districts of Coimbatore, Erode and Dindigul the ground water level has gone beyond 1000 feet. The average area irrigated per well has declined from 1.5 ha in 1950s to 0.9 ha. in 1990s. This is again a point for concern because, it is necessary to see that the ground water is not over exploited and strategies needs to be framed to extract the quantity of ground water which is equal to that of the quantity rechargeable. Hence it is important to manage the ground water sources for sustainable use.

The worked out supply- demand gap based on the growth rates of irrigated crops is 2.12 MHM (44.72%). Further, in another 10-15 years, only 65% of the present available water will be available for agricultural purposes. It is anticipated that only 50% of the water will be available for irrigation. Hence there is an urgent need to balance the gap between the water demand for agriculture and non-agricultural crops. It is necessary to increase the water use efficiency of agricultural crops by efficient management techniques, of industries and in day-to-day use of surface and groundwater.

Scarcity of water in rainfed areas is causing hardship. Groundwater resources are dwindling fast due to poor water harvesting leading to excessive run off and poor recharging of ground water. This is accompanied by excessive drawal / exploitation mainly to meet the household needs of growing population as also irrigation needs of new high yielding crops. The number of dark blocks is increasing.

### **River basins of TN**

There are 34 river basins in Tamil Nadu including minor river basins. For study purposes, they are grouped into 17 by clubbing the minor ones with the adjacent major river basins. Cauvery is the only major river basin (drainage area > 20,000 sq. km.) and out of the remaining basins, 13 are medium basins and 3 minor basins (< 2000 sq. km.). The total surface water potential of river basins is 24,160 MCM (853 TMC).

**Basinwise Reservoirs & Tanks**

(Capacity in MCM)

Sl. No.	River Basin	Tanks		Reservoirs		Total Capacity
		Nos.	Capacity	Nos.	Capacity	
1	Chennai	1519	1373	4	320	1693
2	Palar	661	355	2	8	363
3	Varahanadhi	1421	276	1	17	293
4	Ponnaiyar	1133	240	7	311	551
5	Vellar	457	70	5	115	185
6	Agniar	3975	560	-	-	560
7	Pambar & Kottakariyar	1042	154	-	-	154
8	Vaigai	1497	410	5	659	1069
9	Gundar	649	331	-	-	331
10	Vaippar	862	559	6	66	625
11	Kallar	199	43	1	4	47
12	Thambaraparani	880	196	7	367	563
13	Nambiar	597	95	2	6	101
14	Kodaiyar	2922	268	9	404	672
15	Parambikulam & Aliyar			9	32	32
16	Cauvery	21186	4910	21	4586	9496
	<b>Total</b>	<b>39000</b>	<b>9840</b>	<b>79</b>	<b>6895</b>	<b>16735</b>

**Surface Water Potential of River Basins**

Sl. No.	River Basin	Surface Water Potential @ 75% dependability	
		MCM	TMC
1	Chennai	784	27.69
	From Krishna water as per agreement	340	12.00
2	Palar	1758	62.08
3	Varahanadhi	412	14.55
4	Ponnaiyar	1310	46.26
5	Paravanar	144	5.08
6	Vellar	963	34.01
7	Agniar	1084	38.28
8	Pambar & Kottakariyar	653	23.06
9	Vaigai	1579	55.70
10	Gundar	568	20.06
11	Vaippar	611	21.58
12	Kallar	125	4.41
13	Thambaraparani	1375	48.56
14	Nambiar	204	7.20
15	Kodaiyar	925	32.67
16	Parambikulam & Aliyar as per agreement	864	30.50
17	Cauvery in TN area	4655	164.39
	From Karnataka as per interim Tribunal order	5805	205.00
	<b>Total</b>	<b>24,159 or 24,160 MCM</b>	<b>853.16 or 853 TMC</b>

**Interlinking of Rivers (ILR)**

Suggestions for a National Water Grid envisaging interlinking of rivers with a view to transferring surplus water available in some regions to water deficit areas have been made from time to time.

*National Water Grid by Dr.K.L. Rao* – A note on the National Water Grid was earlier prepared by the then Central Water and Power Commission (around 1972) and three possible alignments for the Ganga-Cauvery link along with other links were brought out. Further studies were made by Dr. K.L. Rao who advocated one of the alignments for the Ganga-Cauvery Link along with a few other links including the Brahmaputra and Ganga Link. The 2640 Km long Ganga-Cauvery Link essentially

envisaged the withdrawal of 1680 cumecs (60,000 cusecs) of the flood flows of the Ganga near Patna for about 150 days in a year and pumping about 1400 cumecs (50,000 cusecs) of this water over a head of 549 metres (1800 feet) for transfer to the Peninsular region and utilizing the remaining 280 cumecs (10,000 cusecs) in the Ganga basin itself. The proposal envisaged utilization of 2.59 million hectare metres of Ganga water to bring under irrigation an additional area of 4 M.Ha. Dr. Rao had also proposed a few additional links like (a) Brahmaputra-Ganga link to transfer 1800 to 3000 cumecs with a lift of 12 to 15 m. (b) link transferring 300 cumecs of Mahanadi waters southwards (c) canal from Narmada to Gujarat and Western Rajasthan with a lift of 275 m and (d) links from rivers of the western ghats towards east. Dr. Rao had estimated his proposals to cost about Rs.12, 500 crores. Very roughly at 1995 prices the Ganga Cauvery link alone would amount to about Rs.70, 000 crores (capital cost). The annual costs including cost of power would be around Rs.30, 000 per hectare. The proposals were examined by the Central Water Commission and found to be grossly under-estimated. It was also observed that the scheme would require large blocks of power (5 to 7 million kw.) for lifting water. It will also have no flood control benefits. Therefore, the proposal was not pursued as such.

The Government prepared a National Perspective Plan (NPP) for Water Resources Development in August 1980 which comprises two components, viz., Peninsular Rivers Development Component and Himalayan Rivers Development Component. The NPP envisages interlinkages between various Peninsular rivers and Himalayan rivers for transfer of water from water surplus basins for optimum utilisation of water resources. The Government established the National Water Agency (NWDA) in July 1980 to firm up these proposals. A total of 30 water transfer links, 16 under peninsular components and 14 under Himalayan components have been identified by the Agency for preparation of feasibility reports.

The Himalayan Rivers Development Component envisages construction of storage reservoirs on the principal tributaries of Ganga and Brahmaputra in India, Nepal and Bhutan along with interlinking canal systems to transfer surplus flows of the eastern tributaries of the Ganga to the west, apart from linking of the main Brahmaputra and its tributaries with the Ganga and the Ganga with the Mahanadi. It will also provide necessary discharge for augmentation of flows at Farakka, required inter-alia, to flush the Kolkata Port and facilitate inland navigation facilities across the country.

Under the Himalayan component, NWDA has already completed water balance studies at 19 diversion points, toposheet studies of 16 storage sites and 19 link alignments and prepared pre-feasibility reports of 14 proposed water transfer links. Feasibility report of one link has already been completed.

Under the Peninsular Component, the Agency has completed data collection and water balance studies of 137 basins / sub-basins and at 52 identified diversion points, toposheet studies of 58 identified storages and 18 toposheet studies of link alignments, and prepared pre-feasibility reports of 17 water transfer links. Presently, the work of field surveys and investigations for preparation of feasibility of reports of link schemes is on hand. Feasibility reports of seven links have already been completed.

It is programmed to complete the feasibility reports of all the water transfer link schemes under peninsular and Himalayan Components by the year 2005.

Before the implementation of the inter-basin water transfer link schemes can be taken up certain steps, viz., negotiations and agreements amongst the States involved in inter-basin transfer, preparation of Detailed Project Reports (DPRs), techno-economic appraisal of DPRs and investment clearance of the schemes, funding arrangements and fixing of agencies for execution, etc., would be necessary.

The Peninsular River Development Component envisages diversion of surplus waters of Mahanadhi to Godavari and further transfer from Godavari to water short Krishna, Pennar, Palar, Cauvery and Vaigai river basin. NWDA has identified the surplus and deficit basins and assessed the surplus available in Mahanadhi and Godhavari for transfer to Krishna, Pennar, Cauvery and Vaigai basins. According to the proposals, the surplus flows of Mahanadhi and Godhavari rivers would get diverted to Krishna and Pennar river in Andhra Pradesh through some links. Among the Peninsular rivers, the Mahanadhi and Godavari are likely to have sizable surpluses. It is therefore possible to divert the surplus of Mahanadhi (Madhya Pradesh / Orissa) and Godavari (Andhra Pradesh) to water-short rivers, viz., the Krishna, the Pennar and the Cauvery. The diversion from Pennar to Cauvery would be through a link canal 534 Km long to divert about 9,455  $\text{mm}^3$  (334 TMC) of Pennar water from Somasila reservoir to the Grand Anicut across river Cauvery beyond Palar. The link canal would provide irrigation and drinking water supply enroute in Andhra Pradesh and Tamil Nadu. Further a quantity of 3855  $\text{mm}^3$  (136.1 TMC) would be delivered at Grand Anicut for use in Cauvery Delta and also in the areas south of Cauvery basin. The Cauvery-Vaigai-Gundar link is the last leg in the link. This aims at diversion of 2252  $\text{mm}^3$  (79.5 TMC) from the quantity of 3855  $\text{mm}^3$  (136.1 TMC) to the south of Cauvery up to Gundar for irrigation, water supply etc.

The Tamil Nadu Government is keenly interested in the expeditious execution of the Peninsular Rivers Development Component.

#### **Diversion of West flowing rivers of Kerala to Tamil Nadu**

The Peninsular River Development Component also envisages diversion of surplus waters of the west flowing rivers to the east for the benefit of the drought prone areas. Under this the Pamba-Achankovil-Vaippar link project has been formulated to divert about 22 TMC of water to Tamil Nadu to irrigate an ayacut of 91,400 hectare in Kovilpatti, Sankarankovil, Sivagiri, Srivilliputhur, Rajapalayam, Sathur and Tenkasi Taluks, which are drought prone. Besides irrigation in Tamil Nadu, the proposal will also facilitate generation of power to the tune of 1114 MU per year, besides combating salinity in Vembanadu lake of Kerala from regulated issues from the reservoirs in the non monsoon season and providing drinking water supply for some areas in Kerala State. The estimated cost of the project is Rs.1, 398 crore at 1992 prices. The project envisages construction of two storage reservoirs, one pumped storage reservoir, power houses for generation of power and one contour canal of about 50 Km length to divert the surplus waters of the Pamba Achankovil stream to the deficit river Vaippar in Tamil Nadu.

The Government of India has constituted a "Sub-Committee" under the Chairmanship of the Secretary, Ministry of Water Resources, Government of India to look into the reservations of the States in respect of the link proposals framed by the National Water Development Agency and to convince the States to arrive at a consensus.

In the meantime, the Government of Kerala has conveyed its dissent against the acceptance of the feasibility report of the NWDA, stating that the study carried out by the NWDA is not correct since the ecological and environmental aspect etc., were not considered. Kerala Government has further stated that there will be no surplus water by 2051 AD for diversion through Pamba-Achankovil-Vaippar Link. In support of this, Kerala Government has sent a study report prepared by its own organization namely CWRDM (Centre for Water Resources Department and Management). The Government of Tamil Nadu has sent its remarks on the Kerala Government's stand that there is no surplus water in the basin. This is being dealt with by the NWDA. The State of Kerala in the meantime has passed an Act in their Assembly stating that the State cannot spare any water from their rivers.

Another issue with Kerala relates to Parambikulam Aliyar Project. The agreement, which had effect from November 1958 and was for a period of 30 years, is under review.

### **Task Force on ILR**

The Supreme Court has ordered that the Inter Linking of Rivers (ILR) Project should be immediately taken up and suggested a time schedule.

The Union Government constituted a Task Force under the Chairmanship of Suresh Prabhu on Interlinking of Rivers on 13 December 2002. The Task Force has the following terms of reference: (i) Provide guidance on norms of appraisal of individual projects in respect of economic viability, socio-economic impacts, environmental impacts and preparation of resettlement plans; (ii) Devise suitable mechanism for bringing about speedy consensus amongst the State; (iii) Prioritise the different project components for preparation of detailed project reports and implementation; (iv) Propose suitable organizational structure for implementing the project; (v) Consider various modalities for project funding; and (vi) Consider international dimensions that may be involved in some project components.

### **River Water Disputes**

The major rivers of the country are mostly inter-State rivers. There has been increasing demand for water in all sectors, sometimes leading to inter-State disputes about the sharing of water of these rivers. Efforts are made to resolve disputes through negotiations amongst the basin States with the assistance of the Central Government. Adjudication through the appointment of water disputes tribunals is also resorted to as and when warranted.

So far the following tribunals have been appointed to resolve inter-State water disputes (i) Godavari Water Disputes Tribunal; (ii) Krishna Water Disputes Tribunal; (iii) Narmada Water Disputes Tribunal; (iv) Ravi and Beas Waters Tribunal and (v) Cauvery Water Disputes Tribunal. The first three Tribunals have given their final reports. Cauvery Water Disputes Tribunal has given its interim award in June 1991 and the final award is awaited.

The Cauvery river is interstate in character in the sense that it takes its source in the Brahmagiri hills in the erstwhile Commissionerate of Coorg, flows through the State of Karnataka, crosses the eastern ghats to flow down to the State of Tamil Nadu and join the sea through the Delta that has been created by the river itself. Parts of the upper catchment of the main tributaries Kabini, Bhavani and Amaravathy lie in the present State of Kerala. Karaikkal region, which is part of the Union Territory of Pondicherry, is in the tailend of the Cauvery Delta getting the irrigation benefits through the seven distributaries of Cauvery river in the Delta passing through Karaikal region. Thus the river now lies in four administrative regions, which form the four party States for the dispute.

Dispute over the use of the waters of Cauvery between the then State of Mysore and the Madras Presidency started even in the last decade of the 19<sup>th</sup> century when the native Mysore State started enlarging their irrigation tanks in the Cauvery basin to divert and hold more waters, which farmers downstream apprehended as a possible interference with the flows that were traditionally benefiting the Madras State irrigating the large Cauvery Delta at the tail end of the system. After a number of discussions over the manner in which the upstream State could be permitted to utilise waters without interfering or encroaching on the riparian rights of the lower Madras State, the Interstate Agreement of 1892 was concluded, in which certain Rules have been framed within which the Mysore State can operate in planning and enlarging their irrigation tanks, not only in the upper regions of Cauvery

but also in the basins of Tungabhadra, a tributary of Krishna basin and Ponnar and Palar river systems, all of which take their source in the Mysore State.

When the then Diwan of Mysore Sir M.Visvesvaraya came up with a proposal to create a storage in Kannambadi presently called Krishnarajasagara and sought the concurrence of the Madras State, there was a lot of opposition from the ayacutdars particularly in the Cauvery Delta which led to arbitration as provided for in the Interstate Agreement of 1892. Not satisfied with the findings of the Arbitrator, the then Madras State appealed to the Secretary of State at London who set at nought the decisions of the Arbitrator and gave three options to get the dispute resolved. The State of Mysore opted to get the problem sorted out by mutual negotiations. The interesting part of this negotiation which more or less started from 1916 was that it was left to the Technical Officers, Chief Engineers of the two States to prepare a technical blue-print through which the waters in the river Cauvery could be beneficially utilised by both the States through the creation of reservoirs at Krishnarajasagar and Mettur and few other reservoirs in both the States, having an eye on the limit flows that are to be made available to the downstream State of Tamil Nadu for the sustenance of the Cauvery Delta before the storages and facilities for new irrigation are created upstream in the Mysore State. The two Governments signed the historical agreement of 1924, after which the construction of the two reservoirs Krishnarajasagara in Mysore and Mettur in Madras State progressed fast. This agreement had a provision that a few of the clauses could be reviewed after 50 years to see if further development could be planned in case there was enough surplus beyond the uses that have been contemplated in the 1924 Agreement.

Even before the 50 year term ended, the State of Karnataka unilaterally without obtaining the concurrence of the downstream State of Tamil Nadu (which is mandatory as per the 1892 & 1924 Agreements) and without obtaining the concurrence of the Government of India on this score, went ahead with the construction of three more new reservoirs without Plan sanctions, one on Kabini a major tributary of Cauvery, another on Harangi and one more on Hemavathi, a tributary of Cauvery with proposals to expand the command area over a large extent.

The sharing of the waters of the Cauvery river has been a contention issue between Kerala and Tamil Nadu for over a century. With the passage of time, Cauvery waters have come to be utilized almost fully, rendering their sharing more complex.

Since prolonged negotiations failed, the dispute was referred for adjudication to the Cauvery Water Disputes Tribunal. This was constituted in June 1990 under the Inter-State Water Disputes Act, 1956 (Section 4 of ISWD Act, 1956) with reference to the direction of the Supreme Court to GOI. The State Government applied for interim relief by way of regulated and timely releases of Cauvery waters on 28.7.90 to the Tribunal.

The Tribunal passed an interim order on 25.6.91 directing Karnataka to ensure 205 TMC of water at Mettur reservoir in an irrigation year (from June to May). It also stipulated monthly quantum to be delivered week by week.

	<b>Qty in TMC</b>		<b>Qty in TMC</b>
June	10.16	December	10.37
July	42.76	January	2.51
August	54.72	February	2.17
September	29.36	March	2.40
October	30.17	April	2.32
November	16.05	May	2.01
		<b>Total</b>	<b>205.00</b>

Out of 205 TMC, Tamil Nadu has to release 5 TMC to Pondicherry.

The State of Karnataka should not increase its area under irrigation beyond 11.20 lakh acres as on June 1990. The interim order was to remain operative till the final adjudication of the dispute (referred to the Tribunal). The Government of Karnataka is, however, not prepared to implement the order of the Tribunal.

The Government of India has constituted a Cauvery River Authority and a Cauvery Monitoring Committee under Section 6A of the Inter State Water Disputes Act, 1956 (Central Act 33 of 1956) for the effective implementation of interim order of the Tribunal and notified the same in its official Gazette on 11.8.1998, with reference to the plea made by the Government of India before the Supreme Court of India on the Suit filed by the Government of Tamil Nadu in May 1992, for the notification of a Scheme under Section 6 -A of the Inter State Water Disputes Act, 1956 (Central Act 33 of 1956). The Cauvery River Authority is chaired by Prime Minister with the Chief Ministers of the basin States as its Members. The Cauvery Monitoring Committee is presided over by the Secretary to Government of India, Ministry of Water Resources, with the Chief Secretaries of the basin States or their nominees, Chief Engineers of the basin States, Chairman, Central Water Commission as Members, and Chief Engineer of Central Water Commission as Member-Secretary in the Committee.

The Government of Tamil Nadu filed two Suits, one on 19.9.2001 and another on 10.7.2002 in the Supreme Court of India in which, among others, it was prayed as follows:-

- (i) to direct the Government of Karnataka to implement the orders of the Tribunal.
- (ii) to direct the Authority to ensure weekly/monthly pattern of release of water
- (iii) to issue a decree of mandatory injunction directing the Union of India to appropriately alter, vary, modify, clarify and/amend the scheme so as to be self-operative to ensure the flows in terms of the orders of the Tribunal.

The above two Suits are pending before the Supreme Court of India.

*Contribution from neighbouring States-* The State depends on neighbouring States for a substantial quantum of water. According to the interim order of the Cauvery Water Dispute Tribunal, Tamil Nadu has to receive 5804 MCM (205 TMC) annually at Mettur reservoir from Karnataka. Adding to this the contribution from neighbouring States to other basins, the total dependence is 7390.7 MCM (261 TMC).

#### Contribution from neighbouring States

Sl. No.	State	Basin	Contribution	
			In MCM	In TMC
1	Karnataka/ Kerala	Cauvery	5804.9	205.0
2	Kerala	PAP	792.9	28.0
3	Kerala	Periyar/ Vaigai	410.6	14.5
4	Kerala	Vaippar	42.5	1.5
5	AP	Kosalathalaiar	339.8	12.0
	<b>Total</b>		<b>7390.7</b>	<b>261.0</b>

Mostly in all river basins, floods occur during monsoon seasons for a short duration. As a result, considerable quantity of water flows to the sea. An analysis of the flow measurements taken at the last anicuts/ regulators across the rivers indicates that the average flows and 75% dependable flows are 5020 MCM (177.12 TMC) and 886 MCM (31.26 TMC) respectively per annum. These flows occur over a very short duration ranging from 5 to 60 days, which is quite unpredictable. And these occur close to the coastal belt where the possibility of having storage is remote

as the terrain is plain. In the Cauvery delta and in other areas nearer to the coastal belt, often drainage congestion occurs during the NE monsoon causing damage to the standing crops.

Dams and reservoirs are the hydraulic structures built to store the stream flow of a river for later use. There are 79 reservoirs with a total capacity of about 6895 MCM (243 TMC) (15% of the annual water potential).

### **Improvement of Irrigation/ Water Use Efficiency**

The inter-State dispute on Cauvery has affected agricultural stability. Modernisation of rivers and tanks could provide support for crops. Data shows that the irrigation efficiency in surface irrigation like canals and tanks is only 40 percent (as compared to 75% in Israel) whereas in well irrigation it is 70 percent. Researchers opine that this level of irrigation efficiency can be increased to 50 to 60 percent in surface irrigation and to 80 percent in well irrigation. If the application efficiency is increased in phases from 40% to 50% and 60%, this would annually save about 3000 MCM for every 10% increase in efficiency.

The overall efficiency of the system is worked out by the extent of water actually used by the crop out of the water that is released from the reservoir. This efficiency is made up of conveyance efficiency, distribution efficiency and field application efficiency. The irrigation efficiency can be improved if the losses in the system are minimized. The loss during conveyance and distribution occurs due to seepage, evaporation, leakages, and evapo-transpiration by non-agricultural crops. Loss in field occurs due to inadequate land leveling, land shaping, deep percolation, evaporation, etc. The water use efficiency also varies with the method of application of water like border, strip, basin furrow, flooding etc. To improve the irrigation efficiency rehabilitation of the existing irrigation projects, canal systems, anicuts and tanks and measures like lining the canal, provision of control structures, prevention of leakages, rotational supply on-farm development and training of farmers can be adopted. Towards this end, WRCP (phase I) was taken up with WB assistance.

There is need for caution in regard to ground water development and exploitation; drawl of ground water is more than recharge in many areas. Water users organization and on-farm development help in judicious water allocation and management. The measures necessary may be listed as below.

- Improvement of the water use efficiency by progressive reduction in conveyance and application losses
- Adoption of better water management practices/ techniques through farmers' organisations
- Promotion of adaptive research and development to ensure more cost effective and efficient execution and management of irrigation systems through better water management practices
- Implementation of the conjunctive use of ground and surface water towards optimal utilisation of water resources and to have its development environmentally sustainable as well. The ground water should be utilized to the maximum during the monsoon period and surface water can be used when the water level goes beyond certain limit below ground level.
- Bridging the gap between the potential created and its utilisation by strengthening the Command Area Development Programme, institutional reforms and promoting farmers' involvement in irrigation management
- Restoration and modernization the old irrigation systems

*Tanks* - An encroachment is a serious issue affecting adversely the water resources particularly the irrigation tanks. Another problem is that of deferred maintenance. The pace of tank rehabilitation is not equal to the problem.

Tanks normally fill in 2 out of 10 years, fail 3 years and will have deficit supply in 5 years. Hence strategies should include the following:

Restoring the supply channel should get priority for with the incidence of rainfall in the catchment, the available run-off should be diverted fast into the storages to be conserved and utilized.

Desilting is uneconomic. Further, as there is problem in the disposal of the earth, only partial desilting covering 10% of the dead storage (near the bottom sluice) should be done. The earth can be used for strengthening the bunds. Also this will help to recharge the wells even when the tank is dry. [Desilting cum reclamation is a good process initiated in the State by which the full tank level would be raised by a small height, say 20 to 30 cms. just necessary to hold back the quantity the tank is designed to hold by raising the surplus weir and heightening and strengthening the bunds to the requirement while simultaneously raising the level of foreshore lands that may be submerged just to the level to retrieve them from submersion.]

Removal of the silt deposits in the tank needs to be done only to the extent necessary to yield the required quantity for strengthening of bund and raising of the foreshore lands.

Water losses in the unlined channels will be 20% and more. Hence lining the channels will help in distributing the water head to tail ends equitably within the short period of tank operation. The EEC tank modernization experience could be re-examined.

*Wells* – The fast rate of ground water development is exhibited by the rate of energisation of irrigation wells after 1950. The number of wells in the year 1951 was 14,400 and increased to 15,28,800 in the year 1996. The study carried out by Ground Water Wing shows that there is concentrated development in the districts of Salem, Erode, Coimbatore, Cuddalore, Villupuram, Kancheepuram and Thanjavur.

Over-exploitation is resulting in decline of ground water levels, sea water intrusion towards inland ground water aquifers in the coastal areas, pollution of ground water, increase in cost of pumping, inequity in access to ground water potential, decline in agricultural production and loss of rural livelihood.

The areas mainly affected from sea water intrusion are Kuttam in Tirunelveli, Athisayapuram, Puthantharuvai in Thoothukudi, East of Tiruvarur in Nagapattinam and Minjur in Thiruvallur districts. The long-term data of Minjur area show that the sea water intrusion is advancing inland with time and this effect is noted down upto 40-50 m. below ground level due to large scale of ground water extraction.

Priority should be for safeguarding the existing wells. Since the well failure is increasing from 40 to 80% in several regions, wherever possible, new bore wells should be discouraged and NABARD norms for spacing should be strictly followed. Also to complement this process, the efficiency of pump-sets should be increased. Currently the efficiency of the pumping is less than 30% and in some cases it is only 15%. Hence improving pump efficiency will help in minimization of the over exploitation. In areas with well intensity watershed programmes particularly, recharge structures should be concentrated. The location of these watershed structures based on decision support system keeping in mind the fact that the zone of influence will be around 700 meters in the downstream is important. In the case of tank intensive region, the emphasis should be on *in situ* moisture conservation. Also cultivation of banana and sugarcane crops in well intensive region should be discouraged. Wherever possible, drip and fertigation should be adopted for those crops.

*Canals* - The canals face the problem of inter-sectoral water allocation as well as poor water control since the State is depending on other States for about 260 TMC of water. There is uncertainty in the supplies of surface water. Hence future

investments in canals should be oriented towards better water control structures. Also water management practices particularly for paddy, which occupy major share of the canal irrigated area, should be followed with appropriate technology transfer activities.

*Dams and reservoirs* - Silting is a serious problem in reservoirs. Very high sedimentation is observed in Krishnagiri, Sathanur, Glemorgan, Pechiparai and Chittar reservoirs. Due to indiscriminate felling of trees in the catchment areas the dams would have their life span reduced drastically. To check soil erosion, it may be worthwhile to use hedges of vetiver grass along contours, which is a cheap and effective method.

Ideally an Integrated Water Resource Management Plan (IWRMP) needs to be formulated keeping each major river basin as a unit with the aim of achieving basin efficiency and productivity of water-use. IWRMP should be prepared for each of the 17 major river basins. [IWS has prepared basin plans for 3 basins as a pilot measure and taken up the preparation for another 3 basins]

Greater public awareness should be created about the dangers of the over-exploitation of ground water in Tamil Nadu. With a view to protecting the ground water resources and providing safeguards against hazards of their over-exploitation and to ensure their planned development and proper management, the Government have passed the "Tamil Nadu State Ground Water Development and Management Act 2003". As water resources become scareer, there will be a tendency to use more saline and sodic ground water for irrigation. Guidelines for its use are available; so in the hands of good management such practice can be effective, especially as plant breeders are working on varieties that are more salt-tolerant. Nevertheless, the condition of the soil has to be carefully monitored. Under specific conditions, sea water has been used to irrigate forage crops, elsewhere. Such possibilities have to be explored in Tamil Nadu also.

The intensive agricultural activity on an irrigation project can itself give rise to changes in water quality. For instance, fertilizers entering open collector drains can cause excessive weed growth, while pesticides and other agro-chemicals can seriously affect aquatic life. The effect of seepage of nitrates into ground water is to be studied in depth. The monitoring of drainage water quality is therefore essential. Further, rising urban population (growing faster than rural population in Tamil Nadu) and eventually its higher standard of living necessitate the diversion of rapidly increasing volumes of water for its use, which is largely non-consumptive. The effluent discharges in urban areas are considerable, reliable and often rich in plant nutrients. The main problem is that they are generally seen as presenting a health hazard unless very technologically advanced treatment processes are used. The FAO has taken a more optimistic view on the use of treated waste water in agriculture, pointing out that pathogenic agents are completely removed by settling and stabilization ponds. The costs depend largely on availability of land for the treatment ponds and on the distance the water has to be conveyed to the agricultural land; opportunities are therefore very site-specific. If there is no restriction on cost, water of the worst quality can be made pure, e.g., use of distilled sea water for irrigation in Kuwait. In the coming years, planning for use of the huge quantity of waste water generated in the urban areas will have to be done. Recycling and reuse of water should be an integral part of water resources development.

### **Major And Medium Irrigation And Flood Control**

The National Commission on Agriculture assessed the ultimate irrigation potential of Tamil Nadu through Major and Medium Irrigation sources as 15 lakhs hectares in 1976. At the commencement of the First Five Year Plan, there were 23 Major and Medium Irrigation Projects benefiting 11 lakhs hectares. In the Ninth Plan

period up to 2001-2002, the area under irrigation through Major and Medium Irrigation Projects had increased to 29.72 lakhs hectares. During 2003-2004 an additional irrigation potential of 5,141 hectares is likely to be created. It is envisaged that during 2004-2005 the additional irrigation potential of 3,629 hectares would be created.

The State is now constrained to find additional water resources through 'trans-basin' diversion of water from the neighbouring States, namely, Kerala, Karnataka and Andhra Pradesh which are blessed with rich water resources which involves 'inter-state' agreements and major policy changes at National level. In this respect, Government of India has formed the National Water Development Agency to look into the urgent need for diversion of surplus water available in the adjoining basins of neighbouring States to augment water resources.

A new World Bank Project namely 'Tamil Nadu Water Resources Consolidation Project' (TNWRCP) Phase - I was launched during the year, 1995-96 with an approved estimate of Rs.807.49 crores under Major and Medium Irrigation head of development and is in progress. The World Bank has extended the project period upto 31.09.2004.

### **Major Projects - Continuing Schemes**

#### **(1) Modernisation of Thanjavur channel**

The Cauvery Delta System is nearly 2000 years old. This system can serve efficiently only if the structural components are modernized. The Government of Tamil Nadu first prepared a master plan for modernization of the Cauvery System including Flood Control and Drainage Rehabilitation in 1970 for seeking International Financial Assistance. But the project could not be taken up as an Externally Aided Project for want of clearance (Inter State angle) from the Ministry of Water Resources, Government of India. However, the modernization work was taken up piecemeal to meet the urgent needs of irrigation, flood control and drainage with the State funds. But these efforts were inadequate for the requirement of the Delta.

Therefore, the modernization of the Cauvery Delta is provided for taking up in three phases. A project report for Phase I, at an estimated cost of Rs. 460 Crores, has been sent to the Government of India for forwarding it to World Bank. This project has the following components.

Modernisation & rehabilitation of ten rivers in the delta benefiting 70,000 ha

Modernisation & rehabilitation of 323 channels

Improvements to 109 Drainage works

Flood Control works to a tune of Rs. 23.02 crores

Other miscellaneous works

A sum of Rs.38.40 lakhs is provided under revised estimate for 2003-04. A sum of Rs.12.61 lakhs is provided for modernization of Thanjavur channel for 2004-2005 to meet the urgent needs of irrigation works.

#### **(2) Restoration of Channels - Canals**

The growth of Ipomoea in the irrigation sources is creating major problems in water management and flood control. Therefore silt and Ipomoea are being removed by using heavy machinery hired from the Agricultural Engineering Department and other private agencies.

Government has accorded sanction for the year 2003-2004 for an amount of Rs. 3500.00 lakhs for restoration of channel system. The revised estimate for 2003-2004 is Rs. 4227.15 lakhs. An amount of Rs.3547.40 lakhs is provided for 2004-2005.

## **Medium Projects - Continuing Scheme**

### **(1) Reservoir Across Koundinyanadhi Near Mordhana Village – WRCP (Vellore district)**

This scheme contemplates formation of a reservoir across Koundinyanadhi near Mordhana village in Gudiyatham taluk of Vellore district.

This scheme aims at providing an additional ayacut of 1,152 hectares, stabilising an extent of 2,585 hectares and bridging a gap of 285 hectares spread over 34 villages in Gudiyatham and Vellore taluks. The construction of masonry dam was originally taken up during 1990-91. Subsequently the work was taken up under World Bank aided WRCP. Under WRCP the project was modified to excavate new left and right main canal. The reservoir work was completed.

All the works are completed. The revised estimate for the year 2003-04 is Rs.17.01 lakhs.

### **(2) Improvements to Veeranam Lake**

The New Veeranam project was originally sanctioned in August 1993 for Rs. 464 crores under the caption "Second Chennai Water Supply Project, New Veeranam" as a World Bank aided project. The project envisaged the supply of 190 Mld. of water to the Chennai city.

Subsequently, revised administrative sanction was accorded for the source works for the project including modernisation of the command conveyance system of Vadavar canal and also Veeranam tank for Rs. 110.95 crores in April 1996. Due to escalation in cost of construction materials and labour, the revised cost is estimated to be Rs. 150 crores (PWD concern). By improvements to the conveyance system, 56,034 acres of ayacut (11,178 acres under Vadavar and 44,856 acres of ayacut under Veeranam) are expected to receive uninterrupted irrigation facility.

The revised estimate for the year 2003-04 is Rs. 1380 lakhs. A sum of Rs.1, 400 lakhs is provided for this scheme for the year 2004-2005.

### **(3) Strengthening of Periyar dam**

The Periyar Reservoir Project is a major venture of Inter basin water transfer designed and executed by Col. Pennycuick, to divert waters of the West flowing Periyar River to the East to extend irrigation in the Vaigai Basin. The Project was completed in the year 1895.

This project is the main source of irrigation for an ayacut of 84,269 Ha. in Theni, Dindigul, Madurai, Sivaganga and Ramanathapuram districts.

During the year 1979, when some apprehensions about the safety and strength of the dam were raised, the matter was referred to the Central Water Commission for the Commission's assessment and advice. Central Water Commission suggested to take some remedial measures. The entire dam strengthening work as suggested by the Central Water Commission at the first conference in 1979 has been completed except strengthening of baby dam.

The Government of Tamil Nadu has filed its response to the reply affidavit filed by the Government of Kerala in respect of the final report on 25<sup>th</sup> Feb. 2002. The transfer petition is yet to be disposed off by the Supreme Court. The baby dam work could not be taken up at present.

The revised estimate for the year 2003-04 is Rs.10 lakhs. A sum of Rs. 87.23 lakhs is provided for this scheme for the year 2004-2005.

**(4) Vadakkupachayar reservoir - WRCP (Tirunelveli district)**

This scheme envisages the formation of a reservoir across Vadakkupachayar, a tributary of Pachaiyar near Manjuvilai village in Nanguneri taluk in Tirunelveli district.

This scheme aims at stabilising 574 hectares of existing ayacut, bridging a gap of 464 hectares of existing irrigated area besides providing irrigation facilities to a new extent of 769 hectares under 45 tanks in Kalakadu, Nanguneri, Ullankulam, Illankulam and Parappadi villages of Nanguneri taluk. Also an extent of the existing single crop area of 1,568 hectares will receive irrigation for a second dry crop.

The scheme has been completed in all respects under WRCP at a revised cost of Rs. 45.38 crores. The revised estimate during the year 2003-04 is Rs.5.01 lakhs.

**(5) Nambiyar reservoir - WRCP (Tirunelveli district)**

This scheme is to form a reservoir across Nambiyar River in Radhapuram taluk of Tirunelveli district.

The scheme aims at irrigating 152 hectares of new dry lands besides bridging a gap of 185 hectares and stabilising an extent of 369 hectares in Kottaikarunkulam, Urumankulam, Ramanathapuram, Karaichitti - Puthur, Kasthurirangapuram, Kumarapuram, Muthumothumozhi and Thisayanvilai villages of Radhapuram taluk.

Earth dam and construction of right side canal sluice and excavation of right main canal have been completed. The balance works are taken up under the Water Resources Consolidation Project at an estimated cost of Rs.20.50 crores. The entire work is completed. The revised estimate during the year 2003-04 is Rs. 242.88 lakhs.

**(6) Nanganjiar reservoir (Dindigul district)**

This scheme contemplates the formation of a reservoir across Nanganjiyar, a tributary of river Amaravathy near Idayankottai village in Palani taluk, Dindigul district to benefit 2,530 hectares of new ayacut with a stabilisation of 24 hectares of old ayacut in Dindigul district and Karur district at the reappraisal estimate of Rs.37.36 Crores. Nearly 93% of the works are completed. The revised estimate for the year 2003-04 is Rs.348.35 lakhs.

**(7) Malattar anicut (Ramanathapuram district)**

This scheme is for the construction of an anicut across Malattar river below the existing Kamudhi regulator and just below the confluence point of Gridhamal and Paralayar rivers with Malattar near Sengapadi village in Kamudhi taluk of Ramanathapuram district.

This scheme will enable stabilisation of an extent of 1,758 hectares besides bridging a gap of 156 hectares under 54 tanks in Kamudhi and Kadaladi taluks. The scheme work is in progress.

The revised estimate for this scheme for the year 2003-04 is Rs.170 lakhs. A sum of Rs.679.56 lakhs is provided for the year 2004-2005.

**(8) Providing irrigation facilities to 58 villages In Usilampatti taluk (Madurai district)**

By implementing this scheme, 570 hectares of wet lands will be stabilised besides bridging a gap of 128 hectares of wet lands under 29 existing tanks and 3 existing ponds in Usilampatti taluk. Further new dry ayacut of 227 hectares will be brought under irrigation through 3 new tanks. The scheme is in progress.

The Government has accorded approval for this scheme at an estimated cost of Rs.33.81 crores. The revised cost is estimated to be Rs. 78.40 crores. The revised estimate for the year 2003-04 is Rs.735.30 lakhs. A sum of Rs.517.355 lakhs is provided for the year 2004-2005.

**(9) Andiappanur odai (Vellore district)**

This scheme envisages the formation of a reservoir of 112 M.Cft. capacities across Andiappanur odai near Andiappanur village in Vaniyambadi taluk of Vellore district. Government has sanctioned this scheme at a revised cost of Rs.27.38 crores.

By implementing this scheme, an extent of 810 hectares of direct ayacut in Andiappanur and Irunappattu villages in Vaniyambadi taluk will be benefitted for raising double dry crops. Land acquisition is completed except 9.885 Ha. The main work is in progress.

The revised estimate for the year 2003-04 is Rs.800 lakhs. A sum of Rs.1, 000 lakhs is provided for the year 2004-2005.

**(10) Varattar – Vallimadurai reservoir (Dharmapuri district)**

This scheme contemplates formation of a reservoir across Varattar near Vallimadurai village in Harur taluk in Dharmapuri district. The Government in April 1997 have sanctioned an amount of Rs.19.20 crores for this scheme.

This scheme will stabilise an extent of 110 hectares of wetlands besides benefiting an extent of 1,047 hectares of single crop dry lands under Keeraipatti anicut, Ellappudayampatti anicut and Mankuppam Eri benefiting Vallimadurai, Thathavalasi, Somanathan, Keeraipatty, Kudumiyampatti, Achalvadi and Somanathampudur villages in Harur taluk.

The Government have accorded sanction for the revised estimate for an amount of Rs.35.95 Crores. NABARD has sanctioned a loan of Rs.27.82 crores for this scheme. Works are in progress. The revised estimate for the year 2003-04 is Rs.850 lakhs. A sum of Rs.1, 500 lakhs is provided for the year 2004-2005.

**(11) Irukkangudi reservoir (Virudhunagar district)**

This scheme is for the formation of reservoir across Vaippar near Irukkangudi village, Sattur taluk, Virudhunagar district at a cost of Rs.28.70 crores. The scheme aims at stabilising an extent of 254 hectares, bridging the gap of 255 hectares and giving new irrigation facilities to 3,705 hectares of dry lands in Thoothukudi district.

In this scheme, construction of masonry dam across Arjuna and Vaippar rivers are in progress at various stages. 80% main canal and 95% of Branch Canal have been completed. Cross masonry works in canal are in progress. The revised cost is estimated to be Rs. 62.20 crores. The scheme is in progress with NABARD loan assistance.

The revised estimate for the year 2003-04 is Rs.3, 000 lakhs. A sum of Rs.237.78 lakhs is provided for this scheme for 2004-2005.

**(12) Shenbagathope reservoir (Tiruvannamalai district)**

The Shenbagathope Reservoir Scheme contemplates the formation of a reservoir across Kamandaluru in Shenbagathope village of Polur taluk in Thiruvannamalai district. The Government have sanctioned this scheme at a revised cost of Rs.34 crores.

This scheme will benefit 2,067 hectares by stabilisation and 642 hectares by bridging the gap in Polur, Arni, Arcot, Cheyyar and Vandavasi taluks. By implementing this scheme, a long time demand of this backward region for better

irrigation facilities will be fulfilled. The scheme is in progress with NABARD loan assistance.

The revised estimate for the year 2003-04 is Rs.1, 706.96 lakhs. A sum of Rs.274.11 lakhs is provided for this scheme for 2004-2005.

### **(13) Canals**

#### **(a) Kuppenatham reservoir (Tiruvannamalai district)**

The scheme contemplates formation of a reservoir across Cheyyar near Kuppenatham village in Chengam taluk of Tiruvannamalai district. The Government in June 1997 have sanctioned this scheme at an estimated cost of Rs.35.46 crores.

This scheme will stabilise an extent of 2528 hectares and bridge a gap of 580 hectares, under 22 tanks fed by 5 anicuts and 2 open off-takes across Cheyyar, in Chengam, Tiruvannamalai and Polur taluk. Preliminary works are in progress. NABARD has been approached for loan assistance.

#### **(b) Anicut across Andi odai (Tiruchirappalli district)**

The Government in June 1998 sanctioned the scheme for formation of an Anicut across Andi Odai near Kallagam village in Lalgudi taluk, Trichichirappalli district at an estimated cost of Rs.1.21 crores.

This scheme will stabilise existing irrigation in an extent of 82 hectares of wet ayacut and provide irrigation facilities to a new dry extent of 84 hectares in Kallagam village of Lalgudi taluk in Tiruchirappalli district and Poondi village of Ariyalur taluk in Perambular district. All the works have been completed

#### **(c) Formation of 18<sup>th</sup> Canal In Uthamapalayam taluk of Theni district**

The Government have sanctioned the scheme for formation of 18<sup>th</sup> Canal in Uthamapalayam Taluk in Theni District at an estimated cost of Rs.26.52 crores. The scheme will stabilise irrigation in an extent of 511.16 hectares, bridge a gap in 73.90 hectares and provide irrigation facilities to a new extent of 22.81 hectares in Tempucheri, T.Chindalacheri, Pannaipuram, Kombai, Sankarapuram, Vembakottai, Thevaram, Lakshminaickanpatti, Pothaipuram, Meenakshipuram, Gudalur and Uthamapuram village in Uthamapalayam Taluk.

The components of the scheme are construction of head sluice and excavation of a canal for a length of 38.90 km and formation of 4 numbers of new tanks. The works have been split up into 3 reaches. Works in all the three reaches are in progress.

Proposal has been sent to NABARD for seeking loan assistance for completing the balance works. The provision for the year 2004-05 is Rs.1000 lakhs.

#### **(d) Extension of Nilaiyur channel (Madurai district)**

The Government have sanctioned the scheme for extending the Nilaiyur channel from upstream of Perungudi tank to feed Valankulam and Kambikudi tanks series in Madurai, Virudhunagar and Sivagangai Districts at an estimated cost of Rs.8.94 crores.

The scheme will stabilise irrigation in an extent of 2686.53 hectares and bridge a gap in 1126.03 hectares in Manamadurai Taluk.

The components of this scheme are construction of head sluice-cum-regulator, excavation of main canal for a length of 7.850 Km and branch canal for a length of 3.00 Km including cross masonry works.

72% of works have been completed. Balance works are in progress. NABARD has accorded approval for loan assistance. Government has approved the

revised estimate for an amount of Rs.19.49 crores. The provision for the year 2004-05 is Rs.248.28 lakhs.

The above four works are carried out under the scheme canals. The revised estimate for the year 2003-2004 is Rs. 1206.01 lakhs. For the year 2004-2005, a sum of Rs. 3,175.44 lakhs is provided.

#### **(14) Kalvoi – Sadayaneri (Thoothukudi district)**

The Government have sanctioned an amount of Rs.12.33 Crores for this scheme which comprises widening the existing Kalvoi – Sadayaneri Channel upto Kalvoi Tank and widening the existing Sadayaneri Channel, excavation of Sadayaneri Extension Channel, improvements to the existing Mudalur Odai from Karumeniyar to Vairavantharuvai and excavating a link canal from Vairavantharuvai to Puthantharuvai.

This scheme contemplates utilising the Thambaraparani surpluses for filling twelve tanks in Sadayaneri and Thanjaikkulam to irrigate 314 hectares of ayacut. Besides, two Tharuvais (lakes) will also get filled which will help recharge 634 wells in four villages for irrigating coconut cultivation in 875 hectares. This scheme will also benefit Kalvoi, Vellur, Udayarkulam, Vellamadam, Pidaneri, Eluvarimukki, Nangaimazhi, Sathankulam, Sasthanvinallur, Kumadikottai, Thirupanikkuthan Tharuvai and Pattakurichi villages in Tiruchendur and Sathankulam Taluks.

This work is now taken up under State funds. Due to the inclusion of certain additional works, the estimated cost has been increased to Rs.1, 435 lakhs. The additional works are in progress at various stages. The revised estimate for the year 2003-04 is Rs.202 lakhs.

#### **(15) Bathalapalli – Malattar reservoir (Vellore district)**

The scheme contemplates formation of a reservoir across Malattar River near Bathalapalli village in Gudiyatham Taluk, Vellore District. The Government have sanctioned this scheme at an estimated cost of Rs.29.55 crores.

This scheme will stabilise 1,064 hectares of ayacut and bridge the gap of 61 hectares in Balur, Machampattu, Vasanampalli, Nariyampattu, Reddimankuppam, Sarangal Kailasagiri, Ayithampattu, Sathampakkam, Rajakal, Alingikuppam, Malmurugai, Melpatti, Kulithigai, Chinnathottalam, Ulli, Kothakuppam, Aranganalalur, Olakasi and Chithathur villages of Gudiyatham Taluk. Besides, provision for drinking water facilities to Peranampet town and the wayside villages and for industrial purposes has been made in this scheme. Also the wells in the area now affected by pollution from tanneries will become good water sources in course of time.

The components of the scheme are Earth dam, Masonry spillways, River sluices, Pickup anicut and drops.

For implementation of this scheme, an extent of 36.98 hectares of patta land, 17.81 hectares of forestland and 11.32 hectares of poramboke land are required. Land acquisition works are completed. Forestland has been handed over to Public Works Department. NABARD has been approached for loan assistance.

The revised estimate for the year 2003-04 is Rs.75 lakhs. A sum of Rs.1,300 lakhs is provided for this scheme for 2004-2005.

#### **(16) Renovation of Narayana Cauvery channel (Ramanathapuram district)**

The Government in May 1998 have sanctioned the scheme for Rehabilitation of Narayana Cauvery channel and its anicut (Mandalamanickam Anicut) to feed Sayalkudi tank and other 33 tanks in Ramanathapuram district at an estimated cost of Rs.5.75 crores. This scheme gives irrigation support to 1, 942.97 hectares of lands in Kamuthi, Tiruchuli and Kadaladi taluks of Ramanathapuram district. 90% works

were completed. Balance works are in progress. The revised estimate for the year 2003-04 is Rs. 250 lakhs. A sum of Rs.39.12 lakhs is provided for this scheme for 2004-2005.

**(17) Tank across Uppar odai (Tiruchirappalli district)**

The Government have sanctioned the scheme for formation of a tank across the Uppar Odai, its confluence with Nandiar near Siruvayalur village Hamlet of Kanakiliyanallur village in Lalgudi Taluk, Tiruchirappalli District at an estimated cost of Rs. 4.18 crores. This scheme will provide irrigation facilities to a new dry extent of 152 hectares in Kanakiliyanallur village in Lalgudi Taluk.

The components of the scheme are formation of earth bund, surplus weir, three irrigation sluices and three Channels. 75% of the work has been completed. Further works are in progress.

The revised estimate for the year 2003-04 is Rs. 100 lakhs. A sum of Rs.53.94 lakhs is provided for this scheme for 2004-2005.

**(18) Tank across Mudalai muthu vari (Thanjavur district)**

The Government have sanctioned the scheme for formation of a tank across Mudalai Muthu Vari in Chennampatti village in Thanjavur Taluk and District at an estimated cost of Rs.9.73 crores. This scheme will stabilise 110 hectares of existing wet ayacut, bridge a gap of 9 hectares of wet land and provide irrigation facilities to a new dry extent of 364 hectares in Chennampatti and Vallampudur villages in Thanjavur District and Karumpondi village in Pudukottai District.

The components of this scheme are 2,300 meter long earth bund, uncontrolled weir and four sluices. Totally 81% of the works have been completed. The remaining works are in progress. Land acquisition process through private negotiations is in progress

The revised estimate for the year 2003-04 is Rs. 420 lakhs. A sum of Rs.129.09 lakhs is provided for this scheme for 2004-2005.

**(19) Gadana Extension Scheme (Tirunelveli district)**

The Government have sanctioned the scheme for formation of an extension reservoir on the right flank of the existing Gadana Dam in Ambasamudram Taluk of Tirunelveli District at an estimated cost of Rs.18.82 crores.

The scheme will stabilise irrigation in an extent of 511 hectares, bridge a gap in 187 hectares and provide irrigation facilities to a new extent of 67 hectares in Sivasailam, Mela Ambur, Keela Ambur and Mannarkoil villages in Ambasamudram Taluk.

The components of the scheme are earth bund of 900m length with one irrigation sluice, main canal with 3 branch canals for a total length of 18.71 Km and formation of an inter-connecting water way by cutting open the saddle dam for a length of 30m.

About 90% of cross masonry works completed. Dam work completed and the balance works are in progress. NABARD has accorded sanction for loan assistance for this scheme.

The revised estimate for the year 2003-04 is Rs. 294.20 lakhs. A sum of Rs.10 lakhs is provided for this scheme for 2004-2005.

**(20) Tank across Nayodai (Dindigul district)**

The Government has sanctioned the scheme for formation of a tank across Nayodai a tributary of Mangariyar in Kannivadi village, Dindigul Taluk and District at

an estimated cost of Rs.3.50 crores. Revised Administrative sanction for this scheme has also been accorded for Rs.7.2 Crores.

The scheme will provide irrigation facilities to a new extent of 148 hectares in Kannivadi, Alanthuranpatti, Veerapudaiyanpatti and Thettupatti villages in Dindigul Taluk and District.

The components of the scheme are earth bund of 620-m length, high coefficient weir of 30-m length, one tower head sluice and field canal of 4,120 m length. Formation of bund 20% completed. Surplus weir 80% completed. Remittance of land acquisition charges is to be done.

The revised estimate for the year 2003-04 is Rs. 15 lakhs. A sum of Rs. 41.60 lakhs for 2004-2005 is provided.

#### **(21) Reservoir across Nallathangal odai (Erode district)**

The Government have sanctioned the scheme for the formation of a reservoir across Nallathangal Odai near Eswarankoil in Ponnivadi village of Dharapuram Taluk in Erode District at an estimated cost of Rs.31.01 crores. Revised Administrative sanction for this scheme has also been accorded for Rs.42.70 crores.

This scheme will provide irrigation facilities to 1,919.87 hectares of new dry extent in Nallanpalayam, Alampalayam, Poramium Thurambadi, Moolanur and Ponnivadi villages of Dharapuram Taluk in Erode District. The components of this scheme are earth dam 3450m, uncontrolled spillway, one head sluice and one river sluice. Construction of quarters and Sub Division Office Buildings is nearing completion. Formation of Earth Dam and Construction of Spillway are in progress

The revised estimate for the year 2003-04 is Rs. 427.07 lakhs. A sum of Rs.1, 558.07 lakhs is provided for this scheme for 2004-2005.

#### **(22) Tank across Ramakkal odai and Anaivilundan odai (Dindigul district)**

The Government have sanctioned the scheme for the formation of tank across Ramakkal Odai and Anaivilundan Odai, tributaries of Kodaganar river in A.Vellode village and Keelakottai village in Dindigul Taluk and District at an estimated cost of Rs.3.55 crores. Revised Administrative sanction for this scheme has also been accorded for Rs.5.65 Crores. This scheme will provide irrigation facilities to 107.65 hectares of new dry lands in A. Vellode and Keelakottai villages in Dindigul Taluk and District.

The components of this scheme are earth bund 480m long, weir with a surplus course to connect the weir to Ramakkal Odai, Head sluice, River sluice and Field canals. The High Court, Chennai has ordered not to proceed with the work without settling the land acquisition charges. Proposal to acquire 0.29.30 Hec. of forest land has been sent.

The revised estimate for the year 2003-04 is Rs. 217.50 lakhs. A sum of Rs.329.37 lakhs is provided for this scheme for 2004-2005.

#### **(23) Reservoir across Nagariar near Sasthakoil (Virudhunagar district)**

The Government have sanctioned the scheme for formation of a reservoir across the river Nagariar near Sasthakoil in Rajapalayam Taluk of Virudhunagar District at an estimated cost of Rs.7.97 Crores. The Revised Estimate cost is Rs.1290 Lakhs (12.90 Crores).

This scheme will stabilise 1,016 hectares of existing ayacut and bridge a gap of 184 hectares under the existing 13 tanks in North Devathanam, South Devathanam, Sethur, Muthusampuram, Kovilur, Nallamangalam and Chettiarpatti villages in Rajapalayam Taluk. The components of this scheme are earth bund for a

length of 1600m, uncontrolled spillway, river sluice and excavation of new surplus course.

90% work completed. Balance Work is in progress. NABARD has accorded sanction for loan assistance for this scheme. The revised estimate for the year 2003-04 is Rs. 303.89 lakhs.

#### **(24) Reservoir across Vellakkal Kanar (Vellore district)**

The Government have sanctioned the scheme for formation of a reservoir across Vellakkal Kanar near Vinnamangalam village in Vaniyambadi Taluk of Vellore District at an estimated cost of Rs.7.70 Crores.

This scheme will stabilise 431 hectares of existing irrigation besides bridging a gap of 57 hectares in Kannadikuppam, Periyankuppam, Sanarkuppam, Melkrishnapuram, Ambur, Samalapuram, Karunwaram, Vadapudupatti, Kilmurugi, Thottalam, Madumur and Katanpakkam villages in Vaniyambadi Taluk. The components of this scheme are earth dam 320 m long, surplus weir of 40 m length and construction of River sluice.

For implementation of this scheme, 35.82 hectares of forestland is required. Stage I approval for diversion of forestland has been accorded by Government of India. Work will be commenced after obtaining loan assistance from NABARD. A sum of Rs.450 lakhs is provided for 2004-2005.

#### **(25) Reservoirs**

The reservoirs scheme consists of tank across Sirumalaiyar in Dindigul district, Mambazhathuraiyar reservoir in Kanyakumari district, Mirukandanathi reservoir in Thiruvannamalai district, and multipurpose reservoir across Cooum in Poonamallee taluk of Thiruvallur district and formation of a reservoir across Adayar at Thiruneermalai in Tambaram taluk of Kancheepuram district. The revised estimate for the year 2003-2004 is Rs.377.45 lakhs. An amount of Rs.857.45 lakhs is provided for 2004-2005. The details of the individual schemes are given below:

##### **a) Tank across Sirumalaiyar (Dindigul district)**

The Government have sanctioned the scheme for formation of a new tank across Sirumalaiyar near Rajadhani Kottai village in Nilakottai Taluk of Dindigul District at an estimated cost of Rs.4.91 crores. Revised administrative sanction has been accorded for Rs.8.87 crores. This scheme will provide irrigation facilities additionally to a new dry extent of 128 hectares in Oruthattu village in Nilakottai Taluk.

The components of this scheme are earth bund of 975-m length including surplus weir of 40m length, one head sluice and surplus course for a length of 60m. Earth bund 0.500m sluice and surplus weir have been completed. 50% work completed. Action is being taken to complete the balance works. The provision for the year 2004-05 is Rs.254.62 lakhs.

##### **(b) Reservoir across Mambazhathuraiyar (Kanyakumari district)**

The Government have sanctioned the scheme for formation of a reservoir across Mambazhathuraiyar near Villukuri village in Kalkulam Taluk in Kanyakumari District at an estimated cost of Rs.9.50 Crores. This scheme will stabilise 3.57 hectares, bridge a gap of 25.82 hectares in single crop and 18.14 hectares in second crop and provide irrigation facilities to a new extent of 308.98 hectares in Kalkulam and Villukuri villages in Kalkulam Taluk in Kanyakumari District. The components of the scheme are formation of earth dam of 295 m length, surplus weir of 50m length and construction of sluice and excavation of right and left side channels. The provision for the year 2004-05 is Rs.300 lakhs.

**(c) Reservoir across Mirukandanadhi (Tiruvannamalai district)**

The Government have sanctioned the scheme for formation of a reservoir across Mirukandanadhi near Melsolankuppam village in Polur taluk in Tiruvannamalai District at an estimated cost of Rs.16.79 crores. Revised Estimate for Rs.1888 Lakhs has been sanctioned.

This scheme will stabilise irrigation in an extent of 778.05 hectares and bridge the gap to the extent of in 81.10 hectares in Melsolankuppam, Gangavaram, Senandal, Nallanpillai Pettran, Gangamaladevi, Kettavarampalayam, Siruvallur, Ennamangalam and Solavaram in Polur taluk of Tiruvannamalai District.

The components of this scheme are earth dam of 670-m length, uncontrolled spillway, one head sluice and one river sluice.

For implementing of this scheme 80.82 hectares of patta land and 23.37 hectares of poramboke land are required. Government have accorded sanction for acquisition of private patta land under urgency clause. The work has been taken up with loan assistance from "NABARD". The provision for the year 2004-05 is Rs.1, 078 lakhs.

**(d) Formation of Multipurpose Reservoir across Cooum In Poonamallee taluk of Thiruvallur district.**

A multipurpose reservoir is provided at Zamin Korattur with a capacity of 152Mcf. The quantity of water required to flush Cooum River once using artificial floods is about 50 Mcft capacities. Hence it may be possible to flush Cooum 3 times in a year roughly.

The balance water if available after flushing Cooum can be used for drinking purposes. Besides this, the scheme will be helpful for flood mitigation, for buffer storage for Krishna water supply schemes, and for ground water recharge and seawater intrusion. The cost of the scheme is Rs.22 lakhs.

**(e) Formation of a reservoir across Adayar at Thiruneermalai in Tambaram taluk of Kancheepuram district.**

This scheme envisages the formation of a multi-purpose reservoir across Adayar at Thiruneermalai for the following purposes.

- To mitigate floods in Adayar.
- To store the flows of Adayar now flowing as a waste into the sea to meet the drinking water needs of the nearby townships of Pallavaram, Anakaputhur, Tambaram etc.
- To store Krishna water as the existing linkages permit to divert Krishna water from Chembarabakkam tank to the Provided Thiruneermalai Reservoir.
- To enhance the environs of the city by flushing the stinking city lying stretches whenever surplus flows are available.
- To augment ground water recharge and to control seawater intrusion.

The cost of the scheme is Rs. 207 crores.

**(26) Ullar Reservoir across Palaiyar and Valamazhaiyar (Tirunelveli district)**

The Government have sanctioned the scheme for formation of a reservoir across Palaiyar and Valamazhaiyar near Sivagiri village in Sivagiri taluk, Tirunelveli District at an estimated cost of Rs.39.20 crores. The scheme will stabilise irrigation in an extent of 971.95 hectares and bridge a gap in 595.18 hectares in Royagiri, Sivagiri, Thenmalai, Thirumelapuram, Naranapuram, Kottaiyar, Chinthamaniperi,

Koodaloor and Ramanathapuram villages in Sivagiri Taluk, Panaiyur, Vayali, Marathoni, Thiruvankadam, Chatrapatti and Karichathan villages in Sankarankoil Taluk.

The components of this scheme are masonry dam, spillway, construction of 2 sluices, improvements to Rasingaperiar and Kulasekaraperiar, construction of dividing wall and improvements to the existing anicuts and tanks. For this scheme about 57 ha. of forest land is to be transferred. Government of Tamilnadu had addressed Government of India on 24.02.2002.

Design for non-spillway section has been prepared. Design for spillway, surplus arrangements and surplus course are under finalisation. The revised estimate for the year 2003-04 is Rs. 100 lakhs. A sum of Rs.700 lakhs is provided for this scheme for 2004-2005.

#### **(27) Modernisation of rainfed tanks (WRCP)**

The World Bank Mission considered during the field visits in November of 2000 additional schemes involving expenditure of Rs. 3,796 million to utilise the savings in the WRCP project on account of the depreciation in rupees value for rehabilitation / modernisation of rainfed tanks of 462 in Palar basin with an ayacut of 63,002 ha. at an estimated cost of Rs.81.80 crores, 77 tanks in Tambaraparani basin with an ayacut of 10,140 ha. at an estimated cost of Rs.13.18 crores and 81 tanks of Vaigai basin with an ayacut of 8,502 ha. at an estimated cost of Rs. 11.18 crores aggregating to 620 tanks at an estimated cost of Rs.106.26 crores.

#### **(28) Formation of a tank across Mathalapallam River near Ramakondahalli village in Pennagaram Taluk of Dharmapuri district**

The scheme contemplates formation of a tank across Mathalapallam River near Ramakondahalli village in Pennagaram Taluk of Dharmapuri district. The river Mathalapallam one of the tributaries of river Cauvery originates from Masakal and Kallappambadi reserved forest in Pennagaram taluk and confluences with river Cauvery near Stanley reservoir.

The provided capacity of the tank is 55.63 Mcft. and it is provided to store 92.40 Mcft. annually in 1.66 fillings. By implementation of this scheme an extent of 700 acres in Ist crop and 400 acres in II crop will be benefitted.

The cost of the scheme during the year 2001–2002 worked out to Rs. 1,415 lakhs. The revised estimate for the year 2003-04 is Rs. 60 lakhs. A sum of Rs. 450 lakhs is provided for this scheme for 2004-2005.

#### **(29) Formation of a tank across Vellaparai odai in Theppampatti village in Andipatti taluk of Theni district.**

This contemplates formation of a tank across Vellapparai odai in Theppampatti village in Andipatti taluk of Theni district. The Vellaparai odai is a Jungle stream, which originates from Kandamanur east reserved forest and is one arm of the Mavoothu odai. This stream comes under Andipatti minor basin of Vaigai river basin.

The provided capacity of the tank is 8.69 Mcft and in two fillings it is provided to store 17.38 Mcft annually. By implementing this scheme 104.28 acres (42.22 Hectare) of wetland will be benefitted. The cost of the scheme works out to Rs. 119 lakhs. The revised estimate for the year 2003-04 is Rs. 69.88 lakhs.

#### **(30) Construction of an anicut across old coleroon in Perambattu village in Chidambaram taluk of Cuddalore district.**

This scheme envisages the construction of an anicut across Old Coleroon river near Perambattu village to prevent intrusion of seawater into the old Coleroon

river by taking remedial measures on a permanent basis. By implementation of this scheme an extent of 460 acres of dry lands will be converted into wetlands, besides tackling the main problem of seawater intrusion.

The cost of scheme works out to Rs. 162 lakhs. The revised estimate for 2003-04 is Rs. 60 lakhs. A sum of Rs.100 lakhs is provided for this scheme for 2004-2005.

**(31) Excavation of new supply channel from Badathalav tank to Vennampalli tank and 10 other lower tanks upto Kasimkhan tank in Krishnagiri taluk in Dharmapuri district.**

This scheme envisages the excavation of new supply channel from Badathalav tank to Vennampalli and 10 other lower down tanks. This tank is one of the biggest tanks in Dharmapuri district. An anicut across Markandanadhi (Tributary of Ponniyar) near Marasamudram village feeds surplus water to Badathalav tank through supply channel of 17.9 km length.

By implementation of scheme 840.74 acres of gap will be bridged and a new ayacut of 500 acres will be benefitted in II crop period. The cost of the scheme works out to Rs. 700 lakhs. The revised estimate for the year 2003-04 is Rs. 50 lakhs. A sum of Rs.647.93 lakhs is provided for this scheme for 2004-2005.

**Water Resources Consolidation Project (W.R.C.P)**

The World Bank cleared the Water Resources Consolidation Project at a total cost of Rs.840.84 crores in 1995. Government of Tamil Nadu accorded sanction for an amount of Rs.807.49 Crores as the base cost in September 1995. The Project is to come to a close on 31.03.2002. Based on the request of the State Government, the World Bank has given approval for extending the scheme upto 31.3.2004. Now the World Bank has further extended the project period for upto 30.09.2004.

The project is implemented as a sector investment loan, financing an agreed State-wide programme to improve the productivity and sustainability of Tamil Nadu's irrigation sector, to introduce multi-sectoral water planning, to integrate farmers in irrigation management and to strengthen the State's institutional and technical capability in water development, management and planning.

The project will enhance agricultural production in about 6 lakhs hectares (about 50% of the State's surface irrigated area) directly benefiting some 40 lakhs farmers. Irrigation will be put on a sustainable footing through rehabilitation and modernisation of the systems linked with farmer participation and upgraded maintenance and water management.

The WRCP provides for rehabilitation and modernisation of 16 irrigation systems and 25 Minor Irrigation Schemes in Tamil Nadu (except those in Cauvery Basin) and for completion of the nine on-going irrigation projects, viz., Poigaiyar, Nambiyar, Sothuparai, Mordhana, Rajathopekanar, Kodumudiyar, Vadakkupachayar, Adavinainarkoil and Gridhamal schemes.

Administrative sanction for 2347 packages at a cost of Rs. 1062.00 crores has been accorded. The revised estimate for the year 2003-04 is Rs. 10,865.12 lakhs. A sum of Rs. 2,034.50 lakhs is provided for the year 2004-2005.

**Flood Control Works**

**(1) Rehabilitation and Reclamation of Chennai City Waterways**

The Government of Tamil Nadu have decided to remove the sludge and silt from the waterways in Chennai city viz., Adyar, Cooum, Buckingham Canal, Otter Nallah, Captain Cotton Channel and other smaller drains. The objective of the project is to clean all the city waterways and to keep them clean on sustainable basis

by preventing the inflow of sewage into these waterways:

The following schemes have been taken up for achieving the objective of cleaning and desilting of waterways.

Desilting and construction of flood defences and resectioning of the following waterways.

- (i) Macro drainages of CMDA area – 50% of works were completed.
- (ii) Buckingham canal from Ennore creek to Muttukadu in Chennai - 85% of works were completed.
- (iii) Adayar River in Chennai – 40% of works was completed.

The revised estimate is Rs.48.38 crores.

## **(2) Removal of Sand Bar and prevention of Sand bar formation on the mouths of Cooum and Adayar on the confluence of these rivers with Bay of Bengal.**

The National Institute of Ocean Technology under the Department of Ocean Development, Government of India had given a groyne based solution for the sustained opening of Cooum river mouth as a technology demonstration project. A groyne for a length of 170 m. has been constructed in the sea at a cost of Rs. 78 lakhs. Based on the suggestion of NIOT, it has been decided to raise the height of the groyne by 1.5 m. This is under consideration.

A sum of Rs.2000.01 lakhs is provided for 2004-2005 in respect of flood control works.

### **Anti Sea Erosion Works**

Tamil Nadu has a coastline of about 960 km out of which over 900 km is along the Bay of Bengal and 60 kms along the Arabian Sea. The eastern coast is prone to considerable sea erosion and this has reached alarming proportions in recent years. To solve the problem, the Government are implementing various protection works.

The sea shore along the Ennore express way from the Fishing Harbour at Royapuram is severely affected by sea erosion for a length of 9.08 km. Action is being taken for protecting the coastal line and safeguarding the Ennore express way by providing Rubble Mound Sea Wall (R.M.S. Wall) in a phased programme.

The anti sea erosion works taken up in Kanyakumari district and in North Chennai have been completed.

A proposal for obtaining technical and financial assistance from the Government of the Netherlands for a permanent solution to the problem of sea erosion along the Ennore express way is pending with the Government of the Netherlands for approval. A sum of Rs.2 crores has been provided for the year 2003-04.

### **Annual Plan Outlay for 2004-05**

#### **Major and Medium Irrigation and Flood Control and Anti Sea Erosion**

An outlay of Rs. 323.96 crores has been provided for the programmes under this sector as detailed below:

(Rs. in lakhs)

Head of Development/Sub Group	Outlay for 2004-05
<b>Major and Medium Irrigation and Flood Control</b>	
Major and Medium Irrigation Projects	28361.16
Water Resources Consolidation Project	2034.50
Flood Control and Anti Sea Erosion Projects	2000.01
Total- Major and Medium Irrigation & Flood Control	32395.67
Centrally Sponsored Schemes - Basic and fundamental research on River Valley Project and National Council for Science and Technology Programme	0.13

### Minor Irrigation

The important sources of Minor Irrigation, i.e., tanks, wells and tube wells, contribute significantly to irrigated agriculture in Tamil Nadu. Tanks and wells extend irrigation support to an extent of 20 lakhs ha. which accounts for 67 percent of total irrigated area. The State Government has been taking concerted efforts to augment and manage these resources to make them sustainable in the long run through several schemes.

### State Ground And Surface Water Resources Data Centre (Ground Water Survey)

Conservation and judicious management of ground water resources are the prime need of the hour and also for the coming years so as to make the State of Tamil Nadu to attain self-sufficiency and sustainability in the ground water resources sector.

Ground water, being a dynamic replenishable resource, requires continuous exploration, monitoring and assessment involving multi- disciplinary studies. The State Ground & Surface Water Resources Data Centre (SG& SWRDC) undertakes the following for the purpose of planning, development and management of ground water resources of the State of Tamil Nadu:

- Scientific ground water investigation and periodic assessment of ground water potential on watershed basis.
- Continuous monitoring of hydrological, hydro-meteorological and water quality for ground water and surface water.
- Collect, process, analyse and store the ground water and surface water data to evaluate the condition for development.
- Develop a suitable plan for judicial development and optimal utilisation of ground water.
- Protecting ground water resources against over exploitation and quality deterioration by enacting.
- Improving the ground water storage through artificial recharge and rainwater harvesting wherever possible.
- Interact and co-ordinate with the other line departments of the State and water users to plan for the better utilization of the ground water resource in the State.
- Drilling of exploratory bore holes in order to study sub surface lithology.
- Consultancy services to public, Govt. Dept. and private sector undertakings for augmentation of water supply schemes.
- Issuing ground water clearance for implementing Minor Irrigation Schemes.
- Special studies for monitoring sea water intrusion into fresh water aquifer (920 km along the coast).

- Co-ordinate to implement the National and State water policies.
- Co-ordinate with the State Ground Water Authority to implement the Tamil Nadu Ground Water (Development & Management) Act 2003 which was recently enacted by the Tamil Nadu Govt. to ensure planned development and proper management of Ground Water.
- The assets created through the Hydrology Project - I, which ended 31.12.2003 have to be maintained and periodic data are to be collected.

A provision of Rs. 74.02 lakhs has been made for the regular ground water works during the year 2004-2005. A provision of Rs.200 lakhs is required for the maintenance of Hydrology Project Phase I also under JD Ground Water Survey including the above provision.

#### **Ground Water Assessment on mini watershed basis**

It is proposed to take up a micro level ground water assessment based on mini watershed basis. There are about 1552 mini water sheds in the hard rock part of the State and three major water sheds viz., Cauvery, Vennar and new delta in Cauvery delta. Initially the study will be focused on the over-exploited and critical blocks numbering about 175 blocks during the year 2004 & 2005. The remaining semi-critical and safe blocks will be taken up in the subsequent years. GW resource Assessment studies have been carried out in Andhra Pradesh and Maharastra States on Watershed basis.

Rs.208.58 lakhs is the revised estimate for 2003-04. For the year 2004-2005, a sum of Rs.198.82 lakhs has been provided for the above activities.

#### **World Bank Aided Hydrology Project**

The World Bank came forward in 1995 to assist five Government of India agencies and eight State Governments including Tamil Nadu in the formulation and execution of hydrology project. The project is intended to improve institutional and organizational arrangements, technical capabilities and infrastructure available for measurement, validation, collection, analysis, transfer and dissemination of hydrological, hydro-meteorological and water quality data to eligible users, to establish a permanent modern hydrological data management system so as to get real time field data of hydro- meteorological observation in perennial river basin for successful flood forecast and to assist the Government of India agencies and the participating State in the development of scientific data base consisting of all aspects of hydrological cycle including Surface Water and Ground Water in terms of quality and quantity. The project period is 6 years from 1995. The estimated cost of the project for Tamil Nadu is Rs.38.65 crores.

The Government have accorded revised administrative sanction for Rs.51.15 Crores. For 2003-04, the revised estimate is Rs.549.13 lakhs. For the year 2004-2005, a sum of Rs.230.31 lakhs has been provided.

#### **Special Minor Irrigation Programme**

This scheme contemplates formation of new tanks, construction of anicuts, excavation of link channels, restoration of abandoned tanks, formation of ponds and standardization of tanks etc. leading to assured irrigation and creating additional irrigation potential. Desilting-cum-reclamation schemes contemplate desilting of tanks to restore the lost capacity due to siltation with reclamation of foreshore lands.

An amount of Rs.600 lakhs is revised estimate for 2003-04. For the year 2004-2005, a sum of Rs.1,110 lakhs is provided for Special Minor Irrigation Programme. Out of this, an amount of Rs. 110 lakhs is for the new schemes as detailed below.

### New Special Minor Irrigation Schemes

- (i) Formation of a new pond in SFNo.79 & 80 in Veriappur village in Oddanchatiram Taluk in Dindugal District at an estimate cost Rs.12 lakhs and Rs.12 lakhs is provided for 2004-05.
- (ii) Formation of a new pond in SFNo.408 in Chikkarasanpalayam village in Sathy Taluk in Erode District at an estimate cost of Rs.25 lakhs and an amount of Rs.10 lakhs is provided for 2004-05.
- (iii) Formation of a new pond across odai near Dharmathupatty village in Andipatti Taluk in Theni District at an estimate cost of Rs. 34 lakhs and cost for the year 2004-05 is Rs. 13 lakhs.
- (iv) Formation of a new pond across odai near Kottodaipatty near Pulimankombai village in Andipatti Taluk in Theni District at an estimate cost of Rs.74 lakhs and the cost for 2004-05 is Rs.30 lakhs.
- (v) Formation of a new pond across odai near Unjalamma Koil in Sippalakottai village in Uthamapalayam Taluk in Theni District at an estimate cost of Rs.60 lakhs and an amount of Rs. 25 lakhs is provided for 2004-05.
- (vi) Formation of a new pond across odai near Ammapatty village in Andipatti Taluk in Theni District at an estimate cost of Rs.25 lakhs and Rs.10 lakhs is provided for 2004-05
- (vii) Augmenting supply from Karaipattar River to feed Naganallur and Pidaramangalam tanks in Musiri Taluk in Trichy District at an estimate cost of Rs.21 lakhs and the cost for the year 2004-05 is Rs.10 lakhs.

### State Tank Irrigation Projects

There are about 8,903 P.W.D. tanks and 9,886 ex-zamin tanks in Tamil Nadu. The Government of Tamil Nadu launched a scheme during 1995-96 exclusively to provide for the standardization and improvements of irrigation tanks. This project has two components. The first component is standardization and improvement of ex-zamin tanks and the second component, standardization and improvement of the other tanks, which are with the Public Works Department. All ex-zamin tanks, after standardization will be handed over either to the Panchayat Unions or to the Public Works Department depending on their size for further maintenance.

The revised estimate for 2003-04 is Rs. 25 lakhs for ex-Zamindari tanks and Rs. 25 lakhs for PWD tanks. The provision of Rs.200 lakhs for 2004-05 is as follows:

1.	State Tank Irrigation Projects Ex-Zamin Tanks	- Rs. 100 lakhs
2.	State Tank Irrigation Projects P.W.D. Tanks	- Rs. 100 lakhs
	Total	- Rs. 200 lakhs.

### Implementation of Minor Irrigation Schemes & SMIP Schemes With Loan Assistance of NABARD

NABARD has extended loan assistance for 45 schemes (5 MI & 40 SMIP) to a total estimated cost of Rs.59.67 crores in different stages. The works under RIDF II were completed. The works under RIDF V / Batch I are in various stages of progress. The works under RIDF VI / Batch II include 2 ongoing MI works. Balance works are to be taken up.

The revised estimate for 2003-04 is Rs. 1,034.29 lakhs. For 2004-2005, an amount of Rs. 1,533 lakhs is provided.

### **Modernisation of Tanks Loan Assistance from NABARD**

The project proposal is for modernising 44 minor irrigation tanks spread over in 23 districts of Tamil Nadu at an estimated cost of Rs.14.66 crores with financial assistance of NABARD under Rural Infrastructure Development Fund (RIDF) benefiting 5,054 hectares.

The State Government have accorded sanction to this project for Rs.14.66 crores. The Government in G.O.Ms.No.516 P.W.D. dated 24.12.2001 issued orders for executing the works through Water Users Association with the involvement of Non Government Organisations (NGOs). These works will be completed during 2002-03.

The revised estimate for 2003-04 is Rs. 46.60 lakhs. For the year 2004-2005, a sum of Rs.3.95 lakhs is provided.

### **Scheme for Desilting and upgradation of tanks with ayacut of more than 100 acres**

Desilting and Upgradation of PWD System and Non-system tanks having an ayacut of 100 acres and above have been taken up at a cost of Rs. 105 crores as part of "SAMPORNA GRAMIN ROZGAR YOJANA" (SGRY) in the drought affected districts. Out of this amount of Rs. 105 crores, 25 crores have been provided as 25% for cash component as wages for the agricultural labourers and Rs. 75 crores will be paid as rice and the balance Rs. 5 crores for material component. An amount of Rs. 2,500 lakhs was provided for this scheme for the year 2003-04 and the revised estimate anticipated is Rs. 3,000 lakhs. For 2004-05, Rs. 2,500 lakhs is provided for this scheme.

#### **(1) Anicuts / Reservoirs having CCA less than 2,000 hectares**

##### **Sothuparai (Varahanadhi) Reservoir In Theni district**

This scheme contemplates the formation of a reservoir across Varahanadhi near Thenkarai in Periakulam taluk in Theni district.

The scheme aims at stabilizing 739 hectares of wet lands and bridging a gap of 27 hectares of wet lands besides irrigating a new extent of 405 hectares of dry lands in Thenkarai and Thamaraikulam village of Periakulam taluk.

The revised estimate for 2003-04 is Rs. 6 lakhs. For the year 2004-2005, a sum of Rs. 7 lakhs is provided.

##### **Shanmuganadhi Reservoir In Theni district**

This scheme contemplates the formation of a reservoir across Shanmuganadhi (Varattar) near Rayappanpatti village in Uthamapalayam taluk of Theni district. The scheme aims of irrigating 664 hectares of new dry land in Rayappanpatti village of Cumbum taluk and Mallingapuram, Chennavalapuram, Erasakkanaickanur, Kanmoiservaipatti, Alagapuri, Odaipatti, Seepalakottai village in Uthamapalayam taluk.

The Government have accorded revised administrative sanction for Rs.14.70 crores. All works have been completed except distributaries work, which are nearing completion.

The revised estimate for 2003-04 is Rs. 99.90 lakhs. A sum of Rs. 48.91 lakhs is provided for the year 2004-2005.

##### **Kodumudiyar Reservoir (Tirunelveli district)**

This scheme contemplates the formation of a reservoir across the jungle stream of Kodumudiyar and Kombaiyar at their confluence point near Tirukurungudi village in Nanguneri taluk in Tirunelveli district.

This scheme is aimed to stabilise an extent of 791 hectares and bridge a gap of 779 hectares in addition to conversion of 193 hectares of single crop into double crop in Mayiladi, Eruvadi, Nambithalavanpattiyam, Vadakku-Valliyoor, Therku-Valliyoor, Rajakkamangalam, Achampadu, Anaikulam, Thalaikulam, Therkkukallikulam, Shanmugarengapuram, Kumbikulam, Alanginaru Thirumalapuram and Radhapuram villages in Radhapuram and Nanguneri taluks.

Improvements to the existing canals, construction of aquaduct and surplus course works have been completed under State fund. The revised estimate for 2003-04 is Rs. 7 lakhs. For the year 2004-2005, a sum of Rs. 7.70 lakhs is provided.

#### **New Minor irrigation schemes (2003-04)**

##### **(1) Conversion of diversion mud bund into masonry training wall in Palar river at the off take of Athur Vadapathy tank supply channel in Chengleput taluk of Kancheepuram district**

The yield available in the provided area is about 77.08 Mcft. By utilising the availability of water an extent of 398.13 acres will be stabilised besides bridging a gap of 293.65 acres in Chengleput taluk of Kancheepuram district. For implementing this scheme in 2003-04, an amount of Rs. 50 lakhs is provided. The revised estimate for 2003-04 is Rs. 50 lakhs. An amount of Rs. 70 lakhs is provided for 2004-05.

##### **(2) Formation of a Pond across Sambarpallam odai in S.F. No. 18**

###### **Alamarathupatti village and conversion of Sorakkappatti pond bylinking the surplus of Sambarpallam pond in Mettur taluk, Salem district**

This scheme is to form a new pond across Sambarpallam odai in Alamarathupatti and to convert Sorakkappatti pond by linking the surplus water of Sambarpallam odai. The ground water level will rise considerably in the surrounding areas of the scheme and will give irrigation facility to an extent of 456.32 acres of new wetland. For this scheme, an amount of Rs. 5 lakhs is provided for the year 2003-04 and the revised estimate is Rs.5 lakhs. A provision of Rs.120 lakhs is allocated for this for 2004-05.

##### **(3) Formation of a new tank across Pachilainachiamman odai (Mandurai odai) near G. Kallupatti village in Periyakulam taluk of Theni district**

This scheme is to form a new tank across Pachilainachiyamman odai. The water yield at the provided site is about 34.78 mcft. The provided tank will store about 13.33 Mcft. annually. By using this water an extent of 160 acres of land in G.Kallupatti area will be benefitted. A sum of Rs. 50 lakhs is provided for this scheme for 2003-04. The revised estimate for 2003-04 is Rs. 50 lakhs and Rs. 77 lakhs is provided for 2004-05.

##### **(4) Formation of a new tank across Periyaoothu Odai in Chinnaovalapuram village in Uthamapalayam taluk of Theni district.**

This scheme is to form a new tank across Periyaoothu Odai to store 8.50 Mcft. annually in two fillings by the available yield of 8.845 Mfct. in the provided area. This scheme will give irrigation facility to an extent of 117.46 acres of dry land. An amount of Rs. 50 lakhs is provided for this scheme for 2003-04. The revised estimate for 2003-04 is Rs. 50 lakhs and Rs. 152 lakhs is provided for 2004-05.

#### **New Minor irrigation schemes (2004-05)**

##### **(1) Formation of a tank across Perumpallam Odai near K.Morur in Kanavaipudur village of Omalur taluk in Salem District.**

This scheme contemplates the formation of a tank with 10.30 M.cft capacities across the Perumpallam odai near K.Morur village. An extent of 210 acres dry land

will be irrigated in the I crop besides benefiting 114.20 acres of wet lands in the II crop period. An amount of Rs. 50 lakhs is provided for 2004-05.

**(2) Construction of an anicut across Ayyar river near Puliyancholai to feed Mahadevi and chain of other tanks in Thuraiyur taluk of Trichy District.**

It is provided to divert the excess flood water to Mahadevi and chain of other tanks by excavating new supply channel from Puliyancholai by constructing an anicut across Ayyar channel. By this scheme an extent of 858.51 acres of land will be stabilised and a gap of 539.97 acres will be bridged. The ultimate cost of this scheme is Rs.184 lakhs and an amount of Rs. 50 lakhs is provided for the year 2004-05.

**Water Resources Consolidation Project - Phase – II**

To improve the overall efficiency and the storage capacity of the State's meager water resources, a follow-on project to Water Resources Consolidation Project, viz., Water Resources Consolidation Project-Phase-II is contemplated for implementation with World Bank assistance at an estimated cost of Rs.2, 890 crores.

The project proposals include certain left out items of Water Resources Consolidation Project, rehabilitation of system and non-system tanks, irrigation schemes both new and ongoing. Eco-restoration works conjunctive use of Ground and Surface Water Development in Sivaganga and Pudukottai Districts etc. are also proposed.

Basin wise master plans were prepared integrating the needs of all the stakeholders in the Basin, while preparing detailed estimates. The Water balance studies for each basin shall be the basic document.

These project proposals were sent to the Government of India to seek World Bank assistance. The Govt of India has sent the proposals to World Bank.

With the meagre Surface water and Ground water potential available, the integrated water resources management is the only remedy to tide over water crisis.

The World Bank therefore suggested that the successor Project should be an Integrated Approach with participation of the Line Departments using water and also choosing Hanumannadhi Sub Basin guided to prepare estimate for an integrated model rehabilitation of Hanumannadhi Sub Basin of Tambaraparani Basin in Tirunelveli District.

An estimate for Integrated Model Rehabilitation for Rs.61.53 crores has been prepared involving all line Departments in water sector and approved by Government after getting NOC from World Bank. An amount of Rs. 1,000 lakhs has been provided for the year 2004-05.

**Western Ghats Development Programme**

The Western Ghats Development Programme is being implemented from 1986-87 onwards in 24 selected taluks of Coimbatore, Erode, Dindigul, Virudhunagar, Tirunelveli and Kanyakumari districts. Construction of check dams and formation of new ponds and improvements to supply channels are executed under this programme.

The revised estimate anticipated for 2003-04 is Rs. 29 lakhs. A sum of Rs.29 lakhs is provided for the year 2004-2005.

## Minor Irrigation

### Annual Plan Outlay for 2004-2005

(Rs. in lakhs)

Sl. No.	Name of Scheme	Outlay for 2004-05
1	Direction and Administration	0.01
2.	Investigation	198.82
3.	Tube wells scheme	63.84
4.	Hydrology Project	230.31
5.	Other Minor Irrigation works	5346.95
6.	Minor Irrigations	13143.72
7.	Western Ghat Development Programme	29.00
	<b>Total</b>	<b>19012.65</b>

### Command Area Development Programme

#### Command Area Development Programme (CADP)

Agricultural Engineering Department implements the Command Area Development Programme in 12 command areas as a centrally sponsored and equally shared programme between the State and Government of India. So far, the programme has been completed in Lower Bhavani project, Cumbum Valley project, Periyar-Vaigai project, Sathanur Reservoir project and Amaravathy Reservoir project. The remaining projects viz., Parambikulam Aliyar project, Kothaiyar-Chittar Pattinamkal project and Thambirabarani River Basin projects have to be completed according to the schedule approved by Government of India. Government of India have recently approved three new schemes namely Krishnagiri Reservoir project, Thoppaiyar project and Palar- Poranthalar project under Command Area Development Programme. The Command area Development Programme is implemented below the sluice outlets of the commands.

Command Area Development Programme is implemented basically to ensure improved irrigated agriculture as a central theme and the activities relate to irrigation facilities and its efficient utilisation through the following three major components:

- On Farm Development (OFD)
- Rotational Water Supply (RWS)
- Participatory Irrigation Management (PIM)

Reclamation of waterlogged areas, saline and alkaline will also be taken up by Agricultural Engineering Department under this programme.

#### On Farm Development Works

The following infrastructural works are taken up as part of On Farm Development (OFD) works.

- Lining of field channels - to reduce the travel time, effective conveyance and arrest the seepage losses of water.
- Construction of new field channels - to provide water to individual holdings.
- Construction of divisions and diversion boxes - to discharge the water in proportion to the block areas for effective and easy handling.
- Construction of drops - to arrest erosion and ponding in the channels.
- Construction of bed dams - to raise water level using a shutter across the flow for irrigating the adjacent fields at higher levels

Out of the total cultivable command area of 10.97 lakhs ha. an area of 9.30 lakhs ha. has been covered till March 2003 with On Farm Development in 12 command areas of Tamil Nadu.

### Rotational Water Supply

Rotational Water Supply or Warabandi is a system of equitable water distribution by turns, according to a predetermined schedule specifying the day, time and duration of water supply to each farmer in proportion to his holding size in an outlet command. The Rotational Water Supply schedule is prepared after executing the On Farm Development works by Agricultural Engineering Department and handed over to the farmers for implementation. Without completion of Rotational Water Supply, Command Area Development Programme will be ineffective and incomplete. Bearing this in mind, it was proposed to give a thrust to Rotational Water Supply in the recent past and accordingly programme intensification is being continued under Rotational Water Supply. An area of 7.82 lakhs hectares has been covered till March 2003.

### Participatory Irrigation Management

Participation of farmers plays a major role in the execution of Command Area Development works and ensuring equitable distribution of irrigation water to each individual field at the right place with right quantity at the right time as per water availability and requirements of crops. The participatory approach is now being intensified and enlarged to achieve the transfer of responsibility of operation and maintenance to farmers' council for effective Participatory Irrigation Management (PIM). To achieve this, a 3-tier system is now adopted.

- Farmers' Association - at the sluice command level
- Farmers' Council - at distributory level
- Farmers' Federation - at project level

Out of 632 Farmers' Councils registered, an amount of Rs. 1,309.55 lakhs has been released as management subsidy till March 2003, to maintain the infrastructure created under the Command Area Development Programme.

It is programmed to cover 55,905 ha. under On Farm Development works and 1,10,000 ha. under Rotational Water Supply works during the year 2003-04.

An amount of Rs.5,088.52 lakhs is proposed for the year 2004-05 for implementation of Command Area Development Programme works, out of which the State's share is Rs. 1,394.88 lakhs as indicated below:

### Command Area Development Programme

#### Annual Plan Outlay for 2004-2005

(Rs. in lakhs)

Programmes	Outlay for 2004-05	
	Full cost	State share
1. Parambikulam Aliyar Command	1,189.01	594.51
2. Cauvery Command	2,589.86	258.99
3. Amaravathy Reservoir Project	3.00	1.50
4. Kothaiyar Chittar Pattanamkal	100.00	50.00
5. Tambiraparani	737.02	368.51
6. Periyar-Vagai Project	0.00	0.00
7. Monitoring and Technical Cell	15.81	7.91
8. Thoppaiyar command	5.06	1.27
9. Krishnagiri Reservoir Project	214.36	53.59
10. Palar- Poranthalar Reservoir Project	234.40	58.60
<b>Total - C.A.D.P.</b>	<b>5,088.52</b>	<b>1,394.88</b>

