

# **WATER YEAR 2007**

## **DISTRICT GROUND WATER BROCHURE TIRUVALLUR DISTRICT**



स्वच्छ सुरक्षित जल – सुन्दर खुशहाल कल

**CONSERVE WATER - SAVE LIFE**

**Government of India  
Ministry of Water Resources  
Central Ground Water Board  
South Eastern Coastal Region  
Chennai**

**DISTRICT AT A GLANCE (TIRUVALLUR DISTRICT)**

<b>S.NO</b>	<b>ITEMS</b>	<b>STATISTICS</b>	
<b>1.</b>	<b>GENERAL INFORMATION</b>		
	<b>i. Geographical area (Sq.km)</b>	<b>3422.43</b>	
	<b>ii. Administrative Divisions as on 31-3-2007</b>		
	Number of Tehsils	8	
	Number of Blocks	14	
	Number of Panchayats	539	
	Number of Villages	805	
	<b>iii. Population (as on 2001 Census)</b>		
	Total Population	2754756	
	Male	1397407	
	Female	1357349	
	<b>iv. Average Annual Rainfall (mm)</b>	1152.80	
<b>2.</b>	<b>GEOMORPHOLOGY</b>		
	i. Major physiographic Units	Pediplain, Residual, structural hills and beach ridges etc.	
	ii. Major Drainages	Araniar, Korattalaiyar Cooum & Adyar river.	
<b>3.</b>	<b>LAND USE (Sq. km) during 2005-06</b>		
	i. Forest area	197.36	
	ii. Net area sown	1157.24	
	iii. Cultivable waste	83.26	
<b>4.</b>	<b>MAJOR SOIL TYPES</b>	1.Red soil 2.Black soil 3.Alluvial soil 4.Colluvial soil etc.	
<b>5.</b>	<b>AREA UNDER PRINCIPAL CROPS (AS ON 2005-2006)</b>	1. Paddy -86304 Ha – 59.5% 2. Groundnut – 12795 Ha – 11.22% 3. Pulses – 8600 Ha – 6.11% 4. Sugarcane – 50058 – 3.41%	
<b>6.</b>	<b>IRIGATION BY DIFFERENT SOURCES (During 2005-06)</b>	<b>Number</b>	<b>Area irrigated (Ha)</b>
	<b>i. Dug wells</b>	19457	32667
	<b>ii. Tube wells</b>	18855	67544
	<b>iii. Tanks</b>	1895	23936
	<b>iv. Canals</b>	17	3676
	<b>v. Other Sources</b>	-	1619
	<b>vi. Net irrigated area</b>	92498 ha	
	<b>vii. Gross irrigated area</b>	129442 ha	

<b>7.</b>	<b>NUMBERS OF GROUND WATER MONITORING WELLS OF CGWB (AS ON 31.03.2007)</b>		
	i. No of dug wells	18	
	ii. No of piezometers	3	
<b>8.</b>	<b>PREDOMINANT GEOLOGICAL FORMATIONS</b>	Recent Alluvium, Boulders, & Conglomerate, Sandstones, Gneisses and Charnockites.	
<b>9.</b>	<b>HYDROGEOLOGY</b>		
	i. Major water bearing formations	Sandstone, weathered & fractured granitic gneisses etc.	
	ii. Pre- monsoon depth to water level (May 2006)	2.38 – 7.36	
	iii. Pre- monsoon depth to water level (Jan'2007)	0.79 – 5.30	
	iv. Long term water level trend in 10 years (1998-2007) in m/yr	<b>Annual</b>	
		<b>Rise (m/year)</b>	<b>Fall (m/year)</b>
		Min : 0.0564	Min : 0.0277
		Max : 0.0984	Max : 0.2748
<b>10.</b>	<b>GROUND WATER EXPLORATION BY CGWB (As on 31-03-2007)</b>		
	i. Number of Exploratory wells	46	
	ii. Number of Observation wells	6	
	iii. Number of Piezometers under Hydrology Project.	3	
	iv. Depth range(m)	18 – 790.50	
	v. Discharge(lps)	0.5 – 39.0	
	vi. Storativity (S)	$2.29 \times 10^{-2}$	
	vii. Transmissivity (m <sup>2</sup> /day)	1 - 4200	
<b>11.</b>	<b>GROUND WATER QUALITY AS ON MAY 2006</b>		
	i. Presence of chemical constituents more than permissible limit	NO <sub>3</sub> & TH as CaCO <sub>3</sub>	
	ii. Type of water	Ca Cl <sub>2</sub> , NaCl & Mixed type	
<b>12.</b>	<b>DYNAMIC GROUND WATER RESOURCES (as on 31.03.2004) in MCM</b>		
	i. Annual Replenishable Ground Water Resources	1238.29	
	ii. Total Annual Ground Water Draft for all purposes	1058.46	
	iii. Projected demand for Domestic and Industrial Uses up to 2025	79.31	
	iv. Stage of Ground Water Development	95%	
<b>13.</b>	<b>AWARENESS AND TRAINING ACTIVITY</b>		
	<b>i. Mass Awareness Programmes Organized</b>		
	Date	6-3-2003	
	Place	R.K.Pet Panchayat Union Office.	
	No of Participants	300	
	<b>ii. Water Management Training Organized</b>		
	Date	05.03.2003 & 06.03.2003	
	Place	Tiruvallur Collectrate office.	
	No of Participants	35	

<b>14.</b>	<b>EFFORTS OF ARTIFICIAL RECHARGE &amp; RAINWATER HARVESTING</b>	Technical Guidance were provided as when sought
	i. Projects completed by CGWB Number of structures Amount spent	Nil
	ii. Projects under technical guidance of CGWB Number of structures	Nil
<b>15.</b>	<b>GROUND WATER CONTROL AND REGULATION</b>	
	i. Number of OE Blocks	6
	ii. Number of Critical Blocks	2
	iii. Number of Blocks Notified	-
<b>16.</b>	<b>MAJOR GROUND WATER PROBLEMS AND ISSUES.</b>	<p>i) High level of ground water development in large areas in both hard rock and sedimentary aquifers and failure of abstraction structures with time</p> <p>ii) Sea water ingress</p> <p>iii) Industrial pollution</p> <p>iv) Water scarcity in part of the district due to unfavorable hydrogeological set up</p>

## 1.0 INTRODUCTION

### 1.1 Administrative Details

Tiruvallur district is having administrative divisions of 8 taluks, 14 blocks, 539 Panchayats and 805 villages as detailed below:

S.No.	Taluk	No.of Villages	Block	No.of Villages
1	Tiruvallur	150	Tiruvallur	49
			Kadambattur	59
			Poondi	42
2	Uthukottai	97	Ellapuram	97
3	Poonamallee	53	Poonamallee	53
4	Ambattur	83	Villivakkam	46
			Puzhal	37
5	Ponneri	191	Minjur	121
			Sholavaram	70
6	Gummidipundi	87	Gummidipundi	87
7	Tiruttani	74	Tiruttani	29
			Thiruvelangadu	45
8	Pallipattu	70	Pallipattu	33
			R.K.Pet	37
	<b>Total</b>	<b>805</b>		<b>805</b>

### 1.2 Basin and sub-basin

The district is part of the composite east flowing river basin having Arniar-Korattaliar and Cooum sub basins.

### 1.3 Drainage

Araniyar, Korattaliayar, Cooum, Nagari and Nandhi are the important rivers. The drainage pattern, in general, is dendritic. All the rivers are seasonal and carry substantial flows during monsoon period.

Korattaliar river water is supplied to Cholavaram and Red Hill tanks by constructing an Anicut at Vellore Tambarambakkam. After filling a number of tanks on its further course, the river empties into the Ennore creek a few kilometres north of Chennai.

The Cooum river, flowing across the southern part of the district, has its origin in the surplus waters of the Cooum tank in Tiruvallur taluk and also receives the surplus waters of a number of tanks. It feeds the Chembarambakkam tank through a channel. It finally drains into the Bay of Bengal.

## 1.4 Irrigation Practices

The nine-fold lands use classification for the district is given below.(2005-06)

S.No	Classification	Area (Ha)
1	Forests	19736
2	Barren & Uncultivable Lands	13638
3	Land put to non agricultural uses	102580
4	Cultivable Waste	8326
5	Permanent Pastures & other grazing lands	8164
6	Groves not included in the area sown	7779
7	Current Fallows	19931
8	Other Fallow Lands	46365
9	Net Area sown	115724
	<b>Total</b>	<b>342243</b>

(Source: Department of Economics & Statistics, Govt. of Tamil Nadu)

The chief irrigation sources in the area are the tanks, wells and tube wells. Canal irrigation is highest in Minjur block followed by Sholavaram, Pallipattu, R.K.Pet, Poondi, Gummidipundi and Ellapuram blocks.

The block wise and source wise net area irrigated in Ha is given below (2005-06).

S.No	Block	Net area irrigated by					Total Net Area irrigated
		Canals	Tanks	Tube wells	Ordinary wells	Other Sources	
1	Tiruvallur	0	1056	4211	439	0	5706
2	Kadambattur	0	1259	1983	4017	0	7259
3	Poondi	32	2581	2794	1848	15	7270
4	Ellapuram	98	289	6517	4679	0	11583
5	Poonamallee	0	650	1417	881	0	2948
6	Tiruttani	7	481	764	3192	0	4444
7	Thiruvelangadu	20	1307	769	4678	0	6774
8	Pallipattu	253	275	2881	1006	0	4415
9	R.K.Pet	313	1822	484	407	813	3839
10	Gummidipundi	28	4756	7797	721	358	13660
11	Villivakkam	0	315	1716	542	93	2666
12	Puzhal	0	116	293	359	0	768
13	Minjur	1400	2244	9205	348	17	13214
14	Sholavaram	581	930	6286	155	0	7952
	<b>Total</b>	<b>2732</b>	<b>18081</b>	<b>47117</b>	<b>23272</b>	<b>1296</b>	<b>92498</b>

(Source: Department of Economics & Statistics, Govt. of Tamil Nadu)

## **1.5 Studies/Activities carried out by CGWB**

The erstwhile Exploratory Tubewell Organisation had undertaken the ground water exploration by drilling in the Araniyar and Korattalaiyar basin during 1956-57 for the study of sub-surface configuration of the basin and to assess the ground water resources for augmenting the water supply to Chennai city. During the 3 phases of explorations, 17 boreholes were drilled down to a maximum depth of 457.50 m bgl. From the results of exploration, potential areas were identified near Panjetti, Minjur and Tamaraipakkam areas for development of ground water by tube wells.

Central Ground Water Board (1975-81) also carried out the exploration in Defence establishments at Avadi, Central farm area of Alamadhi and also at Puduvayal down to a depth of 764 m bgl to assess the ground water resources of the area. The exploratory drilling at Puduvayal revealed the absence of crystalline basement down to a depth of 764.20 m and the sandstone aquifer with intercalation of shale and compact in nature with poor permeability. The aquifers encountered are less productive.

Systematic and Ground Water Management studies were made under various phases. Central Ground Water Board has carried out pollution studies at Manali industrial belt and Ambattur area.

In additions, Short-term Water Supply investigations are being carried out, mainly for defence establishments.

## **2.0 RAINFALL AND CLIMATE**

The district receives the rain under the influence of both southwest and northeast monsoons. Most of the precipitation occurs in the form of cyclonic storms caused due to the depressions in Bay of Bengal chiefly during Northeast monsoon period. The southwest monsoon rainfall is highly erratic and summer rains are negligible. Rainfall data analysis shows that the normal annual rainfall varies from 950mm to 1150mm. It is minimum around Chengam (982.1mm) in the south eastern part of the district. It gradually increases towards west and a maximum around Wandavasi (1117.1mm) is noticed.

The district enjoys a tropical climate. The period from April to June is generally hot and dry. The weather is pleasant during the period from November to January. Usually mornings are more humid than afternoons. The relative humidity varies between 65 and 85% in the mornings while in the afternoon it varies between 40 and 70%.

The annual mean minimum and maximum temperature are 24.3 ° and 32.9°C respectively. The day time heat is oppressive and the temperature is as high as 41.2°C. The lowest temperature recorded is of the order of 18.1 °C.

## **3.0 GEOMORPHYLOGY AND SOIL TYPES**

### **3.1 Geomorphology**

The prominent geomorphic units identified in the district through interpretation of Satellite imagery are 1) Alluvial Plain, 2) Old River Courses 3) Coastal plains 4) Shallow & deep buried Pediments, 5) Pediments and 6) Structural Hills.

The elevation of the area ranges from 183 m amsl in the west to sea level in the east. Four cycles of erosion gave rise to a complex assemblage of fluvial, estuarine and marine deposits. The major part of the area is characterised by an undulating topography with innumerable depressions which are used as irrigation tanks.

The coastal tract is marked by three beach terraces with broad inter-terrace depressions. The coastal plains display a fairly lower level or gently rolling surface and only slightly elevated above the local water surfaces or rivers. The straight trend of the coastal tract is resultant of development of vast alluvial plains. There are a number of dunes in the coastal tract.

### **3.2 Soils**

Soils in the area have been classified into i) Red soil ii) Black soil iii) Alluvial soil iv) colluvial soil. The major part is covered by Red soil of red sandy/clay loam type. Ferruginous red soils are also seen at places. Black soils are deep to very deep and generally occurs in the depressions adjacent to hilly areas, in the western part. Alluvial soils occur along the river courses and eastern part of the coastal areas. Sandy coastal alluvium (arenaceous soil) are seen all along the sea coast as a narrow belt.

## **4.0 GROUND WATER SCENARIO**

### **4.1 Hydrogeology**

The district is underlain by both porous and fissured formations. . The important aquifer systems in the district are constituted by i) unconsolidated & semi-consolidated formations and ii) weathered, fissured and fractured crystalline rocks.

The porous formations in the district include sandstones and clays of Jurassic age (Upper Gondwana), marine sediments of Cretaceous age, Sandstones of Tertiary age and Recent alluvial formations. As the Gondwana formations are well-compacted and poorly jointed, the movement of ground water in these formations is mostly restricted to shallow levels. Ground water occurs under phreatic to semi-confined conditions in the inter-granular pore spaces in sands and sandstones and the bedding planes and thin fractures in shales. In the area underlain by Cretaceous sediments, ground water development is rather poor due to the rugged nature of the terrain and the poor quality of the formation water. Quaternary formations comprising mainly sands, clays and gravels are confined to major drainage courses in the district. The maximum thickness of alluvium is 30.0 m. whereas the average thickness is about 15.0



m. Ground water occurs under phreatic to semi-confined conditions in these formations and is being developed by means of dug wells and filter points. Alluvium, which forms a good aquifer system along the Araniyar and Korattalaiyar river bed which is one of the major sources of water supply to urban areas of Chennai city and also to the industrial units.

Ground water generally occurs under phreatic conditions in the weathered mantle and under semi-confined conditions in the fissured and fractured zones at deeper levels. The thickness of weathered zone in the district is in the range of 2 to 12 m. The depth of the wells ranged from 8.00 to 15.00 m bgl.

The yield of large diameter wells tapping the weathered mantle of crystalline rocks ranges from 100 to 500 lpm and are able to sustain pumping for 2 to 6 hours per day.

The yield of bore wells drilled down to a depth of 50 to 60 m ranges from 20 to 400 lpm. The yield of successful bore wells drilled down to a depth of 150 m bgl during the ground water exploration programme of Central Ground Water Board ranged from 1.2 to 7.6 lpm.

The depth to water level in the district varied between 2.38 – 7.36 m bgl during pre-monsoon (May 2006) and 0.79 – 5.30 m bgl during post monsoon (Jan 2007). The seasonal fluctuation shows a rise between 0.28 and 4.80 m bgl. The piezometric head varied between 2.20 to 10.30 m bgl (May 2006) during premonsoon and 2.72 to 8.55 m bgl during post monsoon.

#### **4.1.1 Long Term Fluctuation (1998-2007)**

The long term water level fluctuation for the period 1998-2007 indicates rise in water level in the area 0.0564 - 0.0984 m/year. The fall in water level ranging between 0.0277 - 0.2748 m.year.

#### **4.1.2 Aquifer Parameters**

The specific capacity in the fissured formation ranges from 27.73 to 979 lpm/m/dd. Transmissivity values in weathered, partly weathered and jointed rocks vary from 14 to 750 m<sup>2</sup>/day and specific yield in these formations is less than 2%.

In the porous formation the specific capacity values vary from 23.5 to 509.9 lpm/m.dd and the Transmissivity values ranged from 40 to 625 m<sup>2</sup>/day. The specific yield varied from less than 1 to 12%. High specific yields are noticed in the river alluvium

### **4.2 Ground Water Resources**

The ground water resources have been computed jointly by Central Ground Water Board and State Ground & Surface Water Resources and Development Centre (PWD, WRO, Government of Tamil Nadu) as on 31<sup>st</sup> March 2004. The salient features of the computations are furnished below.

Block	Net Groundwater Availability (M.Cu.m)	Existing Gross Draft for Irrigation (M.Cu.m)	Existing Gross Draft for Domestic and industrial water supply (M.Cu.m)	Existing Gross Draft for all uses (M.Cu.m)	Allocation for Domestic and Industrial Requirement supply upto next 25 years (2029) (M.Cu.m)	Net groundwater Availability for future Irrigation Development (M.Cu.m)	Stage of Groundwater Development (%)	Category of Block
Ellapuram	114.68	157.14	3.30	160.44	3.49	-45.95	140	Over Exploited
Gummudipoondi	169.05	82.66	4.16	86.82	4.40	81.99	51	Safe
Kadambathur	88.03	79.02	2.86	81.88	3.03	5.98	93	Critical
Madhavaram	31.39	14.49	3.04	17.53	3.22	13.68	56	Safe
Minjur	111.35	113.36	35.71	149.07	35.87	-37.88	134	Over Exploited
Pallipattu	46.93	71.27	2.51	73.78	2.66	-26.99	157	Over Exploited
Poonamalee	64.81	55.43	4.85	60.27	5.13	4.25	93	Critical
Poondi	115.04	77.75	2.55	80.30	2.70	34.59	70	Safe
R.K.Pet	55.49	67.83	2.46	70.29	2.60	-14.95	127	Over Exploited
Sholavaram	88.56	67.62	3.30	70.92	3.49	17.46	80	Semi Critical
Thiruvallankadu	71.42	74.09	2.33	76.43	2.47	-5.15	107	Over Exploited
Tiruttani	32.97	42.56	2.67	45.23	2.83	-12.41	137	Over Exploited
Tiruvallur	70.16	51.72	2.75	54.47	2.91	15.54	78	Semi Critical
Villivakkam	54.59	26.76	4.27	31.02	4.52	23.31	57	Safe
<b>District Total</b>	<b>1114.46</b>	<b>981.69</b>	<b>76.76</b>	<b>1058.46</b>	<b>79.31</b>	<b>53.46</b>	<b>95</b>	

### 4.3 Ground Water Quality

Ground water in phreatic aquifers in Tiruvallur district, in general, is colourless, odourless and slightly alkaline in nature. The specific electrical conductance of ground water in phreatic zone (in MicroSeimens at 25° C) during May 2006 was in the range of 480 to 2360 in the district. It is between 750 and 2250µS/cm at 25°C in the major part of the district. Conductance below 750 µS/cm have been observed in ground water in parts of Gummidipundi, Minjur, Sholavaram and Puzhal blocks, whereas conductance exceeding 2250 µS/cm have been observed in part of Tiruvelangadu block.

It is observed that the ground water is suitable for drinking and domestic uses in respect of all the constituents except total hardness and Nitrate in more than 90 percent of samples analysed. Total Hardness as CaCO<sub>3</sub> is observed to be in excess of permissible limits in about 36 percent of samples analysed whereas Nitrate is found in excess of 45 mg/l in about 32 percent samples. The incidence of high total hardness is attributed to the composition of

lithounits constituting the aquifers in the district, whereas the Nitrate pollution is most likely due to the use of pesticides and fertilisers for agriculture.

With regard to irrigation suitability based on specific electrical conductance and Sodium Adsorption Ratio ( SAR), it is observed that ground water in the phreatic zone may cause high to very high salinity hazard and medium to high alkali hazard when used for irrigation. Proper soil management strategies are to be adopted in the major part of the district while using ground water for irrigation.

#### **4.4 Status of Ground Water Development**

The estimation of groundwater resources for the district has shown that 6 blocks are over exploited and 2 blocks are under “critical” category.

The shallow alluvial aquifers along Korattalaiyar and Araniyar rivers serve as an important source of drinking water for Chennai Metropolitan area and 5 well fields have been constructed in Tiruvallur district for the purpose. The well fields have a combined yield of 36.50 MCM/year. The water supply details of the well fields are furnished below.

Sl.No	Name of Well Field	Capacity (MLD)
1	Poondi	18
2	Tamaraipakkam	44
3	Flood Plains	3
4	Kannigaipair	5
5	Panjetty	17
6	Minjur	3
	Total	<b>100</b>

Dug wells are the most common ground water abstraction structures used for irrigation in the district. The yield of dug wells range from <50 to 200 m<sup>3</sup>/day in weathered crystalline rocks, 20 to 100 m<sup>3</sup>/day in Gondwana formations and upto 400 m<sup>3</sup>/day in Recent alluvial formations along major drainage courses.

The dug wells in hard rock terrain tapping the entire weathered residuum are capable of yielding 6 – 7 lps, requiring the installation of 5 HP centrifugal pumps for extraction of ground water.

#### **5.0 Groundwater Management Strategy**

##### **5.1 Groundwater Development**

In view of the comparatively high level of ground water development in the major part of the district and the quality problems due to geogenic and anthropogenic factors, it is necessary to exercise caution while planning further development of available ground water resources in the district.

The yields of dug wells in crystalline and Gondwana formations are improved at favourable locations by construction of extension bores varies from 20 to

40m. In recent years, a large number of bore wells have also been drilled by farmers for irrigation purposes.

Dug wells with extension bores wherever necessary is ideal for hard rock areas whereas large diameter dug wells with radials is suitable for alluvial areas.

Large diameter collector wells are ideal structures for ground water extraction in the alluvial tracts, where the granular zones are generally restricted to 35 m bgl. The coastal sands in the eastern part of the district also form good aquifer material. The tube wells may be constructed down to a maximum depth of 40 m bgl in the district. The width and position of the screen in the wells may be decided based on the depth to piezometric surface and discharge required. The expected discharges corresponding to the screen lengths are given below for reference.

Hydraulic Conductivity (m/d)	Screen Length (m)	Discharge (m <sup>3</sup> /hr)
20	6	17
30	6	30
40	6	35
30	9	45
40	9	50

The map showing the development prospects for the district is shown in Plate VI.

## 5.2 Water Conservation and Artificial Recharge

The number and type of artificial recharge structures recommended for all the blocks in Tiruvallur district are furnished in Table below. The exact locations of these structures, however, are to be decided on the basis of detailed field investigations.

S.No	Block	PP	CD	DS	DS/RP	RP	SSD	RW	DS/RW
1	Minjur								
2	Cholavaram								
3	Puzhal								
4	Villivakkam								
5	Ellapuram								
6	Gummidipoondi								
7	Poondi								
8	Tiruvallur								
9	Tiruvalangadu								
10	Kadambattur								
11	Tiruttani								
12	Pallipet								
13	R.K.Pet								
14	Poonamalle								
TOTAL									

PP – Percolation Pond, CD – Check dam, DS – Desilting of existing tanks, DS/RP – Desilting of existing tanks with Recharge Pits, RP – Recharge Pits, SSD – Sub surface Dyke, RW – Recharge Well, DS/RW – Desilting with Recharge wells

## **6.0 Groundwater related Issues & Problems**

Based on the high level of ground water development, it is inferred that a major part of the district could be considered vulnerable to water level depletion. A considerable amount of ground water is being developed from the eastern part of the district from a number of well-fields for water supply to Chennai Metropolitan area. As the ground water in the alluvial aquifer in the eastern part of the district is in hydraulic connection with the sea, the district is also vulnerable to saline water ingress.

The heavy pumping of ground water for drinking water supply to Chennai city since 1970s from the well field at Minjur has been primarily responsible for the reversal of hydraulic gradient and consequent saline water intrusion in the eastern part of Minjur block. Recharge of saline water from the Buckingham canal and the presence of a few salt pans along the coast have also contributed to the salinisation of ground water in the area.

The phenomenon of sea water intrusion in Minjur area was first studied during 1966 – 69 by the Ground Water Division of Public Works Dept., Government of Tamil Nadu in collaboration with United Nations Development Project (UNDP). The sea water – fresh water interface in the area was first demarcated during 1969, about 3 km. from the coast. During the study conducted by Metrowater in collaboration with UNDP during 1983, the interface was observed to have moved further west, to a distance of about 8 km. from the coast. Again, the interface was noticed to have moved landwards to a distance of about 9 km during 1987 and is currently located at about 13 km. from the coast.

Prevention/arresting of sea water intrusion by injection of fresh water through a battery of recharge wells have been successfully demonstrated in the area during the studies. However, availability of source water in such large amounts for recharge is a major constraint in successful implementation of the scheme.

### **Presence of untreated/partially treated effluents from industries into the ground water system**

## **7.0 Awareness & Training Activity**

### **7.1 Mass Awareness Campaign (MAP) & Water Management Training Programme (WMTP) by CGWB**

One WMTP was organized on “Rain Water Harvesting Training” at the meeting hall of District Collectorate complex, Tiruvallur on 5<sup>th</sup> March 2003 and on the forenoon of 6<sup>th</sup> March 2003. The training was attended by 35 officers from various State Government agencies, Representatives of Panchayat Administration, Farmers Association, Social Welfare Organisation, Voluntary Organisation, Builders Association, Rice Mill Owners’ Association etc.

One Mass Awareness Campaign on “Ground Water Management, Regulation & Conservation” was organized at R.K.Pet, Tiruvallur district on 6<sup>th</sup> March 2003.

The findings of exploration carried out by CGWB, the results of Geophysical investigations for source finding and their limitations, Ground water resource potential of Tiruvallur district, Techniques on Ground water resource management and need for regulation and water conservation were explained to the gathering of 300 people.

## **7.2 Participation in Exhibition, Mela, Fair Etc.**

Participated in Science exhibition organized at Vellammal College for Women

## **7.3 Presentation & Lectures delivered in Public Forum/Radio/TV/Institution of Repute/Grass roots association/NGO/Academic Institutions etc**

Nil

## **8.0 Area Notified by CGWA/SGWA**

Central Ground Water Authority has not notified any area in the district. Government of Tamil Nadu vide G.O.No. 53 has banned groundwater development for irrigation in the over exploited blocks of Tamil Nadu. The over exploited blocks in this district are as follow.

1. Ellapuram
2. Minjur
3. Pallipattu
4. R.K.Pet
5. Thiruvankadu
6. Tiruttani

In addition, Government of Tamil Nadu vide Act No 27 of 1987 published list of villages as given below in which following provisions have been made in the said act in connection with the groundwater development.

1. No person shall extract or use groundwater in the scheduled area for any purpose other than domestic purposes.
2. no person shall transport groundwater by means of lorry, trailer or any other goods vehicle

The list of scheduled villages is given below.

Name of the village (Village No)	Taluk
Vallur (42), Manopuram (107), Lingapaiyan petai (158), Kalapakkam (51), Kattupalli (92), Ariyanuvoyal (49), Minjur (50), Nallore (54), Thottakadu (52), Thiruvallivoyal (105), Anuppampattu (81), Vannipakkam (56), Marathur (89), Lakshmipuram (157), Peruvoyal (146), Puduyoyal (122), Narashunpettai (35), Valudalambedu (39), Nayar (34), Semapuram (41), Madiyoor (40), Lingasamudram (109), Sivapuram (110), Pulikulam (82), Murichambedu (55), Kumarasiralapakkam (84), Devadanam (83), Velambakkam (53), Siruvelur (86), Kanniambakkam (85), Kolatti (47), Nandhiyambakkam (46), Ashipattu (43), Velur (87), Kadamancheri (88), Voyalur (91), Ennore (44), Chinnambedu (127), Nalliankuppam (128), Arni (129), Dorainallore (122), Vadakkunallore (124), Pondavakkam (131), Sevithupanapakkam (125), Nekkunram (31), Vichoor (13), Sekkancheri (30), Gangaiyadkuppam (58), Thirunilai (15), Vellivoyal (12), Madavaram (130), Kilameni (312), Adambakkam (309), Natham (313), Eranavakkam (311), Bandikavanur (310), Savundapuram (126), Peravallur (120), Panjetti (70), Alingivakkam (65), Vairavankuppam (121), Andarkuppam (74), Perijanjeri (75), Madavaram (73), Tachur (71), Chellapillaiarkuppam (69), Neduvarambakkam (67), Sennivakkam (72), Attipedu (66), Erulupattu (64), Sayanvaram (76), Vadakkupattu (77), Amur (78), Ponneri (116), Elanambedu (80), Atreyamangalam (79), Anuppampattu (81), Aladu (111),	Ponneri

Name of the village (Village No)	Taluk
Thirukandalam (76), Akkaraipakkam (57), Neyveli (77), Anathanakkavakkam (64), Panjetty (68), Thirunilai (58), Amudanallur (59), Kadanallur (59), Koovambakkam (60), Manjankaranai (63), Madavilagam (65), Kattupakkam (63), Kilampakkam (78C), Athangigavanoor (81), Vengal (90), Arumbakkam (139), Vadamadurai (80), Othikkadu (160), Perumudivakkam (75), Kadirvedu (91), Thalakkancheri (164D), Chittathur (158), Karikalavakkam (144), Gomugambedu (85A), Guruvoyal (73), Sethupakkam (83), Magaral (84), Tamaraipakkam (85), Agaram (82), Pagalmedu (88), Perathur (145), Melanoor (137), Panapakkam (55), Melakandiyoor (147), Ikkadu (159), Sembedu (93), Chittambakkam (136), Punnappakkam (161), Kalyanakuppam (167), Veeraraghavapuram (145A), Thadalam (156), Kizhanoor (138), Thirukkancheri (140), Vishnuvakkam (143), Vilampakkam (142), Vadathoor (146), Velliyur (92), Punnappakkam (87), Alapakkam (78), Kerani (72), Alingivakkam (74), Karani (74), Ramanjeri (118), Karamainizambath (119), Kunnavalam (120), Poondi (125), Movur (127), Neyveli (128), Ramathandalam (131), Siyancheri (132), Erayur (133), Meyyur (134), Monnavedi (135), Thohikalai (143), Ayalur (154), Kilambakkam (155), Pullarambakkam (162), Perumbakkam (163), Tiruppasur (165), Pandur (166), Kangavallipuram (167), Pattaraiperunbudur (168), Melvilagam (169), Kilvilagam (170), Kallganur (171), Vidayur (172), Nemiliagaram (173), Athupakkam (174), Karanai (175), Palliaraikuppam (176), Pirayankuppam (177), Venmanambudur (178), Kadambathur (179), Egathur (180), Selai (181), Peirayankuppam (182), Kakkalakalur (183), Thanneerkulam (184), Puthur (185), Tholur (186), Sirukadam (187), Sevapettai (188), Ayathur (189), Perumalpattu (193), Tirur (194), Vengalathur Aramvoyal (201), Kasavanallathur (208), Agaram (209), Panapakkam (210), Ramankoil (211), Madankuppam (212), Sennaaram (213), Senji (214), Thennankaranai (215), Chitrampakkam (216), Perambakkam (217), Kavankulathur (218), Pudumavilangai (219), Ammanambakkam (86), Gerukampundi (141)	Tiruvallur

## 9.0 Recommendations

As the development of ground water has already reached an alarming stage in many blocks of this district, further development of ground water for creation of additional irrigation potential has to be carried out with extreme caution.

Necessary measures for regulating the exploitation of ground water may be implemented in dark and grey blocks of the district.

Intensive monitoring of ground water levels and water quality has to be taken up in the coastal areas of the district to monitor the movement of fresh water – saline water interface.



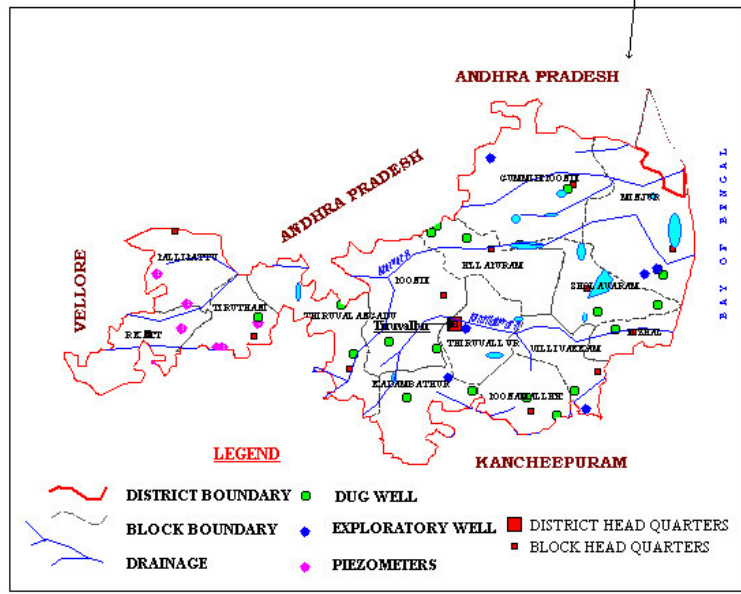
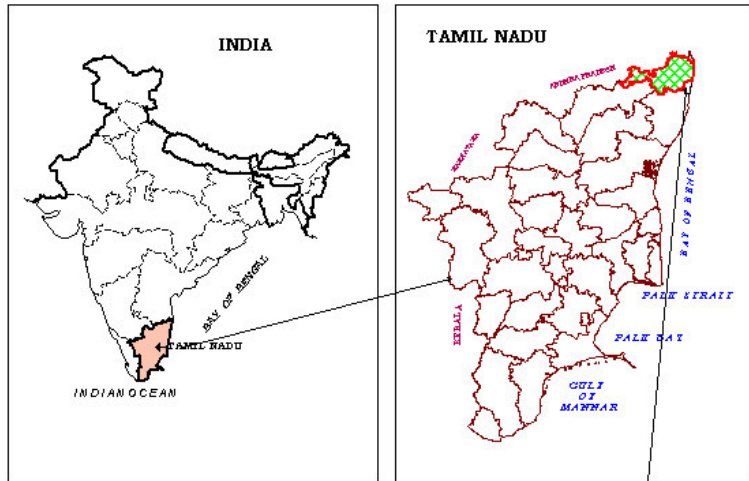
Artificial recharge of ground water through cost-effective rain water harvesting systems may be popularised in the district by providing incentives to individuals/communities embarking upon such initiatives. A concerted effort involving various Government agencies and NGOs can create the necessary awareness among the rural masses.

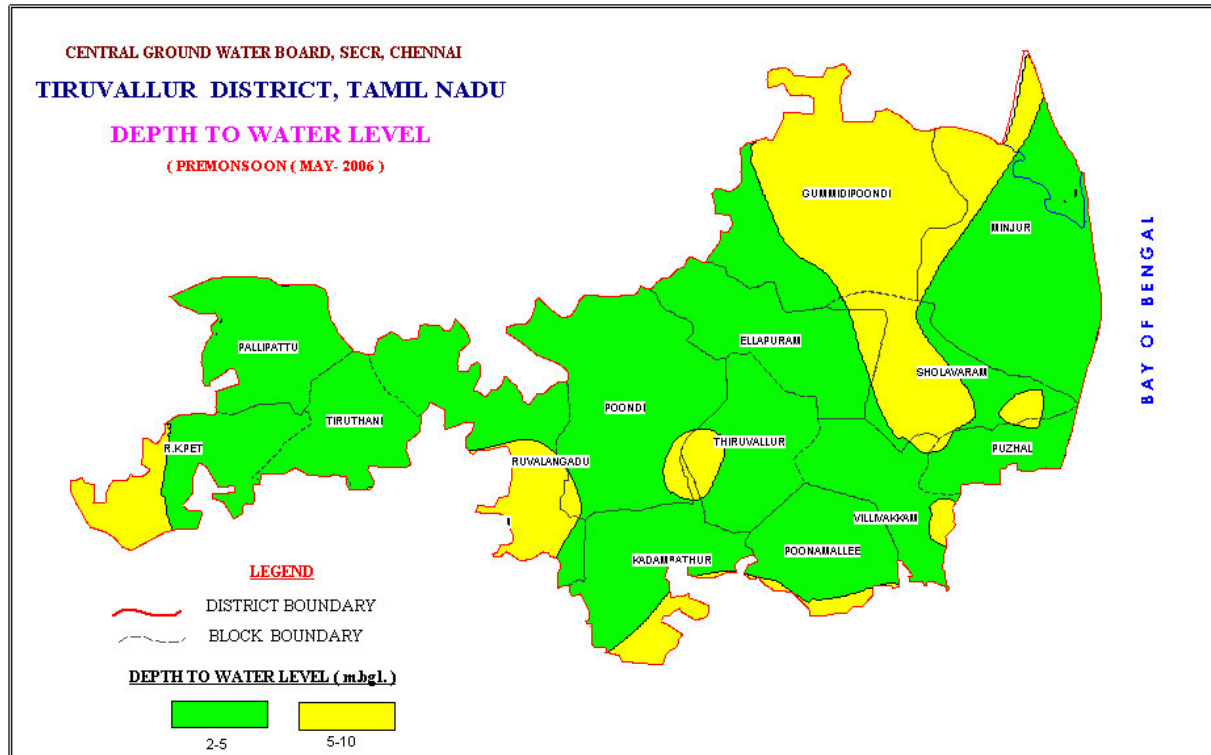
Remedial measures and isolation of pollution by industrial units in Manali – Amabttur industrial belt may be taken up to reduce the damage to the ground water resources in the area.

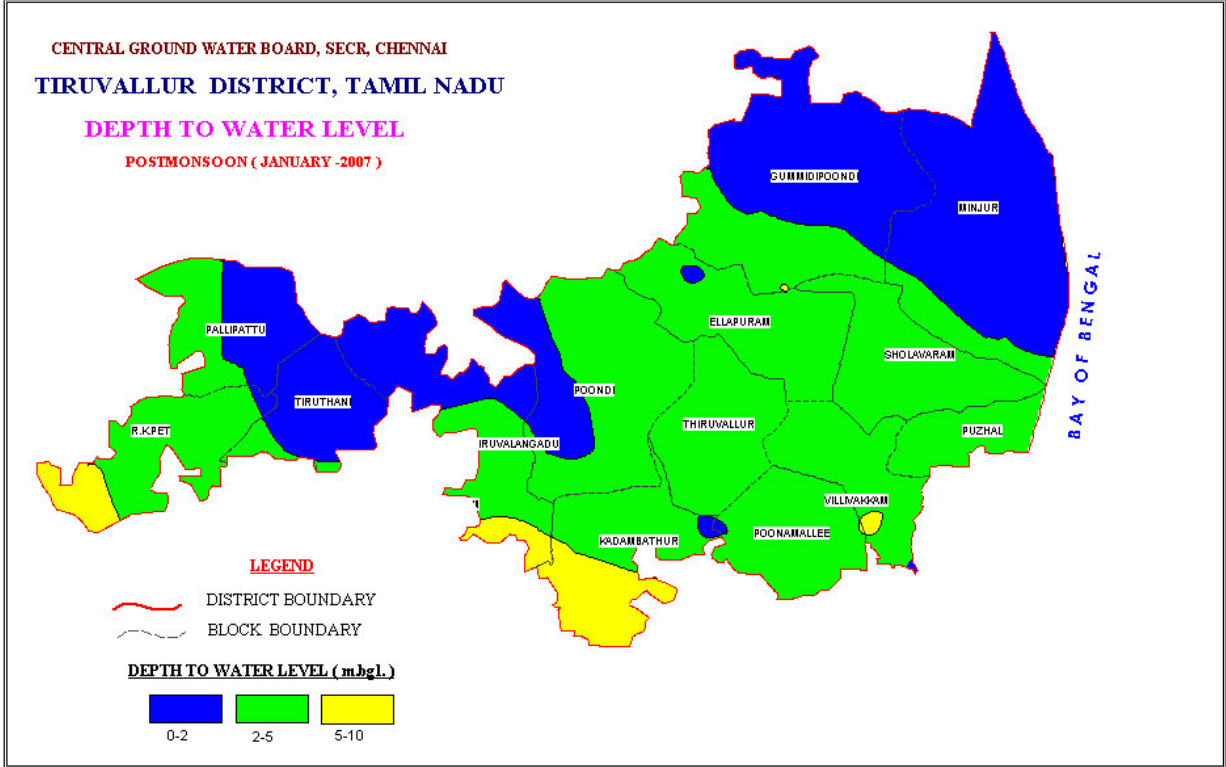
A long term strategy to control and reverse the sea water ingress by limiting the ground water extraction by involving local state holders is necessary. Also, the flood water diversion and recharge to coastal aquifer in the western side of established interface line is necessary and action plan in this direction with participation of state and central agencies and industrial establishments is recommended. Effective aquifer remediation technology can be identified and practiced to minimize the aquifer contamination in vulnerable pockets.

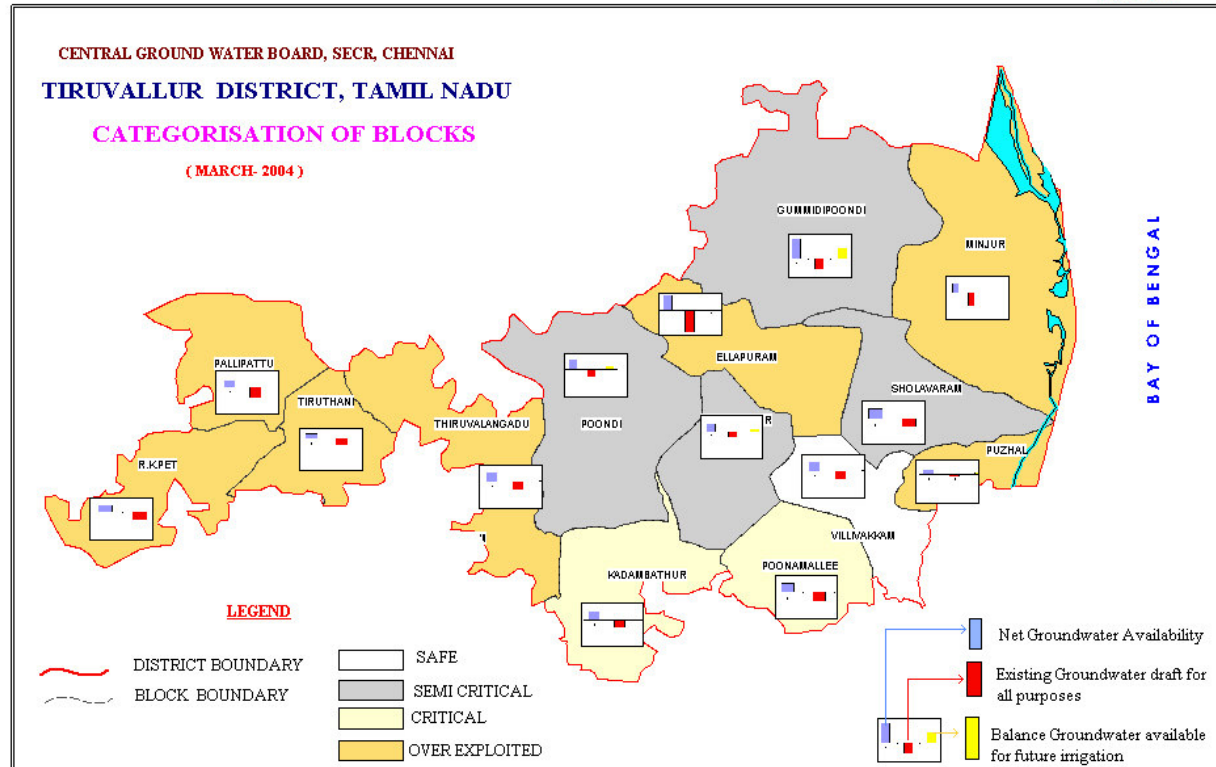
CENTRAL GROUND WATER BOARD, SECR, CHENNAI  
**TIRUVALLUR DISTRICT, TAMIL NADU**

**LOCATION**

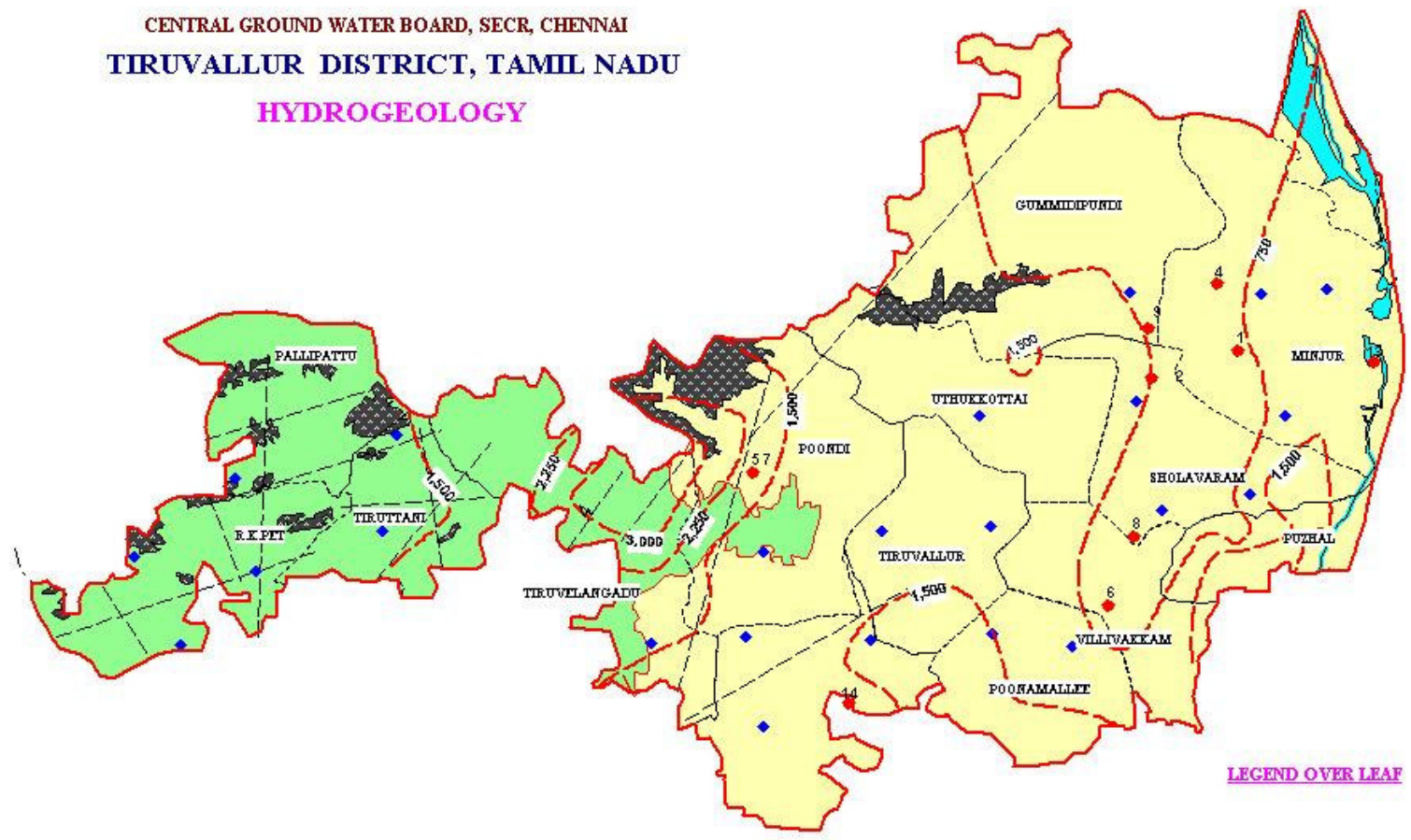








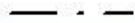


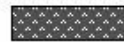


CENTRAL GROUND WATER BOARD, SECR, CHENNAI  
TIRUVALLUR DISTRICT, TAMIL NADU  
HYDROGEOLOGY





LEGEND OVER LEAF

## LEGEND FOR PLATE V

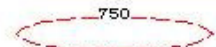
### ADMINISTRATIVE SETUP

-  STATE BOUNDARY
-  DISTRICT BOUNDARY
-  BLOCK BOUNDARY
-  HILLY AREA
-  TRIANGULATION HEIGHT  
[ elevation in m.amsl ]
-  CREEK


### GROUND WATER HYDROLOGY

-  EXPLORATORY BORE WELL [ CGWB ]
-  HIGH YIELDING BORE WELL [ CGWB ]

### HYDROCHEMISTRY

-  750  
ISOCONS [ Sp ELECTRICAL CONDUCTANCE [  $\mu\text{s}/\text{Cm}$  at 25° C ]

### STRUCTURE

-  TRACE OF LINEAMENT


















<u>AQUIFER</u>	<u>AGE</u>	<u>LITHOLOGY</u>	<u>GROUND WATER CONDITIONS</u>	<u>YIELD PROSPECTS (CU.M/D)</u>	<u>GROUND WATER DEVELOPMENT STRATEGIES</u>	
	UNCONSOLIDATED	RECENT	RIVER ALLUVIUM, FLOOD PLAIN- DEPOSITS	DISCONTINUOUS, THIN, UNCONFINED TO SEMI CONFINED	= 200	DEVELOPMENT THROUGH LARGE DIAMETER DUG WELLS AND SHALLOW TUBE WELLS.
	CONSOLIDATED	ARCHAIC	GRANITES, GNEISSES, CHARNOCKITE.	DISCONTINUOUS, UNCONFINED TO SEMI CONFINED AQUIFERS, RESTRICTED TO WEATHERED RESIDUUM AND FRACTURES	= 50 NEAR WATERSHED DIVIDES & HIGH GROUNDS. 50 - 200 NEAR THIRD ORDER STREAMS AND LOW GROUNDS.	SUITABLE FOR DEVELOPMENT THROUGH DUG WELLS BOREWELLS FEASIBLE IN FRACTURE ZONES, BEST LOCATIONS BEING INTERSECTION OF FRACTURES





## LEGEND FOR PLATE - VI

### DISTRICT – TIRUVALLUR

	Wells Feasible	Rigs Suitable	Depth Of Well (M)	Discharge (LPM)	Suitable Artificial Recharge Structures
 Soft Rock Aquifer	Dug Well Shallow Tube Well	Manual Direct Rotary	10 – 15 40 – 80	20 - 180	Percolation Pond/Check Dam
 Soft Rock Aquifer	Medium Tube Well	Direct Rotary	60 – 120	60 - 400	Percolation Pond/Check Dam
 Soft Rock Aquifer	Dug Tube Well	Direct Rotary	60 –120	400 – 2400	Recharge Tube Wells/ Injection Wells
 Hard Rock Aquifer	Dug Well Bore Well	Manual DTH	6 – 10 60 – 100	20 – 60 20 – 100	Gully Plugs/ Check Dam
 Hard Rock Aquifer	Dug Well Bore Well	Manual DTH	10 – 20 60 - 150	10 – 100 60 – 180	Gully Plugs/ Check Dam
	State Boundary			District Boundary	
	Block Boundary			Hilly Area	
	District Headquarters			Block Headquarters	
	Water Level-Pre-Monsoon (Decadal Mean 1993-2002) Mbgl			EC In Microsiemens / Cm At 25°C	
	River			Saline Zone	
	Lineament			Nitrate Greater Than Maximum Permissible Limit (45mg/L)	

## OTHER INFORMATION

Geographical Area	3424 Sq.Km
Number Of Blocks	14
Major Drainage	Araniar , Korttalaiyar And Coovam
Population (2001)	27,38,866
Average Annual Rainfall	1460 Mm
Annual Range Of Temperature	19 – 36°C
Regional Geology	<b>Soft Rocks:</b> Shale, Sandstone and Alluvium <b>Hard Rocks:</b> Granites and Gneisses
Net Ground Water Availability For Future Irrigation	58 MCM/Yr
Stage Of Ground Water Development As On January 2003	95 %
Names Of Blocks Showing Intensive Ground Water Development	★ <b>Over Exploited:</b> Ellapuram, Minjur, Pallipattu, R.K.Pet, Thiruvelangadu, Tiruttani,Puzhal, ★ <b>Critical:</b> Kadambathur, Poonamalee,

SAVE WATER  
AND  
CONSERVE WATER

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