

# **WATER YEAR 2007**

## **DISTRICT GROUND WATER BROCHURE MADURAI 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 (MADURAI 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>3742</b>	
	<b>ii. Administrative Divisions as on 31-3-2007</b>		
	Number of Tehsils	7	
	Number of Blocks	13	
	Number of Villages	670	
	<b>iii. Population (as on 2001 Censes)</b>		
	Total Population	2578201	
	Male	1303363	
	Female	1274838	
	<b>iv. Average Annual Rainfall (mm)</b>	<b>857.63</b>	
<b>2.</b>	<b>GEOMORPHOLOGY</b>		
	i. Major physiographic Units	.Hilly Region & Plains of Madurai and Melur regions	
	ii. Major Drainages	.Vaigai, Gundar, Vaippur and Pambar	
<b>3.</b>	<b>LAND USE (Sq. km) during 2005-06</b>		
	i. Forest area	484.73	
	ii. Net area sown	1530.82	
	iii. Cultivable waste	71.27	
<b>4.</b>	<b>MAJOR SOIL TYPES</b>	Red soil, Black Soil & Sandy Soil	
<b>5.</b>	<b>AREA UNDER PRINCIPAL CROPS (AS ON 2005-2006)</b>	1. Paddy - 70996 Ha – 94% 2. Groundnut – 4537Ha –3% 3. Pulses – 9589Ha – 6% 4. Oil seeds – 20073 Ha – 12% 5. Non-food crops -37047 Ha-23% 6. Vegetables– 13174 Ha-8%	
<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>	53705	36953
	<b>ii. Tube wells</b>	536	634
	<b>iii. Tanks</b>	2287	18306
	<b>iv. Canals</b>	80	36986
	<b>v. Other Sources</b>	-	-
	<b>vi. Net irrigated area</b>	92879 ha	
	<b>vii. Gross irrigated area</b>	99408 ha	

<b>7.</b>	<b>NUMBERS OF GROUND WATER MONITORING WELLS OF CGWB (AS ON 31.03.2007)</b>	
	i. No of dug wells	5
	ii. No of piezometers	10
<b>8.</b>	<b>PREDOMINANT GEOLOGICAL FORMATIONS</b>	Granite gneiss, charnockites and alluvium as patches along the river
<b>9.</b>	<b>HYDROGEOLOGY</b>	
	i. Major water bearing formations	Alluvium weathered and fractured crystallines
	ii. Pre- monsoon depth to water level (May 2006)	3.13 – 7.66 m bgl
	iii. Pre- monsoon depth to water level (Jan'2007)	1.86 – 5.74 m bgl
	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 : 0.05              Min : 0.01 Max : 0.74              Max : 0.93
<b>10.</b>	<b>GROUND WATER EXPLORATION BY CGWB (As on 31-03-2007)</b>	
	i. Number of Exploratory wells	20
	ii. Number of Observation wells	11
	iii. Number of Piezometers under Hydrology Project.	10
	iv. Depth range(m)	80 – 202
	v. Discharge(lps)	< 1.00 - 21.72
	vi. Storativity (S)	$5.7 \times 10^{-4}$ to $8.7 \times 10^{-3}$
	vii. Transmissivity (m <sup>2</sup> /day)	5 – 330
<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> and F
	ii. Type of water	CaCl <sub>2</sub> , NaCl, NaHCO <sub>3</sub> & mixed type
<b>12.</b>	<b>DYNAMIC GROUND WATER RESOURCES (as on 31.03.2004) in MCM</b>	
	i. Annual Replenishable Ground Water Resources	760.83
	ii. Total Annual Ground Water Draft for all purposes	425.83
	iii. Projected demand for Domestic and Industrial Uses up to 2025	32.13
	iv. Stage of Ground Water Development	62%

<b>13.</b>	<b>AWARENESS AND TRAINING ACTIVITY</b>	
	<b>i. Mass Awareness Programmes Organized</b>	
	Year	1999-2000
	Place	Sedapatti
	No of Participants	300
	<b>ii. Water Management Training Organized</b>	
	Date	-
	Place	-
	No of Participants	-
<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	3
	ii. Number of Critical Blocks	2
	iii. Number of Blocks Notified	<b>Nil</b>
<b>16.</b>	<b>MAJOR GROUND WATER PROBLEMS AND ISSUES.</b>	<ol style="list-style-type: none"> <li>1) Unbalanced ground water development in pockets in the district.</li> <li>2) Insitu salinity problem</li> <li>3) Mixing of sewerage with existing surface water bodies</li> </ol>

## 1.0 INTRODUCTION

### 1.1 Administrative Details

Madurai district is having administrative divisions of 7 taluks, 13 blocks and 670 villages as detailed below.

S.No.	Taluk	No. of Villages	Blocks	No. of Villages
1	Madurai North	188	Madurai East Madurai West	106 82
2	Madurai South	80	Tiruparunkundram	80
3	Melur	84	Melur Kottampatti	52 32
4	Vadipatti	77	Vadipatti Alanganallur	31 46
5	Usilampatti	54	Usilampatti Chellampatti	20 34
6	Peraiyur	79	T.Kallupatti Sedapatti	39 40
7	Tirumangalam	108	Tirumangalam Kallikudi	61 47
	<b>Total</b>	670	<b>Total</b>	670

### 1.2 Basin and sub-basin

Madurai district can be further subdivided into Vaigai, gundar, Vaipar and Pambar sub-basins.

### 1.3 Drainage

Vaigai, a major ephemeral river originates in western ghats of Theni district flow in NW-SE direction, in the central part of the district. In addition, tributaries of Vaipar and Gundar drain in south-western part of the district, while the tributaries of Pambar drained in north eastern part. The general flow direction of the drainage is NW-SE.

### 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	48473
2	Barren & Uncultivable Lands	13154
3	Land put to non agricultural uses	74417
4	Cultivable Waste	7127
5	Permanent Pastures & other grazing lands	233
6	Groves not included in the area sown	4014
7	Current Fallows	7356
8	Other Fallow Lands	66317

S.No	Classification	Area (Ha)
9	Net Area sown	153082
	<b>Total</b>	<b>374173</b>

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

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	Madurai East	7860	0	0	1388	0	9248
2	Madurai West	5189	0	0	1298	0	6487
3	Tiruparunkundram	1950	940	0	3847	0	6737
4	Melur	9992	2620	8	1690	0	14310
5	Kottampatti	2562	4449	0	259	0	7270
6	Vadipatti	3658	1119	0	3330	0	8107
7	Alanganallur	2910	965	0	2752	0	6627
8	Tirumangalam	3	1860	25	3049	0	4937
9	Kalikudi	0	1977	6	1393	0	3376
10	Usilampatti	0	405	36	4683	0	5124
11	Chelampatti	2862	2033	482	3748	0	9125
12	Sedapatti	0	920	65	6917	0	7902
13	T.Kallupatti	0	1018	12	1965	0	2995
	<b>Total</b>	<b>36986</b>	<b>18306</b>	<b>634</b>	<b>36319</b>	<b>0</b>	<b>92245</b>

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

### 1.5 Studies/Activities carried out by CGWB

Central Water Board has carried out systematic hydrogeological surveys and entire district has been covered by 1990. Since then periodically Reappraisal Surveys/District Ground Water Management Studies have been taken up to reassess the changes in ground water situations.

Central Ground Water Board had carried out exploration in the district and had drilled 41 wells for gathering scientific information on occurrence of fractures and their corresponding yield.

### 2.0 RAINFALL AND CLIMATE

Analysis of long term rainfall data (1901-2004) shows that the district receives rainfall during NE monsoon (47%) , SW monsoon (32%), summer (17%) and winter (4%).

The normal annual rainfall varies from 806 mm (Sholavandan Rain Gauge Station) in the northern part to 964.1 mm (Melur Rainguage Station) in the eastern part of the district. The entire district experiences a declining trend in annual rainfall except at Melur, where a rising trend is noticed. The climate is subtropical and the temperature varies from 15 to 41 °C in the district. The relative humidity varies from 45 to 85% and is high during NE monsoon.

### **3.0 GEOMORPHYLOGY AND SOIL TYPES**

#### **3.1 Geomorphology**

The prominent geomorphic units in the district are structural and denudated land forms such as structural and denudational hills, residual wells, linear ridges, uplands and barred pediments.

#### **3.2 Soils**

The district is characterised by Red soil, Black clayey soil and Alluvial soil. Red soil is found in all the blocks of the district while black clayey soil is found in Tirumangalam, Usilampatti and Peraiyur blocks of the district and alluvial soil is found along the courses of the river.

### **4.0 GROUND WATER SCENARIO**

#### **4.1 Hydrogeology**

The district is underlain predominantly by crystalline formations and alluvium is found along the courses of the river. Ground water occurs under phreatic conditions in weathered residuum and interconnected shallow fractures and under semi-confined to confined conditions in deeper fractures.

The depth of weathering varies from 20-25 m bgl in Usilampatti, Sedapatti and Kottampatti area, while it varies from 30 to 40 m bgl in remaining parts of the district.

The depth of dug wells varies from 10 – 20 m with a yield of 45 – 135 lpm. In the exploration programme of Central Ground Water Board, 29% of the wells yielded less than 1 lps while 30% of the wells yielded between 1 – 3 lps. In general there are about 2 – 3 fracture zones less than 50 m and about 2 – 3 fracture form beyond 100 m also. The variation in the yield of bore wells are very high in the district. Potential fractures with high discharge have been established along Valandur-usilampatti-Timmarasanayakanur, Thirali-Peraiyur tract and Palkalainagar-Nilayur tract in the district.

The depth to water level in the district varies from 3.13 to 7.66 m bgl during premonsoon (May 2006) and 1.86 to 5.74 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 the water level in the order of 0.05 to 0.74 m/year while the fall in the water level is in the range of 0.07 to 0.93 m/year.

#### 4.1.2 Aquifer Parameters

- i) Shallow Aquifer  
 Permeability :< 1 to 70 m/day  
 Specific yield : 1 – 2%
- ii) Deeper fractured Aquifer  
 Transmissivity : 5 – 33 m<sup>2</sup>/day  
 Storativity : 5.7x10<sup>-4</sup> to 8.7 x 10<sup>-3</sup>

#### 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 computation of ground water resources available in the district has been done using GEC 1997 methodology. The salient features of the computations are furnished below.

Stage of Groundwater Development of Madurai District, Tamil Nadu as on 31st March 2004									
S. No	Name of Groundwater Assessment Unit (Block)	Net Ground water Availability	Existing Gross Draft for Irrigation	Existing Gross Draft for Domestic and industrial water supply	Existing Gross Draft for all uses	Allocation for Domestic and Industrial Requirement supply upto next 25 years (2029)	Net ground water Availability for future Irrigation Development	Stage of Ground water Development	Categorization for Future groundwater development (Safe/Semi Critical/Critical/Over Exploited)
1	2	3	4	5	6	7	8	9	10
1	Alanganallur	3854.48	3626.86	226.81	3853.67	236.25	-8.62	100	Critical
2	Chellampatti	5792.15	5862.16	192.96	6055.12	200.98	-271.00	105	Over Exploited
3	Kallikudi	3428.95	1452.35	161.17	1613.52	167.87	1808.73	47	Safe
4	Kottampatti	5673.63	1008.54	226.25	1234.79	235.66	4429.43	22	Safe
5	Madurai East	7195.13	746.77	291.22	1037.99	303.34	6145.02	14	Safe
6	Madurai West	4822.32	1177.03	302.83	1479.86	315.43	3329.86	31	Safe
7	Melur	11288.27	728.63	269.25	997.88	280.45	10279.19	9	Safe
8	Sedapatti	5000.11	6576.39	136.66	6713.05	142.34	-1718.63	134	Over Exploited
9	T.Kallupatti	2847.94	1972.38	178.77	2151.14	186.21	689.36	76	Semi Critical
10	Thirumangalam	4867.89	3447.16	195.53	3642.70	203.67	1217.06	75	Semi Critical
11	Thiruparankundram	5218.35	3714.74	506.85	4221.59	527.93	975.67	81	Semi Critical
12	Usilampatti	3384.57	5900.17	145.73	6045.90	151.79	-2667.39	179	Over Exploited
13	Vadipatti	5100.95	3285.49	250.61	3536.11	261.04	1554.42	69	Safe



### 4.3 Ground Water Quality

Ground water in phreatic aquifer in general is colorless, odourless and alkaline in nature. The specific electrical conductance of ground water in phreatic zone during May 2006 varied between 632 -6520  $\mu\text{s}/\text{cm}$  at 25°C and in major part of the state it is less than 2200  $\mu\text{s}/\text{cm}$ .

It is observed that ground water is suitable for drinking and domestic uses in respect of all constituents except TH and  $\text{NO}_3$ . It is found to be excess of permissible limit in 34% of sample analysed in respect of TH and in about 66% in respect of  $\text{NO}_3$ . The high incidence of TH can be attributed to geogenic causes while  $\text{NO}_3$  excess may be due to either excess use of fertilisers or due to improper waste disposal.

In reference to irrigation suitability based on EC and Sodium Absorption Ratio (SAR), the ground water in phreatic zone may cause medium to very high salinity hazard and medium to high alkali hazard. Hence proper soil management practices are to be adopted when the ground water from phreatic aquifer is to be used for irrigation purposes.

In case of deeper fractures, the ground water is suitable for domestic and irrigation purposes. However, the data of State Ground & Surface Water Resources Data Centres shows that ground water in Pulipatti, Chinnalatalai, Usilampati and Vikramapuram have fluoride concentration more than the permissible limit.

### 4.4 Status of Ground Water Development

The estimation of dynamic ground water resources (as on 31.3.2004) have shown that out of 13 blocks in the district, 3 blocks have been categorised as over exploited and 2 blocks as critical. Dug wells are most common ground water abstraction structure with depth range of 10 – 20 m bgl. The yield of dug wells may vary between 45-135 lpm and can sustain for 4-6 hrs of pumping.

The fractures are generally limited to 100 m while limited fractures are also available down to a depth of 175 m at few locations. The bore wells may sustain a yield of 1 – 3 lps for 6 – 8 hrs of pumping.

## 5.0 GROUNDWATER MANAGEMENT STRATEGY

The ground water development is to be envisaged only in safe and semi critical blocks. The shallow water level deems it fit to prefer dug well as abstraction structures, tapping the entire weathered residium. As in most parts of the district, shallow fractures are potential. The construction of bores at the bottom of the wells may augment the yield. However, the presence of fractures may be ascertained before the construction. Large diameter collection wells can be a better option in the alluvial tract along the river courses.

## 5.1 Groundwater Development

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

## 5.2 Water Conservation and Artificial Recharge

The topography of Madurai district, in general, is suited for construction of various artificial recharge structures such as percolation ponds, check dams and sub-surface dykes. However, detailed studies are necessary to formulate a comprehensive scheme for artificial recharge of phreatic ground water in the district in view of the variations in the geomorphic set-up and the complex hydrological and hydrogeological conditions.

The number and type of artificial recharge structures recommended for all the blocks in Madurai district are furnished in Table 1. The exact locations of these structures, however, are to be decided on the basis of detailed field investigations. The implementation of the schemes may be taken up in phases, giving priority to blocks where the development of ground water resources is comparatively high.

S.No	Block	Area Suitable for Ground water Development (sq.km)	Categorization of Block as on March 2004	*Harnessable surface water (M.Cu.m)	**Capacity of existing Tanks (MCM)	Committed Supply for existing Tanks (MCM) (2 Billions)	Surplus available for AR (MCM)	Available Subsurface storage (MCM)	Number of Structures	Cost of Structures (Lakhs)	Whether Number of
									PP ( 1 in 15 sq.km). Capacity	PP (Unit Cost - Rs 70 Lakhs)	Structures are Possible
1	Alanganallur	292.29	Critical/DPAP	353.60	0.76	1.520	352.08	15.74	19	380	Yes
2	Chellampathi	212.96	OE/DPAP	170.15	18.99	37.980	132.17	16.01	14	280	Yes
3	Sedapatti	294.47	OE/DPAP	790.16	11.49	22.980	767.18	5.66	20	400	Yes
4	Usilampatti	180.65	OE/DPAP	417.54	2.71	5.420	412.12	15.58	12	240	Yes

\* Data Source : Institute of Remote Sensing, Anna University, Chennai

\*\* Capacity of existing surface water structures computed from data available with SG&SWRDC, Govt. of Tamil Nadu on waterspread area,

# Considering 4mm/day recharge for 120 days filling up of tank in a year.

\$ Weighted average crop water requirement (Delta) for each district is taken from the Report on Dynamic GW Resources of Tamil Nadu as on Jan

\* It is learned from the earlier executed projects that 50% of Percolation Ponds in Tamil Nadu should be provided with Recharge Shaft/Bore

Free technical guidance for implementation of roof-top rain water harvesting schemes is also being provided by Central Ground Water Board.

## 6.0 GROUNDWATER RELATED ISSUES & PROBLEMS

The district is underlain by crystalline formations and ground water potential is not uniform and is limited to areas having fractures. Out of 13 blocks, 3 blocks have been categorised as over exploited and 2 blocks as critical. Thus the ground water development is more than 90% in about 38% of blocks. Thus there is a need for formulation of sustainable ground water development plan.

The ground water from phreatic zone is suitable for drinking and domestic purposes in respect of all constituents except TH and NO<sub>3</sub>.

In reference to irrigation suitability, based on EC and SAR, the ground water from phreatic zone may come medium to very high salinity hazard and medium to high alkali hazard.

## **7.0 AWARENESS & TRAINING ACTIVITY**

One Mass Awareness campaign was conducted at Sedapatti during 1999-2000 on the theme of "Ground Water Management Regulation and Conservation"

The findings of exploration carried out by CGWB, geophysical investigation for source finding and their limitation, ground water potential of Masdurai district were explained to the gathering of about 300 people. The technique of ground water management and need for regulation and conservation was also explained in local vernacular language.

## **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. Chellampatti
2. Sedapatti
3. Usilampatti

## **9.0 RECOMMENDATIONS**

1. Artificial recharge has to be taken up urgently in the over exploited and critical blocks/
2. It is necessary to augment the drinking water sources to make it suitable by recharging the deeper fractures through recharge wells.
3. On the basis of experimented studies, it has been found that Check Dam or Percolation Pond can not be cost effective unless it is combined with recharge wells or shaft.
4. Desilting of existing tanks and supply channel will not only augment the surface water resources for irrigation but also indirectly augment the ground water sources. It is also found that desilting of tank is most beneficial of all the recharge structures.
5. Suitable soil management practices are to be adopted in areas where the ground water is found to have higher EC and SAR.
6. Proper sanitation facilities are to be initiated to avoid mixing of sewerage in the surface water bodies.

PLATE - I

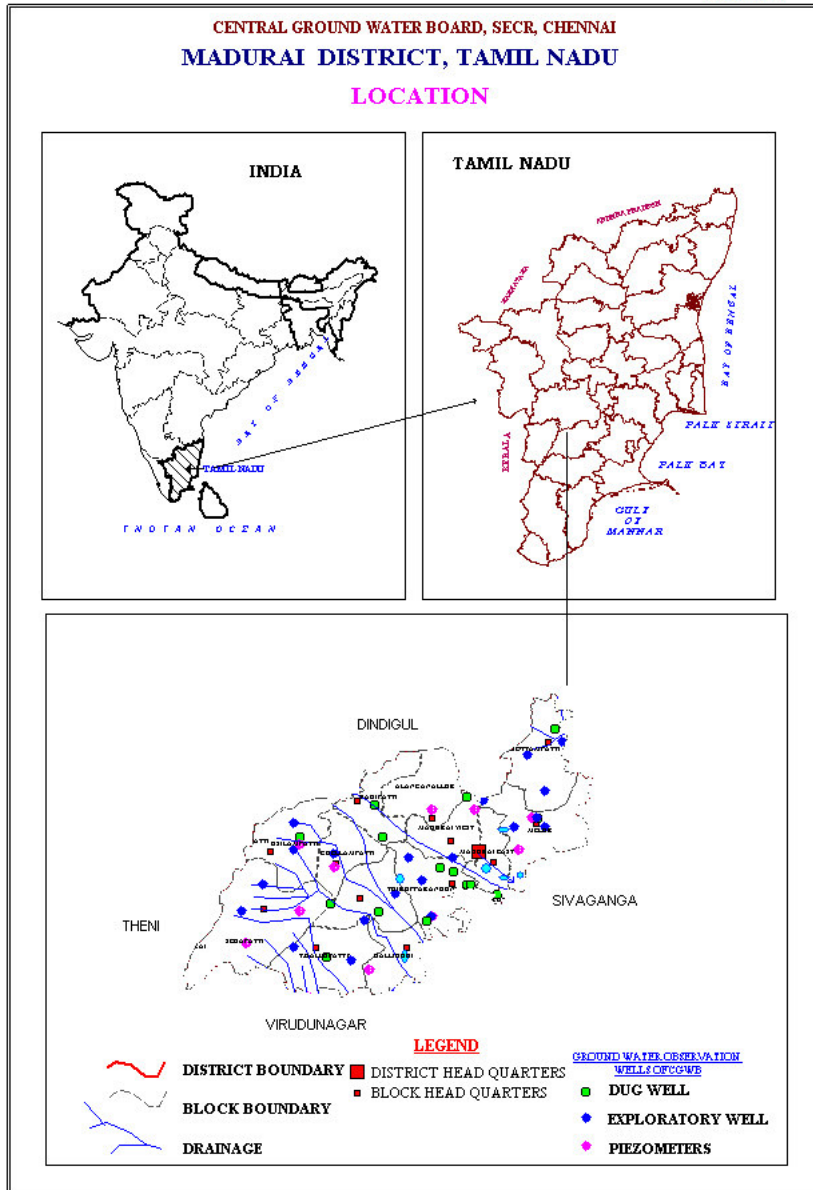


PLATE II

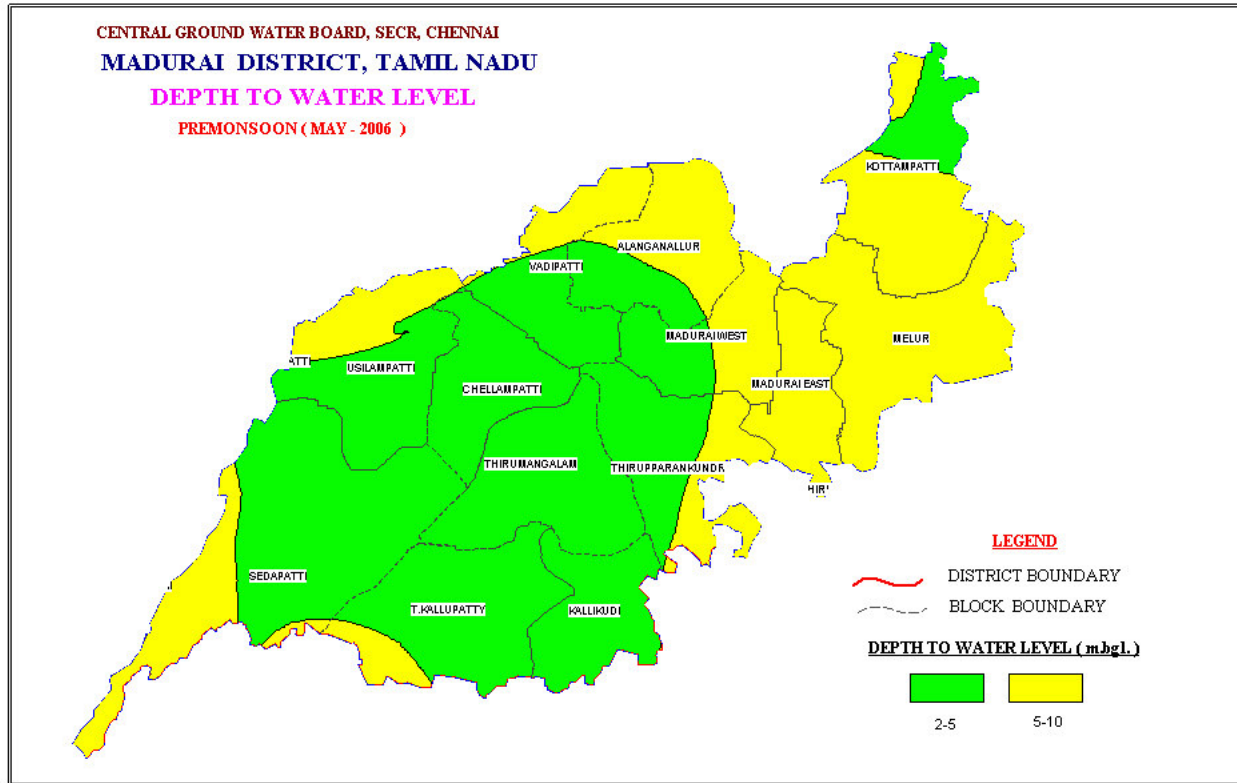


PLATE III

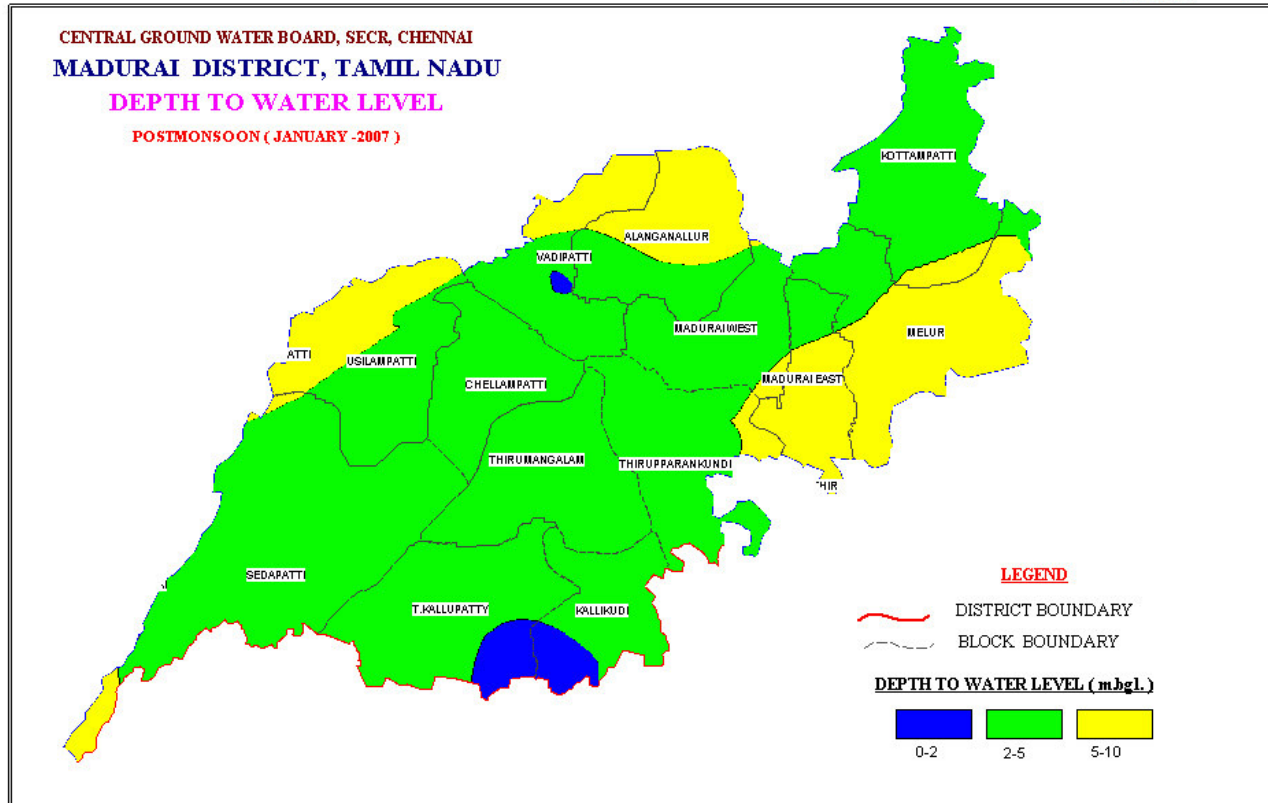


PLATE IV

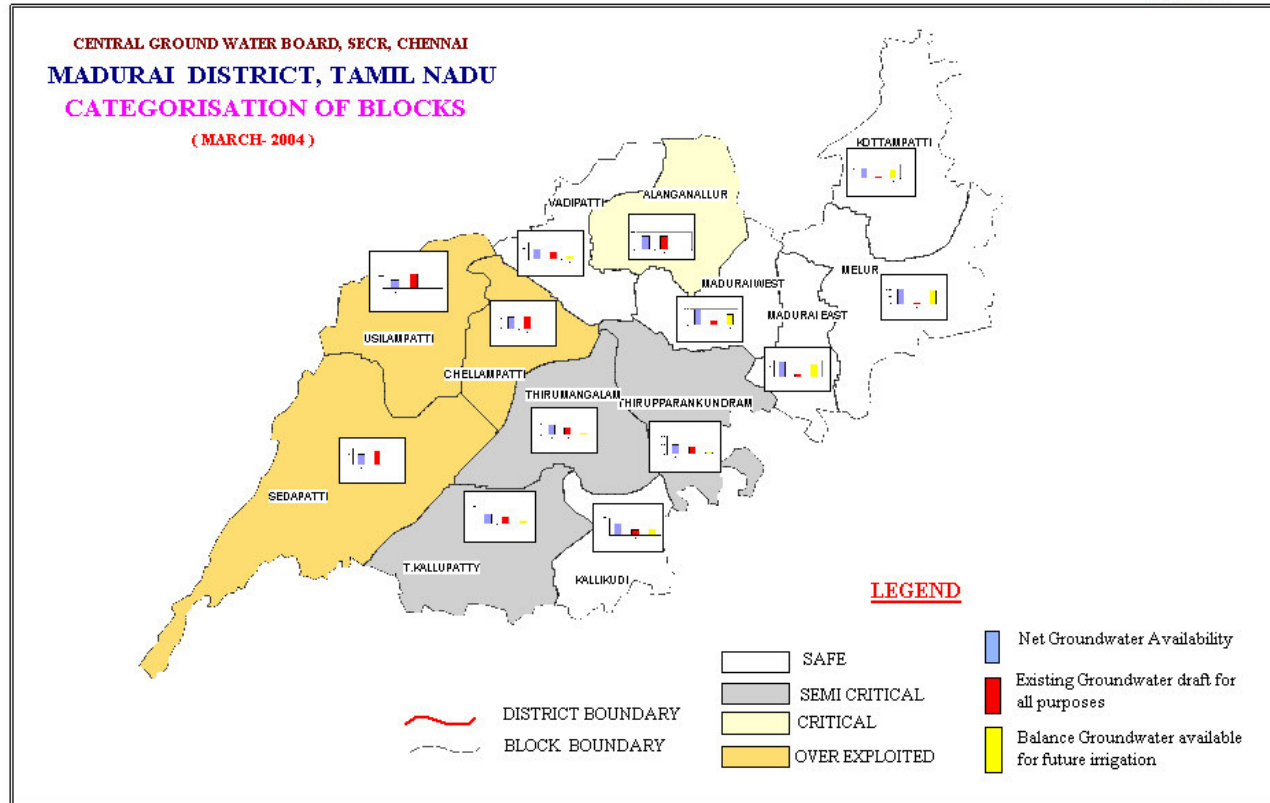
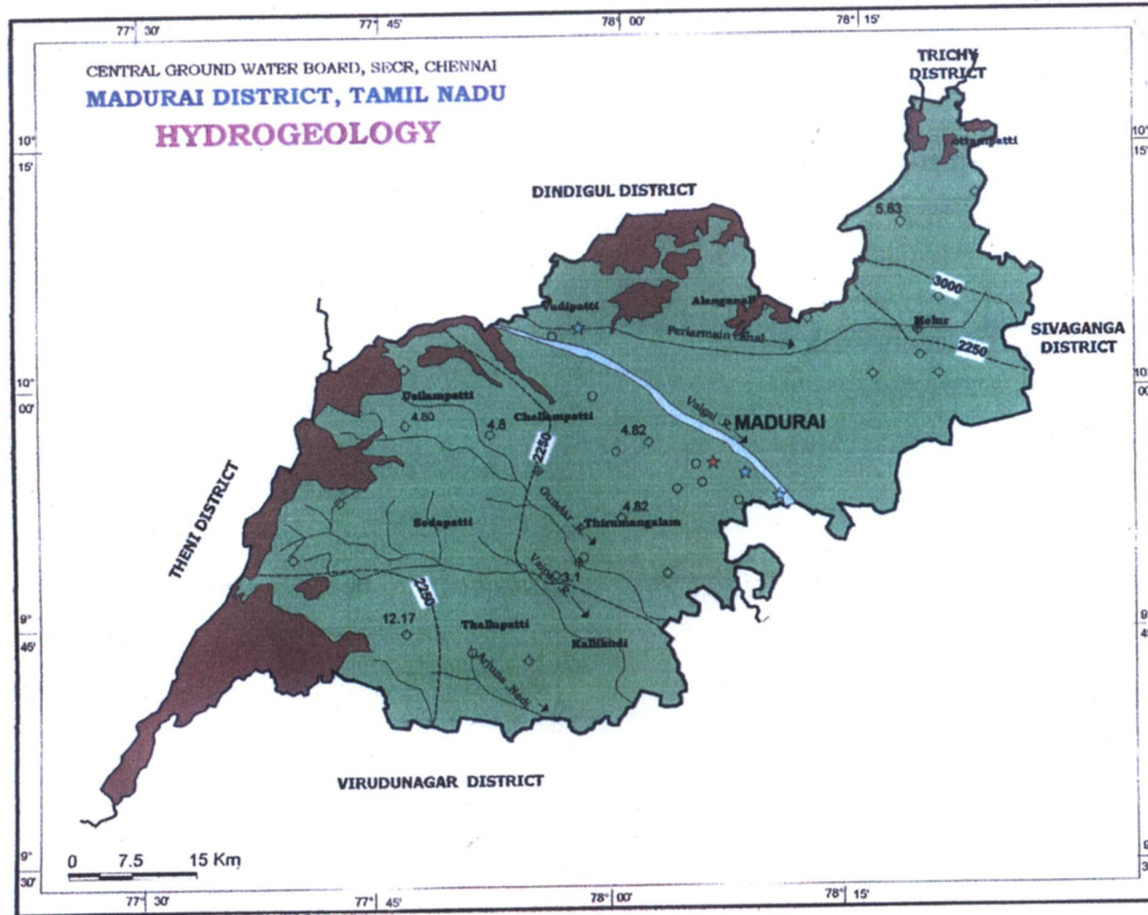


PLATE - V





**LEGEND FOR PLATE - V**

**ADMINISTRATIVE SETUP**



-  DISTRICT BOUNDARY
-  BLOCK BOUNDARY

**GEOMORPHOLOGY**

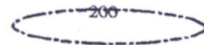


-  HILLY AREA

-  TRACE OF LINEAMENT

**GROUND WATER HYDROLOGY**

-  EXPLORATORY BORE WELL [ CGWB ]
- 4.8  LOCATION OF HIGH YIELD IN EXPLORATORY WELLS IN THE DISCHARGE IN LPS

**HYDROCHEMISTRY**

-  ISOCONS [ Sp ELECTRICAL CONDUCTANCE [  $\mu\text{s} / \text{Cm}$  at 25° C ]
-  FLORIDE [ Point value : 1.0 - 1.5 ]
-  FLORIDE [ Point value : < 1.0 ]

**SURFACE WATER HYDROLOGY**

-  RIVER WITH FLOW DIRECTION


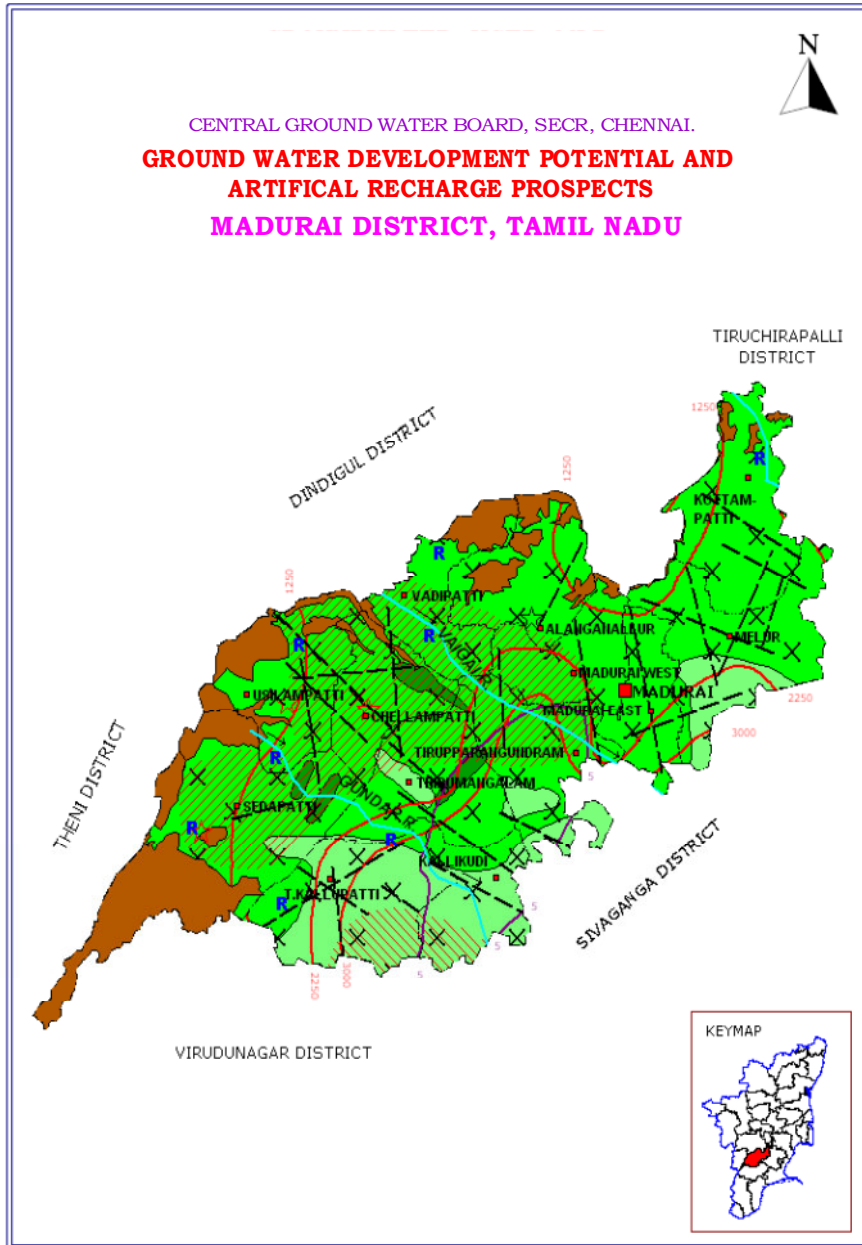















<u>AQUIFER</u>	<u>AGE</u>	<u>LITHOLOGY</u>	<u>GROUND WATER CONDITIONS</u>	<u>YIELD PROSPECTS (CU.M/D)</u>	<u>GROUND WATER DEVELOPMENT STRATEGIES</u>
 CONSOLIDATED	ARCHAEAN	GRANITES, GNEISSES, CHARNOCKITE.	DISCONTINUOUS, UNCONFINED TO SEMICONFINED AQUIFERS, RESTRICTED TO WEATHERED RESIDUUM AND FRACTURES	< 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 LINEAMENTS

PLATE - VI



**LEGEND – PLATE FOR - VI****DISTRICT – MADURAI**

	<b>Wells Feasible</b>	<b>Rigs Suitable</b>	<b>Depth Of Well (M)</b>	<b>Discharge (LPM)</b>	<b>Suitable Artificial</b>
 Hard Rock Aquifer	Dug Well Dug Cum Bore Well Bore Well	Manual Manual + DTH DTH	10 - 20 20 + 80 70 - 150	10 - 60	Check Dams/Recharge Wells/ Gully Plugs
 Hard Rock Aquifer	Dug Well Dug Cum Bore Well Bore Well	Manual Manual + DTH DTH	15 - 20 20 + 75 75 - 175	60 - 180	Check Dams/ Percolation Ponds/ Farm Ponds
 Hard Rock Aquifer	Dug Well Dug Cum Bore Well Bore Well	Manual Manual + DTH DTH	10 - 25 25 + 75 75 - 150	More Than 180	Check Dams/ Percolation Ponds/ Farm Ponds
	District Boundary			Block Boundary	
	District Headquarters			Block Headquarters	
	Water Level-Pre-Monsoon (Decadal Mean 1993-2002) Mbgf			EC In Microsiemens / Cm At 25°C	
	River			Lineament	
	Fluoride Greater Than Maximum Permissible Limit (1.5mg/L)			Nitrate Greater Than Maximum Permissible Limit (45mg/L)	
	Hilly Area			Recommended Site For Artificial Recharge Structure	

**OTHER INFORMATION**

Geographical Area	3405 Sq.Km
No. Of Blocks	13
Major Drainage	Vaigai
Population (2001)	25,62,276
Average Annual Rainfall	817 Mm
Annual Range Of Temperature	20 - 44°C
Regional Geology	<b>Hard Rocks:</b> Granites and Gneisses
Net Ground Water Availability For Future Irrigation	257.63 MCM/Yr
Stage Of Ground Water Development As On January 2003	62 %
Names Of Blocks Showing Intensive Ground Water Development	<p>★ <b>Over-Exploited:</b> Chellampatti, Sedapatti &amp; Usilampatti</p> <p>★ <b>Critical Block:</b> Alanganallur</p>

SAVE WATER

AND

CONSERVE WATER