

WATER YEAR 2007

DISTRICT GROUND WATER BROCHURE KANCHEEPURAM 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 (KANCHEEPURAM DISTRICT)

S.NO	ITEMS	STATISTICS	
1.	GENERAL INFORMATION		
	i. Geographical area (Sq. km)	4470.25	
	ii. Administrative Divisions as on 31-3-2007		
	Number of Tehsils	8	
	Number of Blocks	13	
	Number of Panchayats	648	
	Number of Villages	1214	
	iii. Population (as on 2001 Censes)		
	Total Population	2277468	
	Male	1457242	
	Female	1420226	
	iv. Average Annual Rainfall (mm)	1105-1214	
2.	GEOMORPHOLOGY		
	i. Major physiographic units	1. Chingleput- Tirukkalukundram Surface (Erosional) 2. Palar surface (fluvial) 3. Mamallapuram surface (Marina)	
	ii. Major Drainages	. Palar & Cheyyar	
3.	LAND USE (Sq. km) during 2005-06		
	i. Forest area	23856	
	ii. Net area sown	135998	
	iii. Cultivable waste	144154	
4.	MAJOR SOIL TYPES	1. Clay soil 2. Red loamy soil 3. Alluvial soil	
5.	AREA UNDER PRINCIPAL CROPS (AS ON 2005-2006)	1. Paddy -110601 Ha – 81.49 % 2. Groundnut –19207Ha – 14.15-% 3. Sugarcane – 5904Ha –4.35%	
6.	IRRIGATION BY DIFFERENT SOURCES (During 2005-06)	Number	Area irrigated (Ha)
	i. Dug wells	56378	47252
	ii. Tube wells	24281	12166
	iii. Tanks	1942	60732
	iv. Canals	20	530
	v. Other Sources	-	-
	vi. Net irrigated area	120700ha	
	vii. Gross irrigated area	153305ha	
7.	NUMBERS OF GROUND WATER MONITORING WELLS OF CGWB (AS ON31.03.2007)		
	i. No of dug wells	19	
	ii. No of piezometers	15	
8.	PREDOMINANT GEOLOGICAL FORMATIONS	Weathered and fractured biotite Gneisses, Sandstones and Shales	

9.	HYDROGEOLOGY	
	i. Major water bearing formations	Weathered and fractured biotite Gneisses and sandstones
	ii. Pre- monsoon depth to water level (May 2006)	2.89 – 8.46 m bgl
	iii. Post- monsoon depth to water level (Jan'2007)	1.05 – 7.53 m bgl
	iv. Long term water level trend in 10 years (1998-2007) in m/yr	Annual
		Rise (m/year) Fall (m/year)
		Min : 0.0289 Min :0.0089 Max :0.3433 Max :0.3279
10.	GROUND WATER EXPLORATION BY CGWB (As on 31-03-2007)	
	i. Number of Exploratory wells	41
	ii. Number of Observation wells	6
	iii. No. of piezometers	2
	iv. Number of Piezometers under Hydrology Project.	16
	iv. Depth range(m)	22 – 203
	v. Discharge(lps)	0.07 – 6.06
	vi. Storativity (S)	3.076×10^{-4}
	vii. Transmissivity (m ² /day)	<1 to 170
11.	GROUND WATER QUALITY AS ON MAY 2006	
	i. Presence of chemical constituents more than permissible limit	TH as CaCO ₃ and NO ₃
	ii. Type of water	CaCl, NaCl & CaHCO ₃
12.	DYNAMIC GROUND WATER RESOURCES (as on 31.03.2004) in MCM	
	i. Annual Replenishable Ground Water Resources	1382.91
	ii. Total Annual Ground Water Draft for all purposes	898.71
	iii. Projected demand for Domestic and Industrial Uses up to 2025	58.12
	iv. Stage of Ground Water Development	72%
13.	AWARENESS AND TRAINING ACTIVITY	
	i. Mass Awareness Programs Organized	Nil
	Date	-
	Place	-
	No of Participants	-
	ii. Water Management Training Organized	Nil
	Date	-
	Place	-
	No of Participants	-

14.	EFFORTS OF ARTIFICIAL RECHARGE & RAINWATER HARVESTING	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
15.	GROUND WATER CONTROL AND REGULATION	
	i. Number of OE Blocks	2
	ii. Number of Critical Blocks	1
	iii. Number of Blocks Notified	Nil
16.	MAJOR GROUND WATER PROBLEMS AND ISSUES.	<p>High level of ground water development in large area in the western and southern part of the district both in hard rock and sedimentary aquifers and failure of abstraction structures with time.</p> <ol style="list-style-type: none"> 1. Sea water ingress 2. Water logging 3. Industrial pollution <p>The water level depletion in the eastern part of the district is mainly due to exploitation of ground water for domestic drinking and other purposes.</p>

1.0 INTRODUCTION

1.1 Administrative Details

Kancheepuram district is having administrative divisions of 8 taluks, 13 blocks, 648 panchayats and 1137 villages as detailed below:

S. No.	Taluk	No. of Villages	Block	No. of Villages
1	Kancheepuram	207	1.Kancheepuram 2.Walajabad	91 116
2	Uthiramerur	124	1. Uthiramerur	124
3	Madurantakam	195	1. Madurantakam 2. Acharapakkam	101 94
4	Cheyyur	128	1. Chittamur 2. Lattur	65 63
5	Sriperumpudur	192	1. Sriperumpudur 2. Kundrathur	101 91
6	Tambaram	66	1. St.Thomas Mount	66
7	Chingleput	198	1. Kattankolathur 2. Tiruporur	101 97
8	Tirukkalukkundram	104	1. Tirukkalukkundram	104
Total		1214		1214

1.2 Basin and sub-basin

Kancheepuram district is part of the composite east flowing river basin and spread over a part of Palar and Cheyyar sub-basin.

1.3 Drainage

Palar and Cheyyar are the important rivers. The drainage pattern in general is sub-dendritic and radial. All the rivers are seasonal and carry substantial flows during monsoon period.

River Palar, a major river course, which drains this district originates from Western Ghats in Karnataka state, and discharges in Bay of Bengal near Pudupattinam.

The Cheyyar, a tributary of Palar originates from the Jawadu Hills of Tiruvannamalai district. It has a northeasterly flow in Kancheepuram district and confluences with the Palar near Pazhaiyaseevaram.

Other seasonal river like Korattalaiar and Tandiar drain this district partly on the northern and southern part respectively.

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	23856
2	Barren & Uncultivable Lands	10948
3	Land put to non-agricultural uses	146085
4	Cultivable Waste	10430
5	Permanent Pastures & other grazing lands	18328
6	Groves not included in the area sown	16273
7	Current Fallows	8156
8	Other Fallow Lands	73136
9	Net Area sown	135998
	Total	443210

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

The chief irrigation sources in the area are the tanks, wells, tube wells and canal. Tank irrigation is highest in Madurantakam block followed by Thirukalukkundram, Acharapakkam, Sriperumpudur, Tirupporur, Walajabad, Chittamur, Lattur, Kattankolathur, Lathur, Kundrathur, Kancheepuram, St. Thomas Mount 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	Kancheepuram	24	2809	1878	3206	-	7917
2	Walajabad	30	4493	1831	2860	-	9214
3	Uttiramerur	0	3719	282	7162	-	11163
4	Sriperumpudur	0	6535	508	1692	-	8735
5	Kundrathur	0	2801	1464	2798	-	7063
6	Thirupporur	0	5925	405	1967	-	8297
7	Kattankolathur	0	3070	242	1878	-	5190
8	Thirukalukkundram	0	7205	840	2425	-	10468
9	Thamasalai	0	1036	2	1518	-	2556
10	Madhurantagam	220	8345	439	4774	-	13778
11	Acharapakkam	220	7076	518	4874	-	12688
12	Chittamur	0	4020	2357	8301	-	14678
13	Lathur	56	3700	1400	3797	-	8953
	Total	550	60732	12166	47252	-	120700

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

1.5 Studies/Activities carried out by CGWB

Systematic hydrogeological studies were carried out during 1982 – 1983 and Reappraisal hydrogeological studies were carried out 1994-1995, 1999-2000 and 2000 -2001.

CGWB had taken up Ground Water Exploration during 1993-94 to 1995-96 in the porous formation of the district for the study of sub-surface configuration of the basin to assess the ground water resources. The Board had also taken up Ground Water exploration to assess brine water potential during 1995-96. In total, Central Ground Water Board had drilled 41 EW, 6 OW and 2 piezometers and 16 bore wells drilled under Hydrology Project.

Besides, the Board is also carrying out short-term water supply investigation for the Central and State agencies.

CGWB in collaboration with BARC had taken up a project between 2000-2004 to study the hydrodynamics of coastal aquifer in southern part of Chennai Metropolitan area. It has been established that the coastal aquifer between Kottivakkam and Muthukadu has not been intruded by seawater. Further using modelling techniques the ground water balance has been determined.

2.0 RAINFALL AND CLIMATE

Kancheepuram district generally experiences hot and humid climatic conditions. The district receives the rain under the influence of both southeast and northeast monsoons. Most of the precipitation occurs in the form of cyclonic storm 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.

The normal annual rainfall over the district varies from 1105 mm to 1214mm. It is the minimum in the western and northwestern parts of the district around Uttiramerur (1105 mm) and it is the maximum around Kovalam (1214.2 mm).

High relative humidities between 58 and 84% prevail through out the year. Relative humidity is maximum in the morning and minimum in the evening. Higher rates of relative humidity are observed between November and January i.e., 83 to 84%. In the months of June, the humidity is lower i.e., around 58%. Average relative humidity in the morning and evening 74 and 64%.

The minimum and maximum temperature are 20°C & 37°C. The daytime heat is oppressive and the temperature is as high as 43°C.

3.0 GEOMORPHOLOGY AND SOIL TYPES

3.1 Geomorphology

The prominent geomorphic units identified in the district through interpretation of satellite imagery are i) Chingleput-Tirukkalukkunram Surface (Erosional) ii) Palar Surface (fluvial and iii) Mamallapuram (Mahabalipuram) surface (Marina) etc.

The elevation of the area ranges from 100 m amsl in the west to a sea level in the east. The major part of the area is characterised by an undulating topography with innumerable depressions, which are used as irrigation tanks.

Three beach terraces ranging in elevation between 4 mark the coastal tract and 12 m with broad inter terrace depressions. The coastal plain displays a fairly low level or gently rolling surface and only lightly elevated above the local water surfaces on rivers. The straight trend of the coastline is a result of development of a vast alluvial plain. There are a number of sand dunes in the coastal tract. The coastal landforms include estuarine tidal, mud flats or lagoons and salt marsh etc.

3.2 Soils

Soils have been classified into 1) clayey soil, 2) red sandy or red loamy soil 3) Red sandy brown clayey soil and 4) Alluvial soil. Of the above soils brown clayey soil is the most predominant, covering more than 71 percent of the areal extent of Kancheepuram district.

Alluvial soils are found on the banks of Palar, Cheyyar and other rivers. The river alluvium is transported and is seen in coastal area of this district. Sandy coastal alluvial (arenaceous soil) occurs along the seacoast as a narrow belt.

4.0 GROUND WATER SCENARIO

4.1 Hydrogeology

The district is underlain by both sedimentary and fissured formations. The important aquifer system in the district are constituted by 1) unconsolidated and semi consolidated formations and 2) weathered, fissured and fractured crystalline rocks.

Porous Formation

Semi Consolidated formation:

Gondwana sandstones and shales and Tertiary mottled clays and sandstones represent the porous, semi-consolidated sediments. Ground water occurs under water table conditions to confined conditions in the inter granular spaces of sandstones, sands and in the bedding planes and thin fractures of shales.

The ground water occurs under water table conditions and the depth of the wells ranges from 5 to 10 m bgl. The depth to water level ranged from 2.89 to 4.09 m bgl during May 2006 and 1.05 to 3.40 m.bgl during Jan'2007. The specific capacity of porous formation ranged from 1.00 to 80.00 lpm/m/dd.

Ground Water in Unconsolidated Alluvium

This unconsolidated formations occur mainly along the banks of Palar and Cheyyar rivers and the sand layers of this alluvium form the potential aquifer. Between Walajabad and Kancheepuram, small diameter dug wells tap the alluvium with depths ranging between 6 and 12 m bgl. The yield ranges from 25 to 35 m³/hr. Depth of filter point and dug cum bore wells ranges from 10 – 21 m bgl and yield is around 20 m³/hr. The yield of infiltration wells with varying depths of 5 – 12 m bgl is around 35 m³/hr.

In areas covered by the laterites, the ground water is developed by means of dug wells in the depth of 4 to 6 m bgl.

Along the coast, wind blown sand acts as aquifer zones and ground water extraction is by means of shallow dug wells with radial arms. The wells can sustain for 3 to 6 hours pumping and yield is around 15 m³/hour.

Fissured Formation

The movement of ground water in fissured crystallines is principally controlled by joints, fissured, fractures and their interconnections.

Ground water in fissured crystallines is developed by means of dug wells, dug-cum-bore wells and bore wells. The wells range in depth between 6 and 17.00 m bgl. The depth to water level ranged from 3.50 – 8.34 m bgl during May 2006 and 1.32 – 7.53 m bgl during January 2007. The yield of the wells varies from 30 to 100 m³/day (January-March). The depth of dug cum bore wells ranges from 25 to 45 m bgl. The depth of bore wells ranges up to 200 m bgl. The piezometric head ranges from 2.05 to 5.98 m bgl during May 2006 and 0.70 – 3.75 m bgl during Jan'2007 and the yield ranges up to 12 lps. The specific capacity in the fissured formation ranges from 10 -250 lpm/m/dd.

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 0.0289 -0.3433 m/year. The fall in water level ranges between 0.0089 to 0.3279 m/year.

4.1.2 Aquifer Parameters

The Transmissivity values in weathered, partly weathered and jointed rocks vary from 10.- 125 m²/day and specific yield in these formations is 1.5%.

The specific yield of the porous formation varied from 1.4 – 10.6%. The transmissivity in the semi-consolidated and unconsolidated are varies from 23 to 52 m²/day and 200 – 300 m²/day respectively.

4.2 Ground Water Resources

The ground water resources have been computed jointly by Central Ground Water Board and State Ground & Surface Water Resources Data Centre (PWD, WRO, Government of Tamil Nadu) as on 31st March 2004. The salient features of the computations are furnished in Table-1. The computation of ground water resources available in the district has been done using GEC 1997 methodology.

4.3 Ground Water Quality

Ground water in phreatic aquifers in Kancheepuram in general, is colourless, odourless and slightly alkaline in nature. The specific electrical conductance of ground water in phreatic zone (in Microsiemens at 25°C) during May 2006 was in the range of 240 to 4220 in the district. It is between 750 and 2250 µS/cm at 25°C in the major part of the district. Conductance below 750 µS/cm has been observed in ground water in parts of Chunampet, Mahabalipuram and Oragadam, where conductance exceeding 2250 µS/cm has been observed in Melmukuttu road.

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. The Total Hardness as CaCO₃ is observed to be in excess of permissible limits of 7% sample analysed whereas Nitrate is found in excess of 45 mg/l in about 25 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 fertilizers for agriculture.

With regard to irrigation suitability based on specific electrical conductance and Sodium Adsorption Ratio (SAR), it is observed that the 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.

Table-1: Stage of Groundwater Development of Kancheepuram District as on 31st March 2004										
									(in Ham)	
S.No	Name of Groundwater Assessment Unit (Block): District/Block		Net Groundwater 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 groundwatre Availability for future Irriation Development	Stage of Groundwater Development	Categorization for Future groundwater development (Safe/Semi Critical/Critical/Over Exploited)
1	2		4	5	6	7= 5+6	8	9 = 4-(6+8)	10 = (7/4)*100	6
1	Kancheepuram	Acharapakkam	8355.48	5799.74	336.65	6136.39	356.22	2199.52	73	Semi Critical
2	Kancheepuram	Kancheepuram	9996.49	3685.04	398.06	4083.10	421.18	5890.27	41	Safe
3	Kancheepuram	Kattankulathur	7506.20	4340.26	510.28	4850.54	539.92	2626.02	65	Safe
4	Kancheepuram	Kunrathur	7889.65	4340.26	473.45	4813.71	500.95	3048.44	61	Safe
5	Kancheepuram	Lattur	8744.55	9297.01	276.82	9573.83	292.91	-845.37	109	Over Exploited
6	Kancheepuram	Maduranthagam	10385.78	6188.32	353.02	6541.34	373.53	3823.93	63	Safe
7	Kancheepuram	Sittamur	10967.37	10526.01	324.82	10850.84	343.69	97.67	99	Critical
8	Kancheepuram	Sriperumbudur	12062.35	2251.86	345.17	2597.03	365.22	9445.27	22	Safe
9	Kancheepuram	St.Thomas Mount	3744.96	1877.29	908.20	2785.48	960.95	906.73	74	Semi Critical
10	Kancheepuram	Thirukalunkundram	10292.26	9107.00	478.30	9585.29	506.08	679.18	93	Critical
11	Kancheepuram	Thiruporur	10211.09	7913.39	361.66	8275.05	382.67	1915.03	81	Semi Critical
12	Kancheepuram	Uthiramerur	12698.57	13666.21	390.73	14056.93	413.42	-1381.06	111	Over Exploited
13	Kancheepuram	Wallajabad	11606.69	5385.82	335.89	5721.71	355.40	5865.47	49	Safe
Total			124461.44	84378.2200	5493.04	89871.26	5812.12	34271.10		
Note : * - Denotes the Complete Saline Blocks										

4.4 Status of Ground Water Development

The estimation of ground water resources for the district has shown that two blocks are over exploited and two blocks are under “Critical” category.

The shallow alluvial aquifer along Palar and Cheyyar rivers serve as an important source of drinking water between Kancheepuram to Ayyapakkam and Chingleput to Tambaram. The important tanks, which are being used for drinking water purposes, are given below:

1)	Chembarampakkam tank	88.3 m ³
2)	Madurantakam tank	609.00 m ³
3)	Uttiramerur tank	958.80 m ³
4)	Tenneri tank	1106.70 m ³

Dug wells are the most common ground water abstraction structures used for irrigation. The yield of the dug wells range from 30 to 100 m³ in weathered crystalline rocks, 25 to 35 m³/hr in Recent alluvial formations along major drainage courses.

Along the coast, wind blown sand acts as aquifer zones and ground water extractions is by means of shallow dug wells and they can sustain for 3 to 6 hours pumping and yield is around 15 m³/hr.

The yield of infiltration wells/filter points is around 35 m³/hr.

The dug wells in hard rock terrain tapping the entire weathered residuum are capable of yielding 30-100 m³/day requiring the installation of 3 - 5 HP pumps for extraction of ground water.

5.0 GROUNDWATER MANAGEMENT STRATEGY

5.1 Groundwater Development

The ground water in Kancheepuram district is developed by dug wells, dug-cum-bore wells, tube wells, bore wells and filter points.

The present demand for domestic and industrial water supply is estimated as 54.9304 MCM/annum as per Dynamic Ground Water Resources of Tamil Nadu as on March 2004. Water requirement for the year 2029 would be the reserved quantity of 58.1212 MCM.

Ground water plays a major role in the irrigation activities of the district. There are about 80659 ground water abstraction structures in the district. They contribute about 49.24% percent of net area irrigated in the area. It is estimated that the average draft per dug well and shallow tube well in the district is of the order of 1.2 ha.m and 2.5 ha.m/year respectively.

Present stage of ground water development in the district as a whole is 72.38%(average of ground water development as on March 2004). The stage of ground water development of Lattur and Uttiramerur are 109% and 111% respectively.

Alluvium forms a good aquifer system along the Palar and Cheyyar rivers. The Palar riverbed is the main source of water supply to the urban areas along its course and also to part of Chennai city and industrial area of Maraimalainagar. Ground water yield prospects are poor in major part of the district and the yield ranged between 1 and 2 lps in fissured formations whereas in Palar alluvium ranged from 5 to 10 lps and in Gondwana formations it ranged between <1 to 1.2 lps.

Dug wells and bore wells are suitable for hard rocks whereas large diameter dug wells with radial is suitable for alluvial areas. Large diameter collector wells are ideal structure for ground water extraction in the alluvial tract where the granular zones are generally restricted to 35 m bgl.

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 Kancheepuram district are furnished in Table 2. 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.

Central Ground Water Board is also providing free technical guidance for implementation of rooftop rainwater harvesting schemes.

6.0 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. Uthiramerur
2. Lathur

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.

Accordingly,

1. No person shall extract or use groundwater in the scheduled area for any purpose other than domestic purposes and
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
Kottivakkam (141), Palavakkam(142), Neelankarai (145), Injambakkam(146), Sholinganallur(189), Uthandi(191), Karapakkam (East of B.Canal) (147), Oggianthorappakkam (East of B. Canal)(148), Pallikaranai (East of B.Canal) (149)	Tambaram
Kannathur Reddikuppam (35), Kuttukadu (36), Kovilanthangal (Kanjithotti) (44)	Chengalpattu
Veeraraghavapuram (9), Parivakkam (10), Panavedu Natham (11), Pidari Thangal (12), Kolappancheri (13), Kulathuvanchery (45), Srinivasapuram (46), Kattupakkam (47), Chennerkuppam (48), Koparasanallur (49), Ayyappanthangal (50), Thelliaragaram (51), Mugalivakkam (53), Mangada (42)	Sriperumbudur

7.0 RECOMMENDATIONS

Steps to be taken up to evolve suitable measures for de-silting of Palar spring canals and all the existing tanks in the district to improve their storativity. Effective steps to be carried out to remove the encroachments.

A rapid urbanisation and industrialisation all along GST road have registered its own adverse impact on ground water regime. To counter this, roof top rainwater harvesting techniques with suitable structures be adopted in urban areas.

In fissured formations, wells can yield for 6 months at a rate of 3 hours of pumping per day and suitable short term crops viz., ground nut, soybean, vegetables and flowers, may be encouraged.

PLATE - I

CENTRAL GROUND WATER BOARD, SECR, CHENNAI
KANCHEEPURAM DISTRICT, TAMIL NADU
LOCATION

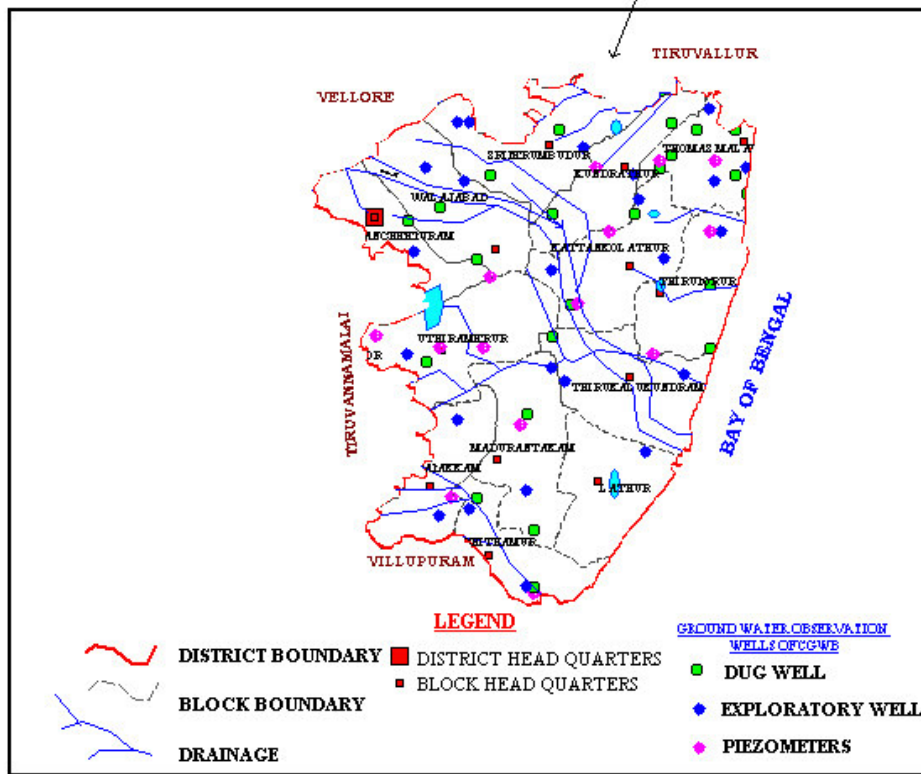
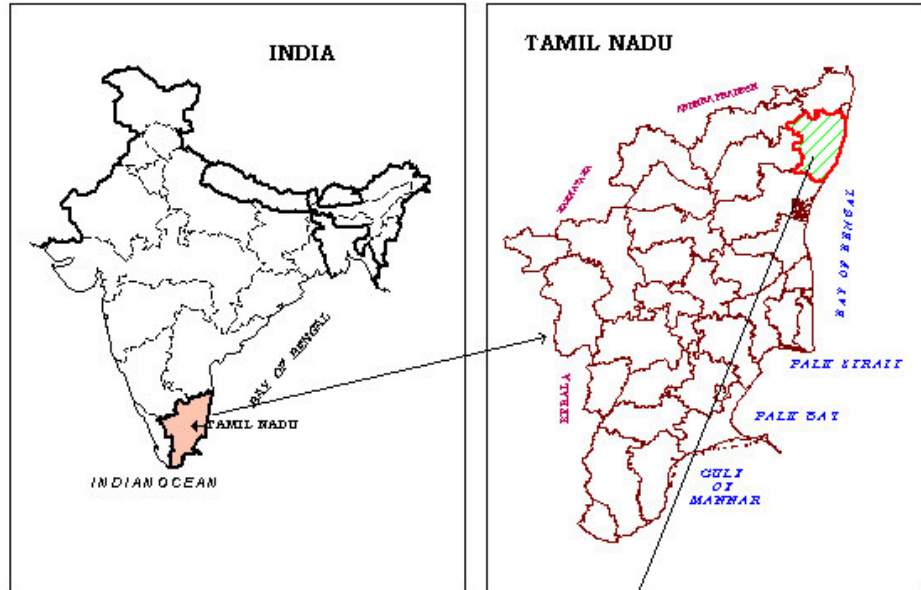


PLATE II

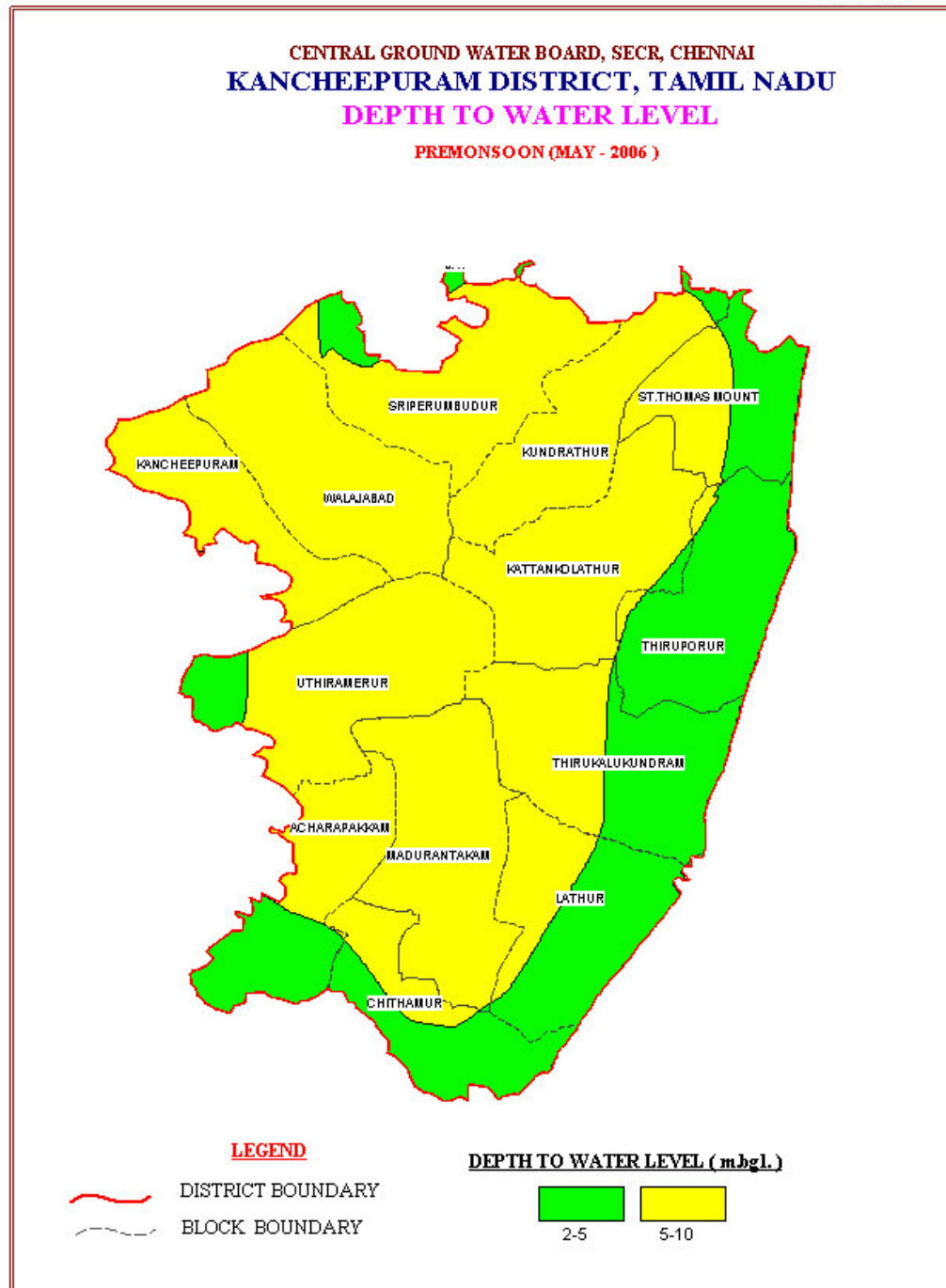


PLATE III

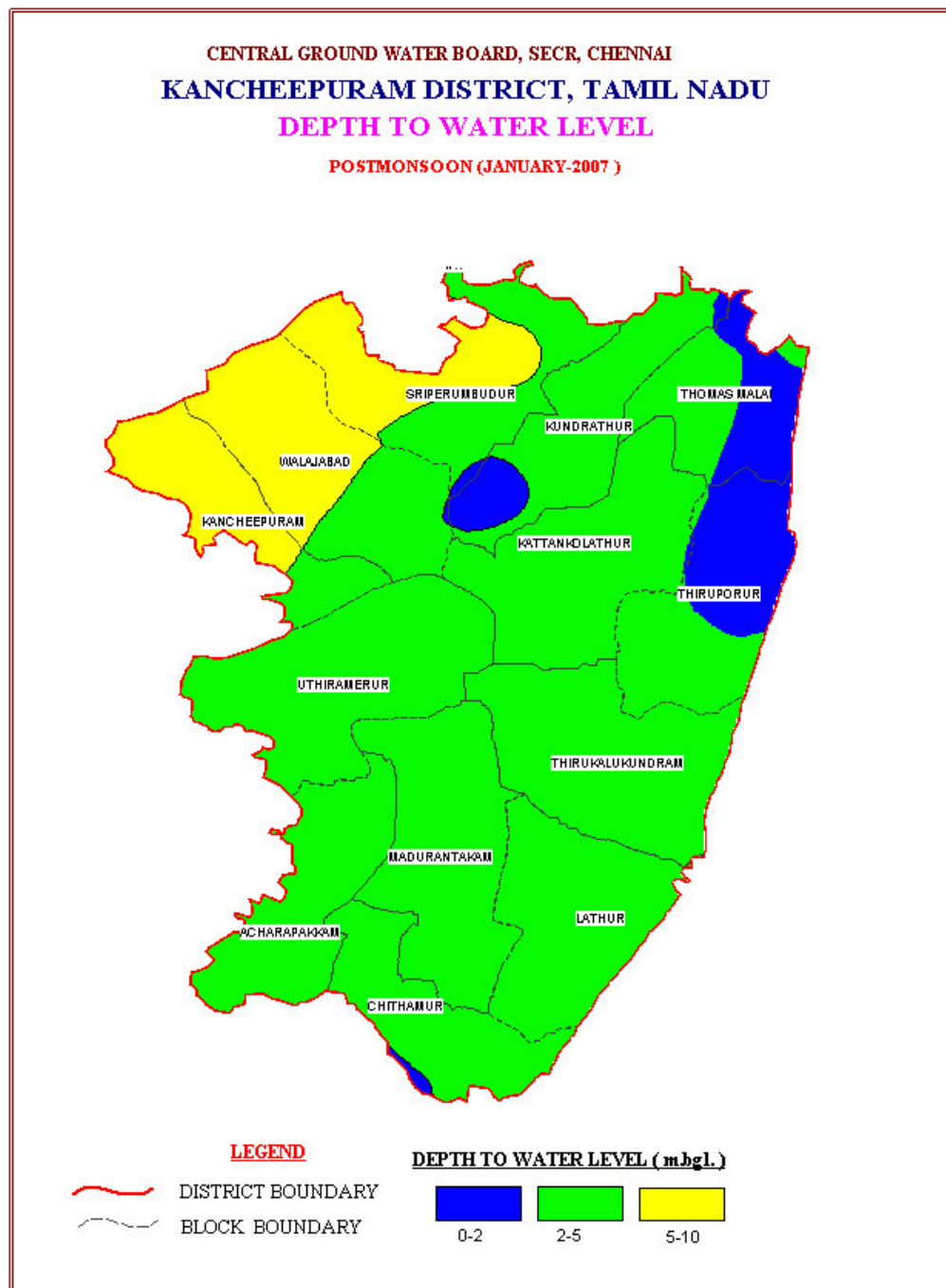


PLATE IV

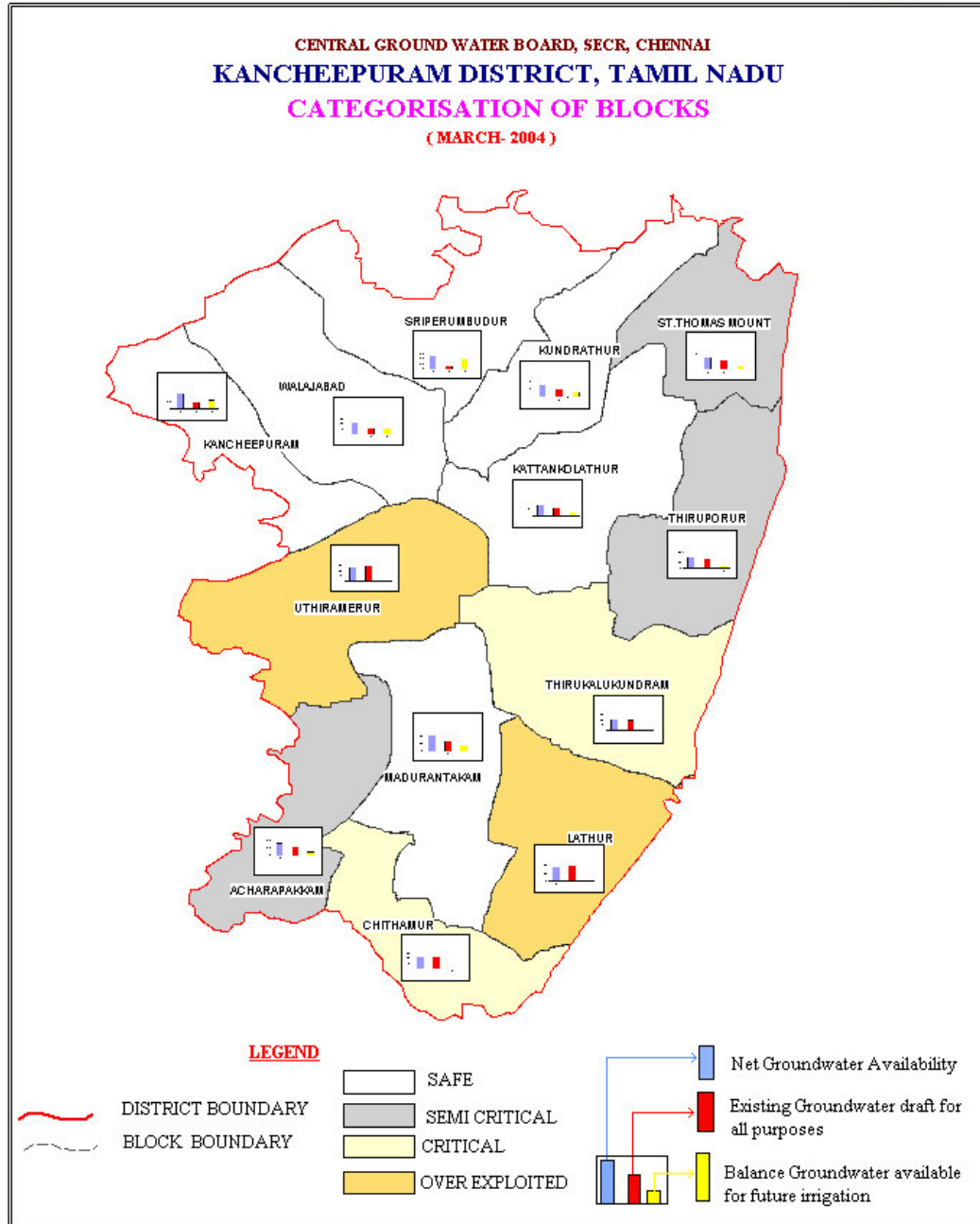
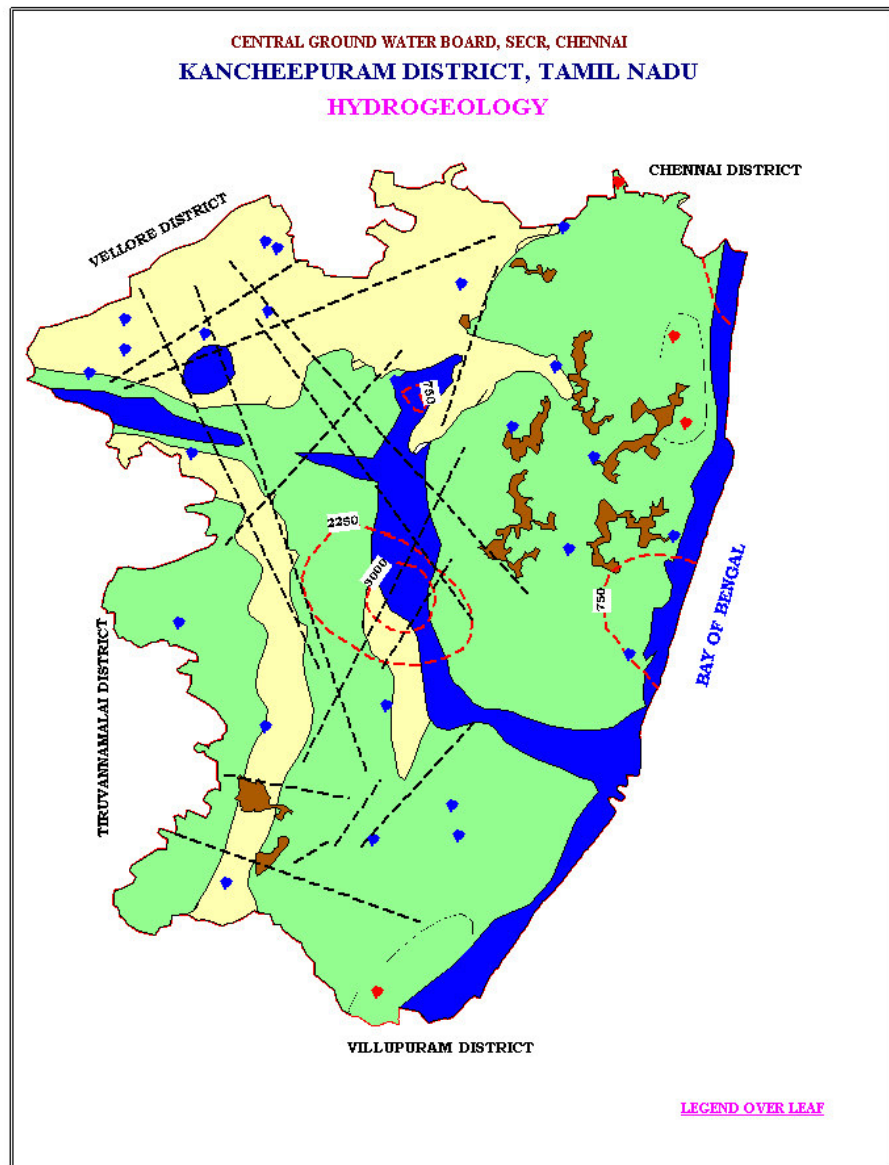


PLATE - V



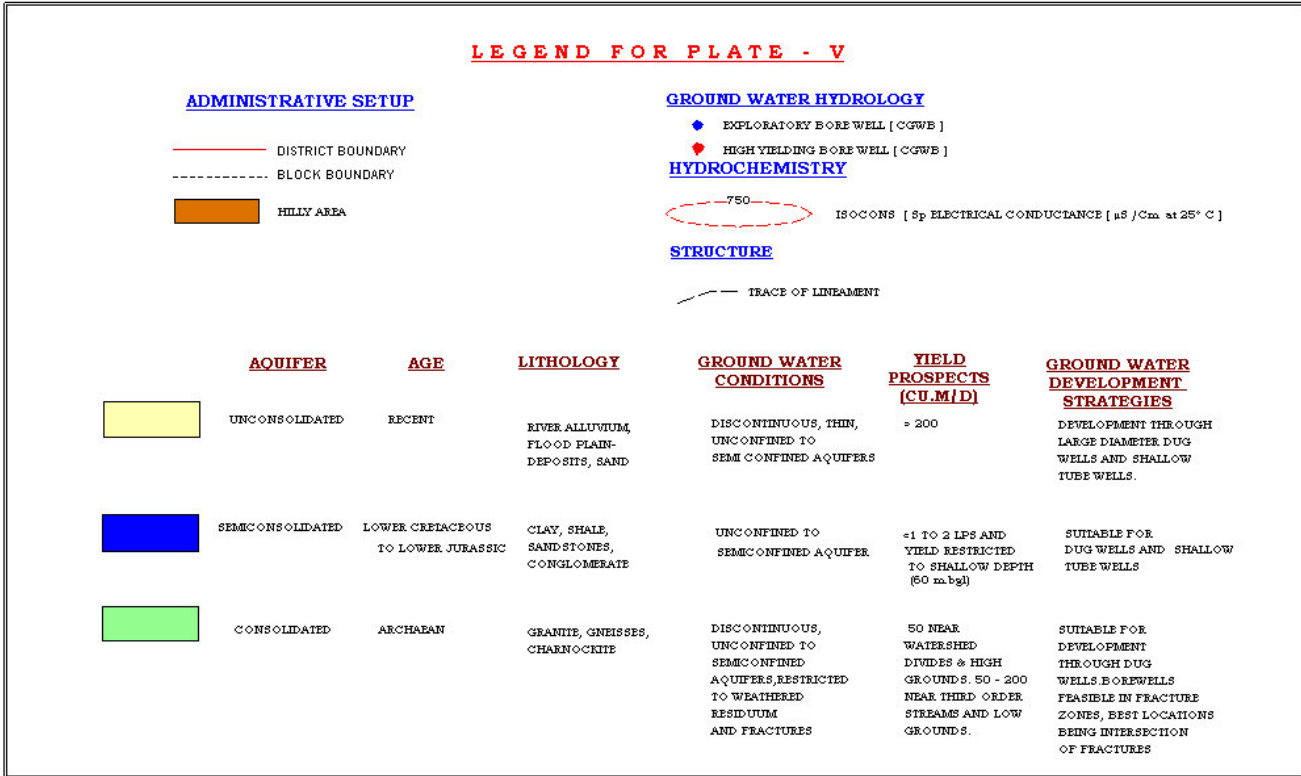
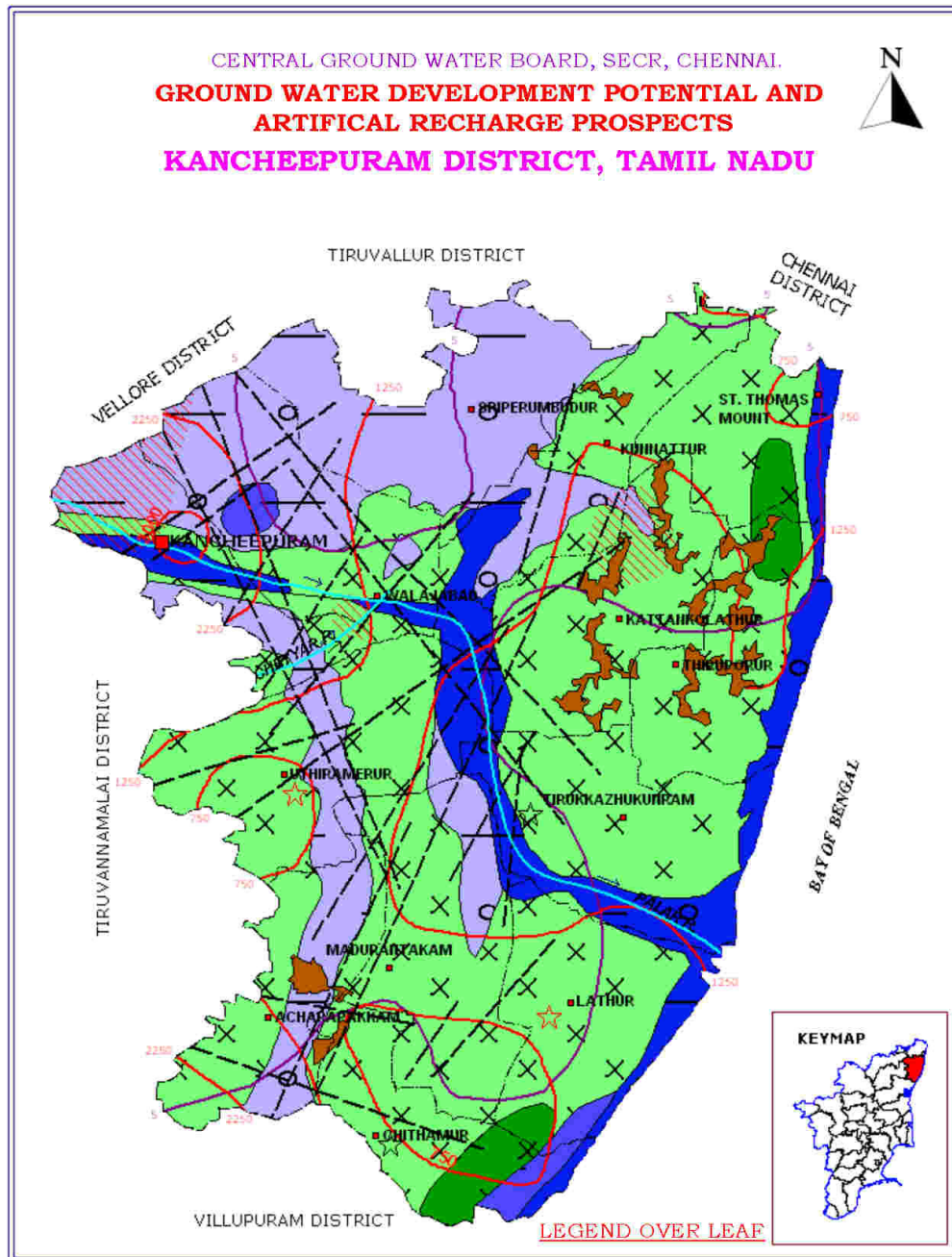
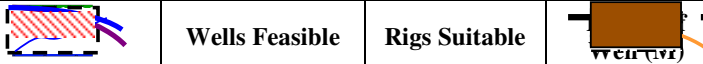


PLATE VI



LEGEND PLATE VI**DISTRICT – KANCHEEPURAM**

	Wells Feasible	Rigs Suitable	Discharge (LPM)	Suitable Artificial Recharge Structures
Soft Rock Aquifer	Dug Well Tube Well	Manual Direct Rotary	8 – 13 300 – 460	10 - 60 Percolation Ponds / Recharge Shafts
Soft Rock Aquifer	Dug Well Tube Well	Manual Direct Rotary	8 – 12 250 – 370	500 – 730 Recharge Tube Well/ Recharge Shafts
Soft Rock Aquifer	Dug Well Tube Well	Manual Direct Rotary	8 – 13 300 – 460	1100 – 1900 Recharge Well / Injection Well
Hard Rock Aquifer	Dug Well Bore Well	Manual DTH	4 – 13 120 – 200	10 - 60 Recharge Well / Percolation Ponds / Gully Plugs
Hard Rock Aquifer	Bore Well	DTH	120 – 200	More Than 180 Percolation Ponds
	District Boundary			Block Boundary
	District Headquarters			Block Headquarters
5	Water Level-Pre-Monsoon (Decadal Mean 1993-2002) Mbgf		1250	Ec in Microsiemens / cm at 25°C
	River			Hilly Area
	Nitrate Greater Than Maximum Permissible Limit (45mg/L)			Lineament

OTHER INFORMATION

Geographical Area	4433 Sq.Km.
Number Of Blocks	13
Major Drainage	Palar And Cheyyar
Population (2001)	2277468
Average Annual Rainfall	1105 - 1214 Mm
Annual Range Of Temperature	20 – 37°C
Regional Geology	Soft Rocks: Alluvium, Sandstone & Shale Hard Rocks: Granite and Gneisses
Net Ground Water Availability For Future Irrigation	342.71 MCM/Yr
Stage Of Ground Water Development As On January 2004	72 %
Names Of Blocks Showing Intensive Ground Water Development	★ Over Exploited: Lathur & Uthiramerur ★ Critical: Chithamur and Thirukalukundram

SAVE WATER
AND
CONSERVE WATER

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