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Technical Report Series

DISTRICT GROUNDWATER BROCHURE THANJAVUR DISTRICT, TAMIL NADU

By

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Ministry of Water Resources

Central Ground Water Board

South Eastern Coastal Region
Chennai

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DISTRICT AT A GLANCE (THANJAVUR DISTRICT)

S. No.	ITEMS	STATISTICS	
1.	**GENERAL INFORMATION**		
	i. Geographical area (Sq. km)	3396.57	
	ii. Administrative Divisions (As on 31-3-2007)		
	Number of Taluks	8	
	Number of Blocks	14	
	Number of Panchayats	589	
	Number of Villages	821	
	iii. Population (2001 Census)		
	Total Population	22,16,138	
	Male	10,96,638	
	Female	11,19,500	
	iv. Average Annual Rainfall (mm) (1988-1996)	1147.8	
2.	**GEOMORPHOLOGY**		
	i. Major physiographic Units	Flood plain, Delta plains, natural levees and sedimentary high ground	
	ii. Major Drainages	Cauvery, Vennar and its tributaries	
3.	**LAND USE (Ha) (2005-06)**		
	i. Forest area	3390	
	ii. Net area sown	1,92,030	
	iii. Cultivable waste	14,700	
4.	**MAJOR SOIL TYPES**	Clayey soils, Sandy soils and mixed soils	
5.	**AREA UNDER PRINCIPAL CROPS (Ha) (2005-2006)** **(The figures given in bracket are percentage of net area sown)**	1. Paddy – 1,54,901 (80%) 2. Sugarcane –15,353 (8%) 3. Banana – 4921 (3 %) 4. Other Crops - 16855 (9%)	
6.	**IRRIGATION BY DIFFERENT SOURCES (2005-06)**	**Number**	**Area irrigated (Ha)**
	i. Dug wells	54032	513
	ii. Tube wells	38035	37279
	iii. Tanks	428	500
	iv. Canals	25	155378
	v. Other Sources	-	-
	vi. Gross irrigated area	193670 ha	

7.	**NUMBER OF GROUND WATER MONITORING WELLS OF CGWB (As on 31.03.2007)**		
	i. Dug wells	28	
	ii. Piezometers	5	
8.	**PREDOMINANT GEOLOGICAL FORMATIONS**	Recent alluvium, Padakkudi, Orthanadu formations and Eastern ghats weathered and fractured gneissic rocks.	
9.	**HYDROGEOLOGY**		
	i. Major water bearing formations	Recent alluvium, Cuddalore sandstone and Weathered and fractured gneissic rocks.	
	ii. Pre- monsoon depth to water level (May 2006)	1.55 – 18.32 m bgl	
	iii. Post- monsoon depth to water level (Jan. 2007)	0.22 -19.20 m bgl	
	iv. Long term water level trend in 10 years (1998-2007) (m/yr)	**Annual**	
		Rise	**Fall**
		Min: 0.0027 Max :0. 3276	Min: 0. 0097 Max: 0. 7347
10.	**GROUND WATER EXPLORATION BY CGWB (As on 31-03-2007)**		
	i. Number of Exploratory wells ii. Number of Observation wells iii. Number of Piezometers under Hydrology Project	18 4 6	
	iv. Depth range (m bgl)	54 – 457	
	v. Discharge (lps)	4.8 – Free flow	
	vi. Storativity (S)	$5.0*10^{-4} – 6.09*10^{-2}$	
	vii. Transmissivity (m^2/day)	10 -1800	
11.	**GROUND WATER QUALITY (As on MAY 2006)**		
	i. Presence of chemical constituents more than permissible limit	TH, NO_3 and SO_4	
	ii. Type of water	NaCl, $CaCl_2$, $MgCl_2$ and mixed type	

12.	**DYNAMIC GROUND WATER RESOURCES (As on 31.03.2004) (MCM)**	
	i. Annual Replenish able Ground Water Resources	73605
	ii. Total Annul Ground Water Draft for all purposes	52788
	iii. Projected demand for Domestic and Industrial Uses up to 2029	4318
	iv. Stage of Ground Water Development (%)	76
13.	**AWARENESS AND TRAINING ACTIVITY**	
	i. Mass Awareness Programs Organized	Nil
	ii. Water Management Training Organized	Nil
14.	**EFFORTS OF ARTIFICIAL RECHARGE & RAINWATER HARVESTING**	Technical Guidance were provided and 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	3
	ii. Number of Critical Blocks	1
	iii. Number of Blocks Notified	Nil
16.	**MAJOR GROUND WATER PROBLEMS AND ISSUES**	The quality of ground water in the coastal region is poor and unsuitable both for domestic and irrigation purposes. In the Tertiary aquifers there is fresh water zone below saline zone. Further development of ground water has to be carried out judiciously with sealing of poor quality formation water

1.0. INTRODUCTION

1.1. Administrative Details

Thanjavur district is having administrative divisions of 8 taluks, 14 blocks (Plate-I), 589 village panchayats and 821 villages.

Sl. No.	Block	No. of village panchayats
1.	Ammapettai	46
2.	Budalur	42
3.	Kumbakonam	47
4.	Madukkur	33
5.	Orattanadu	58
6.	Papanasam	34
7.	Pattukkotai	43
8.	Peraavurnai	26
9.	Sethubhavachatram	37
10.	Thanjavur	61
11.	Thiruppanandal	44
12.	Thiruvaiyaru	40
13	Thruvidaimarudur	48
14.	Thiruvonam	30
	Total	589

(Source: Census Department)

Basin and sub-basin

The district forms part of Cauvery river basin and Vennar and Vettar sub basins.

1.3 Drainage

The district is a part of delta formed by Cauvery River. It has gentle slope towards east and southeast. The Kollidam River forms the northern boundary and flow from west to east. The Grand Anaicut is located at the western boundary, at this point Cauvery splits into Cauvery and Vennar. A regulator at Tirukkatupalli splits Cauvery into Cauvery and Kodamurti rivers. At Thenperumbur anaicut Vennar splits into Vennar and Vettar. In addition to these, the rivers split into many streams before reaching the sea.

1.4 Irrigation Practices

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

S. No.	Classification	Area (Ha)
1	Forest	3390
2	Barren & Uncultivable Lands	2149
3	Land put to non agricultural uses	81676
4	Cultivable Waste	14700
5	Permanent Pastures & other grazing lands	1385
6	Groves not included in the area sown	5010
7	Current Fallows	9404
8	Other Fallow Lands	29913
9	Net Area sown	192030
	Total	**339657**

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

The chief irrigation sources in the district are canals tanks, tube wells and ordinary wells. Irrigation is highest in the Orathanadu block followed by Ammapet, Thanjavur, Thiruvidaimarudur and Thiruppanandal blocks.

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

S. No.	Block	Net area irrigated by					Total Gross Area irrigated
		Canals	Tanks	Tube wells	Ordinary wells	Other Sources	
1	Thanjavur	15676	40	2540	268		18524
2	Budalur	10639	130	1404	12		12185
3	Thiruvaiyaru	10988	-	1928	-		12916
4	Orattanadu	14280	-	11833	-		26113
5	Thiruvonam	7256	174	4151	-		11581
6	Pattukkottai	9072	80	2259	196		11607
7	Madukkur	6628	48	2272	24		8972
8	Peraavurnai	7824	-	5058	1		12883
9	Sethubhavachatram	7184	28	1474	12		8698
10	Kumbakonam	10871	-	1616	-		12487
11	Thruvidaimarudur	13207	-	1122	-		14329
12	Thiruppanandal	12986	-	210	-		13196
13	Papanasam	7857	-	482	-		8339
14	Ammapettai	20910	-	930	-		21840
	Total	**155378**	**500**	**37279**	**513**		**193670**

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

1.5 Studies/Activities carried out by Central Ground Water Board (CGWB)

CGWB has completed systematic Survey in this district and carried out reappraisal surveys during different phases. Ground water exploration was carried out by the erstwhile Exploratory Tube wells Organization and CGWB during the different phases of exploration and in all 18 exploratory bore holes, 4 observation wells and 2 piezometers were drilled in this district between 1957 and 2005. The depth of the boreholes ranged from 54.00 to 457.20 m below ground surface. 4 piezometers also were drilled under Hydrology Project during 1996-1998. The depth of the piezometers ranged from 150 to 157 m bgl.

Ground Water Regime Monitoring is being carried out through dug wells (28 numbers) and purpose built piezometers (5 numbers). The measurements are being carried out 4 times in a year and Water Sampling is collected in the month of May.

2.0. RAINFALL AND CLIMATE

Within the Thanjavur district the rainfall is uneven. The annual normal (1988 – 1996) varies partially from 1179 mm (Lower Anaicut) to 763 mm (Budalur). The rainfall is high on the eastern part of the district compared to the western part. The district receives major portion of its annual rainfall during northeastern monsoon (Oct-Dec). A moderate amount of rainfall is received during the southeast monsoon period (Jan-Sept).

Since the northeast monsoon rainfall is dominating, its effect is felt on the eastern part of the district (Kumbakonam-698 mm, Aduthurai-611 mm, Lower Anicut-706 mm). The intensity decreases gradually towards west and the western most part of the district (Thiruvaiyaru-387 mm, Budalur-377 mm). The rainfall in the coastal area is heavy because of cyclonic storms and depressions formed in the Bay of Bengal.

The climate of the Thanjavur district is humid and tropical. The mean maximum temperature of the district (Adithurai) shows variation between 36.5° in June and 27.8° C in May. The mean minimum temperature shows variation from 22.1° C to 27.1°C in December. The relative humidity varies between 70 and 85 percent, highest occurs during the months of Dec-Jan and the lowest during the month of June.

3.0 GEOMORPHYLOGY AND SOIL TYPES

3.1 Geomorphology

Different geomorphic units like flood plain, delta plains, natural levees and sedimentary high ground are noticed in Thanjavur district. Sedimentary high ground ranging in elevation between 60 and 80 m amsl found in southern side of Thanjavur town mainly constitute laterites. Area north of Thanjavur had been fully covered by flood plains. Isolated levee complexes are found parallel to the Vennar river course.

3.2 Soils

The Thanjavur district is occupied by different geological formations. The different types of soils are derived from the formations are;

Quaternary: Sand, silt and clay super imposed sand, natural levee complexes

Pliocene: Clays heavily weathered super imposed old drainage morphology
Miocene: Sands, clay bound, clays gravels
Cretaceous: Reddish and yellowish calcareous sand stones, clays and lime stones.

4.0 GROUND WATER SCENARIO

4.1 Hydrogeology

The district is underlain by the various geological formations ranging in age from Archaean to Recent (Plate – II). Ground water occurs in six different aquifers in this district. They are Archaean aquifers, Cretaceous aquifers, Eocene Aquifers, Miocene Aquifers, Pliocene Aquifers and Quaternary Aquifers.

Archaean aquifers: Ground water occurs to a limited extent in weathered and fractured rocks under unconfined and semi-confined to confined conditions respectively. The depth of weathered zone ranges from 10 to 12 m. The depth of dug wells is in the range of 8 to 12 m bgl and depth of the bore wells is in the range of 100 m bgl. The yield of dug wells ranges between <1 and 2 lps, while the yield of bore wells ranges from 1 and 2 lps.

Cretaceous aquifers: The course gravely clay bound sand constitutes these aquifers. The maximum thickness of these aquifers is 50 m. Ground water occurs under confined conditions. Dug cum bore wells of well depth ranging from 8 to 10 m bgl with bores at the bottom to the depth of 25 to 30 m bgl are used for irrigation. The yield of the wells ranges from 5 to 7 lps.

Eocene Aquifers: Sand, silt and clay constitute these aquifers. The thickness of the aquifer is around 80 m and ground water occurs under confined conditions. Tube wells tapping these aquifers are in the range of 120 to 300 m bgl and yield of these wells in between from 5 to 10 lps.

Miocene Aquifers: Sand, stone, gravel with clay and limestone constitute the aquifer. The aquifer can be divided into two hydraulically interconnected i) lower Orathanadu aquifer zone and ii) upper or main flowing zone.

Orathanadu aquifer zone: The thickness of the aquifer ranges between 30 and 70 m and ground water occurs under confined condition. The depth of tube wells tapping these aquifers is in the range of 150 m bgl and the yield of the wells range between 10 and 18 lps.

Main flowing zone: Coarse-grained sand constitutes these aquifers in Cauvery sub basin, while fine-grained sands constitute the aquifer in New Delta area. The thickness of the aquifer is around 35 m and ground water occurs in confined conditions. Depth of the tube wells tapping these aquifers is around 100 m bgl and yield of these wells is of the order of 1 to 5 lps.

Pliocene Aquifers: Sand, gravel, sandy clay and variegated clay constitute the aquifers. The aquifer is present to a limited extent in the district. The thickness of the aquifer ranges from 10 to 35 m and ground water occurs under unconfined to confined conditions and are developed through shallow tube wells and dug cum bore wells. The depth of the tube wells is in the range of 40 to 100 m bgl. While the dug wells are in the range of 5 to 10 m bgl with 25 to 30 m bgl deep bore at the bottom of the wells. The yield of the wells is in the range of 1.7 to 7.5 lps.

Quaternary Aquifers: The aquifers comprises of sand, clay and silt. The wide variation in the proportion, both laterally and vertically has resulted in the wide variation in aquifer parameters and yields. The thickness of aquifer ranges from 3 to 25 m. Aquifer at shallow depth is tapped by filter points of 8 to 12 m depth, while the shallow tube wells of depth 20 to 40 m tap the aquifer at depth. The yield of the wells ranges from 8 to 12.5 lps.

The depth to water level (DTW) in the district varied between 1.55 and 18.32 m bgl during pre monsoon (May 2006) and 0.22 to 19.20 m bgl during post monsoon (Jan 2007). The pre-monsoon and post monsoon depth to water maps are presented as Plate-III and IV respectively. Perusal of these maps reveals that during pre monsoon the DTW in the northern half of the district is in the range of .2 to 5 m bgl and in the southern half of the district the DTW is in the range of >5 to 10 m bgl. Where as during post monsoon the DTW in the entire canal command areas is <2 m bgl.

4.1.1 Long Term Fluctuation (1998-2007)

The long term water level fluctuation for the period 1998-2007 indicates that during pre monsoon there is a rise in the order of 0.0027 to 0.3276 m/year and the fall in the order of 0.0097 to 0.7347 m/year, where as during the post monsoon rise in water level is in the order of 0.0221 to 0.0724m/year and the fall is in the order of 0.0033 to 0.9427 m/year.

Aquifer Parameters

Transmissivity of different aquifers in this district is tabulated below

S. No.	Aquifer	Transmissivity (m^2/day)
1	Cretaceous aquifers	Ranges up to50
2	Eocene Aquifers	1600 to 1800
3	Miocene aquifers:	
	Lower Orathanadu Aquifers	10 to 1400
	Main flowing zone	Ranges up to 1350
4	Pliocene Aquifers	50 to 400

Ground Water Resources

Dynamic ground water resources have been computed jointly by Central Ground Water Board and State Ground & Surface Water Resources and Data Center (PWD, WRO, Government of Tamil Nadu) as on 31st March 2004. The salient features of the computations are furnished as Table –1.

Ground Water Quality

Ground water quality of phreatic aquifers in Thanjavur district is, in general, colorless, odorless, and slightly alkaline nature. The electrical conductivity of ground water in phreatic zone during May 2006 was in the range of 279 to 12250 µS/cm and major parts are having the electrical conductivity below 1500 µS/cm at 25° C.

It is observed that the ground water is suitable for drinking and domestic uses in respect of all constituents except total hardness, sulphate and nitrate. Around 50 percent samples are having higher concentration of NO_3 than the BIS permissible limit. The incidence of high total hardness of attributed to the composition of lithounits constituting the aquifer in the district, whereas the nitrate pollution is more likely due to the use of fertilizers for agriculture.

With regards to irrigation suitability based on specific electrical conductance and Sodium Absorption Ratio (SAR), it observed that ground water in the phreatic zone, may cause medium to high salinity and alkali hazard. Proper soil management strategies are to be adopted while using ground water for irrigation.

5.0 GROUNDWATER MANAGEMENT STRATEGY

5.1 Groundwater Development

The stage of ground water development in the district is in the range of 18 to 160 %. The ground Water development is minimum in Budalur block and it is maximum in Thiruvidaimaruthur block. Out of 14 blocks, three block over exploited, one block is critical and three blocks are semi-critical stage. However, ground water development in various parts of the district is not uniform or homogeneous. It is therefore imperative that there should be some control on the ground water development and management of ground water.

Shallow aquifers meet the demand of water supply both for drinking and irrigation in the Cauvery sub basin area, while in the area west of Grand Anaicut canal, shallow and medium aquifer cater to the needs. In the Grand Anicut canal command area medium and deep aquifers with the popularly known main flowing zone satisfy the domestic and irrigation needs of the people.

A map showing stages of ground water development in the district is shown as Plate-V.

Table-1. Stage of ground water development in Thanjavur district as on 31st March 2004

Block	Net Ground water avail-ability (Ha. m.)	Existing Gross Draft for irrigation (Ha. m)	Existing Gross draft for domestic and industrial water supply (Ha. m)	Existing Gross draft for all uses (Ha. m)	Allocation for domestic and industrial requirement supply up to next 25 years (2029) (Ha. m)	Net ground water availability for future irrigation development (Ha. m)	Stage of ground water development (%)	Category of block
Ammapettai	6353.49	5842.48	190.57	6033.05	196.88	314.13	95	Critical
Budalur	7081.58	1094.35	186.18	1280.53	192.34	5794.89	18	Safe
Kumbakonam	5894.90	5570.05	354.39	5924.44	366.12	-41.27	101	Over exploited
Mudukkur	3787.28	3008.19	161.63	3169.82	166.98	612.11	84	Semi critical
Orattanadu	6126.95	3196.31	337.18	3533.49	348.34	2582.3	58	Safe
Papanasam	4644.33	1439.13	568.53	2007.66	587.35	2617.85	43	Safe
Pattukkottai	7103.86	3569.97	690.91	4260.88	713.78	2820.11	60	Safe
Peraavurnai	2688.02	1646.59	36.18	1682.77	37.37	1004.06	63	Safe
Sethubhavachatram	3179.81	1862.25	350.15	2212.39	361.74	955.83	70	Safe
Thanjavur	10453.48	4086.78	285.92	4372.70	295.38	6071.31	42	Safe
Thiruppanandal	3844.76	4073.19	208.68	4281.87	215.59	-444.02	111	Over exploited
Thiruvaiyaru	4281.07	3350.85	235.44	3586.29	243.23	686.99	84	Semi critical
Thruvidaimarudur	4972.64	7489.67	474.49	7964.16	490.20	-3007.23	160	Over exploited
Thiruvonam	3193043	2378.46	99.57	2478.03	102.87	712.11	78	Semi critical
Total	**73605.60**	**48608.27**	**4179.82**	**52788.09**	**4318.17**	**20679.16**	**76.21**	

5.2. Water Conservation and Artificial Recharge

Thorough understandings of the geomorphologic, geological and hydrogeological features are necessary pre requisites for selecting the area suitable for and the type of artificial recharge. The suitability of an area for artificial recharge depends mainly on geological and hydrological boundaries, recharge and discharge characteristics and aquifer parameters. Availability of source water for recharge, long-term trend of ground water levels, availability of unsaturated dried up aquifer zones and ground water quality are other important consideration in this regard.

As far as Thanjavur district is concerned majority of the area is covered by anycut lands. Numerous rivers and canals cuddling across the levee complexes charge the water table aquifer. Areas other than levees are covered by clayey formation. Hence, de-silting of existing ponds and Ooranies are recommended for artificial recharge.

CGWB had prepared a master plan to augment groundwater potential by saturating the shallow aquifer taking into consideration the available unsaturated space during post monsoon and available uncommitted surplus run off. Subsequently, computations have been made for Drought Prone Area Program (DPAP) for over exploited and critical blocks in the districts warranting immediate attention. Institute of Remote Sensing, Anna University had prepared block wise maps demarcating potential zones for artificial recharge for the State of Tamil Nadu. Subsequently, State Government agencies have constructed artificial recharge structures with their own fund or with fund from Central Government, dovetailing various government programs.

Ministry of Water Resources, Government of India has initiated Dug Well Recharge Scheme in the State. The scheme is being implemented by the Nodal Department (SG&SWRDC, PWD, WRO, Government of Tamil Nadu) with the technical guidance of CGWB. The subsidy of Rs. 4000/- for small and marginal farmers and Rs. 2000/- for the other farmers is credited to the beneficiaries' bank account through NABARD. The scheme after implementation will prove to be beneficial to the irrigation sector. The available uncommitted surplus run off has to be recomputed, taking into consideration the quantum of recharge effected through existing irrigation dug wells also. The existing structures and uncommitted surplus flow should be considered for further planning of artificial recharge program.

On the basis of experimental studies, it has been found that de-silting of existing tanks followed by percolation pond with recharge wells, recharge shafts are economical.

There is considerable scope for implementation of roof – top rainwater harvesting in the district. Recharge pits / Shafts / trenches of suitable design are ideal structures for rainwater harvesting in such areas. Central Ground Water Board is also providing free technical guidance for implementation of rooftop rainwater harvesting schemes.

A map showing the development prospects and Artificial recharge structures recommended for various blocks in Thanjavur district are shown in Plate-VI.

6.0 RECOMMENDATIONS

The quality of ground water in the coastal region is poor, unsuitable both for domestic and irrigation purposes, a detailed investigation and studies have to be taken up to find and suggest remedial measures.

In the eastern coastal tracts of the district, exploratory drilling has indicated fresh water aquifers at depth below saline zones. The tube wells with suitable designes adopting cement sealing techniques is an effective way to prevent mixing up of top saline water with the fresh water aquifers beneath.

In drilling and construction of wells electrical logging should be carried out to demarcate precisely the fresh water aquifers and for recommendation of well assembly.

Suitable areas are identified for artificial recharges, with suitable design and artificial structures, depending up on the availability of surface water, nature of weathering and storage etc.

However, there are numerous rivers and channels cutting across the levee complexes recharge the water table aquifers. Areas other than the levees are covered by clayey formation. Hence, de-silting of existing ponds and Oornies are recommended.

PLATE - I

CENTRAL GROUND WATER BOARD, SECR, CHENNAI

THANJAVUR DISTRICT, TAMIL NADU

LOCATION

(NOT TO SCALE)

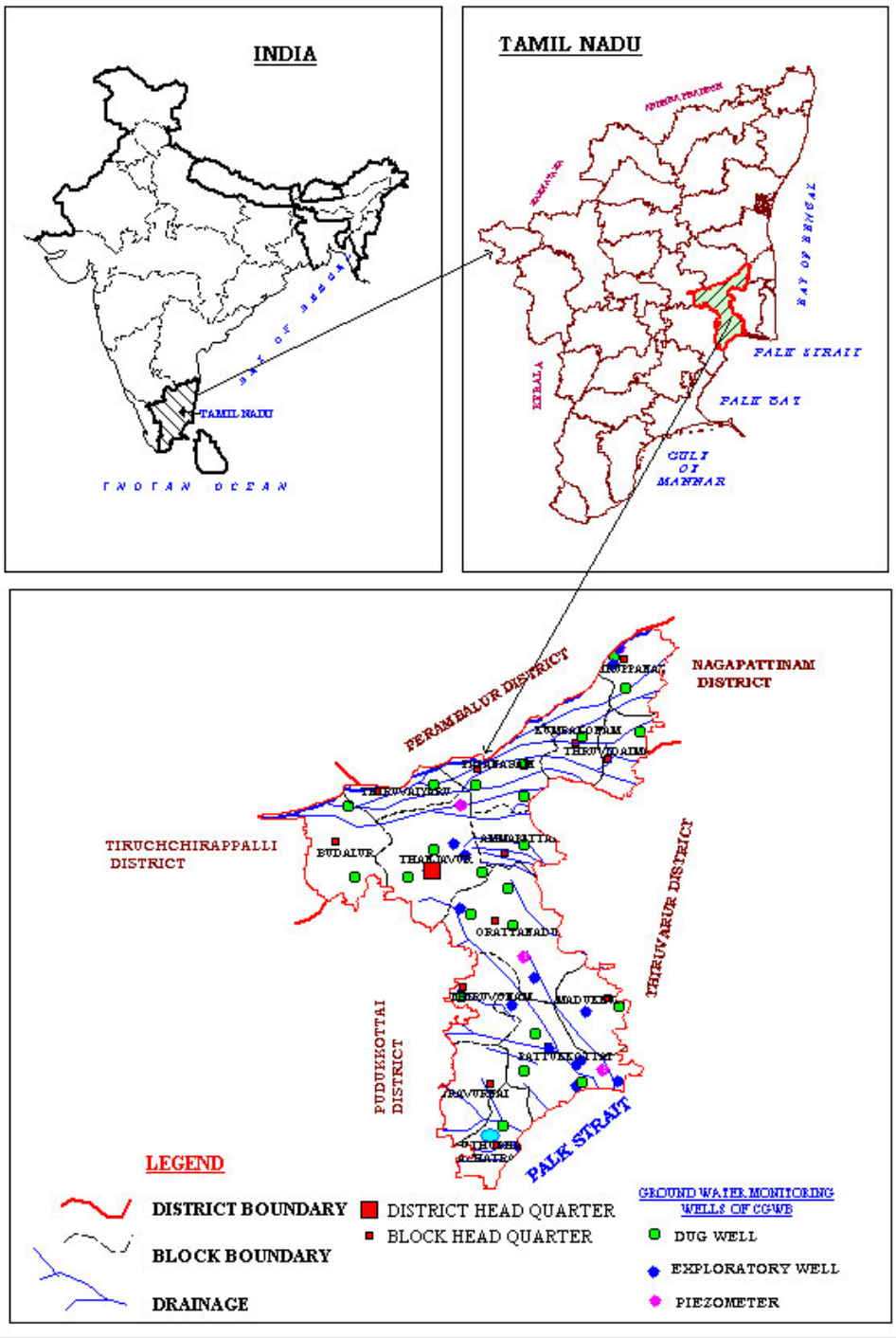
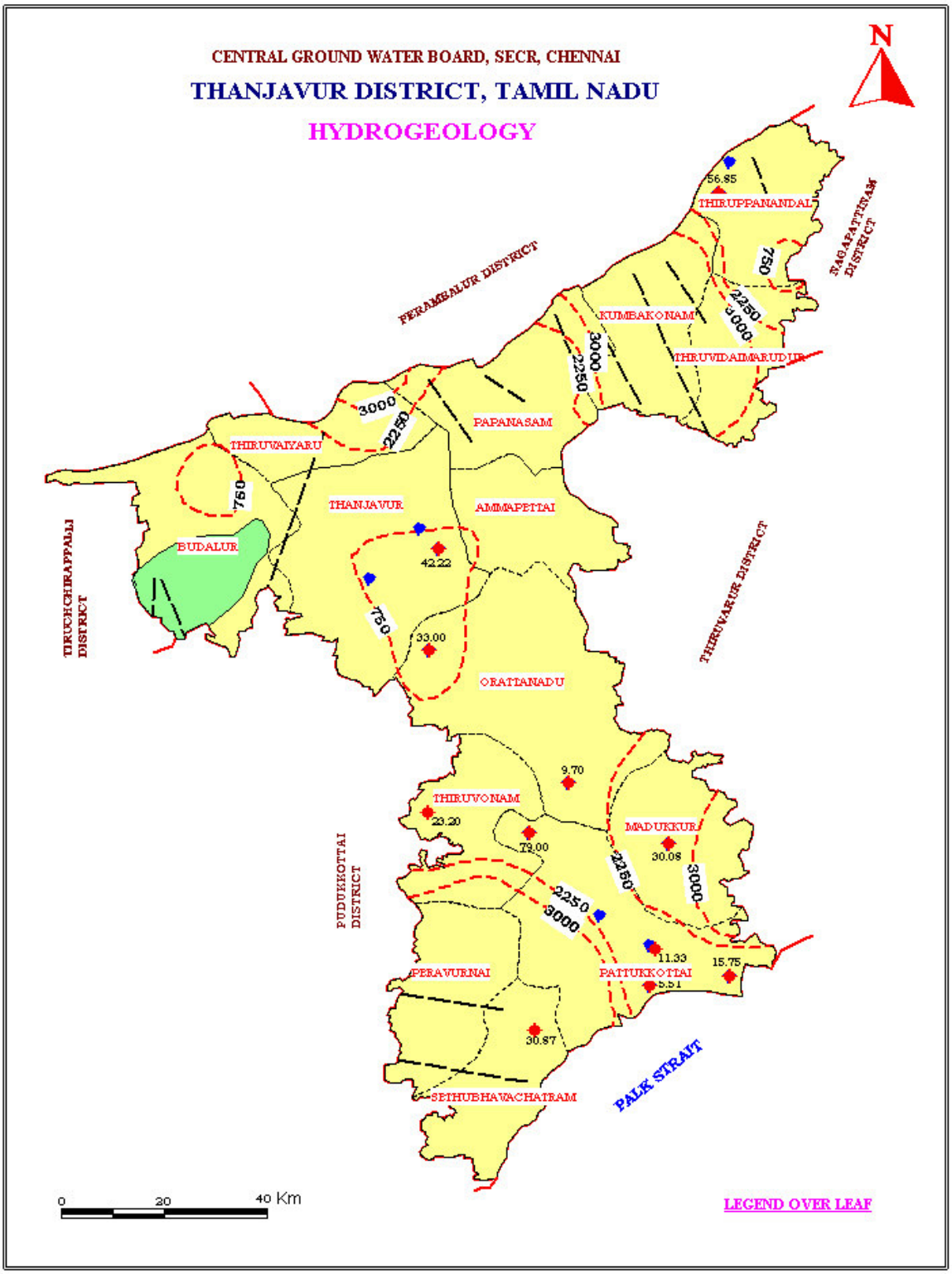


PLATE - II


CENTRAL GROUND WATER BOARD, SECR, CHENNAI
THANJAVUR DISTRICT, TAMIL NADU
HYDROGEOLOGY
N
56.85
THIRUPPANANDAL
NAGAPATTINAM DISTRICT
PERAMBALUR DISTRICT
750
2250
3000
KUMBAKONAM
THIRUVIDAIMARUDUR
PAPANASAM
THIRUVAIYARU
THANJAVUR
AMMAPETTAI
BUDALUR
42.22
33.00
TIRUCHIRAPPALLI DISTRICT
THIRUVARUR DISTRICT
ORATTANADU
9.70
THIRUVONAM
23.20
79.00
MADUKKUR
30.08
PUDUKKOTTAI DISTRICT
PERAVURNAI
PATTUKKOTTAI
11.33
15.75
5.51
30.87
SETHUBHAVACHATRAM
PALK STRAIT
0
20
40 Km
LEGEND OVER LEAF

LEGEND FOR PLATE - II

ADMINISTRATIVE SETUP

DISTRICT BOUNDARY

BLOCK BOUNDARY

GROUND WATER HYDROLOGY

EXPLORATORY BORE WELL [CGWB]

5.1 HIGH YIELDING BORE WELL [CGWB]

HYDROCHEMISTRY

750 ISOCONS [Sp ELECTRICAL CONDUCTIANCE [µs /Cm at 25° C]

STRUCTURE

TRACE OF LINEAMENT

AQUIFER	AGE	LITHOLOGY	GROUND WATER CONDITIONS	YIELD PROSPECTS (LPM)	GROUND WATER DEVELOPMENT STRATEGIES
UNCOSOLIDATED	QUARTERNEEY	SAND, SILT FORMATION	WATER TABLE, SEMI-CONFINTED TO CONFINTED CONDITION. 3 - 2.5 M	500 TO 750	FILTER POINT 8 TO 12 M SHALLOW TUBE WELLS 20 TO 40 M
	PLIOCENE TO MIOCNE	FINE GRAINED SAND WITH CLAY SAND & SILT COARSE GRAINED	SEMI - CONFINTED UPPER TO MIDDLE MIOCENE FORMATIOM, ENTIRE CUVERY DELTA REGION	600 TO 1100	SUITABLE FOR SHALLOW AND DEEP TUBE WELLS
CONSOLIDATED	ARCHAEAN	GRANITES, GNEISSES, CHARNOCKITE	OCCURS IN LIMITED EXTENT UNCONFINED TO SEMI- CONFINED AQUIFERS, RESTRICTED TO WEATHERED RESIDUUM AND FRACTURES	50 TO 100	SUITABLE FOR DEVELOPMENT THROUGH DUG WELLS. 10 TO 12 M BORE WELLS 100 M FEASIBLE IN FRACTURE ZONES, BEING INTERSECTION OF FRACTURES

PLATE - III

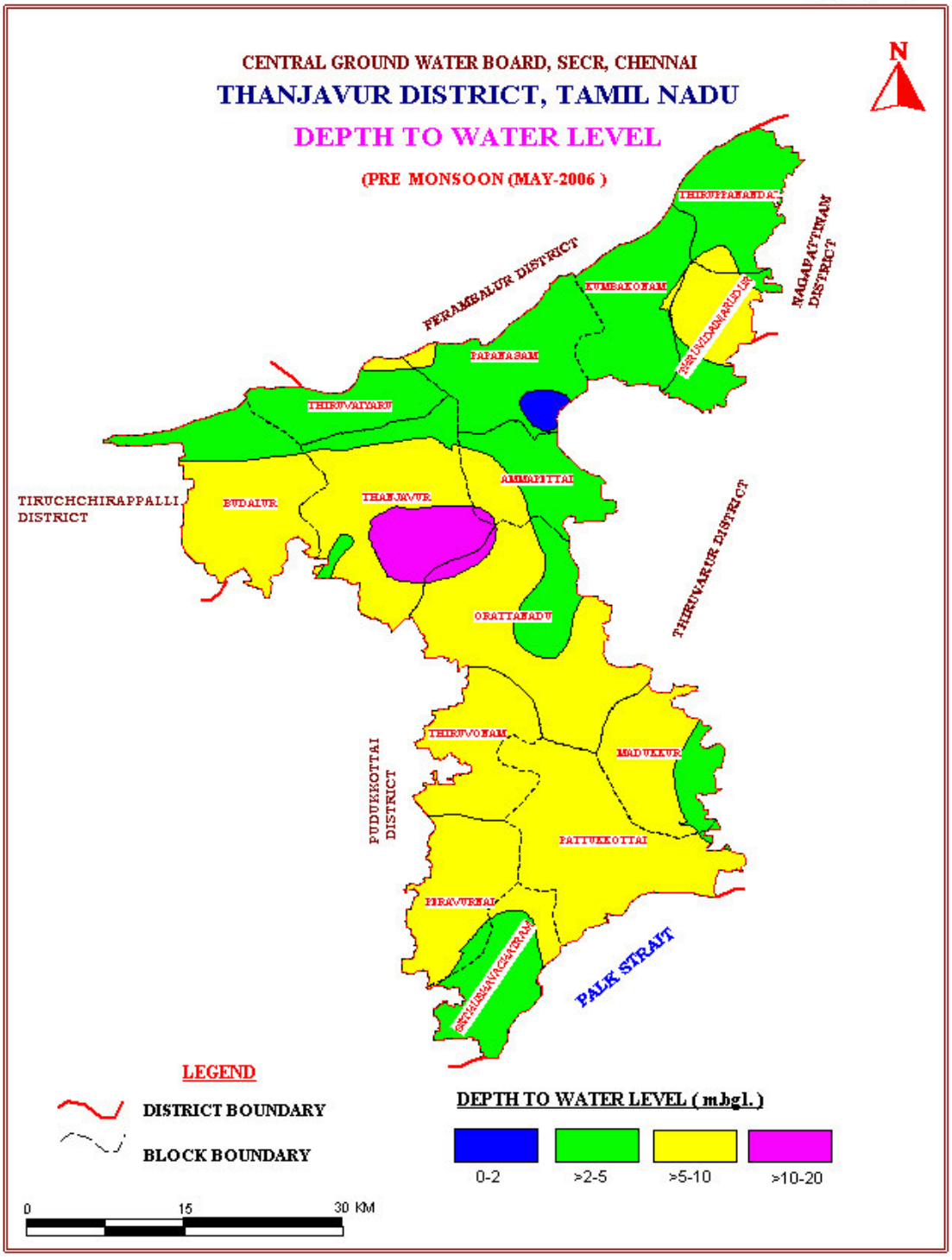

CENTRAL GROUND WATER BOARD, SECR, CHENNAI
THANJAVUR DISTRICT, TAMIL NADU
DEPTH TO WATER LEVEL
(PRE MONSOON (MAY-2006)
N
THIRUPPANANDAL
KUMBAKONAM
PAPANASAM
THIRUVAIYARU
THANJAVUR
ORATTANADU
THIRUVONAM
MADUKKUR
PATTUKKOTTAI
PERAVURANI
FERAMBALUR DISTRICT
NAGAPATTINAM DISTRICT
TIRUCHCHIRAPPALLI DISTRICT
THIRUVARUR DISTRICT
PUDUKKOTTAI DISTRICT
PALK STRAIT
LEGEND
DISTRICT BOUNDARY
BLOCK BOUNDARY
DEPTH TO WATER LEVEL (m.bgl.)
0-2
>2-5
>5-10
>10-20
0
15
30 KM

PLATE - IV

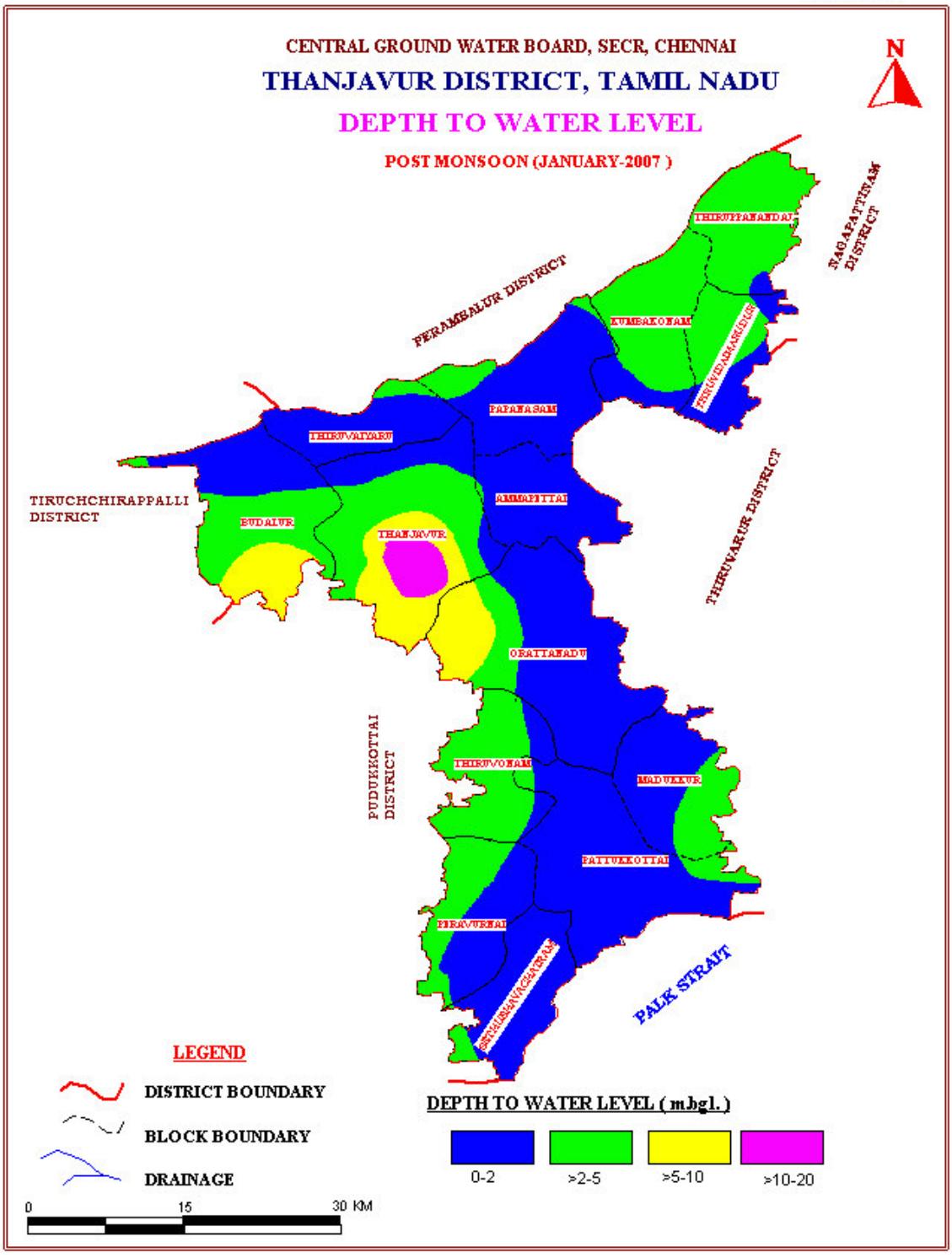
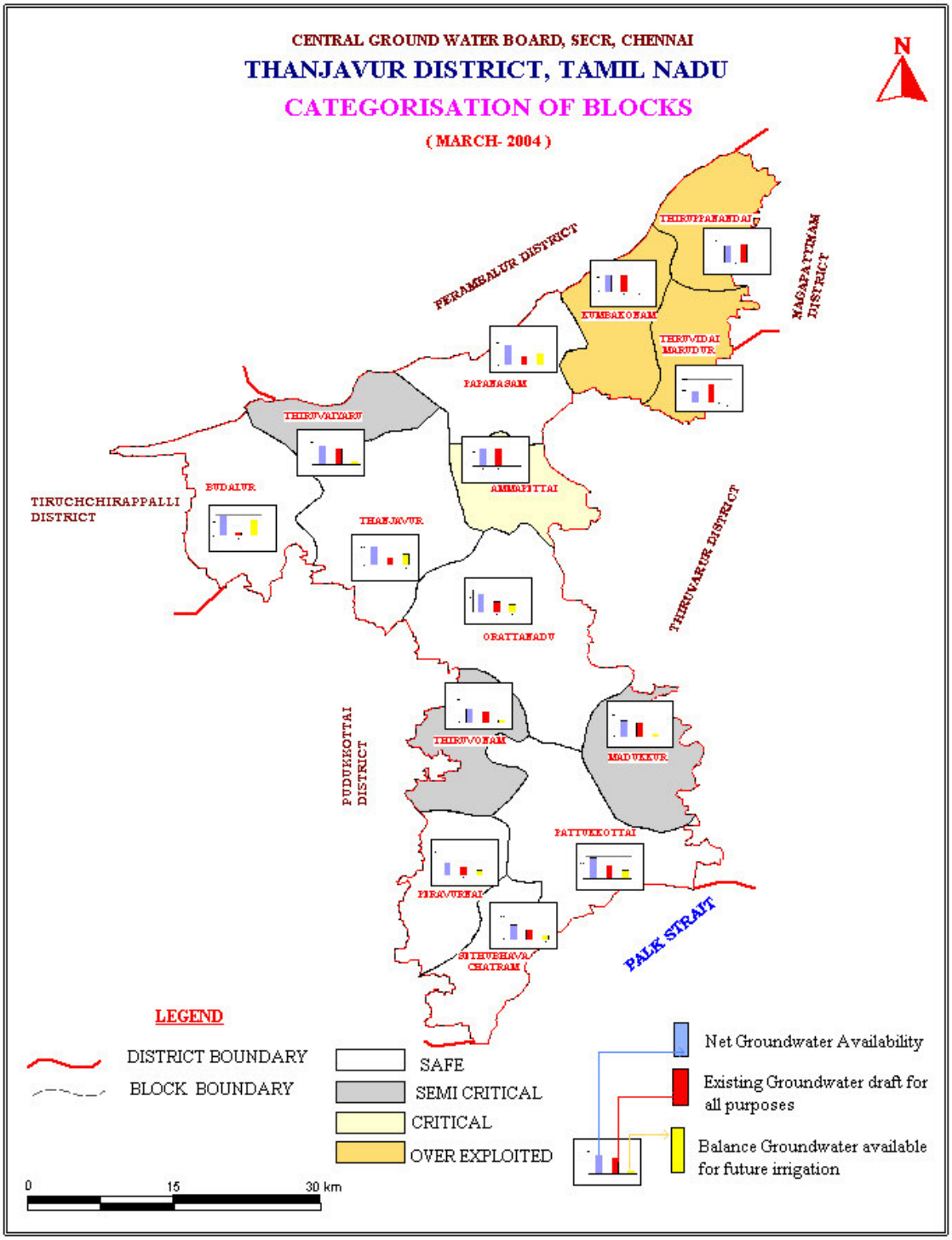

CENTRAL GROUND WATER BOARD, SECR, CHENNAI
THANJAVUR DISTRICT, TAMIL NADU
DEPTH TO WATER LEVEL
POST MONSOON (JANUARY-2007)
N
NAGAPATTINAM DISTRICT
PERAMBALUR DISTRICT
TIRUCHCHIRAPPALLI DISTRICT
THIRUVARUR DISTRICT
PUDUKKOTTAI DISTRICT
PALK STRAIT
THIRUPPANANDAL
KUMBAKONAM
PAPANASAM
THIRUVAIYARU
AMMAPETTAI
BUDALUR
THANJAVUR
ORATTANADU
THIRUVONAM
MADUKKUR
PATTUKKOTTAI
PERAVURANI
LEGEND
DISTRICT BOUNDARY
BLOCK BOUNDARY
DRAINAGE
0
15
30 KM
DEPTH TO WATER LEVEL (mbgl.)
0-2
>2-5
>5-10
>10-20

PLATE - V


CENTRAL GROUND WATER BOARD, SECR, CHENNAI
THANJAVUR DISTRICT, TAMIL NADU
CATEGORISATION OF BLOCKS
(MARCH- 2004)
N
PERAMBALUR DISTRICT
NAGAPATTINAM DISTRICT
TIRUCHCHIRAPPALLI DISTRICT
THIRUVARUR DISTRICT
PUDUKKOTTAI DISTRICT
PALK STRAIT
THIRUVAIYARU
BUDALUR
THANJAVUR
ORATTANADU
PAPANASAM
KUMBAKONAM
THIRUVIDAIMARUDUR
PATTUKKOTTAI
PERAVURANI
MADUKKUR
SITHUBHAVACHATRAM
LEGEND
DISTRICT BOUNDARY
BLOCK BOUNDARY
SAFE
SEMI CRITICAL
CRITICAL
OVER EXPLOITED
Net Groundwater Availability
Existing Groundwater draft for all purposes
Balance Groundwater available for future irrigation
0
15
30 km

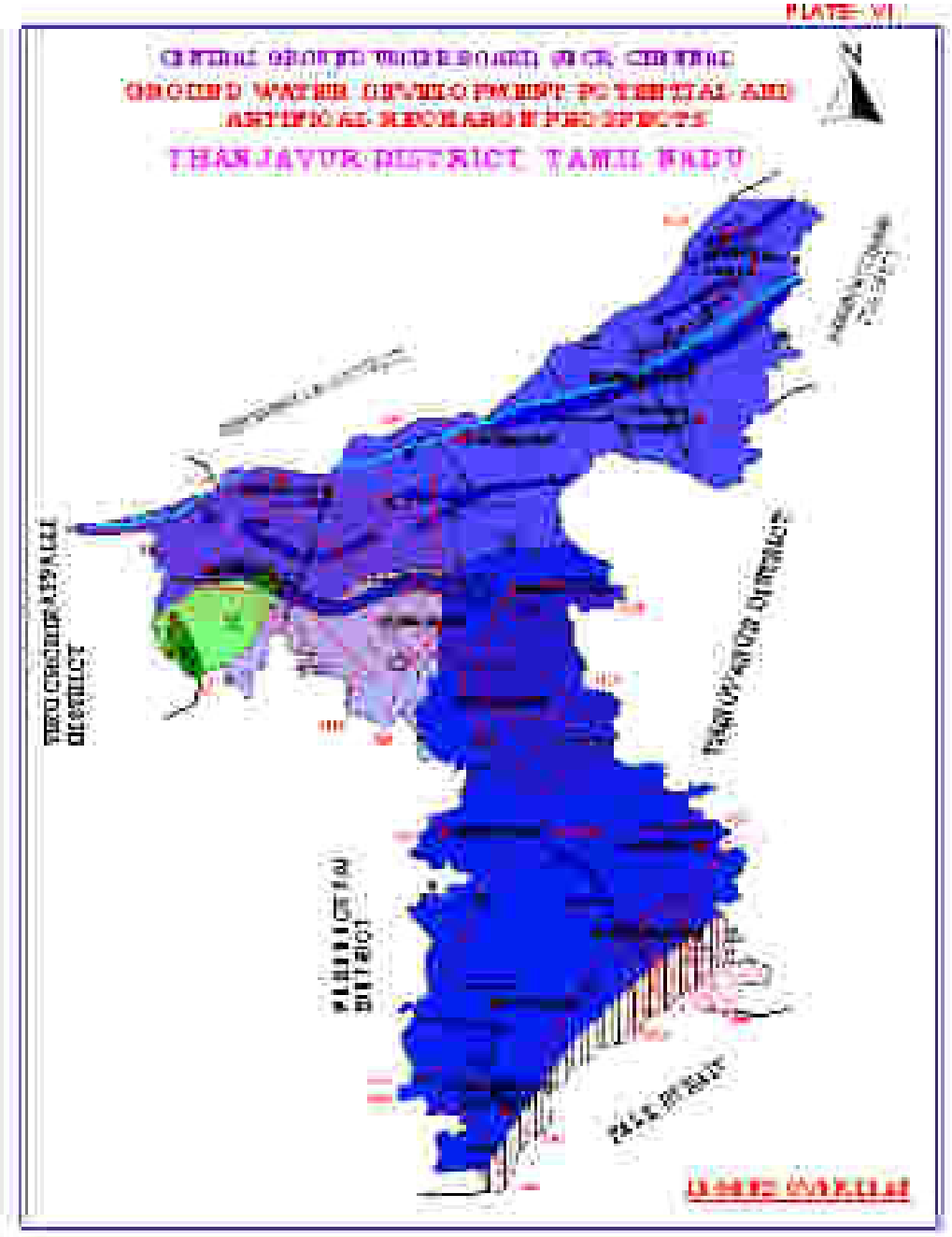
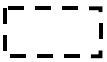
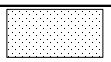
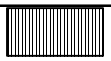


PLATE-VI
THANJAVUR DISTRICT TAMIL NADU

LEGEND FOR PLATE -VI

DISTRICT – TIRUVARUR

	Wells Feasible	Rigs Suitable	Depth of Well (m bgl)	Discharge (lpm)	Suitable Artificial Recharge Structures
 Soft Rock Aquifer	Dug Well Filter Point-Well Tube Well	Manual Hand Bore Direct Rotary	8 – 12 10 + 40 200 – 450	Less Than 300	Rain Water Harvesting /Check Dams /Percolation Pond/ Recharge Wells /Gabion Structures
 Soft Rock Aquifer	Dug Well Filter Point-Well Tube Well	Manual Hand Bore Direct Rotary	8 – 12 10 – 15 100 – 450	300 – 500	Rain Water Harvesting /Check Dams /Percolation Pond/ Gabion Structures
 Soft Rock Aquifer	Dug Well Dug Cum Bore Well Tube Well	Manual Manual + Rotary Direct Rotary	5 - 10 10 + 30 100 250	500 – 1700	Check Dams /Percolation Pond/ Recharge Wells/ Injection Wells
				District Boundary	
	Block Boundary			Palaeo Channel	
	District Headquarter			Block Headquarter	
	River		1250 	EC (Micro Siemens / Cm at 25°C)	
	Saline Zone			Nitrate Greater than Maximum Permissible Limit (45mg/L)	
	Thermal Water			Auto Flow Zone	
	Lineament		R	Recommended Site for Artificial Recharge Structure	

OTHER INFORMATION

Geographical Area	2082 Sq. Km.
Number of Blocks	10
Major Drainage	Arasalar, Vettar & Vennar
Population (2001)	11,65,213
Average Annual Rainfall	1245 Mm
Annual Range of Temperature	22 – 37°C
Regional Geology	**Soft Rocks:** Alluvium, Laterite, Sandstone and Shale
Net Ground Water Availability for future Irrigation	57 MCM/Yr
Stage of Ground Water Development (As on March 2004)	82 %
Name of Blocks Showing Intensive Ground Water Development	☆ **Over-Exploited**: Valangaiman ☆ **Critical**: Kodavasal

SAVE WATER

AND

CONSERVE WATER

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rdsecr-cgwb@nic.in