



For official use

Technical Report Series

**DISTRICT GROUNDWATER BROCHURE
VELLORE DISTRICT, TAMIL NADU**

**T. BALAKRISHNAN
SCIENTIST-D**

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

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DISTRICT AT A GLANCE (VELLORE DISTRICT)

S. No.	ITEMS	STATISTICS	
1.	GENERAL INFORMATION		
	i. Geographical area (Sq. km)	5920.18	
	ii. Administrative Divisions (As on 31-3-2007)		
	Number of Taluks	8	
	Number of Blocks	20	
	Number of Panchayats	753	
	Number of Villages	843	
	iii. Population (As on 2001 Census)		
	Total Population	3477317	
	Male	1741083	
	Female	1736234	
	iv. Annual Normal Rainfall (1901 –1980) (mm)	949.8	
2.	GEOMORPHOLOGY		
	i. Major physiographic Units	i) Hilly terrain in the eastern and south western parts and ii) Plain regions in the eastern part	
	ii. Major Drainage	Palar	
3.	LAND USE (Sq. km) (2005-06)		
	i. Forest area	1507.22	
	ii. Net area sown	2099.03	
	iii. Cultivable waste	2378.33	
4.	MAJOR SOIL TYPES	1. Sandy soil, 2. Sandy loam, 3. Red loam, 4. Clay, 5. Clay loam, 6. Black cotton soil	
5.	AREA UNDER PRINCIPAL CROPS (Ha) (2005-2006)	1. Paddy - 58163 2. Groundnut – 59842 3. Pulses – 20088 4. Sugarcane – 17202 5. Millet & other cereals - 24041 6. Cotton – 7013 7. Gingelly – 794	
6.	IRRIGATION BY DIFFERENT SOURCES (2005-06)	Number	Area irrigated (Ha)
	i. Dug wells	121644	69879
	ii. Tube wells	3719	11516

S. No.	ITEMS	STATISTICS	
	iii. Tanks	1355	21064
	iv. Canals	604	437
	v. Other Sources	---	449
	vi. Net irrigated area	103345 Ha	
	vii. Gross irrigated area	125328 Ha	
7.	NUMBER OF GROUND WATER MONITORING WELLS OF CGWB (As on 31.03.2007)		
	i. No. of dug wells	32	
	ii. No. of piezometers	23	
8.	PREDOMINANT GEOLOGICAL FORMATIONS	Alluvium, granite, gneisses and charnockite	
9.	HYDROGEOLOGY		
	i. Major water bearing formations	Fracture granites, gneisses and charnockites	
	ii. Pre- monsoon depth to water level (May 2006)	1.15 - 18.60	
	iii. Post- monsoon depth to water level (Jan'2007)	1 - 18.45	
	iv. Long term water level trend in 10 years (1998-2007) (m/year)	Annual	
		Rise	Fall
		Min: 0.0025 Max: 0.5264	Min :0. 0568 Max: 2.3958
10.	GROUND WATER EXPLORATION BY CGWB (As on 31-03-2007)		
	i. Number of Exploratory wells	49	
	ii. Number of Observation wells	22	
	iii. Number of Piezometers under Hydrology Project-I	30	
	iv. Depth range (m bgl)	57.3 – 200	
	v. Discharge (lps)	0.27 – 10.56	
	vi. Storativity (S)	$5.7 \times 10.5^{-5} - 9.2 \times 10^{-2}$	
	vii. Transmissivity (m^2/day)	1 to 134	
11.	GROUND WATER QUALITY AS ON MAY 2006		
	i. Presence of chemical constituents more than permissible limit	TH as CaCO ₃ , Cl and NO ₃	
	ii. Type of water	CaCl, NaCl and CaHCO ₃	
12.	DYNAMIC GROUND WATER RESOURCES (as on 31.03.2004) (MCM)		
	i. Annual Replenishable Ground Water Resources	984.84	
	ii. Total Annul Ground Water Draft for all purposes	1377.749	

S. No.	ITEMS	STATISTICS
	iii. Projected demand for Domestic and Industrial Uses up to 25 years 2029	42.80
	iv. Stage of Ground Water Development	144%
13.	AWARENESS AND TRAINING ACTIVITY	
	i. Mass Awareness Programs Organized	
	Year	2004-05
	Place	Sholinghur
	No. of Participants	500
	ii. Water Management Training Organized	
	Year	2004-05
	Place	Sholinghur
	No. of Participants	31
14.	EFFORTS OF ARTIFICIAL RECHARGE & RAINWATER HARVESTING	Technical Guidance were provided as when sought
	i. Projects completed by CGWB	
	Number of structures	Nil
	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	16
	ii. Number of Critical Blocks	1
	iii. Number of Blocks Notified	Nil
16.	MAJOR GROUND WATER PROBLEMS AND ISSUES.	The pollution from tanneries has caused deterioration of quality of ground water and soil in vast areas.
		The stage of ground water development in the district is 144% (As on 31st March 2004). Out of 20 blocks in the district, 16 blocks are having high level of ground water development. All the blocks in the district, except Arakonam, Kaveripakkam and Wallajah blocks, are vulnerable to water table depletion.
		The ground water in the phreatic zone may cause high to very high salinity

S. No.	ITEMS	STATISTICS
		hazard and medium to very 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.

1.0. INTRODUCTION

1.1. Administrative Details

Vellore district has been divided into 7 taluks, 24 blocks, 753 panchayats and 842 villages as detailed below.

S. No.	Taluk	No. of villages	Block	No. of villages
1	Arakonam	145	Arakonam	29
			Nemili	59
			Kaveripakkam	57
2	Wallajah	104	Wallajah	41
			Sholinghur	49
			Arcot (part)	14
3	Arcot	102	Arcot (part)	31
			Thimiri	71
4	Vellore	131	Vellore	30
			Kanniyambadi	30
			Anaicut	52
			Madhanur (part)	19
5	Gudiyatham	161	Gudiyatham	53
			Katpadi	28
			K.V.Kuppam	47
			Pernampattu (part)	33
6	Kanniyambadi	112	Pernampattu (part)	32
			Madhanur	28
			Alangayam	23
			Thirupathur	7
			Natrampalli	19
			Jolarpet	3
7	Thirupathur	87	Thirupathur (part)	13
			Natrampalli	9
			Jolarpet	24
			Alangayam	3
			Kandhili	38
	Total	842		842

1.2 Basin and sub-basin

Major part of the district falls in Palar river basin.

1.3 Drainage

Palar River is the major river draining the district, flowing towards east for a distance of about 295 km. It runs parallel to the hill ranges of the Eastern Ghats for a major part of its course. It has a vast flood plain in the lower reaches, but is dry for major part of the year. Ponnaiyar, Cheyyar, Pambar and Malattar are some of the major tributaries of Palar draining the district. Almost all the streams are ephemeral in nature and are mostly structurally controlled.

1.4 Irrigation Practices

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

S. No.	Classification	Area (Ha)
1	Forests	150722
2	Barren & Uncultivable Lands	24379
3	Land put to non agricultural uses	83735
4	Cultivable Waste	5513
5	Permanent Pastures & other grazing lands	3998
6	Groves not included in the net area sown	2976
7	Current Fallows	55061
8	Other Fallow Lands	55731
9	Net Area sown	209903
	Total	592018

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

The block-wise number of irrigation sources in Vellore district is given in the Table below.

Block-wise number of Irrigation sources in Vellore district, Tamil Nadu

Block	Tube wells	Govt. wells			Private wells			Grand total of all types of wells	Wells used for domestic purpose
		Masonry	Non-Masonry	Total	Masonry	Non-Masonry	Total		
Arakonam	479	0	0	0	2169	496	3144	4623	1850
Kaveripakkam	202	0	0	0	4373	657	5232	5434	2209
Nemili	265	0	0	0	7323	348	7936	8201	1680
Wallajah	18	9	7	16	2892	700	3626	4660	2250
Sholinghur	11	0	0	0	5800	760	6571	6582	3574
Thimiri	39	0	0	0	7462	1384	8885	8924	3329
Arcot	89	0	0	0	5410	370	5869	5958	2385
Vellore	73	0	0	0	3235	917	4225	5298	2398

Block	Tube wells	Govt. wells			Private wells			Grand total of all types of wells	Wells used for domestic purpose
		Masonry	Non-Masonry	Total	Masonry	Non-Masonry	Total		
Anaicut	202	0	0	0	4789	684	5675	6877	2267
Kanniyambadi	224	0	0	0	7790	1372	9386	9610	2892
Katpadi	67	0	0	0	2298	1085	3450	4517	2069
K.V.Kuppam	180	0	0	0	8484	1303	9967	9967	2296
Gudiyatham	771	0	0	0	3183	96	4050	4841	7032
Pernampattu	661	0	0	0	7327	810	8798	8859	5036
Madhanur	67	0	0	0	4266	1330	5663	5690	9059
Alangayam	17	0	0	0	3104	2553	5674	5691	2519
Natrampalli	124	0	0	0	2773	2118	5015	5139	2442
Jolarpet	45	0	0	0	3580	4260	7885	7930	3366
Thirupathur	45	0	0	0	4083	2672	6800	6845	3307
Kandhili	140	0	0	0	3889	3483	7512	7552	3095
Total	3719	9	7	16	94328	27398	125363	133198	65055

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

A perusal of the above table reveals that the chief source of irrigation in the area is ground water through dug wells. Well irrigation is highest in Pernampattu block followed by Kaveripakkam, Kandhili, Gudiyatham, Nemili, Anaicut, Thirupathur, K.V.Kuppam, Madhanur, Alangayam, Thimiri, Natrampalli, and Sholinghur blocks.

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

S. No	Block	Net area irrigated by					Total Net Area irrigated
		Canals	Tanks	Tube wells	Ordinary wells	Other Sources	
1	Arakonam	0	1436	1429	2238	145	5248
2	Kaveripakkam	0	2700	2526	5725	80	11031
3	Nemili	0	3209	2634	5043	116	11002
4	Wallajah	226	2910	157	1878	0	5171
5	Sholinghur	0	2343	37	2782	0	5162
6	Thimiri	0	4080	973	3260	48	8361
7	Arcot	0	2896	581	1824	60	5358
8	Vellore	0	0	1	1511	0	1512
9	Anaicut	0	0	1	4483	0	4484
10	Kanniyambadi	0	0	0	2253	0	2253
11	Katpadi	0	375	4	1928	0	2307
12	K.V.Kuppam	0	18	40	4039	0	4097
13	Gudiyatham	0	0	587	5242	0	5829
14	Pernampattu	0	0	801	5736	0	6537
15	Madhanur	0	0	88	3894	0	3982

S. No	Block	Net area irrigated by					Total Net Area irrigated
		Canals	Tanks	Tube wells	Ordinary wells	Other Sources	
16	Alangayam	121	297	438	3306	0	4162
17	Natrampalli	56	93	18	2889	0	3056
18	Jolarpet	0	679	712	1897	0	3288
19	Thirupathur	0	0	476	4288	0	4764
20	Kandhili	34	28	13	5666	0	5741
	Total	437	21064	11516	69879	449	103345

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

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

CGWB has constructed exploratory bore wells (27 Nos.) and observation wells (12 Nos.) as part of its Ground Water Exploration programme in hard rock areas of Tamil Nadu during 1995-97. Exploratory wells (22 Nos.) and observation wells (10 Nos.) were constructed by CGWB during 1998-99. Piezometers (30 Nos.) were constructed in the district under Hydrology Project-I.

The officers of CGWB carried out systematic hydrogeological surveys during 1980-1989. Reappraisal Hydrogeological surveys to assess the ground water regime were taken up during 1994-95. Detailed studies were carried out on various aspects of ground water pollution due to tannery effluents in Ambur, Ranipet and Wallajah areas by CGWB during 1991-92. The officers of the Board also took up a number of water supply investigations in the district.

2.0. RAINFALL AND CLIMATE

Vellore district receives rainfall from both southwest and northeast monsoons. The annual normal rainfall (1901-80) for the district is 949.8 mm. The contribution of southwest monsoon ranges from 45 to 52 percent, whereas it ranges from 30-43 percent due to northeast monsoon.

The district enjoys a tropical climate. The highest temperatures are recorded during May and June. The mean daily minimum and maximum temperature are 18.2 to 36.8° C. The relative humidity ranges from 37 to 85 percent.

3.0. GEOMORPHOLOGY AND SOIL TYPES

3.1. Geomorphology

The following major geomorphic landforms have been identified from LANDSAT (MASS) and Indian Remote Sensing Satellite (IRS) data.

- | | |
|---------------------|---------------------|
| 1) Structural hills | 2) Residual hills |
| 3) Plateaus | 4) Valley fills |
| 5) Pediments | 6) Buried pediments |
| 7) Pediplains and | 8) Alluvial plains |

A number of lineaments have been identified from remotely sensed data. In the eastern and southwestern part of the district, the predominant trend of lineament is NE-SW, whereas in the central part, both NE-SW and NW-SE trending lineaments have been identified. Traces of major lineaments identified in the area have been shown in hydrogeological map of the area.

Vellore district can be classified into two major physiographic divisions viz., i) Hilly terrain in the eastern and southwestern parts and ii) Plain regions in the eastern part. The landscape in the hilly terrain is undulating to rugged, flanked by hill ranges belonging to Eastern Ghats. The major hill ranges in the district are those belonging to Jawadu, Elagiri and Kalrayan hills. The eastern part of the district is a gently undulating plain dotted with isolated hillocks with sharply rising peaks, sloping towards east.

3.2 Soils

Soils have been classified into 1) Sandy soil 2) Sandy loam 3) Red loam 4) Clay 5) Clayey loam and 6) Black cotton soils. The red loamy soils are generally observed at the highest elevations whereas the black cotton soils invariably occupy the valley areas. Other types of soils are found at Intermediate elevations.

4.0. GROUND WATER SCENARIO

4.1 Hydrogeology

Vellore district is underlain by geological formations ranging in age from Archaean to Recent. In the crystalline formations comprising charnockites, gneisses and granites. In the consolidated formations, primary depositional features such as grain size are the major controlling factors.

Ground water occurs under phreatic conditions in the weathered zone and under semi-confined conditions in the fractures. The thickness of weathered zone varies from less than a metre to about 15 m in the area depending on the topography. Potential aquifer zones are also developed in these rocks by fractures persisting to depths, particularly along lineaments and their inter sections. The depth of dug wells in crystalline formations varies from 8 – 19.5 m bgl. Fracture zones have been encountered in the well down to a depth of 116 m bgl in the borehole drilled by CGWB. The thickness of alluvium along the course of Palar River ranges from 8 – 12 m.

In Gondwana formations, ground water abstraction is through dug wells and dug cum bore wells. These formations have considerably low yield potentials compared to both

hard rock and alluvium. Depth of dug wells in Gondwana sediments varies from 6 – 15 m bgl with extension of bores at the bottom ranging in depth from 15 – 25 m.

Dug wells are the most common structures in recent alluvial formations too. The depth of dug wells tapping Palar alluvium ranges from 4 – 18.70 m bgl. These formations have moderate to good yield potential in the district and can sustain pumping for 3-4 hrs even during peak summer months and have yield up to 4.6 lps. Filter points of 10 – 15 m bgl depth are also being used in these formations for tapping ground water for domestic purposes.

The yield of dug wells is less than <1 lps in massive crystalline rocks whereas it is up to 2.3 lps in highly weathered gneisses. The specific capacity of wells tested in the district ranged from 18.82 to 80.58 lpm/m/dd.

The yield of exploratory wells drilled in crystalline rock areas of the district ranged from 0.27 to 10.55 lps. The specific capacity of bore wells ranged from 0.738 to 23.41 lps/m/dd. While the exploratory wells in alluvium have yields in the range of 3 – 7 lps.

During May 2006, the depth to water levels in observation wells tapping shallow aquifer ranged from 1.15 – 18.60 m bgl. Shallow ground water levels i.e. less than 5 m bgl were prominently observed in observation wells at Arcot, Girisamudram, Rangavaram, Ranipet and Vishram, and comparatively deeper ground water levels (10 – 20 m bgl) at Asanampatti, Kandhili, K.V.Kuppam, Madhanur, Paradarami, Thirupathur and Thimiri.

Depth to ground water levels during January 2007 ranged from 1 to 18.45 m bgl. Water levels were within 2 m bgl in isolated pockets in Echipudur and Ranipet and resulted in localised seasonal water logging conditions. Deeper ground water levels (10 – 20 m bgl) still persisted in the pockets of Asanampattu, Kandhili, K.V.Kuppam, Madhanur, Paradarami-I, Pernampattu, Thirupathur and Thimiri.

The depth to piezometric surface of the deeper fractured aquifers ranged from 3.78 – 21.70 m bgl during pre monsoon and 2.08 to 8.02 m bgl during post monsoon period.

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 ranges from 0.0025 to 0.5264 m/year. The fall in water level ranges between 0.0568 and 2.3958 m/year.

4.1.2 Aquifer Parameters

The aquifers were found to have transmissivity ranging from 1 to 134 m²/day and the storativity varies between 5.7×10^{-5} and 9.2×10^{-2} .

The transmissivity of the alluvial aquifer is between 200 and 300 m²/day and its hydraulic conductivity ranged from 20 – 30 m/day.

4.2. Ground Water Resources

The ground water resources have been computed jointly by CGWB and State Ground & Surface Water Resources and Data Centre, PWD, WRO, Government of Tamil Nadu as on 31st 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.

4.3. Ground Water Quality

Ground water in phreatic aquifers in Vellore district is, in general, colourless, odourless and slightly alkaline in nature. The specific electrical conductance ($\mu\text{S}/\text{cm}$ at 25°C) of ground water in the phreatic zone during May 2006 was in the range of 935 to 7920 in the district. Conductance below 750 has been observed only in select pockets of the district.

It is observed that the ground water is suitable for drinking and domestic uses in respect of all the constituents except total hardness, Chloride and Nitrate. In about 42% of samples, nitrate concentration is above permissible limits of 100 mg/l. The incidence of high total hardness is attributed to the composition of litho units constituting the aquifers in the district, whereas nitrate pollution is most likely due to the use of fertilizers and other improper waste disposal.

Sodium Adsorption Ratio (SAR), values range from 2.4 to 19.6. With regard to irrigation suitability based on specific electrical conductance and SAR it is observed that the ground water in the phreatic zone may cause high to very high salinity hazard and medium to very 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.

The pollution from tanneries has caused irrevocable deterioration of quality of ground water and soil in vast areas. There is an urgent need to arrest/prevent further deterioration of ground water and soil quality through a comprehensive plan. Providing common effluent treatment plant (CETP) and adoption of environment friendly technologies for tanning and safe disposal of waster in the area.

Stage of Groundwater Development in Vellore district, Tamil Nadu as on 31st March 2004 (Ham)									
S. No.	Name of Groundwater Assessment Unit: 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 up to next 25 years (2029)	Net groundwater Availability for future Irrigation Development	Stage of Groundwater Development (%)	Categorization for Future groundwater development (Safe/Semi Critical/Critical/Over Exploited)
1	Alangayam	4449.90	6141.18	172.67	6313.84	179.57	-1870.85	142	Over Exploited
2	Anaicut	5430.50	7581.43	128.91	7710.34	134.07	-2285.00	142	Over Exploited
3	Arakonam	5074.82	3682.59	161.97	3844.57	168.45	1223.78	76	Semi Critical
4	Arcot	4811.50	5306.34	205.57	5511.91	213.79	-708.63	115	Over Exploited
5	Gudiyatham	5152.47	9925.81	210.28	10136.09	218.69	-4992.03	197	Over Exploited
6	Jolarpet	3697.90	6761.35	262.86	7024.20	273.36	-3336.81	190	Over Exploited
7	K.V.Kuppam	4614.25	7814.84	193.43	8008.27	201.16	-3401.75	174	Over Exploited
8	Kandhili	5175.17	8489.57	249.84	8739.41	259.83	-3574.23	169	Over Exploited
9	Kanniyambadi	3332.39	5686.20	100.05	5786.26	104.05	-2457.87	174	Over Exploited
10	Katpadi	2782.47	3700.99	195.98	3896.97	203.82	-1122.34	140	Over Exploited
11	Kaveripakkam	7366.77	6468.74	324.75	6793.49	337.74	560.30	92	Semi Critical
12	Madhanur	5449.84	9329.30	122.19	9451.49	127.07	-4006.54	173	Over Exploited
13	Natrampalli	2880.98	4685.87	163.07	4848.94	169.59	-1974.48	168	Over Exploited
14	Nemili	7858.40	6871.21	299.39	7170.61	311.36	675.82	91	Critical
15	Pernampattu	4828.50	9526.49	164.86	9691.35	171.45	-4869.44	201	Over Exploited
16	Sholinghur	6025.91	6788.75	260.35	7049.10	270.76	-1033.60	117	Over Exploited
17	Thimiri	8517.05	10158.25	256.45	10414.69	266.70	-1907.90	122	Over Exploited
18	Thirupathur	4996.48	9420.03	203.87	9623.91	212.02	-4635.58	193	Over Exploited
19	Vellore	2214.68	2484.70	206.78	2691.48	215.05	-485.07	122	Over Exploited
20	Wallajah	3824.69	2834.96	232.21	3067.16	241.49	748.24	80	Semi Critical
	Total	98484.67	133658.60	4115.49	137774.09	4280.03	-39453.96	143.82	

4.4. Status of Ground Water Development

The estimation of ground water resources for the district has shown that 16 blocks are over exploited and 1 block is under critical category.

The shallow alluvial aquifer along Palar River provides drinking water supply for a number of urban and rural habitations in the district.

Development of ground water in the district for irrigation is through dug wells, dug cum bore wells fitted with electrical or diesel operated pump sets. Dug wells are the most common ground water abstraction structure in the weathered crystalline rocks. The yield of dug wells can be improved at favourable locations by construction of extension bores of 20 – 40 m length at the bottom.

TWAD Board, Govt. of Tamil Nadu has implemented major water supply schemes in the district depend on ground water supply from Palar riverbed. The status of water supply schemes of major urban areas in the district is furnished in the Table given below.

In addition, a number of bore wells fitted with hand pumps by TWAD Board also serve as water supply sources to the urban populace. In rural sector, drinking and domestic needs are met with through dug wells and bore wells in addition to numerous mini water supply schemes and integrated rural water supply schemes executed by the state Govt. About 98 percent villages in the district have been provided with protected water supply scheme.

5.0. GROUNDWATER MANAGEMENT STRATEGY

5.1. Groundwater Development

Based on the estimation of resources, 16 blocks viz. Alangayam, Anaicut, Arcot, Gudiyatham, Jolarpet, K.V.Kuppam, Kandhili, Kanniyambadi, Katpadi, Madhanur, Natrampalli, Pernampattu, Sholinghur, Thimiri, Thirupathur and Vellore have been Categorized as *over exploited* and the Nemili block has been categorized as *Critical*. As such, these blocks are not to be considered for any further development of ground water unless the re-estimation of the resources is completed and the balance potential computed. Ground water development therefore should be taken up in a judicious manner in the remaining 3 blocks viz., Arakonam, Kaveripakkam and Wallajah. The present stage of ground water development in Vellore district is 140 percent and 39454 ham ground water is available for future irrigation development. The present demand for domestic and industrial water supply is estimated as 4115 ham/annum and the ultimate water requirement for domestic and industrial uses up to 2025 is 4280 ham.

Status of Drinking Water Supplies in Urban areas, Vellore district (As on 11998)

S. No.	Name of the Town	Population	Source of supply	Total Quantum supplied (lpd)	Remarks
1	Thirupathur	55,282	2 infiltration wells in Palar river bed	35,00,000	Water scarcity during summer. New Scheme proposed
2	Kanniyambadi	77,026	3 Infiltration wells in Palar river bed (Kodayanji)	55,00,000 10,00,000 (Summer)	New World Bank scheme under execution
3	Gudiyatham	83,232	2 Infiltration wells at Pasumattur and 2 at Bodipettai in Palar river bed	47,00,000	Water supply on alternate days
4	Pernampattu	36,206	2 dug wells and 1 infiltration well in Malattar river bed near Madinapalli	23,00,000	--
5	Ambur	75,828	3 infiltration wells in Palar river bed at Pachakuppam and 5 bore wells near Anaimadu	54,00,000	Sources getting polluted due to tannery effluents new bore wells required to augment supply
6	Vellore	1,72,464	Infiltration wells in Palar river bed	1,03,70,000	New source from Palar river proposed

(Source: TWAD Board, Government of Tamil Nadu)

The ground water plays a major role in the irrigation activities of the district. There are about 125363 ground water abstraction structures in the district. They contribute about 79% (81395 ha) of net area irrigated. It is estimated that the average draft per dug well and shallow tube well is in the order of 1 – 2 ham and 2.5 ha.m/year respectively.

The analysis of ground water level data has indicated that the pre monsoon (May 2006) ground water levels are within 10 m, bgl in about 62 percent of the wells analyzed. The seasonal fluctuation of ground water levels is less than 3 m in almost an equal measure. Hence, in the area underlain by crystalline formations, dug wells, dug cum bore wells or bore wells could be constructed in depending upon the local geomorphological conditions, thickness and nature of weathered zone. In the area underlain by recent alluvium, flood plain deposits and valley fills in crystalline rocks, dug wells or shallow filter point wells may be constructed.

5.2. Water Conservation and 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 Rs4000/- for small and marginal farmers and Rs2000/- 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 Vellore district are shown in Plate-VI.

6.0. AWARENESS & TRAINING ACTIVITY

6.1 Mass Awareness Campaign (MAP) & Water Management Training Programme (WMTP) by CGWB

CGWB, SECR, Chennai conducted mass awareness program and water management training program during the AAP 2004-05 at Sholinghur, Vellore district.

7.0. AREA NOTIFIED BY CGWA/SGWA

Central Ground Water Authority has notified Pernampattu block for registration of ground water structures in. Government of Tamil Nadu vide G.O.No. 53 has restricted groundwater development for irrigation in the over exploited blocks of Tamil Nadu. The over exploited blocks in this district are as follows.

- | | |
|------------------|-----------------|
| 1) Alangayam | 2) Katpadi |
| 3) Anaicut | 4) Madhanur |
| 5) Arcot | 6) Natrampalli |
| 7) Gudiyatham | 8) Pernampattu |
| 9) Jolarpet | 10) Sholinghur |
| 11) K.V.Kuppam | 12) Thimiri |
| 13) Kandhili | 14) Thirupathur |
| 15) Kanniyambadi | 16) Vellore |

8.0. RECOMMENDATIONS

No further development of ground water resources should be taken up in areas categorized as “Over Exploited or Critical”

There is an urgent need to replenish the ground water resources through construction of appropriate ground water conservation/Artificial recharge structures.

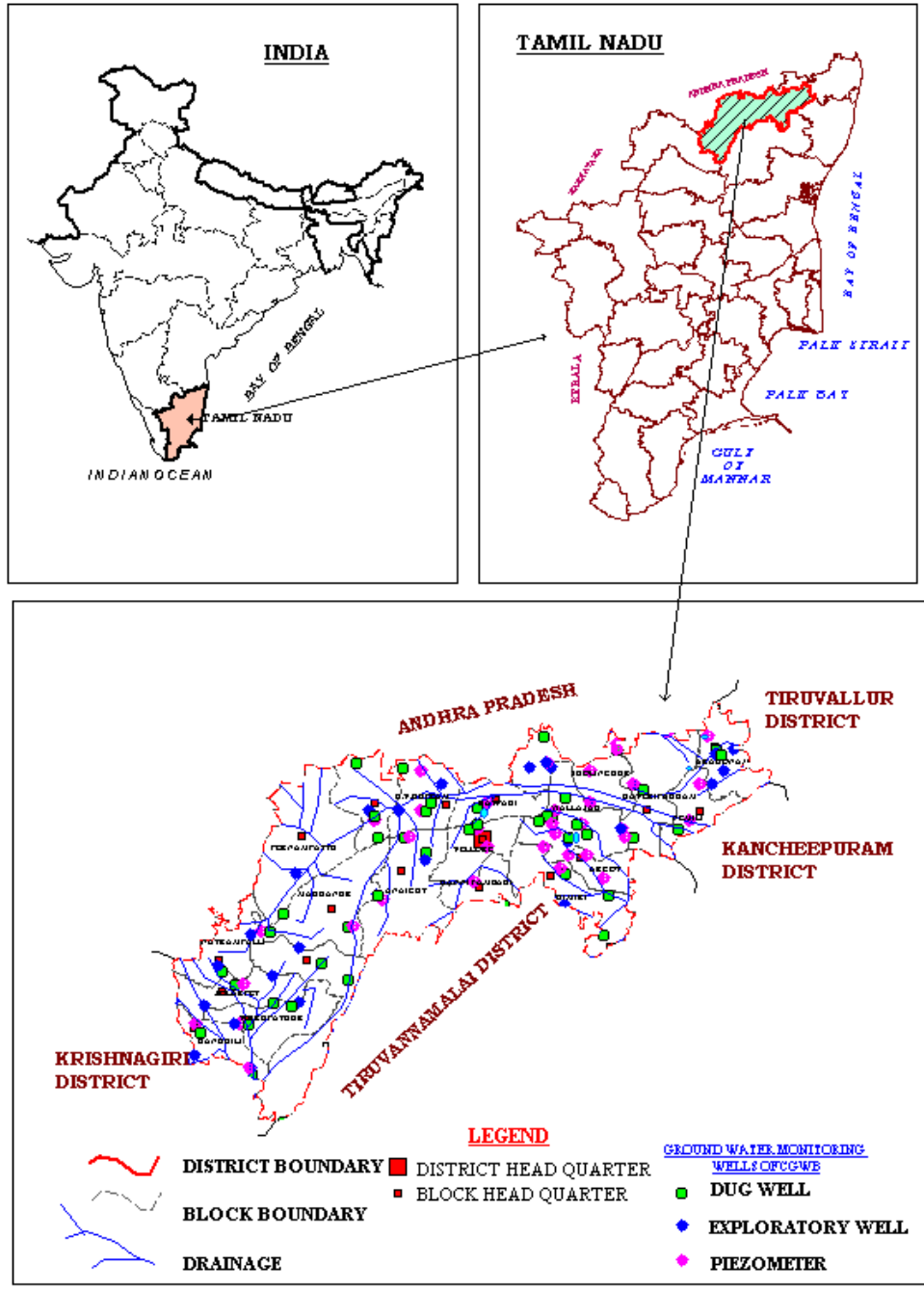
There is an urgent need to arrest/prevent further deterioration of ground water and soil quality through a comprehensive plan incorporating measures Viz., CETP for industrial areas.

In the areas already affected by ground water pollution, cultivation of suitable salt tolerant crops/fodder can be taken up in consultation with the Department of Agriculture.

CENTRAL GROUND WATER BOARD, SECR, CHENNAI
VELLORE DISTRICT, TAMIL NADU

LOCATION

(NOT TO SCALE)



LEGEND FOR PLATE - II

ADMINISTRATIVE SETUP

- DISTRICT BOUNDARY
- BLOCK BOUNDARY
- HILLY AREA

GROUND WATER HYDROLOGY

- EXPLORATORY BORE WELL [CGWB]
- HIGH YIELDING BORE WELL [CGWB]
- FLUORIDE > 1.5 [mg/l]

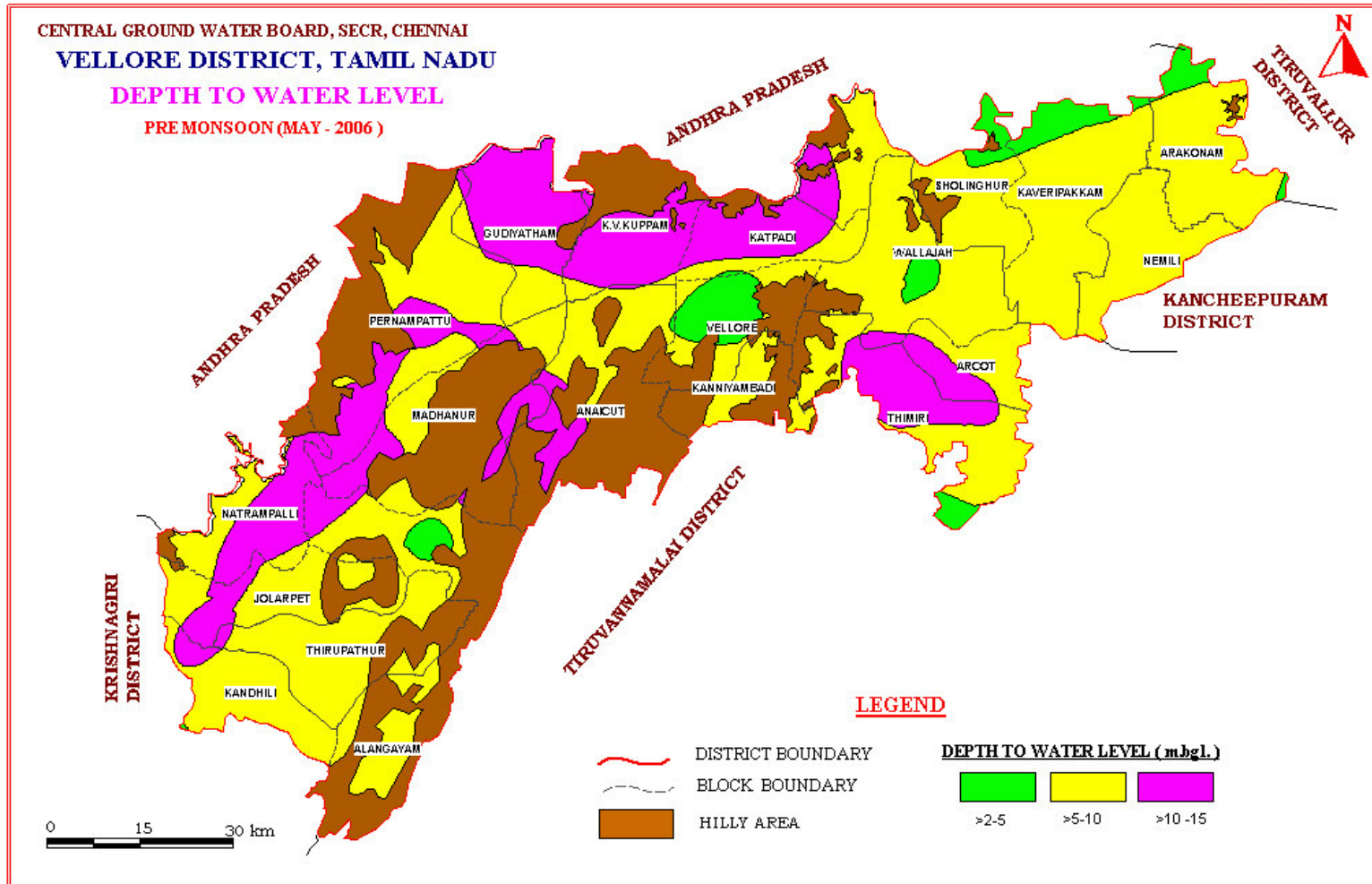
HYDROCHEMISTRY

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

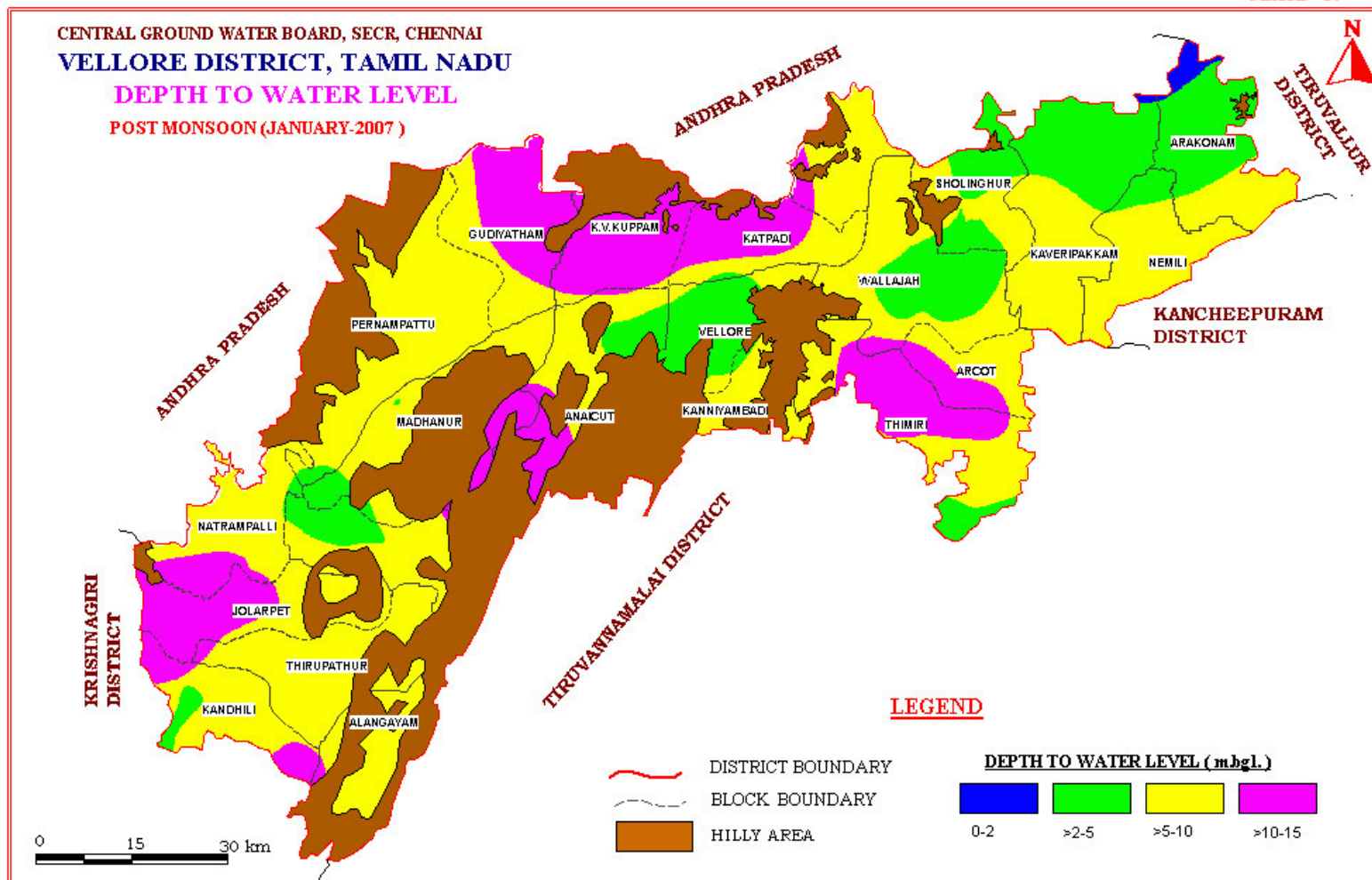
STRUCTURE

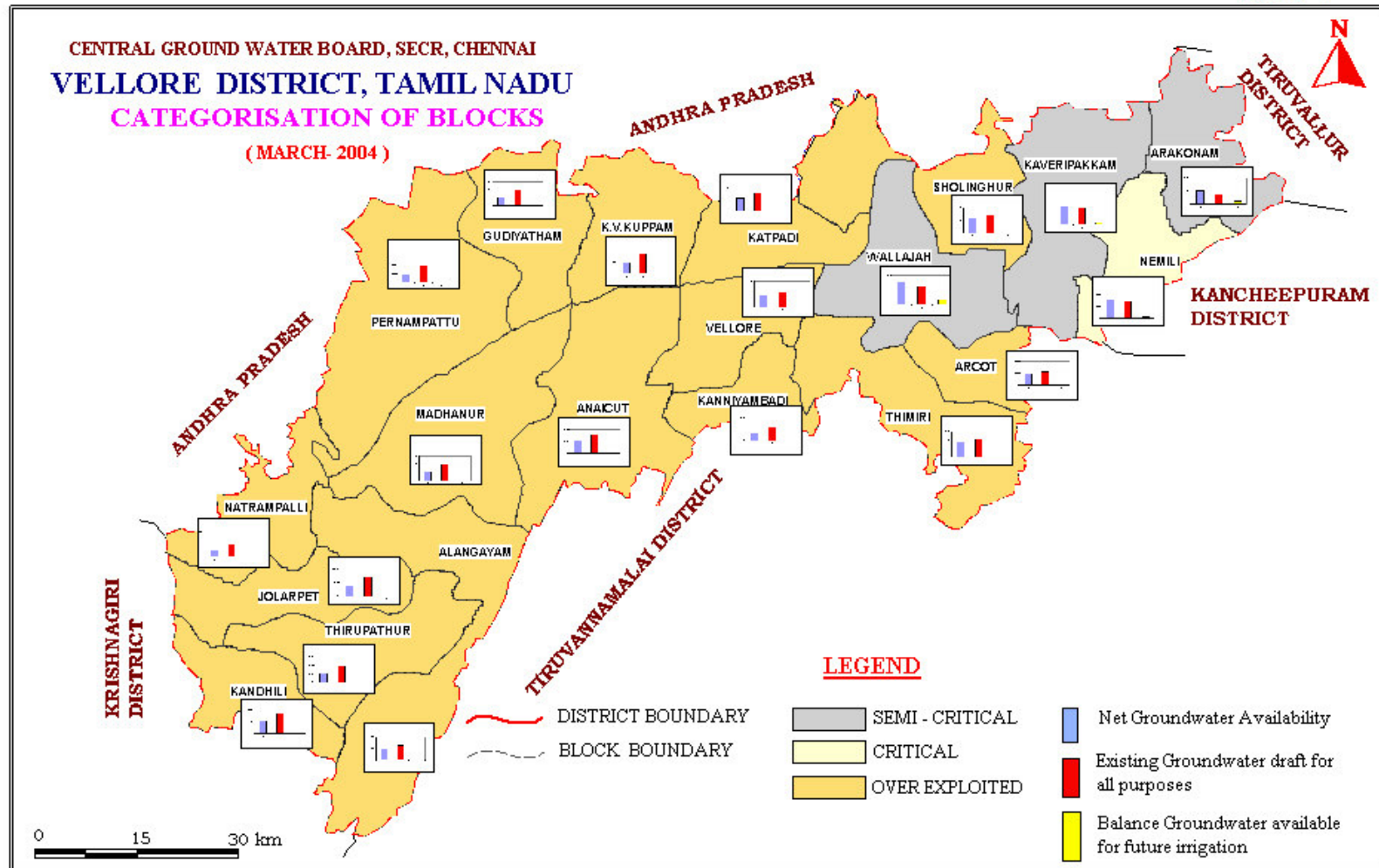
- TRACE OF LINEAMENT

<u>AQUIFER</u>	<u>AGE</u>	<u>LITHOLOGY</u>	<u>GROUND WATER CONDITIONS</u>	<u>YIELD PROSPECTS (lpm)</u>	<u>GROUND WATER DEVELOPMENT STRATEGIES</u>	
	UNCONSOLIDATED	RECENT	RIVER ALLUVIUM FLOOD PLAIN DEPOSITS	DISCONTINUOUS, THIN, UNCONFINED TO SEMI-CONFINED AQUIFERS	= 200	DEVELOPMENT THROUGH LARGE DIAMETER DUG WELLS AND SHALLOW FILTER POINT WELLS
	CONSOLIDATED	ARCHAIC	GRANITE, GNEISSES AND CHARNOCKITE	DISCONTINUOUS, UNCONFINED TO SEMI-CONFINED AQUIFERS, RESTRICTED TO WEATHERED RESIDUUM AND FRACTURES	50 - 200	SUITABLE FOR DEVELOPMENT THROUGH DUG WELLS, BOREWELLS FEASIBLE IN FRACTURE ZONES, BEST LOCATIONS BEING INTERSECTION OF FRACTURES

















CENTRAL GROUND WATER BOARD, SECR, CHENNAI
VELLORE DISTRICT, TAMIL NADU
DEPTH TO WATER LEVEL
 POST MONSOON (JANUARY-2007)





LEGEND FOR PLATE-VI

DISTRICT - VELLORE

	Wells Feasible	Rigs Suitable	Depth of Well (m bgl)	Discharge (LPM)	Suitable Artificial Recharge Structures
 Soft Rock Aquifer	Dug Well	Manual	6 – 15	100 – 300	Check dams
 Hard Rock Aquifer	Dug Well Bore Well	Manual DTH	10 – 20 60 - 120	10 - 60	Gully Plugs / Check dams
 Hard Rock Aquifer	Dug Well Bore Well	Manual DTH	10 – 20 60 - 120	60 - 180	Check dams / Percolation Ponds
	District Boundary			Block Boundary	
	District Headquarter			Block Headquarter	
	Water Level-Pre-Monsoon (Decadal Mean 1993-2002) m bgl			EC (Micro Siemens / cm at 25°C)	
	River			Lineament	
	Fluoride Greater Than Maximum Permissible Limit (1.5 mg/l)			Nitrate greater than maximum permissible limit (45 mg/l)	
	Hilly Area				

OTHER INFORMATION

Geographical Area	5920.18 Sq. Km
Number of blocks	20
Major drainage	Palar
Population (2001)	34,77,317
Average Annual Rainfall	949.8 mm
Annual Range of Temperature	18.2 – 36.8° C
Regional Geology	Soft Rocks: Alluvium Hard Rocks: Granites, Gneisses & Charnockites
Net Ground Water Availability for Future Irrigation	Nil
Stage of Ground Water Development (As on March 2004)	144%
Names of Blocks Showing Intensive Ground Water Development	<p>★ Over Exploited – Alangayam, Anaicut, Arcot, Gudiyatham, Jolarpet, K.V.Kuppam, Kandhili, Kanniyambadi, Katpadi, Madhanur, Natrampalli, Pernampattu, Sholinghur, Thimiri, Thirupathur & Vellore</p> <p>★ Critical - Nemili</p>

SAVE WATER
AND
CONSERVE WATER