



For official use

Technical Report Series

**DISTRICT GROUNDWATER BROCHURE
VILLUPURAM DISTRICT, TAMIL NADU**

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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 (VILLUPURAM DISTRICT)

S. No.	ITEMS	STATISTICS	
1.	GENERAL INFORMATION		
	i. Geographical area (Sq. km)	7222	
	ii. Administrative Divisions (As on 31-3-2007)		
	Number of Taluks	7	
	Number of Blocks	22	
	Number of Panchayats	1104	
	Number of Villages	1490	
	iii. Population (As on 2001 Census)		
	Total Population	29,60,373	
	Male	14,92,442	
	Female	14,67,931	
	iv. Average Normal Rainfall (1901-1980) (mm)	1119.8	
2.	GEOMORPHOLOGY		
	i. Major physiographic Units	i) Structural hills, Residual and denudational hills; Shallow and buried pediments; Older & younger flood plains and Beach landforms	
	ii. Major Drainage	Ponnaiyar, Malattar and Gadilam	
3.	LAND USE (Sq. km) (2005-06)		
	i. Forest area	717	
	ii. Net area sown	3307	
	iii. Cultivable area	3894	
4.	MAJOR SOIL TYPES	1. Forest soil, 2. Red soil, 3. Black soil and 4. Alluvial soil	
5.	AREA UNDER PRINCIPAL CROPS (Ha) (2005-2006)	1. Paddy – 1,68,435 2. Groundnut – 59,842 3. Black gram – 18,158 4. Sugarcane – 17,202 5. Cumbu – 14,810	
6.	IRRIGATION BY DIFFERENT SOURCES (2005-06)	Number	Area irrigated (Ha)
	i. Dug wells	1,64,871	120661
	ii. Tube wells	23454	54525
	iii. Tanks	2085	61205
	iv. Canals	196	6648
	v. Other Sources	---	102
	vi. Net irrigated area	243141 Ha	

S. No.	ITEMS	STATISTICS	
	vii. Gross irrigated area	281185 Ha	
7.	NUMBER OF GROUND WATER MONITORING WELLS OF CGWB (As on 31.03.2007)		
	i. No. of dug wells	22	
	ii. No. of piezometers	17	
8.	PREDOMINANT GEOLOGICAL FORMATIONS	Granites, gneisses and charnockites. Vanur sandstones and Turavai Limestone and clay.	
9.	HYDROGEOLOGY		
	i. Major water bearing formations	Weathered and fractured granites, gneisses and charnockites. Vanur sandstones and sand	
	ii. Pre- monsoon depth to water level (May 2006) (m bgl)	0.74 – 9.7	
	iii. Post- monsoon depth to water level (Jan'2007) (m bgl)	0.7 – 4.45	
	iv. Long term water level trend in 10 years (1998-2007) (m/year)	Annual	
		Rise	Fall
		Min: 0.0033 Max: 0.6299	Min: 0.0144 Max: 0.3083
10.	GROUND WATER EXPLORATION BY CGWB (As on 31-03-2007)		
	i. Number of Exploratory wells	29	
	ii. Number of Observation wells	12	
	iii. Number of Piezometers	7	
	ii) Number of Piezometers under Hydrology Project-I	17	
	v) Deposit wells	10	
	vi. Depth range (m bgl)	76 – 450	
	v. Discharge (lps)	<1 – 37	
	vi. Storativity (S)	$2.84 \times 10.5^{-5} - 8.9 \times 10^{-3}$	
	vii. Transmissivity (m^2/day)	0.86 to 748	
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 and $CaHCO_3$	

12.	DYNAMIC GROUND WATER RESOURCES (as on 31.03.2004) (MCM)	
	i. Annual Replenishable Ground Water Resources	1696
	ii. Total Annual Ground Water Draft for all purposes	1889
	iii. Projected demand for Domestic and Industrial Uses up to 25 years 2029	58
	iv. Stage of Ground Water Development (%)	107
13.	AWARENESS AND TRAINING ACTIVITY	
	i. Mass Awareness Programs Organized	
	Date	07.03.2002
	Place	Vanur
	No. of Participants	300
	ii. Water Management Training Organized	
	Date	07.03.2002
	Place	Villupuram
	No. of Participants	25
14.	EFFORTS OF ARTIFICIAL RECHARGE & RAINWATER HARVESTING	Technical Guidance were provided as when sought
	i. Projects completed by CGWB Number of structures Amount spent	1. Constructed Subsurface dyke (1 No.) at Nallanpillaipetrol for Rs. 8 lacs. 2. Augmentation of ground water through artificial recharge in Vanur water shed through Percolation Pond (7 Nos.) De-silting of Tanks (2 Nos.) for Rs. 71. 256 lacs
	ii. Projects under technical guidance of CGWB Number of structures	Nil
15.	GROUND WATER CONTROL AND REGULATION	
	i. Number of OE Blocks	14
	ii. Number of Critical Blocks	3
	iii. Number of Blocks Notified	Nil
16.	MAJOR GROUND WATER PROBLEMS AND ISSUES	Ground water development in this district is relatively high in both hard and sedimentary rock areas. Ground water development has exceeded 100% in 14 blocks where as it is between 90 and 100% in 3 blocks where the water levels are deeper. It is inferred that a major part of the district could be vulnerable to water level depletion.

1.0. INTRODUCTION

1.1. Administrative details

Villupuram district has 7 taluks, 22 blocks (Plate - I), 1104 panchayats and 1490 villages as detailed below.

Sl. No.	Taluk	No. of panchayats	Blocks	No. of panchayats
1	Gingee	181	1. Melmalayanur	55
			2. Gingee	60
			3. Vallam	66
2	Tindivanam	155	1. Olakkur	52
			2. Mailam	47
			3. Marakanam	56
3	Villupuram	194	1. Koliyanur	48
			2. Kanai	51
			3. Kandamangalam	45
			4. Vikkiravandi	50
4	Tirukoilur	261	1. Mugaiyur	63
			2. Tirukoilur	52
			3. Rshivandiyam	53
			4. Sankarapuram	44
			5. Thiruvennainallur	49
5	Kallakurichi	151	1. Thiyagadurgam	40
			2. Kallakurichi	46
			3. Chinnasalem	50
			4. Kalrayan Hills	15
6	Ulundurpet	97	1. Ulundurpet	53
			2. Tirunavalur	44
7	Vanur	65	1. Vanur	65
	Total	1104		1104

1.2. Basin and sub-basin

The district forms part of Ponnaiyar river basin.

1.3. Drainage

The Ponnaiyar, the Malattar and the Gadilam are the major rivers draining the district. The Ponnaiyar River flows from northwest to east in the district. The Manimukta nadi originates in Kalrayan hills and drains the southern part of the district. The Pambaiyar and the Varaganadhi originate in the uplands of the district and join Bay of Bengal. The Varaganadhi is also known as the Gingee River and drains the parts of Gingee and Vanur taluks of this district. The Malattar and Gadilam rivers also originate in the uplands

within the district and flow eastwards to Cuddalore district. All the rivers are ephemeral in nature and carry only floodwater during monsoon period. The drainage pattern is mostly parallel to sub parallel and drainage density is very low. There are small reservoirs across rivers namely Gomukha, Vedur and Mahanathur.

1.4. Irrigation Practices

The nine-fold land use pattern (2005-06) in the district is given in the Table below.

S. No.	Classification	Area (Ha)
1	Forests	71697
2	Barren & Uncultivable Lands	56651
3	Land put to non agricultural uses	135874
4	Cultivable Waste	10405
5	Permanent Pastures & other grazing lands	4195
6	Groves not included in the net area sown	6142
7	Current Fallows	86725
8	Other Fallow Lands	19802
9	Net Area sown	330712
	Total	722203

The chief irrigation sources in the district are wells, tube wells, tanks and canal. The block-wise number of irrigation sources in the district is given in the Table below.

S. No.	Block	Canals	Tanks	Tube wells	Ordinary wells
1	Melmalayanur	1	85	468	10911
2	Gingee	0	132	0	11821
3	Vallam	0	119	533	10509
4	Olakkur	1	116	252	6028
5	Mailam	1	94	750	2259
6	Marakanam	0	150	1418	9986
7	Koliyanur	41	55	3385	1388
8	Kanai	18	86	298	10162
9	Kandamangalam	0	62	4597	4843
10	Vikkiravandi	0	170	1332	9799
11	Mugaiyur	24	100	645	5492
12	Tirukoilur	7	60	585	2191
13	Rishivandiyam	0	129	13	6683
14	Sankarapuram	0	101	0	5319
15	Thiruvannainallur	31	135	3765	16421
16	Thiyagadurgam	4	54	63	11387
17	Kallakurichi	0	0	25	608
18	Chinnasalem	32	93	38	9306

S. No.	Block	Canals	Tanks	Tube wells	Ordinary wells
19	Kalrayan Hills	4	123	0	8540
20	Ulundurpet	14	81	45	11302
21	Tirunavalur	4	58	1775	3285
22	Vanur	14	82	3467	6631
	Total	196	2085	23454	164871

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

S. No.	Block	Net area Irrigated (Ha)					Total
		Canals	Tanks	Tube wells	Ordinary wells	Other sources	
1	Melmalayanur	0	2597	1200	9138	0	12935
2	Gingee	0	4211	0	8401	0	12612
3	Vallam	0	3790	1384	5623	0	10797
4	Olakkur	0	3239	1264	4741	0	9244
5	Mailam	102	2321	2554	5682	0	10659
6	Marakanam	0	3172	4167	6708	0	14047
7	Koliyanur	0	3196	6069	0	0	9265
8	Kanai	0	3866	1083	5324	0	10283
9	Kandamangalam	0	939	11276	522	0	12737
10	Vikkiravandi	0	3342	3500	4890	0	11732
11	Mugaiyur	980	2415	3376	5100	0	11871
12	Tirukoilur	314	3214	682	5355	0	9565
13	Rishivandiyam	290	2266	68	8871	0	11495
14	Sankarapuram	587	3779	0	8503	0	12869
15	Thiruvannainallur	72	4847	5385	653	0	10957
16	Thiyagadurgam	1525	0	464	5581	0	7570
17	Kallakurichi	2200	2479	12	10128	0	14819
18	Chinnasalem	411	2295	287	14943	0	17936
19	Kalrayan Hills	68	0	0	2012	102	2182
20	Ulundurpet	0	3258	641	5189	0	9088
21	Tirunavalur	0	4386	2741	2588	0	9715
22	Vanur	99	1593	8372	699	0	10763
	Total	6648	61205	54525	120661	102	243141

The well irrigation is highest in Chinnasalem followed by Kallaruichi, Melmalayanur, Rishivandiyam, Sankarapuram, and Gingee so on.

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

Central Ground Water Board completed systematic Survey by 1984 and reappraisal survey were all again taken up during 1987, 2005 and 2006. Central Ground Water Board has drilled deep exploratory wells (3 Nos.) down to depth of 450 m bgl during 1973 -77 in Auroville and Lake Estate areas. Deposit wells (10 Nos.) have been drilled in sedimentary – hard rock contact areas for drinking water supply schemes during 1985-86. Exploratory wells (29 Nos.) and observation wells (12 Nos.) have been drilled in hard rock areas down to a depth of 300 m bgl during 1991-93. Purpose built piezometers (17 Nos.) were constructed under Hydrology Project-I in this district.

Ground Water Regime Monitoring is being carried out through dug wells (22 numbers) and purpose built piezometers (17 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

The district receives rainfall from southwest monsoon (June – September), northeast monsoon (October – December) and non-monsoon periods (January – May). The rainfall is generally heavy during low-pressure depressions and cyclones during the northeast monsoon period. The normal annual rainfall is 1119.8 mm (1901-1980) and the higher is towards coast.

The area falls under tropical climate with temperature in the summer months of March to May. The average temperature varies from 26 to 41⁰ C. The humidity is also high in the order of 80%. The wind speed is high during the months of July and August. The wind speed ranges from 7.4 to 12.6 km/hr, which increases from 100 to 120 km/hr during cyclone period.

3.0. GEOMORPHOLOGY AND SOIL TYPES

3.1. Geomorphology

The residual hills and denudational hills are common in Tirukoilur, Kallakurichi and Gingee taluks. Structural hills are noticed in the western part of the district. The shallow pediments and buried pediments are common in the central part of the district. Coastal areas are having older and younger flood plains and also beach landforms at places. The ground slope is gentle towards coast. The valley fill near Villupuram is thick, which forms main ground water discharge zone. Lineaments are restricted to parts of Kallakurichi and Sankarapuram areas and productive fractures are noticed in select pockets. The crystalline sedimentary contact fault is having sympathetic fractures in hard rocks but mostly they are dry fractures.

Soils

The soils in the district are mostly forest soils and red soil. Alluvial soils are found in eastern side bordering coast. Black soils are confined to low ground in select pockets in Vanur taluk.

4.0. GROUND WATER SCENARIO

4.1. Hydrogeology

Villupuram district is underlain by crystalline metamorphic complex in the western part of the district and sedimentary tract in eastern side (Plate-II). The thickness of sediments exceeds 600m near southern part of the district. Groundwater occurs under phreatic and semi-confined conditions in consolidated formations, which comprises weathered and fractured granites, gneisses and charnockites whereas in unconsolidated sedimentary rocks the groundwater occurs in phreatic, semi-confined conditions in Vanur sandstone, Kadapperi kuppam formation and Turuvai limestone.

The district is having rocky outcrops in major part of Kallakurichi, Sankarapuram and Tirukoilur taluks. The weathering is highly erratic and the depth of abstraction structures is controlled by the intensity of weathering and fracturing. The depth of wells varies from 6.64 to 17 m bgl and water levels in observation wells tapping shallow aquifers varied from 0.74 to 9.7 m bgl during pre monsoon (May 2006) and it varies from 0.7 to 4.45 m bgl during post monsoon (January 2007).

During pre monsoon, the depth to water levels in the range of >2 to 5 m bgl in major part of the district, in the range of >5 -10 m bgl in western and southeastern parts of the district and range of 0-2 m bgl were recorded in two isolated pockets (Plate -III). During post monsoon the depth to water levels range of >2 to 5 m bgl exists in major part of the district, range of 0 - 2 m bgl prevails in central and northeastern parts of the district and range of >5 - 10 m bgl were recorded in two isolated pockets in the southwester and north western parts of the district (Plate -IV).

The depth to piezometric surface ranged from 2.8 to 11.25 m bgl during Pre monsoon and 0.5 to 6.35 m bgl during post monsoon.

The ground water is being developed by means of dug wells, bore wells and tube wells. The diameter of the well is in the range of 7 to 10 m and depth of dug wells range from 15 to 18 m bgl depending on the weathered thickness and joints. The dug wells yield up to 1 lps in summer months and few wells remains dry. The yield is adequate for irrigation for one or two crops in monsoon period. The yield of bore wells in favorable locations vary from <1 to 6 lps. The valley fills, intersection of lineaments, particularly, in the western part along the foot hills of Kalrayan hills are reported to have potential pockets suitable for dug wells and bore wells. The area of contact between crystalline and sedimentary formations has variable yield prospects. The cretaceous formations are very

compact and yield prospects are low. The dug wells of 6 m diameter and 10 m bgl depth in sandy tracts give about 3.5 lps. The yield of tube wells in the sedimentary formation ranges from 2.4 to 37 lps.

4.1.1. Long-term fluctuation

The long –term water level fluctuation for the period of (1998-2007) indicates rise in water level in the range of 0.003 to 0.63 m/year whereas the fall in the water level ranges between 0.014 and 0.31 m /year.

4.1.2. Aquifer Parameters

The transmissivity values of fractured aquifers range from < 1 to $141 \text{ m}^2/\text{day}$ and storativity varies between 2.84×10^{-5} and 8.9×10^{-3} . The transmissivity of sedimentary formation varies from 21 to $748 \text{ m}^2/\text{day}$ and storativity is in the order of 2.75×10^{-3} .

4.2. Ground water resources

The ground water resources have been computed jointly by Central Ground Water Board and State Ground Water Resources Data Centre (PWD, WRO, Govt. of Tamil Nadu) as on 31st March 2004. The computation has been done using GEC1997 methodology. The salient features of the computations are furnished below.

4.3. Ground Water Quality

Ground water in phreatic aquifers in Villupuram district is, in general, colorless, odorless and slightly alkaline in nature. The specific electrical conductance of ground water in phreatic zone ($\mu\text{S}/\text{cm}$ at 25°C) during May 2006 was in the range of 770 to 3650 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 and nitrate. In about 40% 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 use of fertilizers and other improper waste disposal.

Sodium Adoption Ration values range from 1.7 to 4.4 with an average value of 3.25 in the district. This implies that no alkali hazard is anticipated to crops.

Stage of Groundwater Development of Villupuram district, Tamil Nadu as on 31st March 2004									
									(in 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 upto next 25 years (2029)	Net groundwater Availability for future Irriation Development	Stage of Groundwater Development	Categorization for Future groundwater development (Safe/Semi Critical/Critical /Over Exploited)
1	Chinnasalem	8044.08	6865.14	336.26	7201.39	350.25	828.69	90	Semi Critical
2	Gingee	7029.87	9739.95	196.12	9936.07	204.29	-2914.37	141	Over Exploited
3	Kallakurichi	9275.16	8527.08	343.92	8871.00	358.24	389.84	96	Critical
4	Kalrayan hills	3958.86	1429.95	55.53	1485.49	57.85	2471.06	38	Safe
5	Kanai	7186.83	5797.14	269.69	6066.83	280.92	1108.77	84	Semi Critical
6	Kandamangalam	10447.06	15297.51	294.04	15591.55	306.28	-5156.73	149	Over Exploited
7	Kolliyanur	8388.33	10411.74	303.20	10714.94	315.82	-2339.23	128	Over Exploited
8	Mailam	6588.55	6619.54	216.70	6836.24	225.72	-256.71	104	Over Exploited
9	Marakanam	9118.67	10640.35	202.85	10843.20	211.29	-1732.97	119	Over Exploited
10	Melmalayanur	8212.07	9762.78	212.10	9974.88	220.93	-1771.63	121	Over Exploited
11	Mugaiyur	8306.60	9392.81	385.58	9778.39	401.63	-1487.84	118	Over Exploited
12	Olakkur	5913.40	8468.63	146.14	8614.77	152.22	-2707.45	146	Over Exploited
13	Rishivandiyam	6519.07	6784.21	255.34	7039.55	265.97	-531.11	108	Over Exploited
14	Sankarapuram	8761.45	12533.77	306.59	12840.36	319.35	-4091.67	147	Over Exploited
15	Tirunavalur	7191.90	6485.57	236.19	6721.76	246.02	460.31	93	Critical
16	Thiyagadurgam	5488.87	4392.46	220.36	4612.82	229.53	866.88	84	Semi Critical
17	Tirukoilur	7980.91	6656.73	274.61	6931.34	286.04	1038.14	87	Semi Critical
18	Thiruvannainallur	8132.50	8408.57	275.27	8683.84	286.72	-562.79	107	Over Exploited
19	Ulundurpet	8034.65	8042.60	287.68	8330.28	299.65	-307.60	104	Over Exploited
20	Vallam	7687.81	10398.56	160.09	10558.65	166.76	-2877.51	137	Over Exploited
21	Vanur	9387.83	8981.67	275.59	9257.27	287.06	119.09	99	Critical
22	Vikkiravandi	7960.03	7766.55	269.17	8035.72	280.37	-86.89	101	Over Exploited
	Total	169614.50	183403.32	5523.02	188926.35	5752.88	-19541.71	109.06	

4.4. Status of Ground Water Development

Ground water development is very high in the district. There are number of dug wells and dug cum bore wells in the hard rock areas while tube wells are common in the sedimentary areas. The average draft of dug wells in hard rock areas is of the order of 1.2 ha.m./year. The extraction of ground water by shallow tube wells in the eastern part of the district is of the order of 2.5 ha.m./year. The average command area for dug well and bore well in the district is 2 ha and 3 ha respectively.

The hard rock areas in select pockets with valley fills and lineaments are having appreciable ground water potential. At many pockets, the command areas are the main potential ground water zones, The yield prospects are good in select pockets of Villupuram, Sankarapuram and Kallakurichi areas where as it is very poor in Tirukoilur, Ulundurpet, Gingee and Tindivanam taluks. The massive granites in Gingee and Tindivanam taluks do not favour even bore wells. The augmentation of well yield by horizontal and extension bores is successful in part of Kallakurichi and Tirukoilur areas.

The crystalline sedimentary contact zones have thick limestone capping followed by productive granular zones, which are tapped, by number of cavity wells of 40 to 60 m bgl depth giving 7 to 10 lps discharge. The tube wells can yield about 70 to 200 m³/hr and can sustain pumping for 10 hrs a day.

5.0. GROUND WATER MANAGEMENT STRATEGY

5.1. Ground Water Development

The level of ground water development ranges from 38 to 149%. The over development of ground water is recorded mostly in sedimentary tracts due to the feasibility of successful tube wells. There are 14 blocks (Plate - V) with more than 100% development of available replenishable source. There are 3 critical blocks.

The ground water development in different hydrogeological set up in the district needs area specific well design. The major part of the hard rocks is suitable for large diameter dug wells only. The horizontal bores and extension bores can be taken up only with the detailed fracture pattern analysis coupled with resistivity surveys. The horizontal bores in down dip direction are commonly productive. A depth of 10 to 15 m dug well is recommended for hard rock areas. The bore wells of 150 mm diameter and 90 m bgl depth is recommended for water supply scheme with hand pumps. Specific areas having shear zones and intersection of lineament can be considered for 90 to 120 m bgl depth bore well for power pump schemes and to a limited extent for developing horticulture.

Tube wells in this area can give 3 lps. The deep tube well of 100 - 400 mbgl in the eastern side within U. T. of Puducherry enclaves can yield as high as 17 lps discharge which can be pumped with 10 HP submersible pumps. The coastal tract is Marakanam

belt has fresh water in shallow zones down to 40 m bgl. The deeper zones at coastal tract have saline water.

Some of the deep bore wells constructed by Central Ground Water Board in hard rocks are used for water supply schemes and also 10 deposit wells drilled in sedimentary areas by CGWB at the request of TWAD Board are used for comprehensive water supply schemes.

Many pockets in Kallakurichi, Ulundurpet, Gingee and Tirukoilur taluks have very low yield. The pumping test data of select dug wells indicated that the specific yield is in the range of 1 to 2 %. The rational approach in deciding the spacing of wells in hard rock areas is required and it may be in use in planning to have fixed number of wells in every hydrogeological unit depending on the recharge-discharge characteristics. In the absence of detailed picture taking the overall ground water development of the basin spacing of 100 m for dug wells without pump set and 150 m for pump set wells can be kept.

The situation in compact sedimentary tract is also complex for proper management. The tube wells have direct interference due to near by radial flow, the coastal morphology and seawater - fresh water interface has to be considered for proper ground water development.

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 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 Villupuram district are shown in Plate-VI.

6.0. AWARENESS AND TRAINING ACTIVITY

6.1. Mass awareness program and Water Management Training program by Central Ground Water Board

CGWB, SECR, Chennai conducted mass awareness program and water management training program during the AAP 2001-02 at Vanur, Villupuram district and Water Management Training was conducted at Villupuram.

7.0. AREA NOTIFIED

Central Ground Water Authority has not notified any area in the district. 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. Gingee | 2. Melmalayanur | 3. Tiruvennainallur |
| 4. Kandamangalam | 5. Mugaiyur | 6. Ulundurpet |
| 7. Koliyanur | 8. Olakkur | 9. Vallam |
| 10. Mailam | 11. Rishivandiyam | 12. Vikkiravandi |
| 13. Marakanam | 14. Shankarapuram | |

8.0 RECOMMENDATIONS

Agricultural development in the district has to be planned in accordance with the hydrogeological and hydrochemical regime and area specific strategy is needed for better water management. The realistic ground water potential available and irrigation potential created has to be studied in totality for individual watershed.

The small irrigation potential created from minor irrigation projects can be studied in detail and possibility of turn system like Aliyar Project in Coimbatore district can be planned to bring more area under irrigation.

The construction of tube wells in Vanur and Villupuram taluks has to be regulated by at least a regional ground water control bill similar to one in Madras Metropolitan area. The problem should be analyzed for the entire tract in totality and a combined effect to monitor the seawater interface movement is needed. If need be, planning and implementation of remedial measures like fresh water barrier ridge by series of injection well along the coast is recommended.

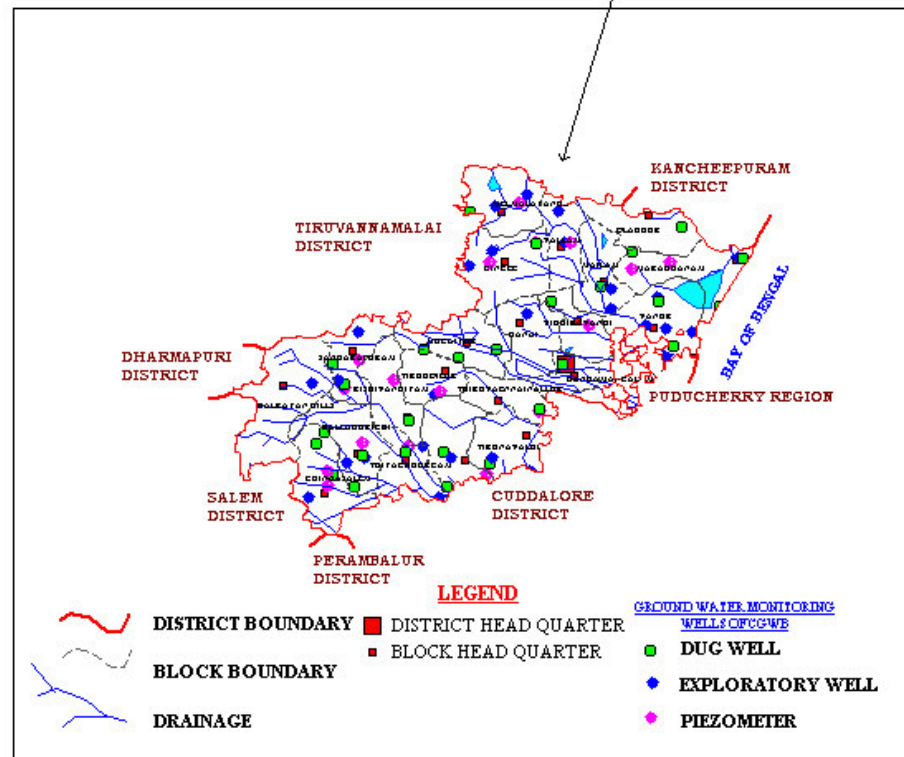
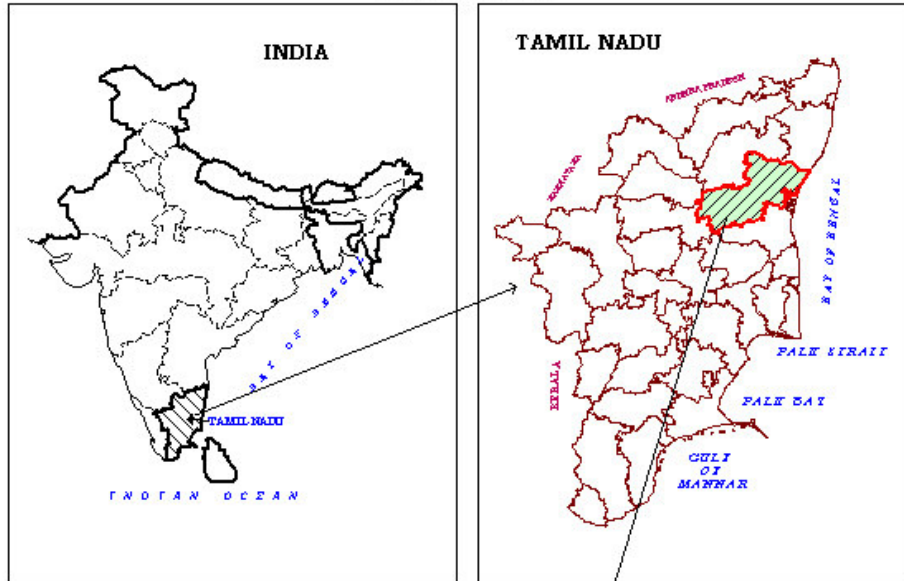
The monsoon rainfall is erratic and stormy days heavy precipitation. The flash floods from the rivers reach the sea without proper utilization. It is recommended to de-silt the supply channels to irrigation tanks and improve the river tank connection system. The contact zone between sedimentary and crystalline rocks is ideal for recharge structures. The combination of basin spread and injection well to recharge the high exploited sedimentary zone is the need of the hour.

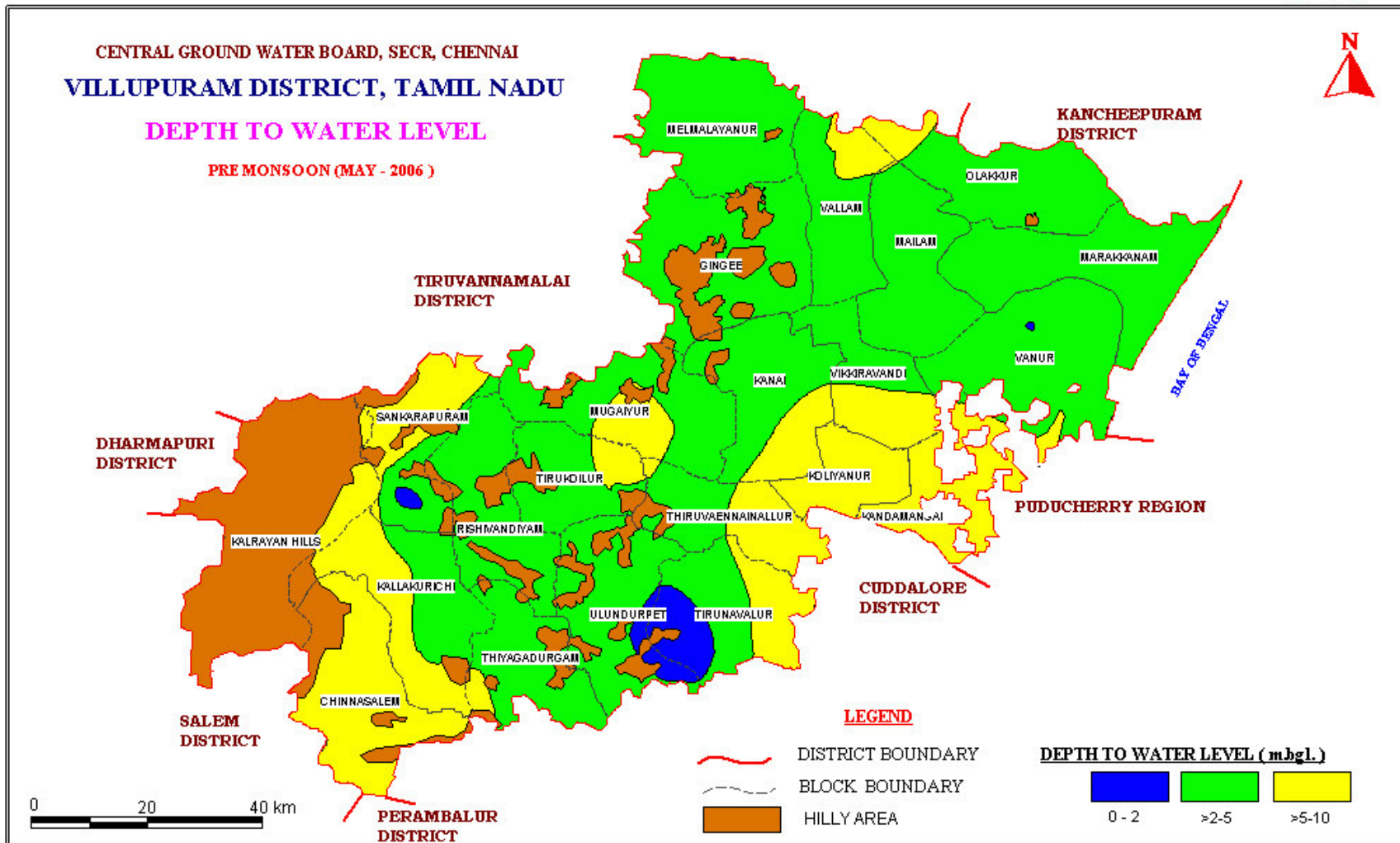
The quality of water in Kaluveli tank and saltpan areas as well as aquaculture activity in coastal areas has to be closely monitored. As and when needed the specific activity effecting general water environment has to be controlled to avoid any deterioration in the coastal eco system.

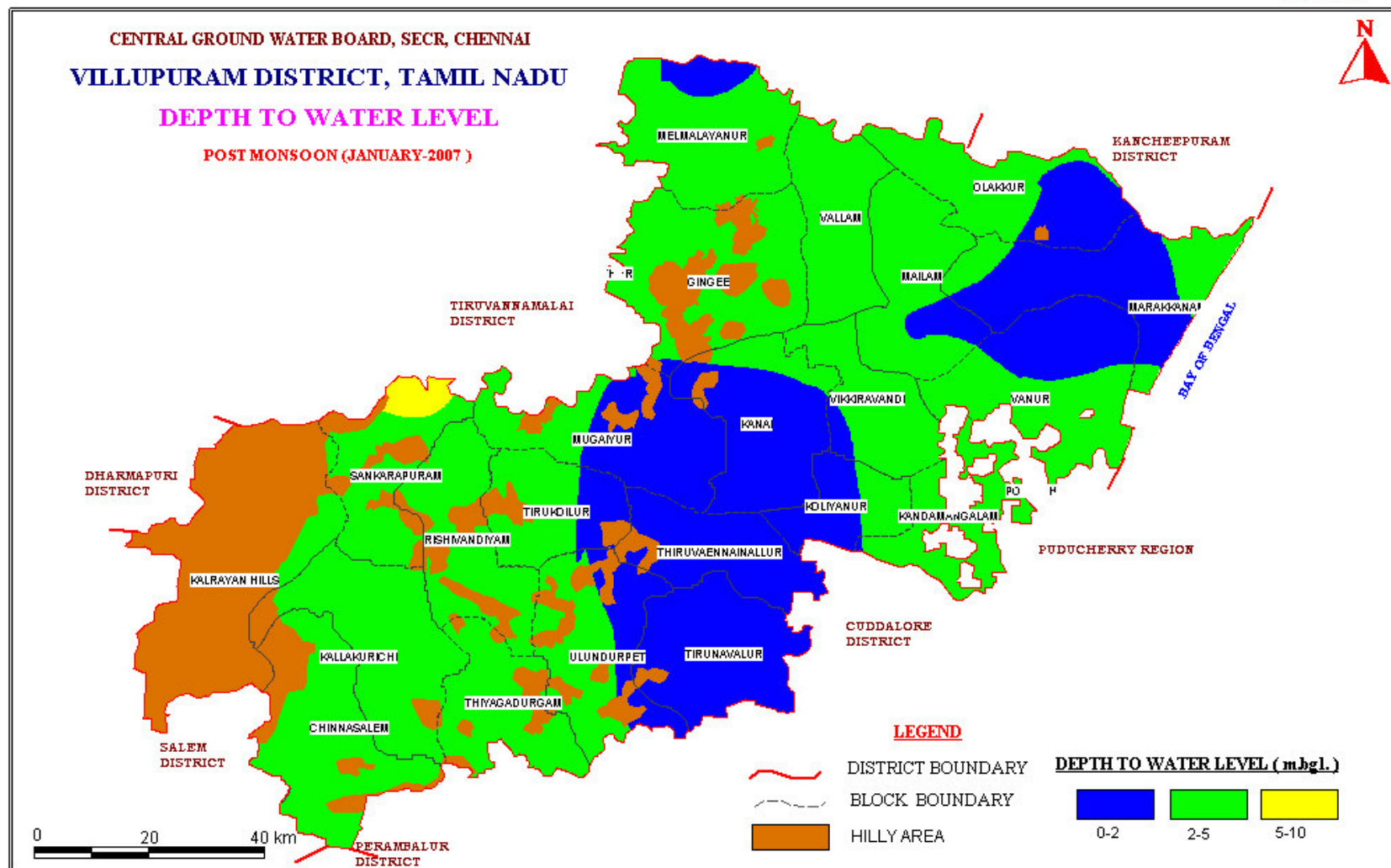
CENTRAL GROUND WATER BOARD, SECR, CHENNAI
VILUPPURAM DISTRICT, TAMIL NADU

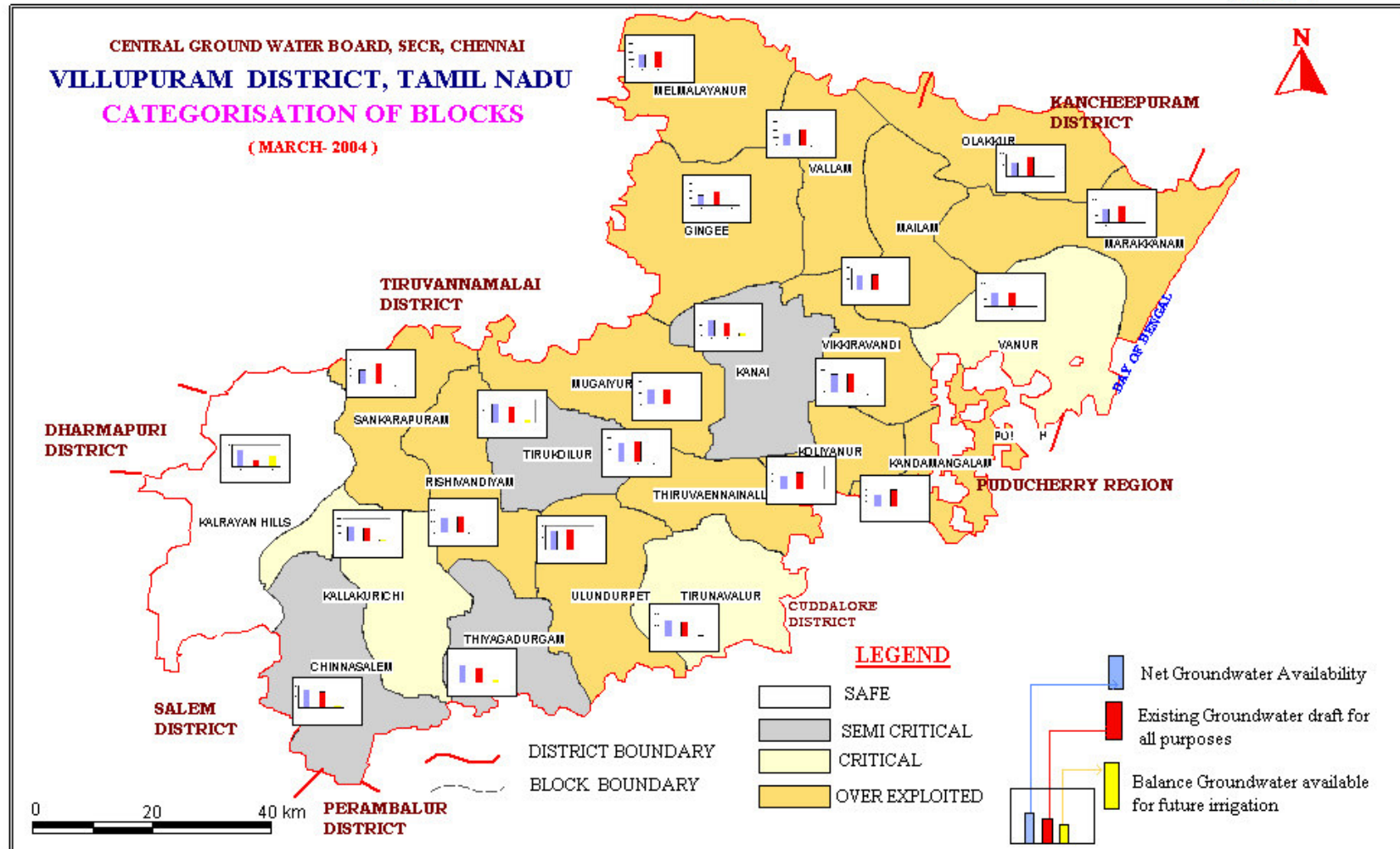
LOCATION

(NOT TO SCALE)








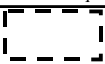















LEGEND PLATE -VI

DISTRICT – VILLUPURAM

	Wells Feasible	Rigs Suitable	Depth of Well (m.bgl)	Discharge (LPM)	Suitable Artificial Recharge Structures
 Soft Rock Aquifer	Dug Cum Bore Well Tube Well	Manual Direct Rotary	10 - 50 75 – 100	150 - 450	Recharge Tube Wells / Recharge Shaft
 Soft Rock Aquifer	Dug Well Filter Point-Well Tube Well	Manual Hand Bore Direct Rotary	8 – 12 10 – 15 100 – 150	500 – 750	Rain Water Harvesting / Check Dams / Percolation Ponds / Gabion Structures / Recharge Tube Wells
 Hard Rock Aquifer	Dug Well Bore Well	Manual DTH	10 – 18 100 – 300	10 - 60	Check Dams /Percolation Ponds
 Hard Rock Aquifer	Dug Cum Bore Well Bore Well	Manual + DTH DTH	15 + 100 60 – 300	60 – 180	Percolation Ponds
 Hard Rock Aquifer	Bore Well	DTH	190 – 300	180 - 300	Percolation Ponds
	District Boundary			Block Boundary	
	Block Headquarter			Block Headquarter	
	Water Level-Pre-Monsoon (Decadal Mean 1993-2002) mbgl			EC (Microsiemens / cm at 25° C)	
	River			Lineament	
	Nitrate Greater Than Maximum Permissible Limit (45 mg/l)			Hilly Area	

OTHER INFORMATION

Geographical Area	7222 Sq .Km
Number of Blocks	22
Major Drainage	Ponnaiyar & Malathur& Gadilam
Population (2001)	2960373
Average Annual Rainfall	1119.8
Annual Range of Temperature	26 – 41° C
Regional Geology	Soft Rocks: Limestones, vanwr Sandstone & clay Hard Rocks: Granites , Gneisses & Charnockite
Net Ground Water Availability for Future Irrigation	Nil
Stage of Ground Water Development (As on March 2004)	109 %
Names of Blocks Showing Intensive Ground Water Development	★ Over Exploited – Gingee, Kandamangalam, Koliyanur, Mailam, Marakkanam, Melmalaiyanur, Mugaiyur, Olakkur, Rishivandiyam, Sankarapuram, Thiruvannainallur, Ulundurpet, Vallam & Vikravandi ★ Critical – Kallakurichchi, Tirunavalur, & Vanur

SAVE WATER
AND
CONSERVE WATER

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