WATER YEAR 2007

GROUND WATER BROCHURE
KARAIKAL REGION
U.T. OF PUDUCHERRY

जल वर्ष 2007 — Water Year 2007

स्वच्छ सुरक्षित जल – सुन्दर खुशहाल कल

CONSERVE WATER - SAVE LIFE

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

REGION AT A GLANCE (KARAIKAL REGION)

S.NO	ITEMS	STATISTICS
1.	**GENERAL INFORMATION**	
	i. Geographical area (Sq.km)	**161**
	ii. Administrative Divisions as on 31-3-2007 Number of Communes Number of Villages	 6 100
	iii. Population (as on 2001 Census) Total Population Male Female	 170791 84487 86304
	iv. Average Annual Rainfall (mm)	1207.13
2.	**GEOMORPHOLOGY**	
	i. Major physiographic Units	Sand Dunes, Tidel Inlet and Spit Bars.
	ii. Major Drainages	Arasalar, Nandalar, Nattar, Nular, Puravadaiyanar, Thirumalairayanar and Vanjiyar (Distributaries of Cauvery)
3.	**LAND USE (In Hectares) during 2005-06**	
	i. Forest area ii. Net area sown iii. Cultivable waste	Nil 6489 2456
4.	**MAJOR SOIL TYPES**	1.Red soil 2.Black soil 3.Alluvial soil 4.Colluvial soil
5.	**AREA UNDER PRINCIPAL CROPS (AS ON 2005-2006)**	1. Paddy - 6559 Ha – 97% 2. Cotton - 117 Ha – 2%
6.	**IRIGATION BY DIFFERENT SOURCES (During 2005-06)**	**Area irrigated (Ha)**
	i. Dug wells	-
	ii. Tube wells	80
	iii. Tanks	-
	iv. Canals	5988
	v. Other Sources	13
	vi. Net irrigated area	6081 ha
	vii. Gross irrigated area	6723 ha

7.	**NUMBERS OF GROUND WATER MONITORING WELLS OF CGWB (AS ON31.03.2007)**				
	i. No of dug wells	2			
	ii. No of piezometers	1			
8.	**PREDOMINANT GEOLOGICAL FORMATIONS**	Recent Alluvium, Sandstones & Claystones of Tertiary Sediments.			
9.	**HYDROGEOLOGY**				
	i. Major water bearing formations	Alluvium, Cuddalore Sandstones & Karaikal beds.			
	ii. Pre monsoon (June 2003) Depth to water level (Alluvial Aquifer) Depth to Piezometric surface (Tertiary Aquifer)	 7.40 – 16.00 4.43 – 12.25			
	iii. Post monsoon (Jan'2004) Depth to water level (Alluvial Aquifer) Depth to Piezometric surface (Tertiary Aquifer)	 3.55 – 12.15 2.10 – 10.20			
	iv. Long term water level trend in 10 years (1995-2004) in m/yr	**Annual**			
		Rise (m/year)		**Fall (m/year)**	
		Min	Max	Min	Max
	Alluvial Aquifer	0.029	0.040	0.047	0.506
	Tertiary Aquifer	-	-	0.148	0.793
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. iv. Number of Slim Holes v. Number of Deposit wells	10 2 2 1 -			
	iv. Depth range(m)	225 – 451			
	v. Discharge(lps)	1.40 – 50.10			
	vi. Storativity (S)	1.209×10^{-4} – 1.02×10^{-3}			
	vii. Transmissivity (m2/day)	30 - 2640			
11.	**GROUND WATER QUALITY AS ON MAY 2006**				
	i. Presence of chemical constituents more than permissible limit	F, Fe & Cl			
	ii. Type of water	$Na\text{-}HCO_3$ – Cl type			

12.	**DYNAMIC GROUND WATER RESOURCES (as on 31.03.2004) in MCM**	
	i. Annual Replenishable Ground Water Resources	71.567
	ii. Total Annual Ground Water Draft for all purposes	12.021
	iii. Projected demand for Domestic and Industrial Uses up to 2025	3.341
	iv. Stage of Ground Water Development	19%
13.	**AWARENESS AND TRAINING ACTIVITY**	
	i. Mass Awareness Programmes Organized	
	Date	NIL
	Place	-
	No of Participants	-
	ii. Water Management Training Organized	
	Date	NIL
	Place	-
	No of Participants	-
14.	**EFFORTS OF ARTIFICIAL RECHARGE & RAINWATER HARVESTING**	Technical Guidance were provided as when sought
	i. Projects completed by CGWB Number of structures Amount spent	Nil
	ii. Projects under technical guidance of CGWB Number of structures	Nil
15.	**GROUND WATER CONTROL AND REGULATION**	
	i. Number of OE Blocks	-
	ii. Number of Critical Blocks	-
	iii. Number of Blocks Notified	**-**
16.	**MAJOR GROUND WATER PROBLEMS AND ISSUES.**	i) Saline nature of formation water in the eastern parts of the Region and not suitable for any development. ii) Insitu Salinity.

1.0 INTRODUCTION

1.1 Administrative Details

About 150 km. further south from Puducherry on the east coast lies the Karaikal region between 10°49' and 11°01' N latitudes and 79°37' and 79°53' E longitudes with an area of 161 sq. km. It consists of six communes (Panchayats), comprising100 villages.

1.2 Basin and sub-basin

The Karaikal region of U.T. of Puducherry is part of Cauvery basin.

1.3 Drainage

The region is situated on the tail end portion of the Cauvery delta. This region is drained by seven distributaries of Cauvery viz. (1) Nandalar, (2) Nattar, (3) Vanjiyar, (4) Nular, (5) Arasalar, (6) Tirumalarajanar and (7) Puravadaiyanar and all these rivers confluence into the Bay of Bengal. A network of canals branches out from these rivers to feed the irrigation channels. These rivers flow with a gentle slope of one percent.

1.4 Irrigation Practices

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

S.No	Classification	Area (Ha)
1	Forests	-
2	Barren & Uncultivable Lands	-
3	Land put to non agricultural uses	4747
4	Cultivable Waste	2456
5	Permanent Pastures & other grazing lands	-
6	Groves not included in the area sown	188
7	Current Fallows	548
8	Other Fallow Lands	1584
9	Net Area sown	6489
	Total	**16012**

(Source: Directorate of Economics and Statistics, Puducherry)

The region is located on the ayacut system of Cauvery river, and hence it is fully dependant on canal water for irrigation. Canals are the major source of irrigation and these canals are fed by the distributaries of Cauvery. It is seen that the net area irrigated is 6081 ha. which is 94 percent of the net area sown. Irrigation through canals constitutes 99 percent of the net area irrigated.

The source wise net area irrigated in Ha is given below (2005-2006)

S.No.	Net area irrigated by (Ha)	
1	Canals	5988
2	Tanks	-
3	Tube wells	80

S.No.	Net area irrigated by (Ha)	
4	Ordinary wells	-
5	Other sources*	13
6	Total Area Irrigated (Net)	6081
7	Area irrigated more than once	642
8	Total Gross Area irrigated	6723

(Source: Directorate of Economics and Statistics, Puducherry)

1.5 Studies/Activities carried out by CGWB

Reconnoitre hydrogeological surveys for selection of sites for exploration was carried out during 1973. Detailed hydrogeological surveys were carried out during 1976. Groundwater exploration through drilling was completed during 1976-78. Scientific information was obtained down to a depth of 450 m bgl.

2.0 RAINFALL AND CLIMATE

The region receives the rain under the influence of both southwest and northeast monsoons. Most of the precipitation occurs in the form of cyclonic storms caused due to the depressions in Bay of Bengal chiefly during Northeast monsoon period. The normal annual rainfall of the Karaikal region is 1207.13 mm of which the northeast monsoon contributes 69 percent and the southwest monsoon contributes 21 percent. The study of rainfall distribution of the Karaikal region reveals that there is a general increase in rainfall from inland towards coast, while the northeast monsoon shows a decrease in rainfall from the coast towards inland. The area receives maximum rainfall during the month of November.

The region enjoys a humid and tropical climate. The mean monthly temperature varies between 31.8°C (May) and 21.7°C (March). The relative humidity is generally high above 70% during August to April and minimum varying from 60 to 65% during the months of June and about 80% during October to April.

3.0 GEOMORPHYLOGY AND SOIL TYPES

3.1 Geomorphology

The region is a monotonous peneplain with elevation not more than five meters above mean sea level at any point. Aeolian action is evident in the coastal tract in the form of sand dunes and mounds. Being situated on sea coast, coastal geomorphological units like sand dunes, tidal inlet, spit bars, coastal beach with swamps and marshes are common. Sand dunes are found in patches on plains.

3.2 Soils

Soils in the area have been classified into i) Red soil ii) Black soil iii) Alluvial soil and iv) Colluvial soil. Alluvial soils occur along the river courses and

eastern part of the coastal areas. Sandy coastal alluvium (arenaceous soil) are seen all along the sea coast as a narrow belt.

4.0 GROUND WATER SCENARIO

4.1 Hydrogeology

Ground water occurs under both phreatic and confined conditions in all the three major group of geological formations, viz., Cuddalore sandstones, Karaikal formations and Alluvium formations. Occurrence and movement of ground water in the said geological formations are controlled by the primary porosities of the sediments. Shallow alluvial aquifers and the medium to coarse grained Cuddalore sandstones constitute the major potential aquifer system in the region.

The eastern and northern parts of the region are characterized by saline groundwater and hence there is no development in these parts of the region. Accordingly, observation wells have been established only in the part where fresh groundwater is available and where groundwater development takes place. The depth to water level and piezometric surface contours are also drawn restricting to only these parts and the tentative boundary of the fresh water zone is also marked on the map.

4.1.1 Tertiary Aquifers (Cuddalore Sandstones)

The medium to coarse grained Cuddalore sandstones constitute the potential aquifer. The Cuddalores which underlie the Karaikal beds are separated from the later by an aquiclude with a thickness of 3 to 71 m. The granular zones of Cuddalores occurring beneath the aquiclude are intercalated with clay beds. Due to various drilling problems like mud loss etc, the exploration could not be complete and only penetrated partially through the Cuddalore sandstones of 194 and 371 m thickness. Ground water occurs under confined conditions in the granular zones of these formations. The yield of the test wells tapping the productive zones varies between 8 and 44 lps for drawdowns varying between 6.10 and 21.92 m. Free flowing conditions also exist with a free discharge of 19 lps.

The specific capacity of the wells tested ranges from 21.49 to 329.8 lpm/m of drawdown. The field permeability of the granular zones is fairly high ranging from 16.01 to 34.16 m/day in the western part as against the low values ranging from 0.90 to 12.17 m/day in the eastern and northeastern part.

The piezometric head varied between 4.43 – 12.25 m bgl (June 2003) during premonsoon and 2.10 – 10.20 m bgl during post monsoon (Jan 2004).

4.1.2 Karaikal Formations:

The Karaikal beds occur in between Quaternary and Tertiary formations in the Region. The Karaikal beds vary in thickness from 54 m in the west to 77 m in the east. The sands and sandstones of this formation are water bearing zones

whose thickness varies between 11 and 40 m. But due to the marine origin of these beds, the quality of ground water is saline in nature and found unsuitable for all purposes. Hence the yields and other aquifer characteristics of these beds were not assessed and it is not tapped in production wells in the Region.

4.1.3 Alluvial Aquifers:

The sands of the alluvium forms the potential aquifer with thickness ranging from 9 to 40 m. Ground water occurs under water table conditions and in semi coinfined to confined condition in the granular zones which are encountered between 26 and 43 m bgl. The water table aquifer is developed by dug wells mostly for domestic purposes, whereas the semi confined/confined aquifers are developed at select areas by means of filter points and shallow tube wells. The reported yield of the filter points and shallow tube wells tapping the potential aquifer zones in the alluvium ranges from 468 to 750 lpm.

The depth to water level in the region varied between 7.40 – 16.00 m bgl during premonsoon (June 2003) and 3.55 – 12.15 m bgl during post monsoon (Jan 2004).

4.1.4 Long Term Fluctuation (1995-2004)

Aquifer	Pre monsoon (1994 – 2003)		Post Monsoon (1995 -2004)	
	Rise	Fall	Rise	Fall
Alluvial	0.75 – 0.98	2.70 – 9.80	-	2.38 – 10.40
Tertiary	-	7.30 – 9.05	-	7.26 – 8.65

4.1.5 Aquifer Parameters

Aquifer	Transmissivity (m^2/day)	Storativity	Specific Yield
Alluvial	200 – 400	-	6 %
Tertiary	1100 - 2640	1.21 $x10^{-4}$ and 1.02 x 10^{-3}.	-

4.2 Ground Water Resources

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

Region	Net Groundwater Availability (M.Cu.m)	Existing Gross Draft for Irrigation (M.Cu.m)	Existing Gross Draft for Domestic and industrial water supply (M.Cu.m)	Existing Gross Draft for all uses (M.Cu.m)	Allocation for Domestic and Industrial Requirement supply upto next 25 years (2029) (M.Cu.m)	Net groundwatre Availability for future Irriation Development (M.Cu.m)	Stage of Groundwater Development (%)	Category of Block
Karaikal	64.41	8.30	3.72	12.02	4.69	51.42	19	Safe

4.3 Ground Water Quality

4.3.1 Alluvial Aquifer

The quality of ground water from shallow alluvial aquifers is almost neutral in nature, with pH values ranging from 6.74 to 7.92. The water is generally sodium-bicarbonate-chloride type, the bicarbonate predominating over chloride. The chloride content was generally within the permissible limit and reaches maximum of 1150 mg/l at Thennankudi-Melaveli. The fluoride concentrations were less than one mg/l, except few patches at central and western parts where it had recorded upto 1.28 mg/l at Keezh Paruthikudi. The concentration of iron values ranged from 0.02 to 0.26 mg/l in the region.

The Electrical Conductivity values, in major part of the region are between 1500 to 3000 µS/cm at 25°C, which increase to more than around 3000 µS/cm at 25°C in few patches at central part and less than 1500 µS/cm at 25°C in the western part.

4.3.2 Tertiary Aquifer

The quality of ground water tapped from Tertiary aquifers is alkaline with pH ranging from 7.60 to 9.78. The chloride content was generally ranged from 225 to 590 mg/l. The fluoride value varied from 0.07 to 0.33 mg/l. The concentrations of iron were within the permissible limit and recorded upto maximum of 0.30 mg/l at Tirunallar. The Electrical Conductivity values were less than 1500 µS/cm at 25°C in western parts.

The quality of ground water in the eastern part of the Karaikal region is poor and unfit for both domestic and irrigation purposes. The ground water in the western part of the region is comparatively better with EC values generally ranging around 1500 µS/cm at 25°C and chloride concentration in most of the samples is well within 500 ppm. The water from both shallow Alluvial aquifers and deeper Cuddalore sandstone aquifers in this part of the region is fit for domestic needs only. It is generally unsuitable for irrigational needs due to higher concentration of sodium in water. Based on U.S. Salinity Classification, most of the water samples are C3-S3 type and above indicating unsuitability of waters for irrigational needs especially for paddy cultivation.

4.4 Status of Ground Water Development

The entire region is covered by the Alluvium of Quaternary age consisting of sands and clays. The Alluvium is underlain by Karaikal beds and Cuddalore sandstones with thicknesses ranging between 54 to 77 m and 194 to 371 m respectively. The sub-surface configuration reveals that the thickness increases from west to east.

Ground water occurs in the Alluvial aquifers under both water table and confined conditions. It is being developed by filter-point wells and shallow tubewells. The quality of ground water of Karaikal aquifers is mostly saline

and unfit for development. The Cuddalore sandstone formations constitute several aquifers separated by clay beds with moderate to high permeability. Ground water occurs in these aquifers under confined conditions and are developed by means of deep tubewells.

The occurrence of potable water bearing aquifers are limited to the western part of the Karaikal Region. The shallow Alluvial aquifers occurring within a depth range of about 50 mbgl and deeper Cuddalore sandstone aquifers occurring below 150 mbgl are potential ones bearing potable water in the Region.

The yield of tubewells in shallow Alluvial aquifers is of the order of 1 to 2 lakhs litres/day. The extraction of ground water by shallow tubewells in the Alluvium is of the order of 2.5 ha.m./year. The average command area for tubewell is about 3 ha.

The deep tubewells of 200 mm dia and 300 – 350 m depth in Tertiary aquifers can yield as high as 1000 lpm discharge, which can be pumped with 10 to 15 HP submersible pumps. The average annual draft of deep tubewells varies from 70 – 200 m^3/hr, with 200 days pumping in a year and an average daily pumping of 10 hours, the annual draft varies from 0.14 to 0.40 MCM.

5.0 GROUNDWATER MANAGEMENT STRATEGY

5.1 Groundwater Development

The non-availability of surface water in canal in recent times have resulted in groundwater being used as a supplementary source. The area is characterized by the occurrence of poor quality aquifers sandwiched between moderate to good quality water bearing aquifers in the western half of the region and any developmental programme should take care of sealing the saline zones.

Since the western part of the Region bearing comparatively better quality water both in shallow Alluvial aquifers and in deeper Cuddalore sandstone aquifers, these aquifers can be developed by shallow tube wells as well as by deep tube wells respectively. In view of the saline nature of formation water, the Karaikal aquifers are not suitable for development.

5.2 Water Conservation and Artificial Recharge

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

The number and type of artificial recharge structures recommended for Karaikal region are furnished in Table 1. The exact locations of these

structures, however, are to be decided on the basis of detailed field investigations and implementation of the schemes may be taken up in phases.

Table:1 Details of number and types of Artificial Recharge Structures recommended in Karaikal Region of UT of Pondicherry

S.No	Region	Area Suitable for Ground water Develop-ment (sq.km)	Categorization as on March 2004	Surplus available for AR (MCM) *	Number of Structures	Cost of Structures (Lakhs)
					PP (1 in 15 sq.km). Capacity - 0.1 M.Cu.m	PP (Unit Cost - Rs 20 Lakhs)
	Pondicherry	89.4	Safe	19.00	6	120

* *Data Source : Groundwater Unit of Department of Agriculture, Government of Pondicherry*

It is also recommended that recharge tubewells may also be drilled to recharge the deeper aquifers wherever necessary as the deeper aquifers are also equally being developed in the region.

Free technical guidance for implementation of schemes of rain water harvesting and recharge to ground water is also being provided by Central Ground Water Board.

6.0 GROUNDWATER RELATED ISSUES & PROBLEMS

The quality of ground water in the east and northeastern part of the Karaikal region is poor and unfit for both domestic and irrigation purposes. The ground water in the western part of the region is comparatively better with EC values generally ranging around 1500 µS/cm at 25°C and chloride concentration in most of the samples is well within 500 ppm. The water from both shallow Alluvial aquifers and deeper Cuddalore sandstone aquifers in this part of the region is fit for domestic needs only. It is generally unsuitable for irrigational needs due to higher concentration of sodium in water. Based on U.S. Salinity Classification, most of the water samples are C3-S3 type and above indicating unsuitability of waters for irrigational needs especially for paddy cultivation. Hence, ground water can be used as a supplementary source for canal irrigation for paddy cultivation for a limited period only. It is generally not fit for raising nurseries.

7.0 AWARENESS & TRAINING ACTIVITY

Nil

8.0 AREA NOTIFIED BY CGWA/SGWA

Karaikal Region has not been notified by either Central Ground Water Authority or Pondicherry Ground Water Authority.

9.0 RECOMMENDATIONS

Since the western part of the Region bearing comparatively better quality water both in shallow Alluvial aquifers and in deeper Cuddalore sandstone aquifers, these aquifers can be developed by shallow tube wells as well as by deep tube wells respectively. In view of the saline nature of formation water, the Karaikal aquifers are not suitable for development.

Since the area is characterized by the occurrence of poor quality aquifers sandwiched between moderate to good quality water bearing aquifers in the western half of the region, any developmental programme should take care of sealing the saline zones.

The quality of ground water in the western half of the region and also in southern part covering Neravy and T.R.Pattinam communes bear potable water for domestic needs only. Since sodium and salinity hazards are recorded in the above areas of the region, it is recommended to initiate conjunctive use of ground water with canal waters on a limited scale for irrigation in the area.

Intensive monitoring of ground water levels and water quality has to be taken up in the coastal areas of the region.

Artificial recharge of ground water through cost-effective rain water harvesting systems may be popularised in the district by providing incentives to individuals/communities embarking upon such initiatives. A concerted effort involving various Government agencies and NGOs can create the necessary awareness among the rural masses. For recharging deeper aquifers, recharge tubewells in all favourable locations and coastal areas is recommended.

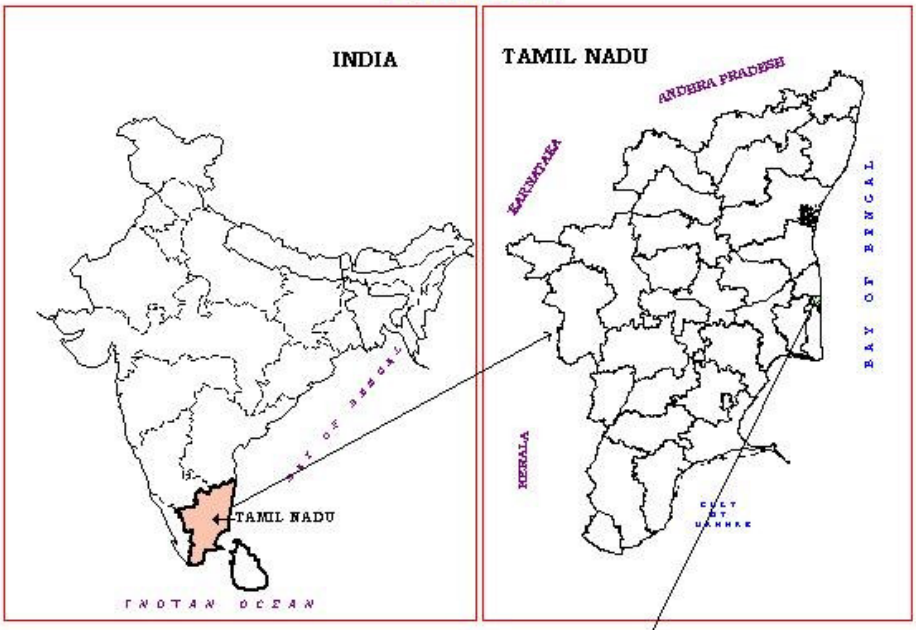
The brackish water aquifers can be developed for irrigating salt resistant crops. Also, the surface and ground water can be blended to increase the water availability in water shortage seasons.

PLATE - I

CENTRAL GROUND WATER BOARD, SECR, CHENNAI

KARAIKAL REGION, U.T.OF PUDUCHERRY

LOCATION



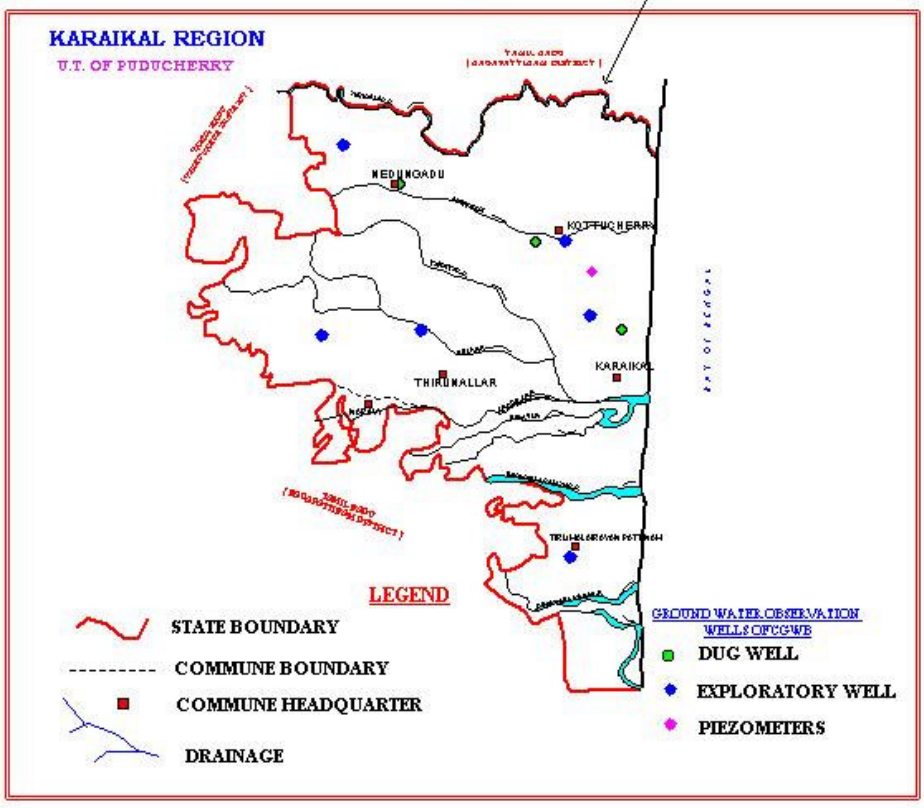


PLATE II

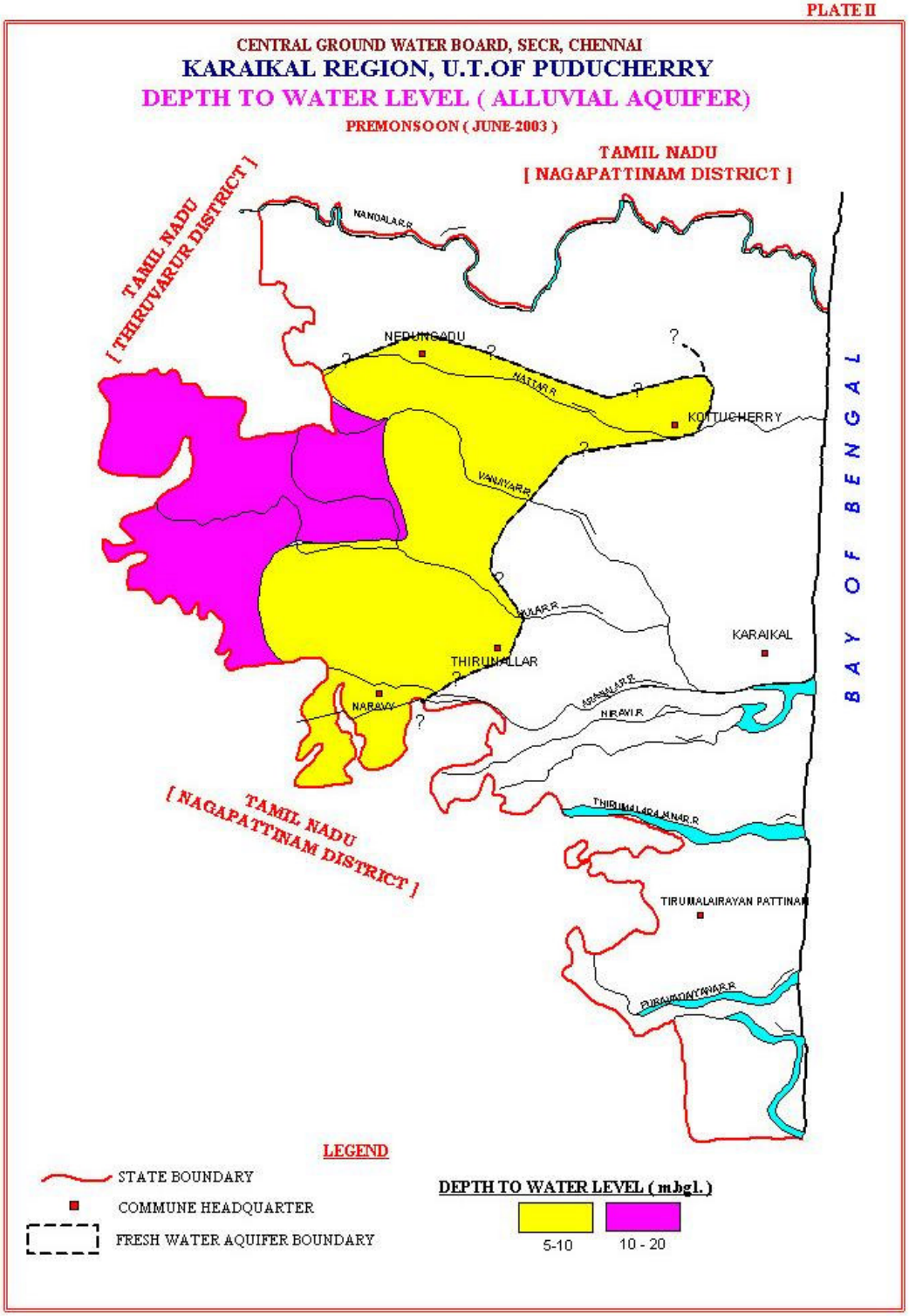

CENTRAL GROUND WATER BOARD, SECR, CHENNAI
KARAIKAL REGION, U.T.OF PUDUCHERRY
DEPTH TO WATER LEVEL (ALLUVIAL AQUIFER)
PREMONSOON (JUNE-2003)
TAMIL NADU
[NAGAPATTINAM DISTRICT]
TAMIL NADU
[THIRUVARUR DISTRICT]
NANDALAR R
NEDUNGADU
NATTAR R
KOTTUCHERRY
VANIYAR R
KUMAR R
KARAIKAL
THIRUNALLAR
NARAVAR
ARASALAR R
NIRAVI R
THIRUMALARAJANAR R
TIRUMALAIRAYAN PATTINAM
PURAVANKARAR R
BAY OF BENGAL
TAMIL NADU
[NAGAPATTINAM DISTRICT]
LEGEND
STATE BOUNDARY
COMMUNE HEADQUARTER
FRESH WATER AQUIFER BOUNDARY
DEPTH TO WATER LEVEL (mbgl.)
5-10
10 - 20

PLATE III

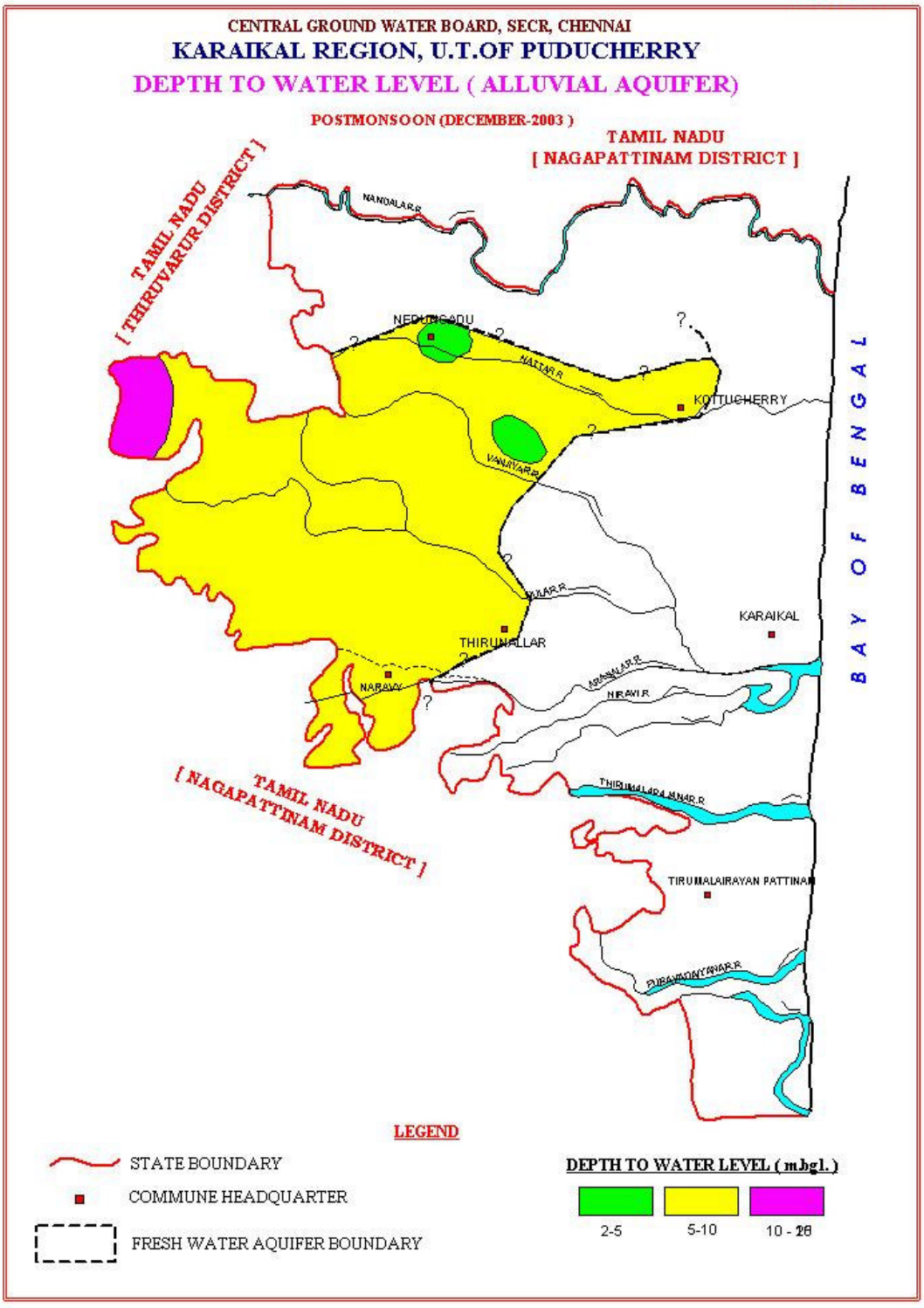

CENTRAL GROUND WATER BOARD, SECR, CHENNAI
KARAIKAL REGION, U.T.OF PUDUCHERRY
DEPTH TO WATER LEVEL (ALLUVIAL AQUIFER)
POSTMONSOON (DECEMBER-2003)
TAMIL NADU
[NAGAPATTINAM DISTRICT]
TAMIL NADU
[THIRUVARUR DISTRICT]
NANDALAR.R
NEDUNGADU
NATTAR.R
KOTTUCHERRY
VANIYAR.R
KARAIKAL
THIRUNALLAR
NARAVAY
KANNAR.R
NIRAVI R
THIRUMALAIRAYAN PATTINAM
PURAVADIYAR.R
BAY OF BENGAL
TAMIL NADU
[NAGAPATTINAM DISTRICT]
LEGEND
STATE BOUNDARY
COMMUNE HEADQUARTER
FRESH WATER AQUIFER BOUNDARY
DEPTH TO WATER LEVEL (mbgl.)
2-5
5-10
10 - 20

PLATE IV

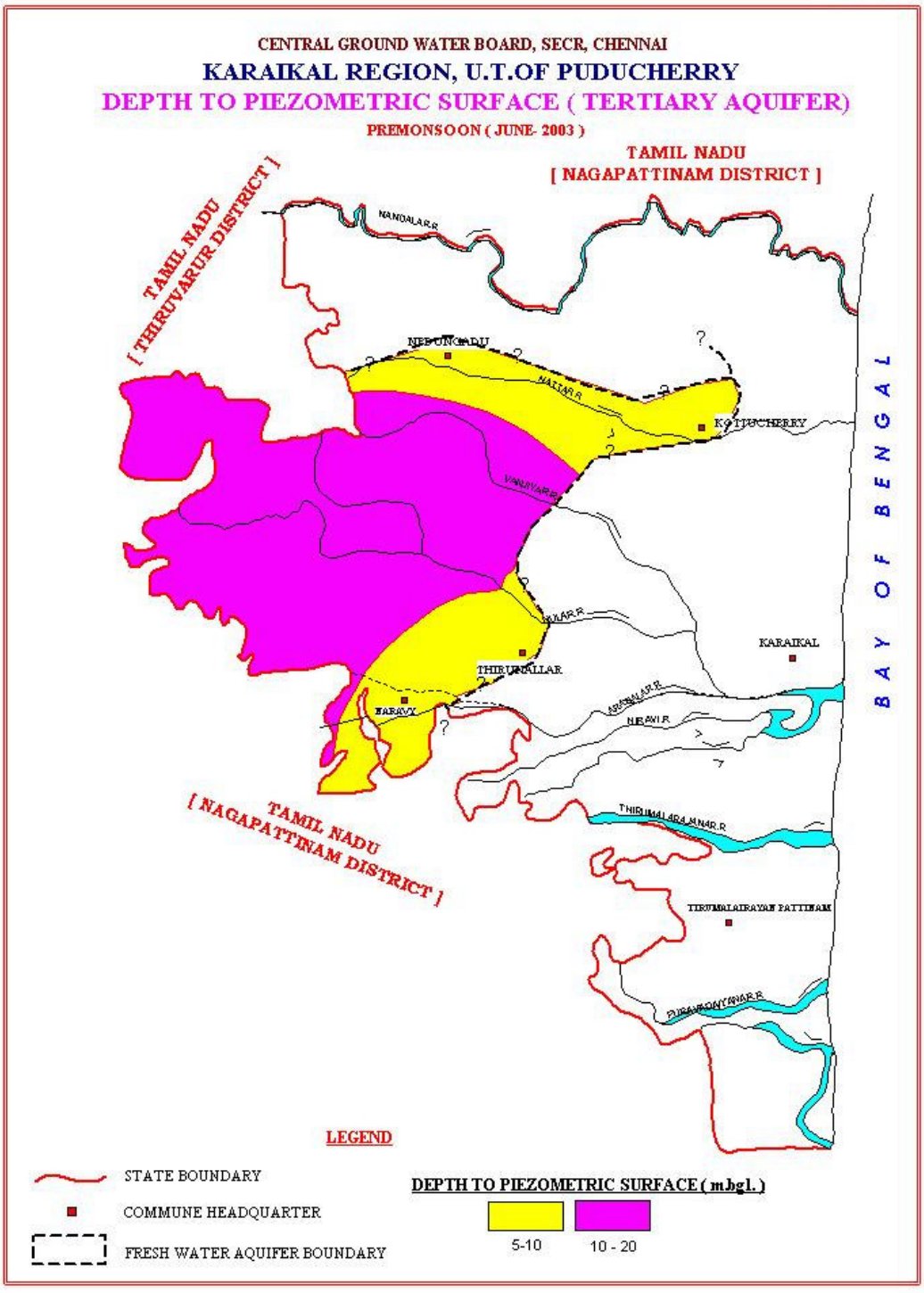

CENTRAL GROUND WATER BOARD, SECR, CHENNAI
KARAIKAL REGION, U.T.OF PUDUCHERRY
DEPTH TO PIEZOMETRIC SURFACE (TERTIARY AQUIFER)
PREMONSOON (JUNE- 2003)
TAMIL NADU
[NAGAPATTINAM DISTRICT]
TAMIL NADU
[THIRUVARUR DISTRICT]
NANDALAR R
NEDUNGADU
NATTAR R
KOTTUCHERRY
VANIYAR R
KARAIKAL
THIRUMALLAR
NERAVY
NERAVI R
THIRUMALAIRAYAN PATTINAM
PURAKUDIYAR R
BAY OF BENGAL
TAMIL NADU
[NAGAPATTINAM DISTRICT]
LEGEND
STATE BOUNDARY
COMMUNE HEADQUARTER
FRESH WATER AQUIFER BOUNDARY
DEPTH TO PIEZOMETRIC SURFACE (mbgl.)
5-10
10 - 20

PLATE V

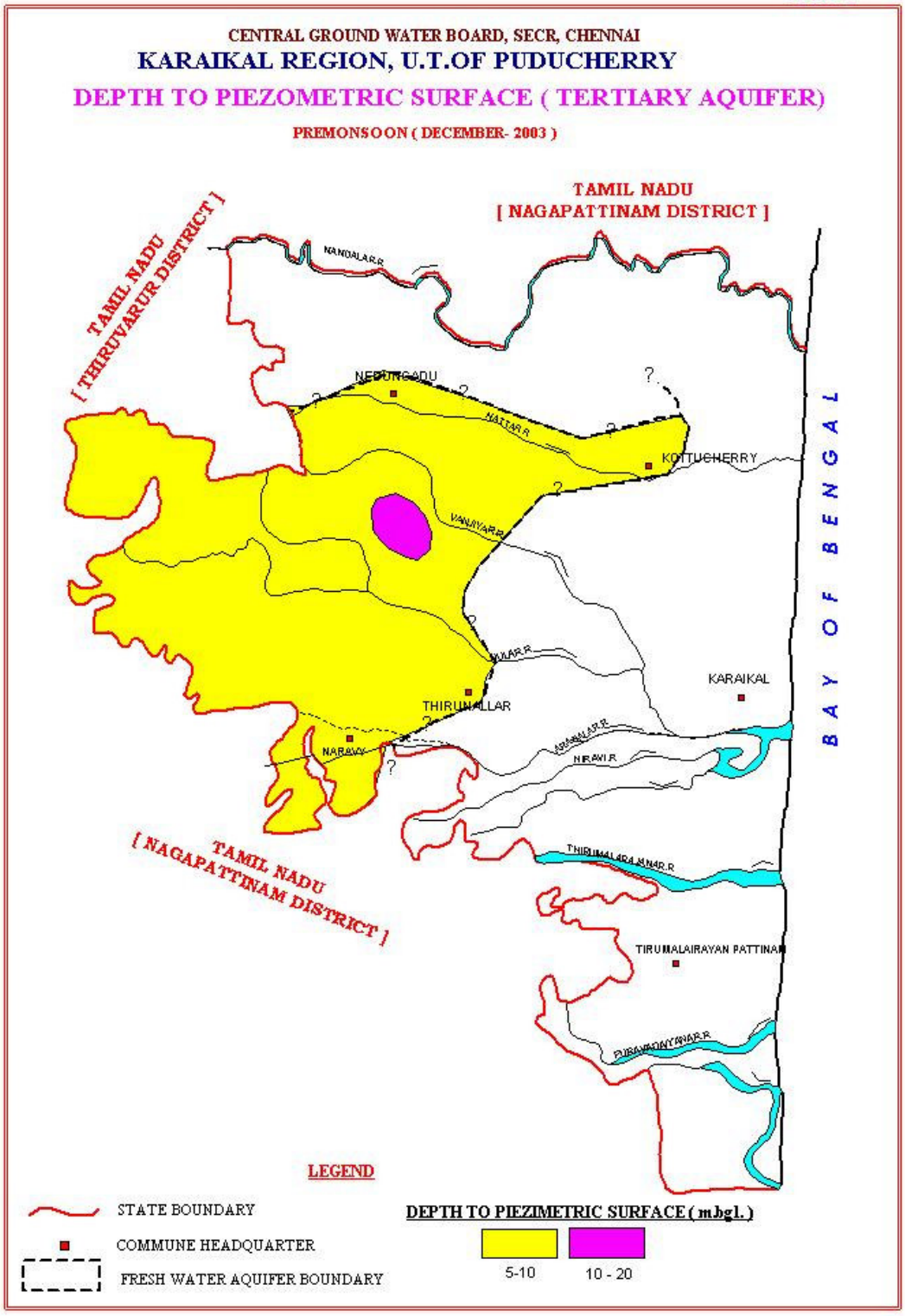
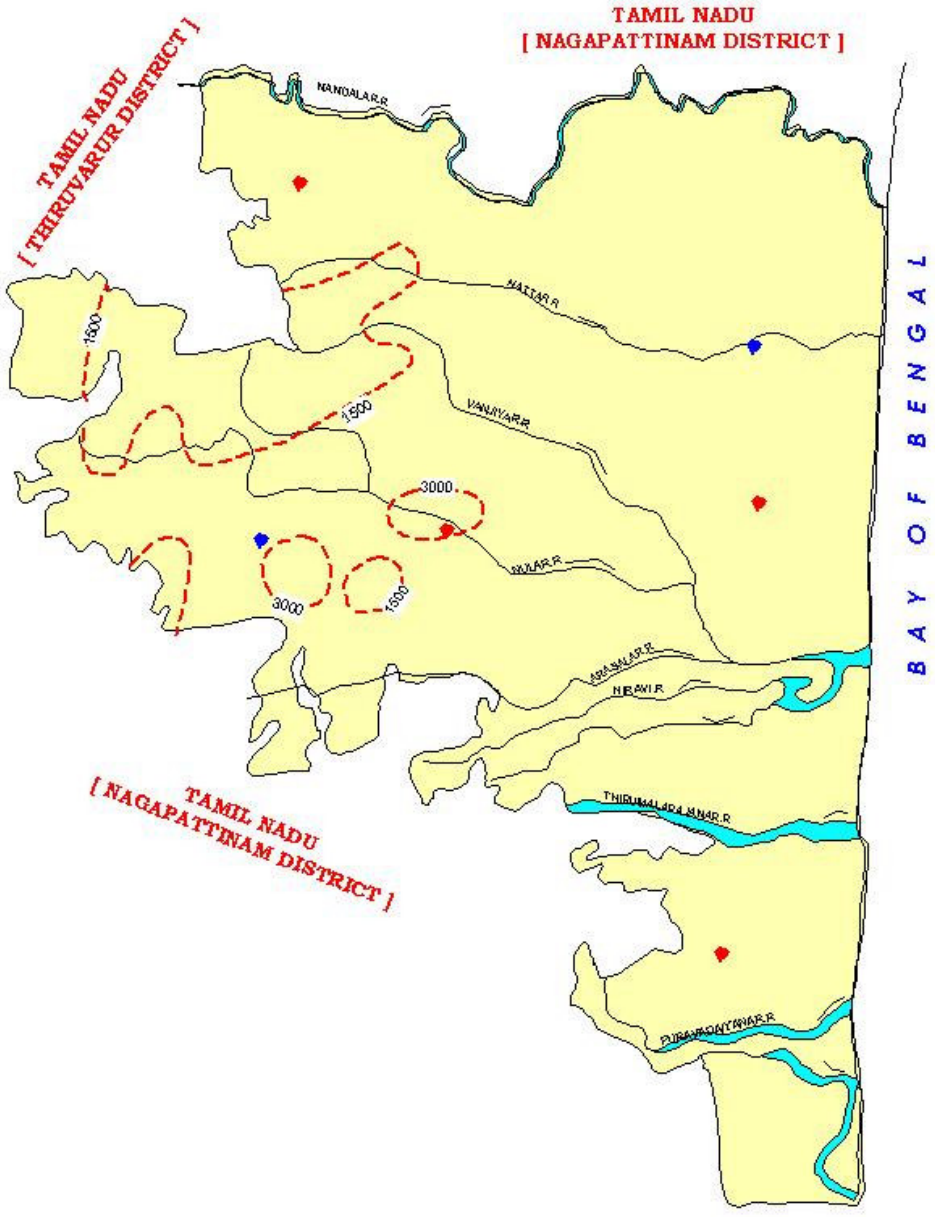

CENTRAL GROUND WATER BOARD, SECR, CHENNAI
KARAIKAL REGION, U.T.OF PUDUCHERRY
DEPTH TO PIEZOMETRIC SURFACE (TERTIARY AQUIFER)
PREMONSOON (DECEMBER- 2003)
TAMIL NADU
[NAGAPATTINAM DISTRICT]
TAMIL NADU
[THIRUVARUR DISTRICT]
NANDALAR.R
NEDUNGADU
NATTAR.R
KOTTUCHERRY
VANIYAR.R
KARAIKAL
THIRUNALLAR
NARAVAR
NIRAVI.R
THIRUMALAIRAYAN PATTINAM
BAY OF BENGAL
TAMIL NADU
[NAGAPATTINAM DISTRICT]
LEGEND
STATE BOUNDARY
COMMUNE HEADQUARTER
FRESH WATER AQUIFER BOUNDARY
DEPTH TO PIEZIMETRIC SURFACE (m.bgl.)
5-10
10 - 20

PLATE VI

CENTRAL GROUND WATER BOARD, SECR, CHENNAI

KARAIKAL REGION, UT OF PONDICHERY

HYDROGEOLOGY



LEGEND OVER LEAF

LEGEND FOR PLATE VI

ADMINISTRATIVE SETUP

STATE BOUNDARY

RIVER WITH FLOW DIRECTION

Δ^{752} TRIANGULATION HEIGHT [elevation in m.amsl]

CREEK

GROUND WATER HYDROLOGY

EXPLORATORY BORE WELL [CGWB]

LOCATION OF HIGH YIELDINGEXPLORATORY WELLS WITH DISCHARGE IN LPS [CGWB]

HYDROCHEMISTRY

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

AQUIFER	AGE	LITHOLOGY	GROUND WATER CONDITIONS	YIELD PROSPECTS (CU.M/D)	GROUND WATER DEVELOPMENT STRATEGIES
UNCONSOLIDATED	RECENT	RIVER ALLUVIUM, FLOOD PLAIN-DEPOSITS	DISCONTINUOUS, THIN, UNCONFINED TO SEMI CONFINED	> 200	DEVELOPMENT THROUGH LARGE DIAMETER DUG WELLS AND SHALLOW TUBE WELLS.
	TERTIARY	SANDSTONE	DISCONTINUOUS. CONFINED AQUIFER	1000 - 2000	DEVELOPMENT THROUGH TUBE WELLS OF 150 - 350 M DEPTH

SAVE WATER

AND

CONSERVE WATER

Published by: Regional Director, CGWB, SECR, E-1, Rajaji Bhavan, Besant Nagar, Chennai-90
☎+914424912941/24914494 ☎/Fax : 91 4424914334 Web: www.cgwb.gov.in
rdsecr-cgwb@nic.in