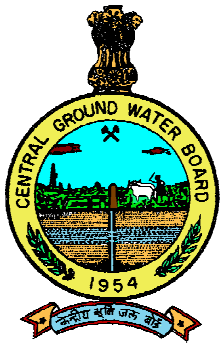

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Technical Report Series

DISTRICT GROUNDWATER BROCHURE

SIVAGANGA DISTRICT, TAMIL NADU

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Government of India
Ministry of Water Resources

Central Ground Water Board

South Eastern Coastal Region
Chennai

February 2008

DISTRICT AT A GLANCE (SIVAGANGA DISTRICT)

S.NO	ITEMS	STATISTICS	
1.	**GENERAL INFORMATION**		
	i. Geographical area (Sq.km)	**4189**	
	ii. Administrative Divisions as on 31-3-2007 Number of Tehsils Number of Blocks Number of Villages	 6 12 521	
	iii. Population (as on 2001 Census) Total Population Male Female	 1155356 566947 588409	
	iv. Average Annual Rainfall (mm)	904.7	
2.	**GEOMORPHOLOGY**		
	i. Major physiographic Units	Residual hills & Central Upland	
	ii. Major Drainages	Kottakaraiyar, Manimuttar, Vaigai & Pambar	
3.	**LAND USE (Sq. km) during 2005-06**		
	i. Forest area ii. Net area sown iii. Cultivable waste	218.77 1204.51 183.75	
4.	**MAJOR SOIL TYPES**	Red, Lateritic, Alluvial & Black Soils	
5.	**AREA UNDER PRINCIPAL CROPS (AS ON 2005-2006)**	1. Paddy - 89924 Ha – 75% 2. Ground Nut – 6409 Ha - 5% 3. Coconut – 5852 Ha – 5% 4. Sugarcane – 3995 Ha – 3%	
6.	**IRRIGATION BY DIFFERENT SOURCES (During 2005-06)**	**Number**	**Area irrigated (Ha)**
	i. Dug wells	17228	13950
	ii. Tube wells	1085	2201
	iii. Tanks	4911	72849
	iv. Canals	-	-
	v. Other Sources	-	-
	vi. Net irrigated area	89000 Ha	
	vii. Gross irrigated area	89000 Ha	
7.	**NUMBERS OF GROUND WATER MONITORING WELLS OF CGWB (AS ON 31.03.2007)**		
	i. No of dug wells	14	
	ii. No of piezometers	6	
8.	**PREDOMINANT GEOLOGICAL FORMATIONS**	Alluvium, Sandstone, Shale, Charnockite & Granite	
9.	**HYDROGEOLOGY**		
	i. Major water bearing formations	Sandstone, Alluvium &	

		weathered and fractured Granite & Charnockite	
	ii. Pre- monsoon depth to water level (May 2006)	1.18 to 10.10 m bgl	
	iii. Post- monsoon depth to water level (Jan'2007)	0.86 to 18.25 m bgl	
	iv. Long term water level trend in 10 years (1998-2007) in m/yr	**Annual**	
		Rise (m/year)	**Fall (m/year)**
		Min : 0.0122 Max :0.5069	Min : 0.0281 Max : 0.7357
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.	29 6 6	
	iv. Depth range(m)	Crystalline Rocks: 65 - 200 Sedimentary Rocks: 150 - 325	
	v. Discharge(lps)	Crystalline Rocks: < 1 to 5 Sedimentary Rocks: 5 - 25	
	vi. Storativity (S)	Sedimentary Rocks: 7.6×10^{-5} to 3.59×10^{-4} Crystalline Rocks: 2.16×10^{-5} to 4.9×10^{-5}	
	vii. Transmissivity (m^2/day)	Crystalline Rocks: < 1 to 25 Sedimentary Rocks: 100 - 500	
11.	**GROUND WATER QUALITY AS ON MAY 2006**		
	i. Presence of chemical constituents more than permissible limit	NO_3 & F	
	ii. Type of water	NaCl, $MgCl_2$& Mixed	
12.	**DYNAMIC GROUND WATER RESOURCES (as on 31.03.2004) in MCM**		
	i. Annual Replenishable Ground Water Resources	904.03	
	ii. Total Annual Ground Water Draft for all purposes	128.05	
	iii. Projected demand for Domestic and Industrial Uses up to 2025	22.20	
	iv. Stage of Ground Water Development	16	
13.	**AWARENESS AND TRAINING ACTIVITY**		
	i. Mass Awareness Programmes Organized	Nil	
	ii. Water Management Training Organized	Nil	
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	Nil	
	ii. Number of Critical Blocks	Nil	
	iii. Number of Blocks Notified	-	
16.	**MAJOR GROUND WATER PROBLEMS AND ISSUES.**	There are patches of brackish	

		quality of formation water in the district. Higher concentration of NO_3 is noticed in more than 50% of samples analyzed in the district. It is observed that the groundwater is suitable for drinking and domestic uses in respect of all constituents except in and around Chettinadu.

1.0 INTRODUCTION

1.1 Administrative Details

Sivaganga district is having administrative divisions of 6 taluks, 12 blocks, 521 villages as detailed below:

S.No	TALUK	NAME OF BLOCK	NO. OF VILLAGES
1	Sivaganga	Sivaganga Kallayarkoil	51 70
2	Manamadurai	Manamadurai Tiruppuvanam	43 46
3	Ilayangudi	Illayangudi	55
4	Devakottai	Devakottai Kannangudi	66 25
5	Thiruppathur	Tiruppathur Singampuneri S.Pudur	42 25 16
6	Karaikudi	Kallal Sakkottai	44 38
	Total		**521**

1.2 Basin and sub-basin

The district is part of Capecomerin to Cauvery Basin and parts of Kottakaraiyar, Tirumanimuttar, Vaigai and Pambar sub basins.

1.3 Drainage

The district is drained by Kottakaraiyar, Tirumanimuttar, Vaigai and Pambar and all these rivers are ephemeral in nature. In the major part of the district the drainage pattern is sub-dentritic and dentritic and at places, the drainage pattern is controlled by geological structures also.

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	21877
2	Barren & Uncultivable Lands	4747
3	Land put to non agricultural uses	117569
4	Cultivable Waste	18375
5	Permanent Pastures & other grazing lands	1367
6	Groves not included in the area sown	8712
7	Current Fallows	7342
8	Other Fallow Lands	118460
9	Net Area sown	120451
	Total	**418900**

The chief irrigation sources in the area are tanks, followed by wells. The block wise and source wise net area irrigated in Ha is given below (2005-06).

S.No	Block	Net area irrigated by					Total Net Area irrigated
		Canals	Tanks	Tube wells	Ordinary wells	Other Sources	
1	Sivaganga	0	5059	105	2684	0	7848
2	Kalaiyarkoil	0	111057	153	3136	0	14346
3	Manamadurai	0	6708	75	502	0	7285
4	Thiruppuvanam	0	7323	40	1300	0	8663
5	Ilayangudi	0	8449	461	273	0	9183
6	Devakottai	0	7518	354	176	0	8048
7	Kannangudi	0	4731	160	100	0	4991
8	Sakkottai	0	4803	218	47	0	5068
9	Thiruppathur	0	5659	104	1099	0	6862
10	Singampunari	0	4414	416	2348	0	7178
11	S.Pudur	0	3933	107	1893	0	5933
12	Kallal	0	3195	8	392	0	3595
	Total	**0**	**72849**	**2201**	**13950**	**0**	**89000**

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

1.5 Studies/Activities carried out by CGWB

Systematic hydrogeological surveys were completed by 1990s and subsequently re-appraisal hydrogeological surveys were carried out during the years 1992-93 and 1998-99.

Under exploratory programme, 29 exploratory wells and 6 Observation wells have been drilled to evaluate the aquifer parameters in the district during the years1976-79, 1996-97, 1998-99 and 2000-01.

Regional Groundwater Monitoring is being carried out in the district since 1972 and over the years the well density has been optimized for regional monitoring. Under this work, 14 dug wells and 6 piezometers are being monitored for studying the changes in water level and water quality. The monitoring is being carried out 4 times a year for water levels (January, May, August & November) and Water samples are collected during May measurements to study the changes in quality of water with time and space.

2.0 RAINFALL AND CLIMATE

The normal annual rainfall over the district varies from about 861.8 mm. to about 988.6 mm. The normal south west monsoon rainfall varies from 275.8 to 401.1 mm while during NE monsoon the normal seasonal rainfall varies from 382.5 to 442.8 mm. A perusal of the rainfall pattern shows that in general the rainfall increases towards east.

The district enjoys a tropical climate. The period from April to June is generally hot and dry. The weather is pleasant during the period from November to January. Usually mornings are more humid than afternoons. The

relative humidity varies between 65 and 85% in the mornings while in the afternoon it varies between 40 and 70%.

3.0 GEOMORPHOLOGY AND SOIL TYPES

3.1 Geomorphology

Differing resistances of the geological formation has given rise to various land forms, viz., structural hills, residual hills and pediment terrains in the district. The eastern and southern part of the district is characterized by flood plain.

The structural hills are occurring north west of Sivaganga in Sivaganga taluk, while pediment terrain in Tiruppuvanam and Tiruppathur. Deep buried pediments occur NW of Tiruppuvanam and Tiruppathur in Sivaganga and Manamadurai taluks. Flood plains are found along Vaigai river and alluvial plain in Devakottai, Sivaganga and Manamadurai Taluks.

3.2 Soils

The major soil types in the district are 1. Red soil, 2. Lateritic Soil, 3. Alluvial Soil and 4. Black Cotton soil. Red soils are prevalent in Devakottai, Tiruppathur and Sivagangai taluks, while Lateritic soil is found in Karaikudi and Devakottai taluks. Alluvial soil along the river courses and Black Soil in Illayangudi, Manamadurai and Tiruppathur Taluks.

4.0 GROUND WATER SCENARIO

4.1 Hydrogeology

Two-third area of the district is underlain by sedimentary formations while rest by Archaean crystalline metamorphic complex. The important aquifer systems encountered in the district are classified into

i) Porous formations, viz., alluvium, sandstone etc
ii) Weathered and fractured crystalline formations consisting of Charnockite and Granite.

The aquifers of porous formation may be grouped as follows

i. Gondwana aquifers
ii. Lower Cretaceous Aquifers
iii. Upper Cretaceous Aquifers
iv. Tertiary Aquifers (Cuddalore Sandstone)
v. Alluvium

Gondwana aquifers comprise shale, micaceous sandstone and conglomerates. Gondwana aquifers occur at shallow depth as water table aquifers and also in confined conditions as deeper aquifers. The shallow aquifer is tapped by dug wells ranging in depth between 6 to 11m bgl and the

yield of the dug wells varies from 56 to122 m^3/day. The groundwater exploration in deeper aquifer at Sivaganga, down to a depth of151 m bgl has revealed that there are no potential granular zones. The groundwater extraction is mainly used for domestic purposes. The dug wells can sustain a pumping of 2 - 3 hrs in a day with a yield of 2 – 3 lps

Lower cretaceous aquifers comprising clay and sandstone encountered to a limited extent in the district and exploration at Amaravathipudur revealed that six zones between 80 and 185 m bgl yield about 4 lps. However, the aquifer is not extensive in the district and is found around Karaikudi area. The aquifer is not being exploited at present. Tube wells can sustain a pumping of 4-6 hrs with a yield of 2 -4 lps.

Upper cretaceous formation comprises red coloured, fossiliferous sandstone and grey sandstone intercalated with shale. They are found at depth, in confined conditions and are encountered only in the eastern part of the district in Devakottai taluk down to a depth of 100 m bgl. The depth to piezometric surface varied from 4.50 m bgl to 17.25 m bgl during Jan 2007. The aquifer is being extensively used for domestic purposes. The groundwater from these aquifers is extensively used for piped water supply schemes. Tube wells can sustain a pumping of 4 -6 hrs with a yield of 5 - 6 lps.

Tertiary aquifers comprise sandstones and clays and Cuddalore sandstone aquifer in one of the potential aquifers of the State. The aquifers occur as water table aquifer (at shallow depth) and as confined aquifer at depth. The shallow aquifer is tapped by dug wells ranging in depth between 9 to 21 m bgl and yield of these wells range from 85 to170 m^3/day. The confined aquifer is encountered at the depth between 150 – 325 m bgl with about 3 to 5 zones, yielding up to 75 lps. The wells tapping these aquifers were in artesian condition in 70s and 80s and do not have free flow at present. The aquifer is mainly used for public water supply schemes and to a limited extent for irrigation. The wells used for public water supply are mostly drilled by CGWB and handed over to State agencies and they tap the zones between 150 – 325 m bgl, while the irrigation wells tap only zones in the range of 150 m, tapping mainly the top zones of the aquifers. Tube wells can sustain a pumping of 10 hrs with a yield of 10 - 20 lps.

Alluvium comprising sand and clay is well developed along the Vaigai river. The thickness of the alluvium varies between 6 and 32 m and the aquifer is mainly unconfined and due to the presence of clay at places, the aquifer also occurs in semi confined condition. The aquifer is generally exploited through dug wells and dug cum bore wells, tapping the entire thickness of aquifer. The yield of these wells varies from 50 to 500 m^3/day. The wells are used for both domestic and irrigation purposes. In addition, infiltration galleries are also used to tap the groundwater in the rived bed alluvium for drinking water purposes. Dug wells can sustain a pumping of 10 hrs with a yield of 2 -4 lps.

In case of crystalline formations, groundwater occurs under watertable condition in weathered and shallow fractures and under semi-confined to confined conditions in deeper fractures. The depth of weathering varies from

place to place from less than a metre to a maximum of 15 m bgl. The exploration has revealed that within 50 m bgl, there about 2 -3 zones, 50 – 100m bgl have 2 zones, 100- 150 m bgl has one zone and 150 – 200 has 2 zones. The fracture zones below 150 m are restricted to north western part of the district. The number of fracture zones is generalized and occurrence of fracture zones varies considerably due to heterogeneous nature of crystalline formations. The combined yield of the fracture zones vary from < 1 to 5 lps. The dug wells down to a depth 20 m bgl are used for both domestic and irrigation purposes, while the bore wells down to a depth 100 m are used mainly for drinking water supply.

The dug wells can sustain a yield of < 5 lps for 2 – 4 hrs in a day and bore wells with a yield of 2 – 5 lps can sustain for a pumping of 4 – 6 hrs. However, the success of the bore wells depend on the presence of fractures and their presence is limited and needs scientific siting.

4.1.1 Long Term Fluctuation (1998-2007)

Aquifer	Period	Rise (m)		Fall (m)	
		Minimum	Maximum	Minimum	Maximum
Shallow (Phreatic)	Pre monsoon (May 1998 – May 2006)	0.08	5.84	0.83	1.08
	Post Monsoon (Jan 1998 – Jan 2007)	1.93	1.93	0.20	5.13
Deep (Semi Confined to Confined)	Pre monsoon (May 2000 – May 2006)	3.56	4.02	1.05	1.05
	Post Monsoon (Jan 2001 – Jan 2007)	2.52	2.52	0.60	0.60

4.1.2 Aquifer Parameters

Aquifer Parameters		Shallow (Phreatic)	Deeper (Confined)
Depth Range (m bgl)	Sedimentary	30 -32	150 -325
	Hard rock	15 - 20	65 - 200
Zones Tapped	Sedimentary	6 -32	<50 : 1 zone 50 – 100 : 2 -3 Zones 100 – 200 : 5 – 6 Zones 200 – 300: 3 -5 Zones 300 – 350: 2 – 3 Zones
	Hard rock	5 - 20	<50 : 2 - 3 zones 50 – 100 : 2 Zones 100 – 150 : 1 Zone 150 – 200: 2 Zones
Transmissivity (m^2/day) :	Sedimentary	1 -10	100 - 500
	Hard rock	<1 - 5	<1 - 25
Storativity	Sedimentary	-	7.6×10^{-5} to 3.59×10^{-4}
	Hard rock	-	2.16×10^{-5} to 4.9×10^{-5}
Specific Yield	Sedimentary	12%	-
	Hard rock	1.5%	-

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.

Stage of Groundwater Development of Sivaganga District as on 31st March 2004 (in Ham)

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 Ground water Develop-ment	Category of the Block
Devakottai	6727.62	138.42	97.12	235.55	100.21	6488.99	4	Safe
Illayangudi	8588.48	54.08	209.41	263.49	216.07	8318.33	3	Safe
Kaliyarkoil	11615.78	459.43	211.99	671.43	218.74	10937.61	6	Safe
Kallal	9018.48	1416.98	166.71	1583.69	172.01	7429.49	18	Safe
Kannankudi	4767.27	212.61	63.00	275.61	65.01	4489.65	6	Safe
Manamadurai	6587.13	1287.92	198.13	1486.04	204.43	5094.79	23	Safe
S.Pudur	2052.94	1446.31	189.81	1636.12	195.89	410.74	80	Semi Critical
Sakkottai	6969.79	149.62	189.83	339.45	195.87	6624.30	5	Safe
Singampunari	3899.52	471.31	219.68	690.99	226.67	3201.54	18	Safe
Sivagangai	8504.72	2539.92	191.28	2731.20	197.36	5767.44	32	Safe
Thiruppathur	4930.99	595.53	199.57	795.10	205.92	4129.54	16	Safe
Thiruppuvanam	7700.14	1880.92	215.30	2096.23	222.15	5597.06	27	Safe
District Total	**81362.86**	**10653.05**	**2151.83**	**12804.88**	**2220.32**	**68489.49**	**16**	

4.3 Ground Water Quality

Groundwater Quality of phreatic aquifer in Sivaganga district is in general, colourless, odourless and slightly alkaline in nature. The electrical conductivity of groundwater in phreatic zone during May 2006 was in the range of 410 to 5110 µS/cm and major parts are having electrical conductivity below 1600 µS/cm.

It is observed that the groundwater is suitable for drinking and domestic uses in respect of all constituents except in and around Chettinadu. About 50% samples are having higher concentration of NO_3 more than the BIS permissible limit.

4.4 Status of Ground Water Development

The estimation of groundwater resources for the district has shown that out of 12 blocks, 1 block is categorized as semi critical and rest is Safe.

In crystalline formation, Dug wells are used to extract groundwater from weathered formation while deeper fractures are tapped through bore wells and dug cum bore wells. The dug wells down to a depth 20 m bgl are used for both domestic and irrigation purposes, while the bore wells down to a depth 100 m are used mainly for drinking water supply.

The dug wells can sustain a yield of < 5 lps for 2 – 4 hrs in a day and bore wells with a yield of 2 – 5 lps can sustain for a pumping of 4 – 6 hrs. However, the success of the bore wells depend on the presence of potential fractures and their presence is limited and needs scientific siting.

In Gondwana aquifers, the shallow aquifer is tapped by dug wells ranging in depth between 6 to 11m bgl and the yield of the dug wells varies from 56 to122 m^3/day. The dug wells can sustain a pumping of 2 - 3 hrs in a day with a yield of 2 – 3 lps. The groundwater exploration in deeper aquifer at Sivaganga, down to a depth 151 m bgl has revealed that there are no potential granular zones. The groundwater extraction is mainly used for domestic purposes.

In Lower cretaceous aquifer is encountered to a limited extent in the district and the aquifer is not being exploited at present. Tube wells can sustain a pumping of 4-6 hrs with a yield of 2 -4 lps.

Upper cretaceous formation are found at depth, in confined conditions and are encountered only in the eastern part of the district in Devakottai taluk down to a depth of 100 m bgl. The aquifer is being extensively used for domestic purposes. The groundwater from these aquifers is extensively used for piped water supply schemes. Tube wells can sustain a pumping of 4 -6 hrs with a yield of 5 - 6 lps.

Tertiary aquifers occur as water table aquifer (at shallow depth) and as confined aquifer at depth. The shallow aquifer is tapped by dug wells ranging in depth between 9 to 21 m bgl and yield of these wells range from 85 to170 m^3/day. The confined aquifer is encountered at the depth between 150 – 325 m bgl with about 3 to 5 zones, yielding up to 75 lps. The wells tapping these aquifers were in artesian condition in 70s and 80s and do not have free flow at present. The aquifer is mainly used for public water supply schemes and to a limited extent for irrigation. The wells used for public water supply are mostly drilled by CGWB and handed over to State agencies and they tap the zones between 150 – 325 m bgl, while the irrigation wells tap only zones in the range of 150 m, tapping only the top zones of the aquifers. Tube wells can sustain a pumping of 10 hrs with a yield of 10 - 20 lps.

Alluvium is well developed along the Vaigai river and the thickness of the alluvium varies between 6 and 32 m and the aquifer is mainly unconfined and due to the presence of clay at places, the aquifer also occurs in semi confined condition. The aquifer is generally exploited through dug wells and dug cum bore wells, tapping the entire thickness of aquifer. The yield of these wells varies from 50 to 500 m^3/day. The wells are used for both domestic and irrigation purposes. In addition, infiltration galleries are also used to tap the groundwater in the river bed alluvium for drinking water purposes. Dug wells can sustain a pumping of 10 hrs with a yield of 2 -4 lps.

5.0 GROUNDWATER MANAGEMENT STRATEGY

5.1 Groundwater Development

In view of the low level of ground water development in the major part of the district, there is still scope for further groundwater development in the district. The variation in occurrence of fresh water zones and absence of specific aquifers make it necessary to exercise caution while designing tube wells for development of available ground water resources at depth.

The map showing the development prospects for the district is shown in Plate VI.

5.2 Water Conservation and Artificial Recharge

The stage of development is very low in comparison to other parts of the State and hence CGWB has not planned for artificial recharge to groundwater in the district taking into consideration other priority areas warranting immediate attention.

6.0 GROUNDWATER RELATED ISSUES & PROBLEMS

There are patches of brackish quality of formation water in the district. Higher concentration of NO_3 is noticed in more than 50% of samples analyzed in the district. It is observed that the groundwater is suitable for drinking and domestic uses in respect of all constituents except in and around Chettinadu.

7.0 AWARENESS & TRAINING ACTIVITY

CGWB has not so far taken Awareness Campaign and Water Management Training

8.0 AREA NOTIFIED BY CGWA/SGWA

Central Ground Water Authority has not notified any area in the district and State Ground Water Authority has also not notified any area in the district.

9.0 RECOMMENDATIONS

As there is scope for further development of ground water, irrigation can be augmented using groundwater sources.

The variation in occurrence of fresh water zones and absence of specific aquifers make it necessary to exercise caution while designing tube wells for development of available ground water resources at depth.

On the basis of the experiences in execution of Central Sector Scheme and Demonstrative Projects on artificial recharge, the desilting of existing

ponds/tanks will be the most cost effective structures. The provision of recharge wells/shafts in percolation ponds/ check dams will enhance the efficacy of these structures.

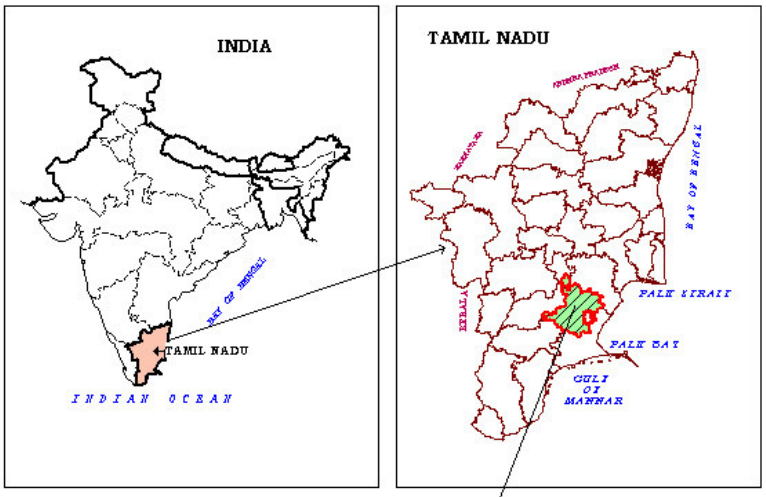
Roof Top Rainwater Harvesting (RTRWH) had been made mandatory for all the buildings in the State of Tamil Nadu. However, it is seen that site specific designs can improve the existing RTRWH system and efforts may be made to incorporate the improvements if found necessary. A concerted effort involving various Government agencies and NGOs can make the movement of artificial recharge to groundwater a successful one.

PLATE - I

CENTRAL GROUND WATER BOARD, SECR, CHENNAI

SIVAGANGA DISTRICT, TAMIL NADU

LOCATION



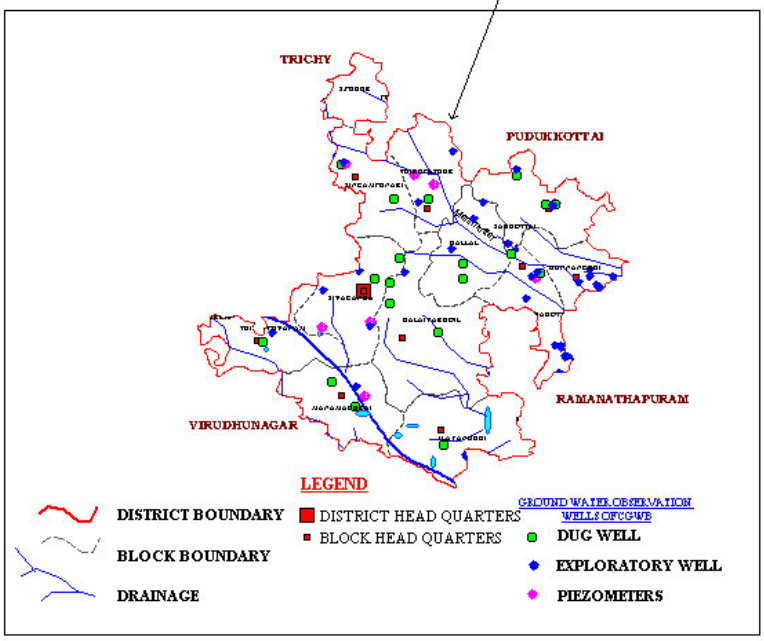


PLATE II

CENTRAL GROUND WATER BOARD, SECR, CHENNAI

SIVAGANGA DISTRICT, TAMIL NADU

DEPTH TO WATER LEVEL

PREMONSOON (MAY - 2006)

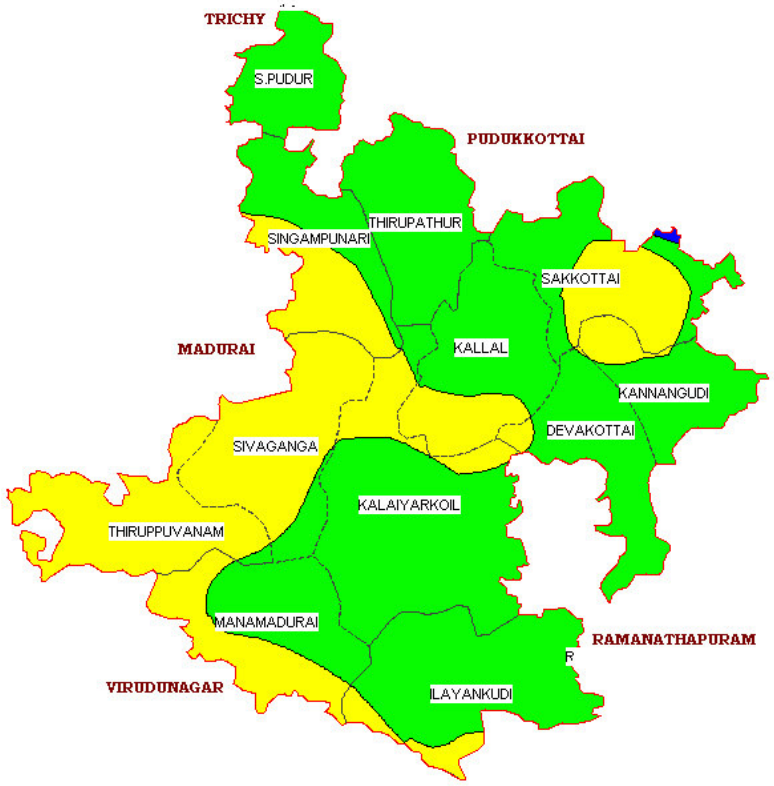


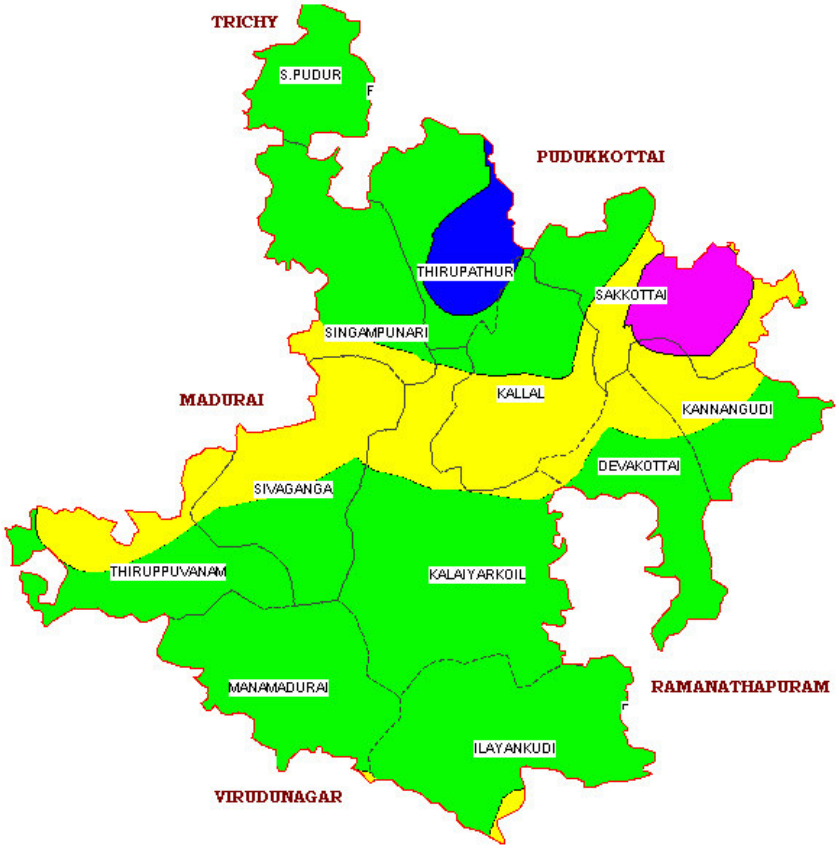
PLATE III

CENTRAL GROUND WATER BOARD, SECR, CHENNAI

SIVAGANGADISTRICT, TAMIL NADU

DEPTH TO WATER LEVEL

POSTMONSOON (JANUARY-2007)



LEGEND

DISTRICT BOUNDARY

BLOCK BOUNDARY

DEPTH TO WATER LEVEL (mbgl.)

0-2	2-5	5-10	10 -20

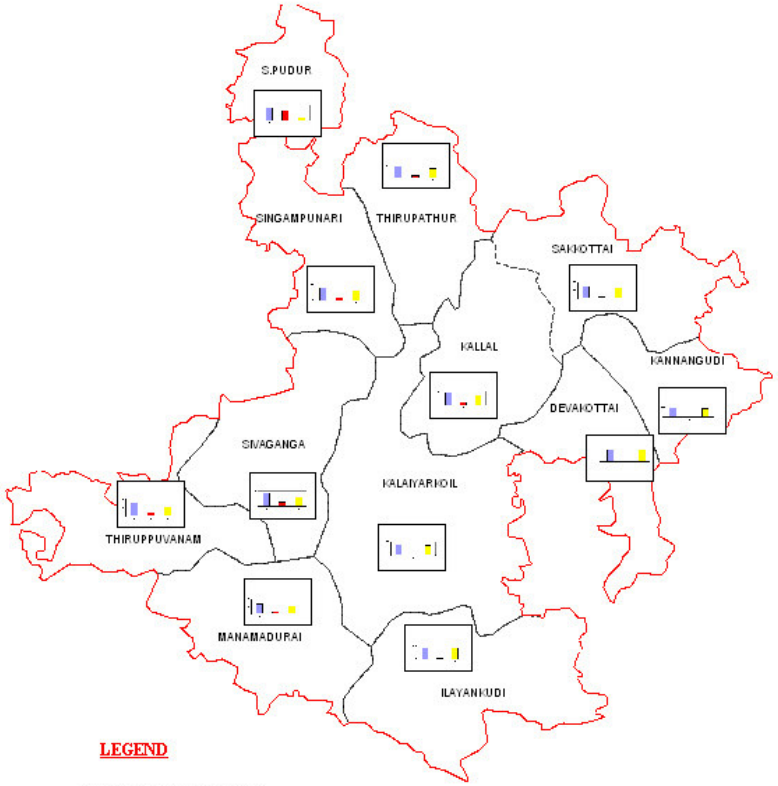
PLATE IV

CENTRAL GROUND WATER BOARD, SECR, CHENNAI

SIVAGANGA DISTRICT, TAMIL NADU

CATEGORISATION OF BLOCKS

(AS ON MARCH- 2004)



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

PLATE V

CENTRAL GROUND WATER BOARD, SECR, CHENNAI

SIVAGANGA DISTRICT, TAMIL NADU

HYDROGEOLOGY

LEGEND OVER LEAF

LEGEND FOR PLATE V

ADMINISTRATIVE SETUP

- DISTRICT BOUNDARY
- BLOCK BOUNDARY
- HILLY AREA
- Δ^{752} TRIANGULATION HEIGHT [elevation in m.amsl]
- CREEK

GROUND WATER HYDROLOGY

- EXPLORATORY BORE WELL [CGWB]
- HIGH YIELDING BORE WELL [CGWB]

HYDROCHEMISTRY

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

STRUCTURE

- TRACE OF LINEAMENT

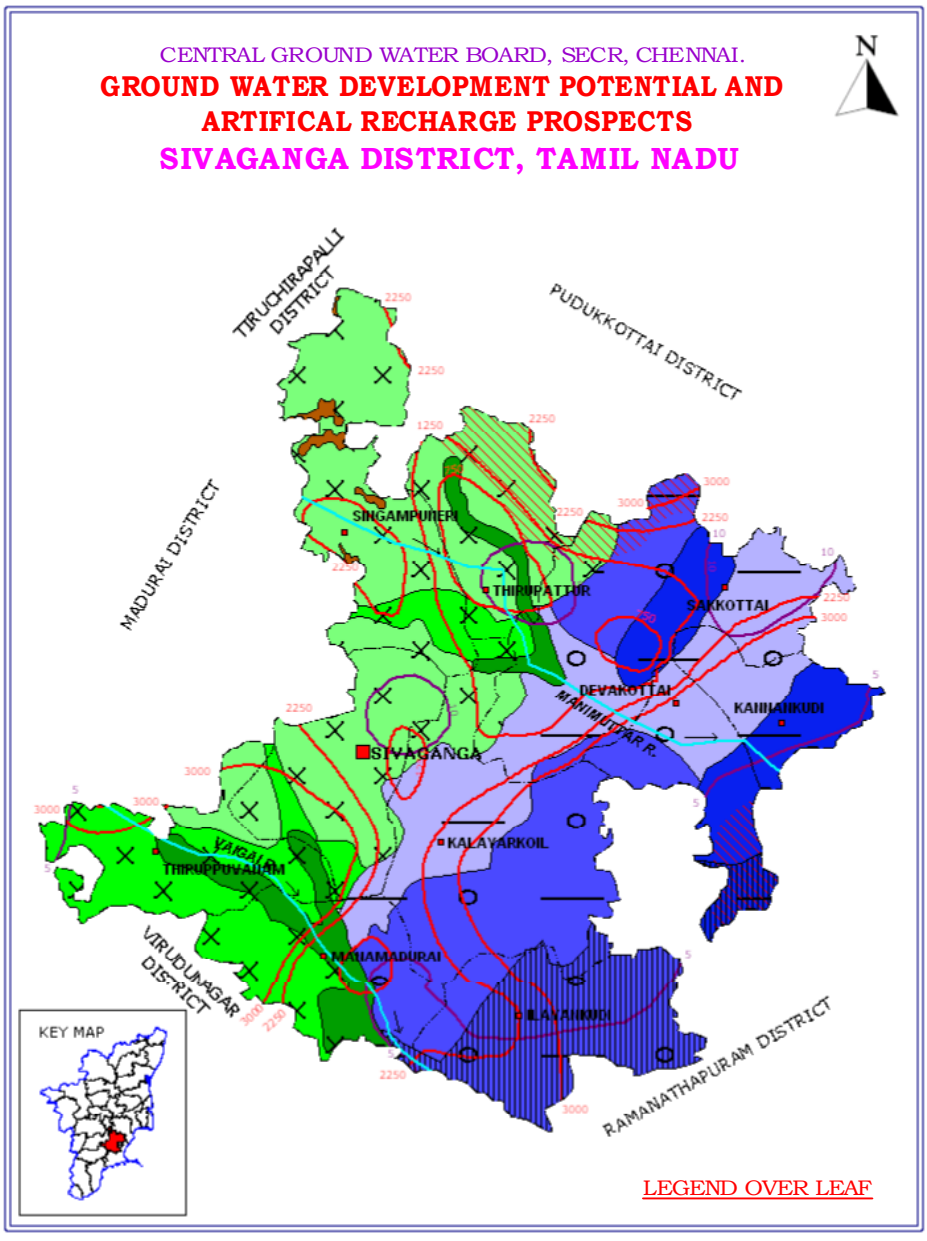
Aquifer	Age	Lithology	Groundwater Condition	Yield Prospects (Cu.m/day)	Groundwater Development Strategies
Unconsolidated	Recent	Alluvium	Discontinuous, thin, unconfined to semi confined	<200	Development through dug well, shallow tube well
Semi consolidated	Miocene	Sandstone	Discontinuous, unconfined to semi confined	360 -720	Development through dug well, deep tube well
Semi consolidated	U.Carboniferous	Sandstone, Conglomerates	Discontinuous, unconfined to semi confined	20 -30	Development through dug well, shallow tube well
Consolidated	Archaean	Granite Gneiss, Granites & Charnockites	Discontinuous, unconfined to semi confined, restricted to weathered residuum and fractures	<75	Development of weathered residuum through dug well & fractures through bore well

PLATE VI

CENTRAL GROUND WATER BOARD, SECR, CHENNAI.

GROUND WATER DEVELOPMENT POTENTIAL AND ARTIFICAL RECHARGE PROSPECTS

SIVAGANGA DISTRICT, TAMIL NADU



LEGEND PLATE FOR VI

DISTRICT – SIVAGANGA

	Wells Feasible	Rigs Suitable	Depth Of Well (M)	Discharge (LPM)	Suitable Artificial
Soft Rock Aquifer	Dug Well Shallow Tube Well	Manual Direct Rotary	10 – 15 40 - 60	100 – 300 60 - 200	Gully Plugs / Percolation Ponds
Soft Rock Aquifer	Tube Well	Direct Rotary	50 - 100	150 - 300	Recharge Tube Wells / Percolation Ponds
Soft Rock Aquifer	Tube Well	Direct Rotary	100 - 400	300 - 2000	Recharge Tube Wells
Hard Rock Aquifer	Dug Well Bore Well	Manual DTH	10 - 18 90 - 120	60 60	Gully Plugs / Recharge Wells / Percolation Ponds
Hard Rock Aquifer	Dug Well Bore Well	Manual DTH	8 - 15 75 - 100	60 – 180 60 - 180	Recharge Wells / Percolation Ponds
Hard Rock Aquifer	Dug Well Bore Well	Manual DTH	8 - 15 75 - 100	More Than 180 More Than 180	Recharge Wells / Percolation Ponds
	District Boundary			Block Boundary	
	District Headquarters			Block Headquarters	
5	Water Level-Pre-Monsoon (Decadal Mean 1993-2002) Mbgl		1250	EC in Microsiemens / Cm At 25°C	
	River			Lineament	
	Saline Zone			Nitrate Greater Than Maximum Permissible Limit (45 mg/L)	
	Hilly Area				

OTHER INFORMATION

Geographical Area	4189 Sq.Km.
Number Of Blocks	12
Major Drainage	Manimuttar, Pambar, Kottakaraiyar & Vaigai
Population (2001)	11,55,356
Average Annual Rainfall	904.7 mm
Annual Range Of Temperature	26 – 37°C
Regional Geology	**Hard Rocks:** Granites and Charnockites **Soft Rocks:** Sandstones, Shale and
Net Ground Water Availability For Future Irrigation	684.89 MCM/Yr
Stage Of Ground Water Development as on Match 2004	16 %
Names Of Blocks Showing Intensive Ground Water Development	Nil

SAVE WATER

AND

CONSERVE WATER

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