

**CHAPTER 4.1.9 GROUND WATER RESOURCES
DINDUGAL DISTRICT**

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GROUND WATER REPORT OF DINDUGAL DISTRICT

INTRODUCTION :

In Tamil Nadu, the surface water resources are fully utilized by various stake holders. The demand of water is increasing day by day. So, groundwater resources play a vital role for additional demand by farmers and Industries and domestic usage leads to rapid development of groundwater. About 63% of available groundwater resources are now being used. However, the development is not uniform all over the State, and in certain districts of Tamil Nadu, intensive groundwater development had led to declining water levels, increasing trend of Over Exploited and Critical Firkas, saline water intrusion, etc.

ADMINISTRATIVE SET UP

The total geographical area of the Dindigul district is 6,26,664 hectares, which is about 4.82 percent of the total geographical area of Tamil Nadu state. The district, is well connected by roads and railway lines with other towns within and outside Tamil Nadu. This district comprising 359 villages has been divided into 7 Taluks, 14 Blocks and 40 Firkas.

Thoppampatti and Korikadavu firkas of Thoppampatti Block covering 23 villages are coming under Palani taluk and Thevathur and Kallimandayam firkas covering 18 villages are coming under Oddanchatram taluk. The district area falls within the following geographical co-ordinates

Latitude : 10°05'00" N - 10°49'50" N

Longitude : 77°16'30" E - 78°19'30" E

1. HYDROGEOLOGY

(i) Major Geological formations:

Geology:

Dindugul district is almost made up of hard rock covered by thin soil.

a) Hard rock

More than 97% of the district is covered by hard rocks. The gneissic rock type is the country rock seen commonly.

Charnockite rock occurs in Kodaikkanal hills and in parts of Nilakottai and Nattam taluks. Calc Gneisses are seen in parts of Oddanchatram, Gujiliyamparai, Vedasandhur and Reddiarchatram blocks. Quartzites are seen in patches in Vadamadurai, Sanarpatti and in Oddanchatram blocks.

Valley-fill sediments admixed with sand, silt and clay are found in parts of Nattam and Sanarpatti blocks. They are the transported weathered rocks from the adjoining hill slopes.

b) Alluvium

Alluvial deposits comprising of sand, silt, clay and gravel are very limited in aerial extent in this district and are found along Vaigai, Manjalar and MarudhaNadhi river courses.

Drilling of bore holes:

The occurrence and movement of groundwater in hard rock formations are restricted to the porous zones of weathered formations and the open systems of fractures, fissures and joints. Generally, in hard rock regions, occurrence of weathered thickness is discontinuous both in space and depth. Hence recharge of groundwater in hard rock formations is influenced by the intensity and depth of weathering. The subsurface lithological condition and the aquifer characters can be ascertained by drilling exploratory boreholes and conducting pump tests.

The State Ground and Surface Water Resources Data Centre, during the course of investigation, have drilled more than 152 boreholes spread over the entire district to find out the nature and behaviour of the sub surface material. There is considerable diversity in the nature of formation even within short distance. In Nattam and Nilakottai taluks only there is considerable thickness of valley fill sediments ranging from 15 to 25 metres. In the reserve forest and hilly area, around Kodaikkanal, Nattam, Vedasandur taluks, the weathering zone is limited to 15 to 20 m below ground level. In the remaining parts of the districts, the depth of weathering

zone varies from 21 to 30 m below ground level. The sedimentary tract of Vaigai alluvium is restricted to either side of the river Vaigai and the thickness of alluvium varies from 5 to 10 m.

Aquifer parameters

a) Hard rock

In general, hard rock is highly heterogeneous in its occurrence. Hence thickness of aquifer varies between 15m and 30m below ground level. The secondary porosity is essentially dependent upon the intensity and degree of weathering and fracture development in the bed rock. The range of aquifer parameters in hard rock regions is given below.

Parameters	Range
Well yield in LPM	30-100lpm
Transmissivity (T) m ² /day	10-50 m ² /day
Permeability (K) m/day	0.7-2.0 m/day

Source: State Ground and Surface Water Resources Data Centre, Chennai.

b) Alluvium

The alluvium occurs as a linear patch along the Vaigai River course which occupies a fraction of area in southern part of Dindugul district.

The two bore holes drilled one at Nadakottai and other at Sirunaickenpatti near the Vaigai alluvium in Dindugul district show that the thickness of alluvium is 2 to 3m followed by hard crystalline rock.

(iii) Drilling:

The drilling types are different according to the formation of the terrain. In general, DTH rigs are used in Hard rock formations for drilling a borewell at a depth ranges from 30m to 200m, according to the extension of joints, fractures,

lineaments, etc in an area. In Sedimentary formations, rotary rigs with different rotors used according to the Tube well's diameter. The Bentonite clay is used in rotary rigs to avoid the collapse of the Tube well. The sedimentary tube wells are drilled up to a depth of 30m to 300m depending on the area, yield, etc. In alluvial formations, the hand rotary used for drilling tube wells ranges from 10m to 15m. In river beds, infiltration tube wells used for extraction of groundwater.

In Hard rock, the well designing is simple. The upper top soil and highly weathered zone is cased with PVC pipe and the remaining weathered, Fissured, Jointed portion is left as it is. In Villupuram District, the weathered zone ranges from 1.0m to 12.0m. In Granitic gneiss area, the highly weathered portion will be more up to 15m but in charnockite area, the weathered zone will extend up to 8.0m to 10.0m only. In Sedimentary area, the well construction depends on the occurrence of sand thickness in the referred area. The logger is also used in the construction to identify the area of good quality of water.

2. GROUNDWATER REGIME MONITORING:

(i) Notes on existing water level scenario:

The water level is being monitored by State Ground & Surface Water Resources Data Centre from 1971 onwards from a network of 1746 observation wells (shallow open wells) located all over the State. The water level readings are observed in the first week of every month by the field officers. In Dindugal District, 227 observation wells and 112 piezometers, totally 339 wells are monitoring on Monthly basis. The Central Ground Water Board also monitors the water level from 900 numbers of wells spread all over the State. They observe water level four times in a year. (i.e January, May, August and November). The collected water level data are uploaded in GWDES software and database is maintained regularly for analysing the water level trend with rainfall. From the Monitoring network of wells, the selected representative wells are taken for Resource Estimation computations.

In Dindugal District, during the pre monsoon, the water level generally in declining trend ranges from G.L. to 15m. The depth of well below GrundLevel 12.0m are become dry during hot season like May, June, July. In the post monsoon, the

water level generally in upward trend due to rainfall and it may reach the Ground Level also. The water level trend maps for pre and post monsoons are included as Annexure- I & II.

(ii) Long term trend of water level:

The long term fluctuations of water levels range from G.L. to 14.0m in many parts of the Dindugal District. The analysis reveals that the water level has gone down in the north, west and central parts of the Dindugal District. The inference taken from the annual fluctuation is due to lack of rainfall which in turn affects the groundwater levels in phreatic aquifer. The seasonal fluctuation study reveals that due to necessity for development of ground water for different sector needs and due to failure of monsoons, the water level has gone down. The hydrograph of observation wells water level trend from 2005 to 2017 enclosed as Annexure – III and water level trend from 2000 to 2017 of Piezometers enclosed as Annexure – IV for Dindugal District.

(iii) Existing network of Monitoring wells:

In Dindugal District, the existing network of monitoring wells is 339 wells, 227 wells are observation wells and 112 wells are piezometers. These wells are observed for every month water level.

Dindigul District: Observation Wells - Location and Co-ordinates

Well No	District	Tahsil / Taluk	Block / Mandal	Village	Latitude	Longitude
83019 A	Dindigul	Natham	Natham	Lingavadi	10°08'54"	78°11'05"
83021A	Dindigul	Nilakottai	Nilakottai	Pallapatti	10°08'25"	77°54'47"
83029A	Dindigul	Dindigul	Dindigul	A.Vellodu	10°19'26"	77°57'50"
83034A	Dindigul	Vedasandur	Guziliamparai	Guziliamparai	10°44'00"	78°07'05"
83035A	Dindigul	Dindigul	Dindigul	Chettinaickenpatti	10°26'11"	77°57'28"
83037A	Dindigul	Oddanchatram	Oddanchatram	chatrapatti	10°28'06"	77°39'07"
83038A	Dindigul	Palani	Palani	Palani	10°27'50"	77°31'20"

83038B	Dindigul	Palani	Palani	Palani Town	10°27'32"	77°31'05"
83040A	Dindigul	Vedasandur	Vedasandur	Kaithienkottai	10°34'53"	77°56'40"
83042A	Dindigul	Palani	Thoppampatti	Melkaraipatti	10°35'30"	77°30'05"
83043A	Dindigul	Palani	Thoppampatti	Porulur	10°35'50"	77°37'42"
83094B	Dindigul	Nilakottai	Nilakottai	Thevasori	10°04'23"	78°06'56"
83100A	Dindigul	Nilakottai	Batlagundu	Vathalagundu	10°09'34"	77°47'01"
83509A	Dindigul	Dindigul	Shanarpatti	Silvarpatti	10°18'23"	78°08'26"
83512A	Dindigul	Dindigul	Athoor	Palayakannivadi	10°21'05"	77°51'24"
83513A	Dindigul	Dindigul	Reddiarchatram	Palayakannivadi	10°23'15"	77°49'39"
83515B	Dindigul	Dindigul	Dindigul	Dindigul	10°22'30"	77°59'40"
83521A	Dindigul	Dindigul	Dindigul	Alagupatti	10°28'18"	77°54'50"
83522A	Dindigul	Oddanchatram	Oddanchatram	Verupakshi	10°28'00"	77°41'59"
83526A	Dindigul	Palani	Thoppampatti	Thumbalapatti	10°32'02"	77°31'35"
83527A	Dindigul	Palani	Palani	Eramanickenpatti	10°29'30"	77°35'07"
83530A	Dindigul	Oddanchatram	Oddanchatram	Puliyurnatham	10°32'17"	77°49'48"
83531A	Dindigul	Vedasandur	Vedasandur	Vedasandur	10°31'57"	77°57'08"
83536A	Dindigul	Oddanchatram	Oddanchatram	Jogipatti	10°35'12"	77°50'22"
83539A	Dindigul	Palani	Thoppampatti	Kolumakondan	10°34'39"	77°26'27"
83547A	Dindigul	Vedasandur	Guziliamparai	R.Vellodu	10°42'28"	78°01'40"
83547B	Dindigul	Vedasandur	Guziliamparai	Mallpuram	10°00'56"	78°00'48"
83549A	Dindigul	Vedasandur	Guziliamparai	R.Vellodu	10°45'12"	78°01'42"
83551A	Dindigul	Vedasandur	Guziliamparai	Landakkottai	10°49'10"	78°09'56"
502001	Dindigul		Athoor	Seevalsaragu	10°18'15"	77°53'26"
502002	Dindigul		Athoor	Veerakkal	10°18'56"	77°53'43"

502003	Dindigul		Athoor	S. Parapatti	10°18'36"	77°51'47"
502004	Dindigul		Athoor	Palayamkottai	10°15'46"	77°51'19"
502005	Dindigul		Athoor	Sithayankottai	10°16'17"	77°50'15"
502006	Dindigul		Athoor	Sitharevu	10°14'44"	77°47'23"
502007	Dindigul		Athoor	Ayyampalayam	10°14'26"	77°43'57"
502008	Dindigul		Athoor	Athoor	10°17'01"	77°50'34"
502009	Dindigul		Athoor	Veerakkal	10°19'36"	77°54'21"
502010	Dindigul		Athoor	N. Panjampatti	10°19'04"	77°55'48"
502011	Dindigul		Reddiyarchatram	Chathrapatty	10°20'11"	77°49'06"
502012	Dindigul		Reddiyarchatram	Pandrimalai	10°22'05"	77°45'36"
502013	Dindigul		Reddiyarchatram	Thethupatti	10°23'46"	77°49'08"
502014	Dindigul		Reddiyarchatram	Kullampatti	10°25'50"	77°48'37"
502015	Dindigul		Reddiyarchatram	Silvarpatti	10°26'50"	77°54'30"
502016	Dindigul	Dindigul	Dindigul	Adiyanuthu	10°20'07"	77°59'21"
502017	Dindigul	Dindigul	Dindigul	Anjukulipatti	10°14'31"	78°04'47"
502018	Dindigul	Dindigul	Dindigul	Tadikombu	10°26'09"	77°58'51"
502019	Dindigul	Dindigul	Dindigul	Kurumbapatti	10°23'03"	77°57'36"
502020	Dindigul	Dindigul	Shanarpatti	Timmanallur	10°16'12"	78°07'30"
502021	Dindigul	Dindigul	Shanarpatti	Siluvathur	10°21'30"	78°06'11"
502022	Dindigul	Dindigul	Shanarpatti	Rajakkapatti	10°21'11"	78°03'02"
502023	Dindigul	Kodaikanal	Kodaikanal	Poomparai	10°15'24"	77°24'17"
502024	Dindigul	Kodaikanal	Kodaikanal	Kookal	10°17'30"	77°23'55"
502025	Dindigul	Kodaikanal	Kodaikanal	Mannavanoor	10°13'33"	78°20'44"

502026	Dindigul	Kodaikanal	Kodaikanal	Kodaikanal	10°14'12"	78°29'45"
502027	Dindigul	Natham	Natham	Lingavadu	10°08'15"	78°10'50"
502028	Dindigul	Natham	Natham	Reddiyapatti	10°09'12"	78°11'49"
502029	Dindigul	Natham	Natham	Sathambadi	10°11'12"	78°12'50"
502030	Dindigul	Natham	Natham	Samuthrapatti	10°12'55"	78°17'34"
502031	Dindigul	Natham	Natham	Sirugudi	10°14'38"	78°18'04"
502032	Dindigul	Natham	Natham	Pannayamalai	10°14'36"	78°14'18"
502033	Dindigul	Natham	Natham	Sethur	10°18'39"	78°16'33"
502034	Dindigul	Natham	Natham	K. Pudhur	10°21'20"	78°12'34"
502035	Dindigul	Natham	Natham	Mulaiyur	10°13'18"	78°09'59"
502036	Dindigul	Natham	Natham	Punnapatti	10°14'19"	78°11'10"
502037	Dindigul	Nilakottai	Nilakottai	Pachamalaiyankottai	10°16'37"	77°52'23"
502038	Dindigul	Nilakottai	Bathlagundu	Pattiveeranpatti	10°12'53"	77°45'37"
502039	Dindigul	Nilakottai	Nilakottai	Kottur	10°12'37"	77°52'04"
502040	Dindigul	Nilakottai	Nilakottai	Pillaiyarnatham	10°06'45"	77°57'35"
502041	Dindigul	Nilakottai	Bathlagundu	Kulichettipatti	10°05'56"	77°49'23"
502042	Dindigul	Nilakottai	Bathlagundu	Kunnuvarankottai	10°06'42"	77°46'01"
502043	Dindigul	Nilakottai	Bathlagundu	Viruveedu	10°05'24"	77°46'44"
502044	Dindigul	Nilakottai	Bathlagundu	Sandaiyur	10°05'42"	77°45'21"
502045	Dindigul	Nilakottai	Bathlagundu	Palaya Bathlagundu	10°09'40"	77°44'34"
502046	Dindigul	Nilakottai	Bathlagundu	Kanavaipatti	10°11'06"	77°44'14"
502047	Dindigul	Oddanchatram	Oddanchatram	Javadhupatti	10°34'32"	77°48'56"
502049	Dindigul	Oddanchatram	Oddanchatram	Kuthilappai	10°36'19"	77°46'43"
502050	Dindigul	Oddanchatram	Oddanchatram	K. Keeranur	10°36'03"	77°44'22"

502051	Dindigul	Oddanchatram	Oddanchatram	D. Reddykottai	10°27'19"	77°39'20"
502052	Dindigul	Oddanchatram	Oddanchatram	Ambilikkai	10°31'34"	77°41'55"
502053	Dindigul	Oddanchatram	Thoppampatti	Koothampoondi	10°40'07"	77°40'58"
502054	Dindigul	Oddanchatram	Thoppampatti	Manjanaickenpatti	10°29'06"	77°37'07"
502055	Dindigul	Oddanchatram	Oddanchatram	Kollapatti	10°29'41"	77°45'26"
502056	Dindigul	Palani	Palani	Kodaimangalam	10°28'36"	77°31'30"
502057	Dindigul	Palani	Palani	Chathrapatti	10°29'54"	77°31'36"
502058	Dindigul	Palani	Palani	Kottathurai	10°36'31"	77°29'36"
502059	Dindigul	Palani	Thoppampatti	Melakarapatti	10°35'47"	77°28'26"
502060	Dindigul	Palani	Thoppampatti	Melakarapatti	10°35'43"	77°27'21"
502061	Dindigul	Palani	Thoppampatti	Kodaimangalam	10°37'09"	77°26'58"
502062	Dindigul	Palani	Thoppampatti	Kuruvanvalasu	10°36'14"	77°24'30"
502063	Dindigul	Palani	Thoppampatti	Kolumankondan	10°34'09"	77°25'50"
502064	Dindigul	Palani	Palani	Chithrakulam	10°29'21"	77°26'37"
502065	Dindigul	Palani	Palani	Kavalapatti	10°27'08"	77°25'59"
502066	Dindigul	Palani	Palani	Andipatti	10°26'47"	77°20'57"
502067	Dindigul	Palani	Palani	A. Kalayampatti	10°27'26"	77°28'54"
502068	Dindigul	Palani	Palani	Chinna Kalayampatti	10°28'26"	77°28'38"
502069	Dindigul	Palani	Palani	Pethanaickenpatti	10°29'13"	77°28'38"
502070	Dindigul	Palani	Palani	Sivagiripatti	10°26'08"	77°30'12"
502071	Dindigul	Palani	Palani	Balasamudram	10°25'14"	77°30'24"

502072	Dindigul	Palani	Palani	Ayakkudi	10°26'59"	77°33'31"
502073	Dindigul	Palani	Palani	Amarampoondi	10°30'35"	77°34'16"
502074	Dindigul	Vedasendur	Vedasendur	Kudappam	10°35'25"	78°01'37"
502075	Dindigul	Vedasendur	Vedasendur	V.pudukottai	10°35'51"	77°56'38"
502076	Dindigul	Vedasendur	Vedasendur	Kalvarpatti	10°36'56"	77°57'24"
502077	Dindigul	Vedasendur	Vedasendur	Senemkottai	10°31'18"	77°54'32"
502078	Dindigul	Vedasendur	Vedasendur	Nallamanarkottai	10°28'04"	78°02'02"
502079	Dindigul	Vedasendur	Vedasendur	Perumpulli	10°29'03"	78°03'54"
502080	Dindigul	Vedasendur	Gujiliyamparai	Karikali	10°41'11"	78°06'07"
502081	Dindigul	Vedasendur	Gujiliyamparai	Mallapuram	10°40'48"	78°03'28"
502082	Dindigul	Vedasendur	Gujiliyamparai	Vadugampadi	10°37'59"	78°05'28"
502083	Dindigul	Vedasendur	Gujiliyamparai	R.kombai	10°36'49"	78°07'53"
502084	Dindigul	Vedasendur	Gujiliyamparai	R.pudukkottai	10°36'50"	78°07'15"
502085	Dindigul	Vedasendur	Vadamadurai	Vadamadurai	10°26'03"	78°04'55"
502086	Dindigul	Vedasendur	Vadamadurai	Morpatti	10°27'18"	78°07'04"
502087	Dindigul	Vedasendur	Vadamadurai	Ayyalur	10°28'50"	78°08'52"
502088	Dindigul	Vedasendur	Vadamadurai	Pilathu	10°28'31"	78°06'16"
502089	Dindigul	Vedasendur	Vadamadurai	Thennampatti	10°28'07"	78°05'31"
502090	Dindigul	Vedasendur	Vadamadurai	Velvarkottai	10°25'04"	78°03'46"
502091	Dindigul	Vedasendur	Vadamadurai	Kulathur	10°26'57"	78°00'39"
83019	Dindigul	Natham	Natham	Parali	10°08'54"	78°11'05"
83019 A	Dindigul	Natham	Natham	Lingavadi	10°08'54"	78°11'05"
83019B	Dindigul	Natham	Natham	Parali	10°08'39"	78°11'21"
83021	Dindigul	Nilakottai	Nilakottai	Gullalagundu	10°08'50"	77°55'00"
83021A	Dindigul	Nilakottai	Nilakottai	Pallapatti	10°08'25"	77°54'47"

83022	Dindigul	Nilakottai	Nilakottai	Nilakottai	10°09'50"	77°51'15"
83024	Dindigul	Natham	Natham	Samutrapatti	10°12'30"	78°17'18"
83024A	Dindigul	Natham	Natham	Samudrapatti	10°14'16"	78°18'40"
83029	Dindigul	Dindigul	Dindigul	A.Vellodu	10°18'50"	77°56'50"
83029A	Dindigul	Dindigul	Dindigul	A.Vellodu	10°19'26"	77°57'50"
83029B	Dindigul	Dindigul	Dindigul	A.vellodu	10°19'10"	77°57'04"
83030	Dindigul	Dindigul	Shanarpatti	Vembarpatti	10°15'20"	78°07'40"
83031	Dindigul	Dindigul	Shanarpatti	Ammapatti	10°21'58"	78°08'30"
83031A	Dindigul	Dindigul	Sanarpatti	Ammapatti	10°22'04"	78°08'19"
83032	Dindigul	Vedasandur	Vadamadurai	Vadamadurai	10°26'30"	78°06'08"
83033	Dindigul	Vedasandur	Vadamadurai	R.Kombai	10°36'30"	78°04'58"
83034	Dindigul	Vedasandur	Guziliamparai	Guziliamparai	10°43'30"	78°08'18"
83034A	Dindigul	Vedasandur	Guziliamparai	Guziliamparai	10°44'00"	78°07'05"
83034B	Dindigul	Vedasendur	Gujiliamparai	Mettukalathur	10°44'02"	78°07'13"
83035	Dindigul	Dindigul	Dindigul	Chettinaickenpat ti	10°26'15"	77°57'50"
83035B	Dindigul	Dindigul	Dindigul	Chettinaickenpat ti	10°26'11"	77°57'28"
83036	Dindigul	Dindigul	Reddiarchatra m	Palakkanuthu	10°28'10"	77°47'45"
83037	Dindigul	Oddanchatram	Oddanchatram	Chatrapatti	10°28'06"	77°39'35"
83037A	Dindigul	Oddanchatram	Oddanchatram	chatrapatti	10°28'06"	77°39'07"
83038	Dindigul	Palani	Palani	Palani	10°27'13"	77°30'52"
83039	Dindigul	Palani	Palani	Pappampatti	10°27'09"	77°24'20"
83040	Dindigul	Vedasandur	Vedasandur	Kaithienkottai	10°34'45"	77°56'32"
83040A	Dindigul	Vedasandur	Vedasandur	Kaithienkottai	10°34'53"	77°56'40"

83040B	Dindigul	Vedasendur	Vedasandur	V.ellapatti	10°34'41"	77°56'32"
83041	Dindigul	Dindigul	Athoor	Attur	10°17'48"	77°49'20"
83042	Dindigul	Oddanchatram	Thoppampatti	Melkaraipatti	10°35'37"	77°30'19"
83042A	Dindigul	Palani	Thoppampatti	Melkaraipatti	10°35'30"	77°30'05"
83043	Dindigul	Oddanchatram	Thoppampatti	Porulur	10°36'04"	77°37'50"
83043A	Dindigul	Palani	Thoppampatti	Porulur	10°35'50"	77°37'42"
83044	Dindigul	Oddanchatram	Oddanchatram	Odaipatti	10°34'51"	77°46'20"
83089	Dindigul	Nilakottai	Batlagundu	Viralipatti	10°06'40"	77°43'50"
83090	Dindigul	Nilakottai	Batlagundu	Viruveedu	10°04'38"	77°52'51"
83090A	Dindigul	Nilakottai	Batlagundu	Viruveedu	10°03'36"	77°46'57"
83091	Dindigul	Nilakottai	Nilakottai	Nilakottai	10°04'38"	77°52'51"
83091A	Dindigul	Nilakottai	Nilakottai	Nilakottai	10°04'38"	77°52'51"
83091B	Dindigul	Nilakottai	Nilakottai	Vilampatti	10°05'56"	77°52'43"
83094B	Dindigul	Nilakottai	Nilakottai	Thevasori	10°04'23"	78°06'56"
83098	Dindigul	Natham	Natham	Samutrapatti	10°09'30"	78°18'00"
83100	Dindigul	Nilakottai	Batlagundu	Vathalagundu	10°09'13"	77°47'23"
83100A	Dindigul	Nilakottai	Batlagundu	Vathalagundu	10°09'34"	77°47'01"
83100B	Dindigul	Nilakottai	Batalagundu	Vengadasthrikottai	10°09'53"	77°47'10"
83502	Dindigul	Dindigul	Athoor	Sitharevu	10°13'05"	77°48'28"
83503	Dindigul	Dindigul	Dindigul	Ambathurai	10°16'25"	77°55'14"
83504	Dindigul	Dindigul	Shanarpatti	Shanarpatti	10°16'53"	78°04'15"
83505A	Dindigul	Natham	Natham	Natham	10°13'02"	78°14'00"
83508	Dindigul	Natham	Natham	Sirugudi	10°17'04"	78°16'09"
83508 A	Dindigul	Natham	Natham	Kuttupatti	10°16'31"	78°15'25"

83509	Dindigul	Dindigul	Shanarpatti	Silvarpatti	10°18'23"	78°08'26"
83509A	Dindigul	Dindigul	Shanarpatti	Silvarpatti	10°18'23"	78°08'26"
83510	Dindigul	Dindigul	Dindigul	Ragalapuram	10°18'57"	78°04'53"
83511	Dindigul	Dindigul	Shanarpatti	Koovanuthu	10°18'15"	78°18'45"
83511A	Dindigul	Dindigul	Dindigul	Nochiodaipatti	10°18'24"	78°01'38"
83512	Dindigul	Dindigul	Reddiarchatram	Palayakannivadi	10°20'30"	77°51'15"
83512A	Dindigul	Dindigul	Athoor	Palayakannivadi	10°21'05"	77°51'24"
83513	Dindigul	Dindigul	Reddiarchatram	Tettupatti	10°23'48"	77°49'30"
83514	Dindigul	Dindigul	Dindigul	Sinthalakundu	10°21'55"	77°54'20"
83515	Dindigul	Dindigul	Dindigul	Dindigul	10°22'12"	77°59'05"
83515A	Dindigul	Dindigul	Dindigul	Dindigul	10°22'10"	77°59'45"
83515B	Dindigul	Dindigul	Dindigul	Dindigul	10°22'30"	77°59'40"
83516	Dindigul	Dindigul	Shanarpatti	Madur	10°21'35"	78°04'40"
83517	Dindigul	Natham	Natham	Manakattur	10°20'45"	78°14'25"
83518A	Dindigul	Natham	Natham	Sendurai	10°22'52"	78°18'22"
83519	Dindigul	Vedasandur	Vedasandur	Puthur	10°25'45"	78°10'19"
83519A	Dindigul	Vedasendur	Vadamadurai	Puthur	10°25'54"	78°10'13"
83520	Dindigul	Dindigul	Dindigul	Seelapadi	10°24'22"	78°00'23"
83521	Dindigul	Dindigul	Dindigul	Alagupatti	10°28'48"	77°55'23"
83521A	Dindigul	Dindigul	Dindigul	Alagupatti	10°28'18"	77°54'50"
83522	Dindigul	Oddanchatram	Oddanchatram	Verupakshi	10°28'00"	77°42'00"
83522A	Dindigul	Oddanchatram	Oddanchatram	Verupakshi	10°28'00"	77°41'59"
83523	Dindigul	Palani	Palani	Palani	10°27'47"	77°34'10"
83524	Dindigul	Palani	Palani	Neikkarapatti	10°27'00"	77°27'45"
83525	Dindigul	Palani	Thoppampatti	Thalaiyuthu	10°31'18"	77°26'20"
83526	Dindigul	Palani	Thoppampatti	Thumbalapatty	10°32'10"	77°31'35"

83526A	Dindigul	Palani	Thoppampatti	Thumbalapatti	10°32'02"	77°31'35"
83527	Dindigul	Palani	Palani	Amarpoondi	10°29'30"	77°34'10"
83527A	Dindigul	Palani	Palani	Eramanickenpatti	10°29'30"	77°35'07"
83528	Dindigul	Oddanchatram	Oddanchatram	Periyakottai	10°30'35"	77°41'10"
83529	Dindigul	Oddanchatram	Oddanchatram	Thangachiammapatti	10°31'25"	77°44'40"
83530	Dindigul	Oddanchatram	Oddanchatram	Puliyurnatham	10°31'55"	77°50'00"
83531	Dindigul	Vedasandur	Vedasandur	Vedasandur	10°31'40"	77°57'03"
83531A	Dindigul	Vedasandur	Vedasandur	Vedasandur	10°31'57"	77°57'08"
83531B	Dindigul	Vedasandur	Vedasandur	Vedasandur	10°31'41"	77°56'38"
83532	Dindigul	Vedasandur	Vedasandur	Marambadi	10°31'05"	78°00'30"
83533	Dindigul	Vedasandur	Vedasandur	Thennampatti	10°31'00"	78°03'55"
83534	Dindigul	Vedasandur	Vedasandur	Kollapatti	10°29'38"	78°10'48"
83535	Dindigul	Vedasandur	Vedasandur	Usilampatti	10°34'20"	78°01'50"
83536	Dindigul	Oddanchatram	Oddanchatram	Jogipatti	10°34'40"	77°50'20"
83536A	Dindigul	Oddanchatram	Oddanchatram	Jogipatti	10°35'12"	77°50'22"
83537	Dindigul	Palani	Palani	Midapadi	10°33'30"	77°24'00"
83538	Dindigul	Palani	Thoppampatti	Vagarai	10°35'05"	77°34'30"
83539	Dindigul	Palani	Thoppampatti	Kolumakondan	10°34'40"	77°26'27"
83539A	Dindigul	Palani	Thoppampatti	Kolumakondan	10°34'39"	77°26'27"
83540	Dindigul	Oddanchatram	Thoppampatti	Poosaripatti	10°39'45"	77°37'30"
83541	Dindigul	Oddanchatram	Thoppampatti	Kariyampatti	10°38'13"	77°42'35"
83542	Dindigul	Oddanchatram	Oddanchatram	I.Vadipatti	10°36'50"	77°45'45"
83543	Dindigul	Oddanchatram	Oddanchatram	Valayapatti	10°38'08"	77°50'45"

83543A	Dindigul	Oddanchatram	Oddanchatram	Valayapatti	10°38'08"	77°50'40"
83544	Dindigul	Vedasandur	Vedasandur	Kalvarpatti	10°37'27"	77°56'30"
83545	Dindigul	Vedasandur	Vedasandur	Mallapuram	10°40'32"	78°03'58"
83546	Dindigul	Vedasandur	Guziliamparai	R.Kombai	10°39'35"	78°06'22"
83546A	Dindigul	Vedasandur	Guziliamparai	R.Kombai	10°39'35"	78°06'22"
83547	Dindigul	Vedasandur	Guziliamparai	R.Vellodu	10°42'27"	78°01'35"
83547B	Dindigul	Vedasandur	Guziliamparai	Mallapuram	10°00'56"	78°00'48"
83548	Dindigul	Vedasandur	Guziliamparai	Thirukoornam	10°45'08"	77°57'53"
83548B	Dindigul	Vedasandur	Guziliamparai	Ayyampatti	10°46'00"	78°01'00"
83549	Dindigul	Vedasandur	Guziliamparai	R.Vellodu	10°45'05"	78°25'00"
83549A	Dindigul	Vedasandur	Guziliamparai	R.Vellodu	10°45'12"	78°01'42"
83550	Dindigul	Vedasandur	Guziliamparai	Gudalur	10°46'55"	78°07'58"
83550A	Dindigul	Vedasandur	Guziliamparai	Gudalur	10°46'58"	78°07'46"
83551	Dindigul	Vedasandur	Guziliamparai	Landakkottai	10°49'10"	78°09'56"
83551A	Dindigul	Vedasandur	Guziliamparai	Landakkottai	10°49'10"	78°09'56"
83551B	Dindigul	Vedasandur	Guziliamparai	Landakkottai	10°49'10"	78°09'56"
83552A	Dindigul	Kodaikanal	Kodaikanal	Kodaikanal	10°16'30"	77°37'33"
83555	Dindigul	Kodaikanal	Kodaikanal	Kodaikanal	10°15'48"	77°32'33"

Dindugal District - Piezometers - Location and Co-ordinates

Well no	District	Tashil/Taluk	Block/Mandal	Village	Latitude	Longitude
AWLR 81037	Dindigul	Dindigul	Raddiyarchatram	Kamatchipuram	10.5125	77.861944
AWLR 81082	Dindigul	Nilakottai		Sithargalnatham	10.0847 22	77.843889

AWLR 81176	Dindigul	Vedasandur		Vedasandur Toboco Station	10.5388 89	77.968056
AWLR 81190	Dindigul	Nilakottai		Veriyappanayakanpatty	10.1197 22	77.706111
AWLR 81266	Dindigul	Palani	Palani	Palani	10.4530 56	77.518889
22001D	Dindigul	Dindigul	Reddiyarchatram	Palayakannivadi	10.3847 22	77.831667
22002D	Dindigul	Dindigul	Athoor	Ambathurai	10.275	77.913889
22003D	Dindigul	Dindigul	Athoor	Athoor	10.2861 11	77.850556
22004D	Dindigul	Dindigul	Dindigul	Dindigul	10.3583 33	77.968333
22005D	Dindigul	Vedasandur	Vedasandur	Thennampatti	10.5291 67	78.057778
22006D	Dindigul	Dindigul	Shanarpatti	Vembarpatti	10.2569 44	78.121944
22007D	Dindigul	Dindigul	Reddiarchatram	Palayakannivadi	10.3513 89	77.856667
22008D	Dindigul	Palani	Thoppampatti	Melkaraipatti	10.5908 33	77.504167
22009A	Dindigul	Dindigul	Shanarpatti	Madur	10.3411 11	78.077778
22009D	Dindigul	Dindigul	Shanarpatti	Madur	10.3577 78	78.077778
22010D	Dindigul	Dindigul	Athoor	Sitharevu	10.2266 67	77.808333
22011D	Dindigul	Dindigul	Shanarpatti	Kambiliampatti	10.355	78.144722
22012D	Dindigul	Dindigul	Shanarpatti	Koovanuthu	10.2894 44	78.030000
22013D	Dindigul	Vedasandur	Vadamadurai	Vadamadurai	10.4416 67	78.102222
22014D	Dindigul	Dindigul	Shanarpatti	Pudupatti	10.3097 22	78.141944
22015D	Dindigul	Dindigul	Dindigul	Chettinaickenpatti	10.4375	77.955000
22016D	Dindigul	Dindigul	Reddiarchatram	Palakkanuthu	10.4361 11	77.801667
22017D	Dindigul	Palani	Thoppampatti	Thumbalapatti	10.5338 89	77.526389
22018D	Dindigul	Oddanchatram	Oddanchatram	Verupakshi	10.4666 67	77.699167
22019D	Dindigul	Nilakottai	Nilakottai	Pallapatti	10.1841 67	77.916667
22020D	Dindigul	Nilakottai	Batlagundu	Vathalagundu	10.1494 44	77.742778

22021D	Dindigul	Nilakottai	Batlagundu	Nadakottai	10.0888 89	77.830556
22022D	Dindigul	Nilakottai	Nilakottai	Sithargalnatham	10.105	77.854167
22023D	Dindigul	Natham	Natham	Samutrapatti	10.2152 78	78.290000
22024D	Dindigul	Natham	Natham	Sendurai	10.3805 56	78.251389
22025D	Dindigul	Vedasandur	Vadamadurai	Puthur	10.4255 56	78.169444
22026D	Dindigul	Vedasandur	Guziliamparai	R. Kombai	10.5727 78	78.090556
22027D	Dindigul	Vedasandur	Guziliamparai	Landakottai	10.8111 11	78.163889
22028D	Dindigul	Vedasandur	Guziliamparai	Mallapuram	10.6819 44	78.012500
22029D	Dindigul	Vedasandur	Vedasandur	Vedasandur	10.5266 67	77.955000
22030A	Dindigul	Oddanchatram	Thoppampatti	Porulur	10.5972 22	77.628333
22030D	Dindigul	Oddanchatram	Thoppampatti	Porulur	10.5972 22	77.628333
22031D	Dindigul	Oddanchatram	Thoppampatti	Koothampoondi	10.6816 67	77.680556
22032D	Dindigul	Palani	Palani	Eramanaickenpatti	10.4916 67	77.590000
22033D	Dindigul	Palani	Palani	Pappampatti	10.4194 44	77.497222
22034D	Dindigul	Kodaikanal	Kodaikanal	Kodaikanal	10.1952 78	77.495000
22035D	Dindigul	Kodaikanal	Kodaikanal	Kodaikanal	10.2805 56	77.630556
22036D	Dindigul	Nilakottai	Nilakottai	Gullalagunda	10.1488 89	77.912778
22037D	Dindigul	Dindigul	Dindigul	Sirumalai	10.2388 89	78.002778
22038D	Dindigul	Dindigul	Athoor	Pithalaipatti	10.335	77.925556
Ex 22093	Dindigul	Dindigul	Dindigul	Nallamanaickenpatti	10.3244 44	78.013611
Ex 22094	Dindigul	Vedasandur	Vadamadurai	V.singarakottai	10.3933 33	78.114722
EX 22092	Dindigul	Dindigul	Sanarpatti	Sakkiliankodai	10.2536 11	78.161944
Ex-22039	Dindigul	Dindigul	Reddiyarchatram	Nettiyapatti	10.395	77.883056
EX-22039A	Dindigul	Dindigul	Reddiyarchatram	Nettiyapatti	10.395	77.883056
Ex-22040	Dindigul	Dindigul	Reddiyarchatram	Kondamanaickenpatti	10.4163 89	77.910278

Ex-22041	Dindigul	Vedasendur	Vadamadurai	Kalanampatti	10.4480 56	78.010556
Ex-22091	Dindigul	Vedasendur	Vadamadurai	Velvarkottai	10.4102 78	78.068889
EX-22095	Dindigul	Dindigul	Shanarpatti	Maniakaranpatti	10.3638 89	78.073056
EX-22096	Dindigul	Palani	Thoppampatty	Santhanchettivalasu	10.5791 67	77.443611
HP 22097	Dindigul	Palani	Palani	Chithiraikulam	10.5033 33	77.413611
HP 22098	Dindigul	Oddanchatram	Thoppampatti	Kothayam	10.5583 33	77.621111
HP 22099	Dindigul	Palani	Thoppampatti	Marisilambu	10.5519 44	78.558056
HP 22100	Dindigul	Nilakottai	Bathalagundu	Pattiveeranpatti	10.2036 11	77.760278
HP 22101	Dindigul	Oddanchatram	Thoppampatti	Kariyampatti	10.6341 67	77.668333
HP 22102	Dindigul	Oddanchatram	Oddanchatram	Periya Mandavadi	10.5827 78	77.708889
HP 22103	Dindigul	Oddanchatram	Oddanchatram	Javathupatti	10.5775	77.815278
HP 22104	Dindigul	Oddanchatram	Oddanchatram	Chinnakampatti	10.6280 56	77.801667
HP 22105	Dindigul	Oddanchatram	Oddanchatram	Puliyamarathukottai	10.56	77.910000
MWS22042	Dindigul	Dindigul	Dindigul	Karungalpatti	10.4383 33	77.940833
MWS22043	Dindigul	Dindigul	Dindigul	Sellamanthadi	10.4058 33	78.003889
MWS22044	Dindigul	Dindigul	Dindigul	T.N.paraipatti	10.4205 56	77.049444
MWS22045	Dindigul	Dindigul	Sanarpatti	Siluvathur	10.3511 11	78.093333
MWS22046	Dindigul	Dindigul	Authur	Mallayapuram	10.3155 56	77.836667
MWS22047	Dindigul	Dindigul	Authur	Ayyampalayam	10.23	77.757222
MWS22056	Dindigul	Palani	Palani	Pethanaickenpatti	10.4877 78	77.479444
MWS22057	Dindigul	Palani	Palani	Kalikkanaickenpatti	10.4725	77.530833
MWS22058	Dindigul	Palani	Thoppampatti	Pushpathur	10.5416 67	77.408889
MWS22059	Dindigul	Palani	Thoppampatti	Kovilammampatti	10.5638 89	77.462778
MWS22060	Dindigul	Palani	Thoppampatti	Peruchipalayam	10.6294 44	77.503889

MWS22061	Dindigul	Oddanchatram	Thoppampatti	Appipalayam	10.6197 22	77.600833
MWS22062	Dindigul	Oddanchatram	Thoppampatti	Kallimanthayam	10.5822 22	77.691944
MWS22063	Dindigul	Palani	Thoppampatti	Manjanaickenpatti	10.4833 33	77.619444
MWS22072	Dindigul	Natham	Natham	Kottaiyur	10.3188 89	78.338056
MWS22073	Dindigul	Vedasendur	Vedasandur	K.sukkampatti	10.5738 89	77.908333
MWS22074	Dindigul	Vedasendur	Vedasendur	Kasipalayam	10.6133 33	77.954167
MWS22075	Dindigul	Vedasendur	Gujiliamparai	Puliyampatti	10.6430 56	78.101944
MWS22076	Dindigul	Vedasendur	Gujiliamparai	D.Gudalur	10.7877 78	78.129167
MWS22077	Dindigul	Vedasendur	Gujiliamparai	K.Vasanthakathirpalaya m	10.7725	78.072778
MWS22078	Dindigul	Vedasendur	Vadamadurai	S.Kurumbapatti	10.5141 67	78.165000
MWS22079	Dindigul	Vedasendur	Vadamadurai	Kanapadi	10.4011 11	78.099722
MWS22088	Dindigul	Nilakottai	Nilakottai	Chitharkalnatham	10.0872 22	77.843889
MWS22089	Dindigul	Nilakottai	Nilakottai	Mattaparai	10.0955 56	77.915556
MWS22090	Dindigul	Nilakottai	Nilakottai	Patchamalayankottai	10.2722 22	77.880556
MWS22048	Dindigul	Dindigul	Reddiyarchatram	Kannivadi	10.3841 67	77.829444
MWS22049	Dindigul	Dindigul	Reddiyarchatram	Kasavanampatti	10.3680 56	77.870278
MWS22050	Dindigul	Palani	Palani	Andipatti	10.4361 11	77.348056
MWS22051	Dindigul	Palani	Palani	Velusamudram	10.4619 44	77.393611
MWS22052	Dindigul	Palani	Palani	Pappampatti	10.4469 44	77.405000
MWS22053	Dindigul	Palani	Palani	Chittarevu	10.4294 44	77.413611
MWS22054	Dindigul	Palani	Palani	Shanmugamparai	10.3758 33	77.451389
MWS22055	Dindigul	Palani	Palani	Poduchu	10.4208 33	77.481389
MWS22055 A	Dindigul	Dindigul	Palani	Poduchu	10.4208 33	77.481389

MWS22064	Dindigul	Oddanchatram	Oddanchatram	Kapliampatti	10.5222 22	77.718611
MWS22065	Dindigul	Oddanchatram	Oddanchatram	Pudukalanjipatti	10.4972 22	77.777500
MWS22066	Dindigul	Oddanchatram	Oddanchatram	Veriappur	10.5230 56	77.791944
MWS22067	Dindigul	Nilakottai	Oddanchatram	Kethaiyambu	10.5041 67	77.826111
MWS22068	Dindigul	Oddanchatram	Oddanchatram	Idayakottai	10.6180 56	77.841667
MWS22069	Dindigul	Oddanchatram	Oddanchatram	Markampatti	10.6666 67	77.805278
MWS22070	Dindigul	Natham	Natham	Pappapatti	10.2319 44	78.248611
MWS22071	Dindigul	Natham	Natham	Naduvanur	10.2494 44	78.281111
MWS22080	Dindigul	Vedasendur	Vadamadurai	P.Kosavapatti	10.4547 22	78.051111
MWS22081	Dindigul	Kodaikanal	Kodaikanal	Poolathur	10.2225	77.668611
MWS22082	Dindigul	Kodaikanal	Kodaikanal	Poomparai	10.2575	77.409722
MWS22083	Dindigul	Kodaikanal	Kodaikanal	Perumalmai	10.2644 44	77.546111
MWS22084	Dindigul	Nilakottai	Batlagundu	Kanavaipatti	10.0866 67	77.727222
MWS22085	Dindigul	Nilakottai	Batlagundu	Rengappanaickenpatti	10.1841 67	77.736667

(iv) Data Constraints:

The following are constraints in collecting the water level data in the field and validating the data are:

- 1) The water level data are collected on the monthly basis in the referred observation wells and piezometers. The collected data is not sufficient quantity for analyzing purpose due to drying of wells, Wells abounded by various reasons, lack of selecting the alternate wells, lack of open wells available for monitoring purpose due to increased usage of bore wells in the villages, Panchayats, etc. In many villages, the water supply schemes implemented by overhead tank supply or mini energised pumps and the existing open wells are not used generally by the villagers and moreover, they filled with garbage.
- 2) The number of bore wells should be increased for monitoring purpose.

- 3) The site selection of new bore wells should be based on the Geological methods.
 - 4) Strengthening the network of monitoring wells by closing the gaps in the network.
 - 5) Maintenance cost should be allotted to maintain the bore wells on the periodical basis to maintain the quality as well as yield.
 - 6) Installation of Automatic water level recorders in the sensitive and more water level fluctuation in the bore wells will helpful to monitor the extensive depletion of groundwater areas.
 - 7) Upgrading the measuring instruments will helpful to take accurate reading of water levels in the field.
 - 8) Upgrading the soft ware will helpful to minimize the errors and increasing the accuracy of data.
 - 9) Erecting the Telemetric water level recorders in the over exploited Firkas will helpful to monitor the over extraction of groundwater.
- 10) Lack of manpower and transporting vehicles are also major problems for data collection in the field in proper time.

3. DYNAMIC GROUND WATER RESOURCES:

The State Ground and Surface Water Resources Data Centre has estimated the ground water resources of Tamil Nadu periodically in co-ordination with the Central Ground Water Board, Government of India , Ministry of Water Resources, Chennai, based on the Methodology evolved by the Ground Water Resources Estimation Committee, 1997 (GEC 97).

Groundwater potential assessment is a dynamic one and not static. While assessing an area, the following factors can be considered such as Geology, Total Irrigated Area, Total Number of Wells used for Irrigation, Water Level Data for the past five years, Average Rainfall, Total Recharge, Irrigation methods adopted in the area, Cropping pattern details, Seepage factor, Specific yield, Geological conditions prevailing in that area, Recharge through Artificial recharge structures, etc.

Groundwater potential assessment proposal should be presented for approval in the Central and State Level Working Group Committees and then, presented for final approval in the Central Level Committee as well as State Level Committees.

The Ground Water Potential Assessments as on January 1992 and January 1997 were done in the State, taking the Panchayat Union Block as an Assessment Unit and the entire State **was categorized as Dark, Grey and White areas**. The Blocks with more than 85% to 100% ground water development (extraction) were categorized as “Dark Blocks” and the blocks with ground water development between 65% to 85% were categorized as “Grey Blocks” and blocks with less than 65% ground water development were categorized as “White Blocks”.

Subsequently, the **Ground Water Potential Assessment was done as on March 2003 and as on March 2009**. In these assessments, the Panchayat Union Blocks in Tamil Nadu were **categorized as Over-Exploited, Critical, Semi-Critical, Safe and Saline instead of Dark, Grey and White blocks**. The Blocks with more than 100% extraction were categorized as “Over Exploited Blocks”, the blocks with 90% to 100% extraction as “Critical Blocks”, the blocks with 65% to 90% extraction as “Semi Critical Blocks”, the blocks with less than 65% extraction as “Safe Blocks” and the bad quality blocks were categorized as “Saline Blocks”. No schemes should be formulated in over exploited and critical blocks - “Notified Blocks – A category – (Stage of Groundwater extraction is 90% and above)”.

The re-estimation of groundwater resources in the State as on March 2011 and as on March 2013 can be assessed in Micro Level basis. In these assessments, the assessing unit is Firka (Unit of Taluk) and **categorized as Over-Exploited, Critical, Semi-Critical, Safe, and Saline Firkas**. As on March 2013 assessment, in the Dindugal District

Based on the Estimation of Ground Water Resources of Tamil Nadu State as on March 2013, Out of 1139 Firkas in the State, 358 Firkas are categorized as “Over Exploited Firkas”, 105 Firkas are categorized as “Critical Firkas”, 212 Firkas are categorized as “Semi Critical Firkas”, 429 Firkas are categorized as “Safe Firkas” and 35 Firkas are categorized as “Saline Firkas”.

When compared to last assessment as on March 2011, the “Over Exploited Firkas” comes down from 374 to 358 Firkas, the “Critical Firkas” increased from 48 to 105 Firkas, the “Semi Critical Firkas” comes down marginally from 235 to 212 Firkas, the “Safe Firkas” comes down marginally from 437 to 429 Firkas and the “Saline Firkas” remains same as 35 Firkas. The alteration of Firkas are due to the construction of Artificial Recharge structures such as Check Dams, Recharge Wells, Recharge shafts, percolation ponds; etc was constructed in the “Over Exploited Firkas” by various departments.

Methodology adopted for Estimation of Ground Water Potential :

The present methodology used for resources assessment is known as Ground Water Resource Estimation Methodology - 1997 (GEC'97) .In GEC'97, two approaches are recommended - **water level fluctuation method and norms of rainfall infiltration method**. The water level fluctuation method is based on the concept of storage change due to differences between various input and output components. Input refers to recharge from rainfall and other sources and subsurface inflow into the unit of assessment. Output refers to ground water draft, ground water evapotranspiration, base flow to streams and subsurface outflow from the unit. Since the data on subsurface inflow / outflow are not readily available, it is advantageous to adopt the unit for ground water assessment as basin / sub basin / watershed, as the inflow / outflow across these boundaries may be taken as negligible.

In each assessment unit, hilly areas having slope more than 20% are deleted from the total area to get the area suitable for recharge. Further, areas where the quality of ground water is beyond the usable limits should be identified and handled separately. The remaining area after deleting the hilly area and separating the area with poor ground water quality is to be delineated into command and non-command areas. Ground water assessment in command and non-command areas are done separately for monsoon and non-monsoon seasons.

The rainfall recharge during monsoon season computed by Water Level Fluctuation (WLF) method is compared with recharge figures from Rainfall Infiltration Factor (RIF) method. In case the difference between the two sets of data are more than 20% then RIF figure is considered, otherwise monsoon recharge from WLF is adopted. While adopting the rainfall recharge figures, weight age is to be given to WLF method over adhoc norms method of RIF. Hence, wherever the difference

between RIF & WLF is more than 20%, data have to be scrutinized and corrected accordingly.

During non-Monsoon season, rainfall recharge is computed by using Rainfall infiltration Factor (RIF) method. Recharge from other sources is then added to get total non-Monsoon recharge. In case of areas receiving less than 10% of the annual rainfall during non-monsoon season, the rainfall recharge is ignored.

The total annual ground water recharge of the area is the sum-total of monsoon and non-monsoon recharge. An allowance is kept for natural discharge in the non-monsoon season by deducting 5 to 10 % of total annual ground water recharge.

The balance ground water available accounts for existing ground water withdrawal for various uses and potential for future development. This quantity is termed as Net Ground Water Availability.

Net Ground Water Availability = Annual Ground Water Recharge - Natural discharge during non-monsoon season.

GEC'97 methodology has recommended norms for various parameters being used in ground water recharge estimation. These norms vary depending upon water bearing formations and agroclimatic conditions. While norms for specific yield and recharge from rainfall values are to be adopted within the guidelines of GEC'97, in case of other parameters like seepage from canals, return flow from irrigation, recharge from tanks & ponds, water conservation structures, results of specific case studies may replace the adhoc norms.

The Gross yearly ground water draft is to be calculated for Irrigation, Domestic and Industrial uses. The gross ground water draft would include the ground water extraction from all existing ground water structures during monsoon as well as during non-monsoon period. While the number of ground water structures should preferably be based on latest well census, the average unit draft from different types of structures should be based on specific studies or adhoc norms given in GEC'97 report.

The stage of Ground water Development is defined by

$$\text{Stage of Ground water Development (\%)} = \frac{\text{Existing Gross Ground water Draft for all uses}}{\text{Net annual Ground Water Availability}} \times 100$$

The units of assessment are categorized for ground water development based on two criteria – a) stage of ground water development and b) long-term trend of pre and post monsoon water levels. Four categories are - Safe areas which have ground water potential for development; Semi-critical areas where cautious ground water development is recommended; Critical areas; Over -exploited areas where there should be intensive monitoring and evaluation and future ground water development be linked with water conservation measures.

The criteria for categorization of assessment units are as follows:

S. No.	Stage of Groundwater Development	Significant Long term Decline		Categorization
		Pre-monsoon	Post -monsoon	
1.	<=70%	No	No	SAFE
		Yes / No	No / Yes	To be re-assessed
		Yes	Yes	To be re-assessed
2.	>70% and <=90%	No	No	To be re-assessed
		Yes / No	No / Yes	SEMI – CRITICAL
		Yes	Yes	SEMI – CRITICAL
3.	>90 and <=100%	No	No	To be re-assessed
		Yes / No	No / Yes	CRITICAL
		Yes	Yes	CRITICAL
4.	>100%	No	No	To be re-assessed
		Yes / No	No / Yes	OVER- EXPLOITED
		Yes	Yes	OVER- EXPLOITED

Note: 'To be re-assessed' means that data is to be checked and reviewed. If the ground water resources assessment and the trend of long term water levels contradict each other. This anomalous situations requires a review of the ground water resource computations, as well as the reliability of water level data.

The long term ground water level data should preferably be for a period of 10 years. The significant water level decline may be taken in consideration between 10 to 20 cm/ year depending upon the local hydro geological conditions.

Dynamic Ground Water Resources Estimation of TamilNadu As on March 2013

District Summary

(in ha.m)

CHENNAI DISTRICT							
Sl.No (District))	District	Net Annual Ground Water Availability	Existing Gross Ground Water Draft for Irrigation	Existing Gross Ground Water Draft for domestic and industrial water supply	Existing Gross Ground Water Draft for All uses (4+5)	Stage of Ground Water Development $\{(6/3)*100\}$ %	No of Over Exploited Firkas
1	2	3	4	5	6	7	8
1	DINDIGUL	58,016.67	60,102.31	2,468.30	62,570.61	108	21

Firka Wise Summary

(in ha.m)

DINDUGAL DISTRICT							
Sl.No	Assessment Unit (Firka)	Net Annual Ground Water Availability	Existing Gross Ground Water Draft for Irrigation	Existing Gross Ground Water Draft for domestic and industrial water supply	Existing Gross Ground Water Draft for All uses (4+5)	Stage of Ground Water Development $\{(6/3)*100\}$ %	Category of the Firka
1	ATHOOR	1,421.61	1,161.63	63.48	1,225.11	86	SEMI CRITICAL

2	AYAKUDI	2,476.33	2,109.18	81.80	2,190.98	88	SEMI CRITICAL
3	AYYALUR	1,206.54	1,625.53	56.61	1,682.13	139	OVER EXPLOITED
4	AYYAMPALAYAM	1,800.83	2,593.59	70.79	2,664.37	148	OVER EXPLOITED
5	CHINNAKKAMPATTI	1,966.03	2,874.15	47.39	2,921.54	149	OVER EXPLOITED
6	CHINNALPATTI	1,102.04	1,215.18	86.29	1,301.46	118	OVER EXPLOITED
7	DEVATHUR	1,321.65	1,774.40	38.99	1,813.39	137	OVER EXPLOITED

DINDUGAL DISTRICT

Sl.No	Assessment Unit (Firka)	Net Annual Ground Water Availability	Existing Gross Ground Water Draft for Irrigation	Existing Gross Ground Water Draft for domestic and industrial water supply	Existing Gross Ground Water Draft for All uses (4+5)	Stage of Ground Water Development $\{(6/3)*100\}$ %	Category of the Firka
8	DHARMATHUPATTI	1,165.52	1,088.40	48.24	1,136.64	98	CRITICAL
9	DINDIGUL NORTH	1,181.19	904.20	116.01	1,020.21	86	SEMI CRITICAL
10	DINDIGUL SOUTH	1,317.87	1,100.50	109.73	1,210.23	92	CRITICAL
11	ERIODU	1,115.87	1,879.50	64.32	1,943.82	174	OVER EXPLOITED
12	KALLIMANTHAYAM	2,018.14	2,319.40	37.95	2,357.35	117	OVER EXPLOITED
13	KAMBILIAMPATTI	1,107.41	829.80	64.99	894.79	81	SEMI CRITICAL
14	KODIAKANAL	2,108.47	47.40	23.78	71.18	3	SAFE
15	KORIKADAVU	1,731.62	1,443.15	54.83	1,497.98	87	SEMI CRITICAL
16	KOTTANATHAM	1,331.83	1,634.30	58.50	1,692.80	127	OVER EXPLOITED
17	KOVILUR	954.39	1,613.70	47.58	1,661.28	174	OVER EXPLOITED
18	NATHAM	1,385.48	1,026.70	49.88	1,076.58	78	SEMI CRITICAL
19	NEIKKARAPATTAI	2,102.61	1,062.40	43.56	1,105.96	53	SAFE
20	NILAKOTTAI	961.65	1,450.90	103.34	1,554.24	162	OVER EXPLOITED
21	ODDANCHATHRAM	1,875.74	2,922.20	100.58	3,022.78	161	OVER EXPLOITED
22	ORUTHATTU	1,161.35	1,008.50	87.56	1,096.06	94	CRITICAL
23	PALAKKANOOTTHU	1,458.17	2,608.40	94.08	2,702.48	185	OVER EXPLOITED

24	PALANI	2,179.58	985.60	106.28	1,091.88	50	SAFE
25	PALAYAM	1,599.07	2,242.80	83.70	2,326.50	145	OVER EXPLOITED
26	PANNAIKADU	1,653.08	35.00	18.63	53.63	3	SAFE
27	PAPPAMPATTI	1,560.10	1,208.80	17.39	1,226.19	79	SEMI CRITICAL
28	PILLAIYARNATHAM	1,126.73	998.50	54.07	1,052.57	93	CRITICAL
29	PULIYURNATHAM	1,616.83	1,866.25	41.35	1,907.60	118	OVER EXPLOITED
30	REDDIAPATTI	1,164.31	927.50	29.72	957.22	82	SEMI CRITICAL
31	REDDIARCHATRAM	1,440.03	2,550.80	65.90	2,616.70	182	OVER EXPLOITED
32	SENTHURAI	1,759.29	1,264.45	62.29	1,326.74	75	SEMI CRITICAL
33	SHANARPATTI	1,584.63	1,780.20	85.22	1,865.42	118	OVER EXPLOITED
34	SILVATHUR	794.63	865.40	43.04	908.44	114	OVER EXPLOITED
35	THANDIKUDI	742.45	21.00	9.95	30.95	4	SAFE
36	THOPPAMPATTI	1,473.59	1,380.50	34.25	1,414.75	96	CRITICAL
37	VADAMADURAI	1,395.92	1,933.88	96.61	2,030.48	145	OVER EXPLOITED
38	VATLAGUNDU	1,124.37	2,154.40	67.77	2,222.17	198	OVER EXPLOITED
39	VEDASANDUR	1,067.21	1,546.15	45.62	1,591.77	149	OVER EXPLOITED
40	VIRUVEEDU	1,462.50	2,048.00	56.23	2,104.23	144	OVER EXPLOITED
TOTAL		58,016.67	60,102.31	2,468.30	62,570.61	108	

4. Groundwater quality issues:

The rainfall is the main source for the availability of water both in surface and sub surface. The quantum of rainfall varies every year depending upon the monsoon. However, the extraction of surface and sub surface water is increasing year by year. It leads to environmental impact on the water sources like depletion of water level, deterioration of water quality. It makes the demand for the quantification of available water and also its quality for various purposes like agriculture, industries, drinking and domestic purposes.

For the present assessment, the value of Total Dissolved Solids (TDS) have been considered for demarcation of good / bad quality areas. For this purpose, the TDS value of less than or equal to 2000 mg/l have been considered as good quality and the value more than 2000 mg/l have been considered as bad quality areas.

The presence of fluoride in natural Ground Water is having its merits and demerits depending upon the concentration. Presence of fluoride <1.0 mg/l in drinking water reduces dental diseases whereas higher level > 1.50 mg/l will affect the health and causes dental fluoridise. Nitrate is noted significantly in Ground Water due to use of chemical fertilizer for agriculture and other local pollution rocks and soils are also contributing nitrate to Ground Water. Arsenic is another poisonous heavy metal in Ground Water. The allowable limits for drinking purposes are 0.05 mg/l.

In Dindugal District, the quality of Ground Water generally ranges from moderate to good quality both in the shallow dug well and bore wells except in & around the Kazhuveli tank, where the water quality is poor due to seawater intrusion in the lagoons during high tide seasons, the production of salt and Aquaculture farming.

5. Groundwater issues and challenges:

The groundwater quantity and quality are to be highlighted and may be analyzed in terms of :

(i)Problems posed by nature:

In terms of Quantitative aspects, nowadays, rainfall may more within the short period of duration. Due to this aspect, recharge is less and runoff will be more. The availability of groundwater is less due to over extraction than recharge. The Percentage of OE/Critical Firkas increased due to this reason. Increasing the artificial recharge structures in the proper areas may avoid the depletion of groundwater especially in OE/Critical Firkas.

(ii) Problems caused by anthropogenic activities:

The problems caused due to intensive groundwater extraction, intensive surface water irrigation, intensive mining activities, growing urban complexes and industrial establishments will lead to drastic depletion in groundwater resources only. Proper alternative recharge structures must be established.

(iii) Problems caused by socio-economic condition:

The land holdings of farmers may be different from another. One farmer having more than 5 Acres has less expense than a farmer having one acre. The free electric supply to all farmers have chance to extract more groundwater. To avoid this, proper guidance will be given to the farmers for the usage of groundwater.

(iv) Administrative issues:

To control, regulate and manage the Ground Water Resources in the State, there is no groundwater act, now in force. But, the **Chennai Metropolitan Area Ground Water (Regulation) Act, 1987** is in force and it extends to Chennai City and notified 302 revenue villages in Kanchipuram and Thiruvallur Districts, only.

The rest of Tamilnadu, **G.O.(Ms).No.142, Public Works (R2) Department, dated: 23.07.2014** and **G.O.(Ms).No.113, Public Works (R2) Dept , Dt:09.06.2016** are regulate and manage the groundwater resources. The Government of Tamil Nadu had enacted the **Tamil Nadu Ground Water (Development and Management) Act, 2003**. However, this **Act was repealed on 14.09.2013**, in order to enact a comprehensive law to develop and manage the groundwater in the changed scenario in the State.

The pricing policy for groundwater users is also an important strategy in controlling the illegal extraction of groundwater by taking from lorries,etc. The unused dug wells and bore wells can be used as artificial recharge structures will be good concept in recharging the ground water.

6. Groundwater Management and Regulations:

(i) Statute/Law/Policy/Regulations if any:

The Central Ground Water Authority has been constituted to regulate, control, development and management of ground water resources for whole country based on overall situation prevailing in India. But, the ground water conditions are varying from State to State. **Ground Water is a State subject and the State Government has every right to protect and regulate their own precious ground water resources according to the prevailing conditions in the State.**

The Tamil Nadu Government had enacted “**The Tamil Nadu Ground Water (Development and Management) Act, 2003**” which was subsequently **repealed in 2013**, so as to bring out an effective management Act considering the present scenario. **As an interim measure, for regulating the exploitation of ground water, the Government have issued G.O. (Ms) No.142,PWD dated 23.07.2014 for regulations for management of ground water**

for safe guarding the scarce groundwater resources in Tamil Nadu State. In the absence of an Act, the Government executes this Government order to control, regulate and manage the Ground Water Resources while taking into consideration of the future of the State and its people.

The State Ground and Surface Water Resources Data Centre has estimated the Ground Water resources of Tamil Nadu State periodically in co-ordination with the Central Ground Water Board, Government of India, SECR, Chennai, based on the Methodology evolved by Ground Water Resources Estimation Committee, 1997 (GEC 97).

Accordingly, **the Ground Water Potential Assessment done as on January 1992 and as on January 1997 on the basis of Panchayat Union Blocks as assessment units** in Tamil Nadu and **categorized as Dark, Grey and White areas.** The Blocks with more than 85% to 100% ground water development were categorized as “Dark Blocks” and the blocks with ground water development between 65% to 85% were categorized as “Grey Blocks” and less than 65% ground water development were categorized as “White Blocks” and the Government approved the categorisation and released as Government order and G.O.No:326, PW (R2) Dept, dated: 23.11.1993. It was in effect up to the next assessment done as on March 2003.

Subsequently, **the Ground Water Potential Assessment done as on March 2003, categorized the blocks as Over Exploited, Critical, Semi Critical, Safe, Saline instead of Dark, Grey and White blocks.** The Blocks with more than 100% were categorized as “Over Exploited Blocks”, the blocks in between 90% to 100% as “Critical Blocks”, the blocks in between 65% to 90% as “Semi Critical Blocks” and less than 65% as “Safe Blocks” and the bad quality blocks were categorized as “Saline Blocks” and the same was approved by the Government and released as G.O.No:51, PW (R2) Dept, dated: 11.02.2004. It was in effect up to the next assessment done as on March 2009.

The Next **Ground Water Potential Assessment done as on March 2009**, and the same was approved by the Government and released as **G.O.No:52,PW(R2) Dept, dated: 02.03.2012.**

As per G.O.No.52,PW(R2) Dept, dated: 02.03.2012 and G.O. (Ms) No.142,PW(R2)Dept dated 23.07.2014, the State Government have authorized and empowered the Chief Engineer, State Ground and Surface Water Resources Data Centre, Chennai for issuing permission or license or No Objection Certificate/renewal for drawal and transportation of Ground Water based on the hydro geological conditions to the New Industries, Packaged Drinking Water Companies, Infrastructures and Mining projects, etc except the areas to which the Chennai Metropolitan Area Ground Water (Regulation) Act,1987 extends.

Subsequently, the next **Ground Water Resources Assessment of the State was completed as on March 2011** and taking **Firka as an assessment unit** in the State of Tamil Nadu. Based on the above assessment, **the Government had approved and issued G.O.(Ms).No.113, Public Works (R2) Dept , Dt:09.06.2016** for categorisation of the Firkas in the State as Over Exploited, Critical, Semi-Critical and Safe Firkas. All the Over Exploited and Critical Firkas are notified as **“A” Category** (where the stage of ground water extraction is 90% and Above) and all the Semi Critical and Safe Firkas are notified as **“B” Category** (where the stage of ground water extraction is below 89%). In this Government Order, the Government had directed that **no Schemes should be formulated in the “A” Category Firkas and in “B” Category Firkas, all the Schemes should be formulated through State Ground and Surface Water Resources Data Centre by issuing No Objection Certificate for Ground Water Clearance.**

The term “Schemes” excludes Energisation of Agricultural pump sets by the Tamil Nadu Electricity Board. The present order may also exclude the Ground Water drawal for a). Domestic purpose by individual household, b). Domestic Infrastructure project (Housing), c).Government’s Drinking Water Supply Schemes and d). non water based industries, (i.e.- the industries which do not require and use water, either as raw material or for other processing). However, the domestic use of water by this non water based industries will be permitted by the Chief Engineer / State Ground and Surface Water Resources Data Centre based on hydro geological conditions. (i.e. NOC from Chief Engineer, State Ground and Surface Water Resources Data Centre, Water Resources Department, Chennai). The list of non

water based industries will be issued by the Industries Department of Government of Tamil Nadu separately.

Appropriate rain water harvesting and Artificial recharge schemes should be carried out in the categories viz , Over exploited , Critical , Semi Critical and Safe blocks of Tamil Nadu. While carrying out the above schemes, priority should be given to marginal quality and bad quality areas so as to avoid further deterioration.

All the schemes and proposals based on Ground Water will have to adhere to the Government orders and conditions. The Chief Engineer, State Ground and Surface Water Resources Data Centre had received the Government approval on Groundwater Assessment as on March 2011.

Regarding granting permission/ License for transportation of ground water for water suppliers/ private water tankers for selling the water on commercial basis, the State Ground and Surface Water Resources Data Centre, Public Works Department is not issuing any No Objection Certificate.

The Chief Engineer, SG&SWRDC have empowered to issue the NOC for drawal of Ground Water is up to 1 Million Gallons per day. Beyond this, the firms should get an approval in Water Utilisation Committee for drawal of both Surface and Ground Water resources in Tamil Nadu.

(ii) Suggestions for improvement of groundwater governance.

Groundwater is recognized as a common pool resource. The use of groundwater by anybody should in no way cause adverse impacts on realization of other person's fundamental right to safe water for life. Access to groundwater without any discrimination, equitable distribution, and sustainable use considering the needs of future generations are considered. Right to water for life is the first priority and then to agriculture, and eco system needs. The precautionary principle and the polluter pay principle only to conserve and recharge groundwater.

The responsibility of the State for ensuring every person's right to safe water even when water service is delegated to a private agency.

Groundwater is not amenable to ownership by the State, communities or persons and the State is the public trustee of groundwater. It also deals elaborately on groundwater protection and groundwater security plans.

The Groundwater Act should incorporate legal pronouncement on groundwater such as the public, trust doctrine and recognition of the right to groundwater. It addresses the deficiencies in the present legal frame work in dealing with over exploitation and includes the improvements to the control mechanism to ensure the qualitative and quantitative sustainability of groundwater resources. It proposes to strengthen the regulating powers of Panchayat and Municipal bodies related to Ground water in line with articles 243G and 243W of the constitution.

The Pricing of Ground Water for irrigation, Industrial and domestic purposes and collecting fees by water users association should be left to the State decision.

(iii) Institutions governing/managing/monitoring the resources and Institutional structure, gaps if any :

While framing the Groundwater Act, the recommendation for the constitution of (1) Gram Panchayat Groundwater Sub-Committee, (2) Block Panchayat Groundwater Management, (3) Ward Groundwater Committee, (4) Municipal Water Management Committee, (5) District Ground Water Council and (6) State Ground Water Advisory Council to control and manage Ground water should be considered.

- The constitution of aforesaid committees is completely based on administrative boundaries such as village, block, ward, municipality, district etc. But, with respect to water resources control and management issues and conflicts, the boundary should be based on river basins to have efficient monitoring and management of water resources. The Government of India, in all issues related to water resources considered only the basin boundary concept. Hence, the institutional frame work has to be revised so as to have the jurisdiction of the committees with respect to basin / watershed concept. Further, Government of India, MoWR, RD &GR advocates time and again integrated water resources

management. The above institutional frame work separately for groundwater is not in line with that.

- Further, it has also provided for many committees, viz., Gram Panchayat Groundwater Sub-Committee, Village Water and Sanitation Committee, Ward Committee, Municipal Committee, Block level Committee, District level Committee and State level Committee. For managing surface water resource water users association already exists. Too many committees at village / ward level would jeopardize the very purpose of managing the Groundwater resources efficiently and may invite lot of conflicts.

(iv) Areas of people/private participation if any:

The participation of people or private parties in the groundwater management is not suggestible, acceptable one and more chances of making litigations in the society and has unnecessary law and order problems may arise.

7. Tools and Methods

(i) Water Level and quality measurements through wells, piezometers, DWLR with telemetry, ground water elevation.

In general, water levels in the observation wells and piezometers can be taken manually by measuring tape. This is the simple, cost effective, good accuracy and less maintenance method. Water Levels are observed above the Measuring point.

Monitoring water level in DWLR with telemetry is costly, high maintenance, good accuracy, get the data immediately on desktop, easy to analysis purpose.

The water quality generally is analysed in the Chemical Lab only by collecting water samples in Pre Monsoon and post Monsoon period in the field. Sometimes, instant kits are used for analyzing the TDS and Ph level in the water.

(ii) Metering water supply to confirm contribution from groundwater.

Metering the water supply is essential one to monitor the overall usage of groundwater by different sectors. Flow meter must be fixed in every extraction structure and it has to be monitored periodically by Government officials.

8. Performance Indicators:

(i) Bench Marks/ Norms/ Standards and deviation from the norms/bench marks/ standards currently.

The Ground Water resources of State periodically estimated in co-ordination with the Central Ground Water Board, Government of India, SECR, Chennai, based on the Norms evolved by Ground Water Resources Estimation Committee, 1997 (GEC 97).

The ground water potential assessment can be assessed based on the bench marks such as Average Rainfall, Total recharged Area, Monthly Water Level Data, Total no of wells in the area, Irrigation methods adopted, Cropping pattern details, Geological conditions prevailing in that area, Specific yield, Seepage factor, Constructed Artificial recharge structures, etc and various calculations methods, etc, have to be considered.

Status of various Performance Indicators

(ii) Percentage of over exploited ,critical, Semi critical , Safe and Saline/Poor quality Firkas/area units

- Trend of over exploited and critical Firkas to total Firkas as per pervious assessment. (2009 Assessment Vs 2011 Assessment)

The Ground Water Potential Assessment as on March 2009, Out of 14 blocks in Dindugal District, 11 blocks are categorized as Over Exploited and Critical blocks and remaining 4 blocks are categorized as Semi Critical and Safe blocks.

The next Ground Water Resources Assessment of the State was done as on March 2011 and taking Firka as an assessment unit. In Dindugal District, totally 40 Firkas, 23 Firkas are categorized as Over Exploited and remaining 17 Firkas are categorized as Semi Critical and Safe blocks.

Instead of taking Block as an assessment, Firka can be taken as assessment unit is to concentrate the assessment in micro level. For Eg, a block contains more than three to four Firkas. In this block, two Firkas may have good groundwater potential than other two Firkas but it may to categorize as Over Exploited. To avoid this, assessment done on the basis of

Firkas for the benefit of farmers to the implementation of schemes related to Irrigation.

The percentage of over exploited and critical Firkas has been increased by changing the concept from Block to Firka assessment. The total percentage of over exploited and critical Blocks for 2009 Assessment is 78.57%, but, the total percentage of over exploited and critical Firkas as on March 2011 Assessment is 57.5%, in the Dindugal District.

- Trend of over exploited and critical Firkas to total Firkas as per latest assessment

The percentage of over exploited and critical Firkas has been decreased in 2013 latest assessment when compared to 2011 assessment. In 2011 assessment, out of 40 Firkas, the total percentage of over exploited and critical Firkas is 57.5%, but, In 2013 assessment, out of 40 Firkas, it has been come down marginally to 65%, in the Dindugal District.

- Existing state of groundwater resources as compared to previous assessment (2013 Vs 2011 assessment).

Based on the Estimation of Ground Water Resources of Tamil Nadu State as on March 2013, Out of 40 Firkas in the District, 21 Firkas are categorized as “Over Exploited Firkas”, 5 Firkas are categorized as “Critical Firkas”, 9 Firkas are categorized as “Semi Critical Firkas”, 5 Firkas are categorized as “Safe Firkas”.

Based on the Estimation of Ground Water Resources of Tamil Nadu State as on March 2011, Out of 40 Firkas in the District, 21 Firkas are categorized as “Over Exploited Firkas”, 2 Firkas are categorized as “Critical Firkas”, 12 Firkas are categorized as “Semi Critical Firkas”, 5 Firkas are categorized as “Safe Firkas”.

When compared to last assessment as on March 2011, the “Over Exploited Firkas” maintains the same as 21 Firkas, the “Critical Firkas” increased from 2 to 5 Firkas, the “Semi Critical Firkas” decreased marginally from 12 to 9 Firkas, the “Safe Firkas” maintains the same as 5 Firkas and the “Saline Firkas” remains Nil Firkas. The alteration of Firkas are due to the construction of Artificial Recharge structures such as Check Dams, Recharge

Wells, Recharge shafts, percolation ponds; etc was constructed in the “Over Exploited Firkas” by various departments.

S.No	Categorisation	No of Firkas	
		2011	2013
1	Over Exploited	21	21
2	Critical	2	5
3	Semi Critical	12	9
4	Safe	5	5
5	Saline	Nil	Nil
TOTAL		40	40

(iii) Water Level(Well hydrographs and water level trends – pre and post monsoon such as declining trend/rising trend,etc).

(iv) Comparison of area irrigated from groundwater resources (Current assessment 2013 to previous assessment 2011).

S.No	Description	2011 Assessment	2013 Assessment
1	Area Irrigated from ground water resources(In hm)	6538.07	6505.06

(v) No. of groundwater abstraction structures (existing no. over the year and trends).

S.No	Description	2011 Assessment	2013 Assessment
1	No of groundwater abstraction structures for Irrigation	1,71,071 Wells	1,70,983 Wells

(vi) Trend in water quality (no of habitations affected with groundwater contamination like As, F, Salinity etc. Change in contamination level over the years.

(vii) Source augmentation (Groundwater)

- Area covered with infrastructure for recharging groundwater:

The proper artificial recharge structures has to be constructed based on local geological conditions in the areas of existing infrastructure for recharging groundwater according to their extraction needs.

- GW recharge plan to combat adversaries:

Groundwater recharge plans has to be strictly followed by with of implementing the groundwater laws to combat adversaries.

9. Reforms undertaken/being undertaken/proposed if any.

10. Road Map of activities/tasks proposed for better governance with timelines and agencies responsible for each task/activity.