CHAPTER 4.1.9 GROUND WATER RESOURCES

KARUR DISTRICT

INDEX

GROUND WATER REPORT OF KARUR DISTRICT

INRODUCTION :

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 Geographical extent of Karur district is 2, 89,557 hectares (2895.57 sq.km) accounting for 2.2 percent of geographical area of Tamil Nadu State. The district has well laid out roads and railway lines connecting all major towns within and outside the state. For administrative purpose, this district has been bifurcated into 4 Taluks, 8 Blocks and 19 Firkas. The district capital is Karur, which is a major city with municipality status.

Karur District is Totally bifurcated into 19 Firkas.

1. HYDROGELOGY

(i) Major Geological formations:

Geology:

Geologically, the entire district can be broadly classified into hard rock and sedimentary formations.

a) Hard rock formations

More than 90% of the district is underlain by hard rock of Archaean age. The gneissic type of formation is the major formation among the various types of hard rocks

Charnockite occurs in this district as pockets in Karur and Aravakurichitaluks. Quartzites which are resistant to weathering are also seen as patches in charnockite and gneissis varieties.

b) Sedimentary formations

Recent alluvial deposits such as sand, silt, clay, gravel, etc., which are transported sediments by river are found on either side of Cauvery river in Karur, Krishnarayapuram and Kulithalai blocks. These formations are overlying the hard rock.

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 has drilled more than 85 boreholes spread over the entire district to find out the nature and behaviour of the subsurface material and their water holding and water yielding capability. There is considerable diversity in the nature of formalities even within the short distance. The lithology of the boreholes indicate that in Kulithalaiand Krishnarayapuramtaluks, there is considerable thickness of weathering ranging from 16m to 20 m below ground level. The sedimentary tract of Cauvery alluvium is restricted to either side of the river Cauvery and the thickness of Alluvium is estimated to be around 10-12 m.

Aquifer parameters:

More or less, 90 percent of Karur district is covered by crystalline formation of Archaean age. The thickness of aquifer in hard rock formation varies from 15 to 35 m. The inter granular porosity is essentially depend upon the intensity and degree of weathering and fracture development in the bed rock. Deep weathering is developed in gneissic formations and moderate weathering in charnockite formation. The alluvial formation stretches mainly along the rivcer course of Cauvery. The aquifer parameters of the formations hard rock and alluvium are furnished in the table below.

Formation	Specific yield in %	Transmissivity (T) m^2/day	Permeability (K) m/day	yield in lps
Alluvium	6.8	45-205	2-4.5	8.3 to 16.66
Hard rock	0.7-2.3	28-75	5-9	1.66 to 2.5

(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 Bento novate 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 Karur 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.m 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) <u>Notes on existing water level scenario</u>:

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 Karur District,103 observation

wells and 42 piezometers,totally 145 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 Karur District, during the pre monsoon, the water level generally in declining trend ranges from G.L. to 15m. The depth of well below GroundLevel 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) <u>Long term trend of water level</u>:

The long term fluctuations of water levels range from G.L. to 14.0m in many parts of the Karur District. The analysis reveals that the water level has gone down in the north, west and central parts of the Karur 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 sectored 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 Karur District.

(iii) Existing network of Monitoring wells:

In Karur District, the existing network of monitoring wells is 145 wells, 103 wells are observation wells and 42 wells are piezometers. These wells are observed for every month water level.

Karur District: Observation Wells - Location and Co-ordinates

Well No	District	Tahsil / Taluk	Block / Mandal	Village	Latitude	Longitude
73037	Karur	Karur	Karur	Velayudampalaiyam	11°04'35"	78°00'13"
73037A	Karur	Karur	Karur	Punchaipugalur	11°03'40"	78°00'56"
73051	Karur	Aravakurichi	K.paramathi	Thoppur	10°59'23"	77°50'35"
73052	Karur	Aravakurichi	K.paramathi	Kuppam	11°00'40"	77°55'35"
73053	Karur	Aravakurichi	K.paramathi	Bharathinagar	11°00'15"	77°59'55"
73053A	Karur	Aravakurichi	K.paramathi	Punnam	10°59'43"	77°59'45"
73054	Karur	Karur	Aravakurichi	Thannirpandalpalaiyam	11°00'25"	78°05'50"
73054A	Karur	Karur	Thanthoni	Puduppalaiyam	11°00'25"	78°05'50"
73068	Karur	Aravakurichi	K.paramathi	Uttukkaraipalaiyam	10°54'42"	77°50'12"
73069	Karur	Aravakurichi	K.paramathi	Ariyur	10°54'32"	77°55'00"
73070	Karur	Aravakurichi	K.paramathi	Kulanayakkanpatti	10°54'44"	78°01'05"
73071	Karur	Karur	Thanthoni	Kaliyappagoundanur	10°55'24"	78°05'50"
73072	Karur	Krishnarayapuram	Krishnarayapuram	Valayalkaranputhur	10°55'15"	78°11'30"
73073	Karur	Krishnarayapuram	Krishnarayapuram	Kovakkulam	10°55'15"	78°16'25"
73073A	Karur	Krishnarayapuram	Krishnarayapuram	Thottiyapatti	10°55'07"	78°17'10"
73073B	Karur	Krishnarayapuram	Krishnarayapuram	Krishnarayapuram	10°55'05"	78°15'17"

73074	Karur	Krishnarayapuram	Krishnarayapuram	Thaliyampatti	10°54'35"	78°22'40"
73082	Karur	Aravakurichi	Aravakurichi	Nagampalli	10°49'52"	77°56'00"
73083	Karur	Aravakurichi	Aravakurichi	Thirumanickkampatti	10°50'16"	78°00'28"
73084	Karur	Karur	Thanthoni	Jellippatti	10°49'15"	78°06'20"
73085	Karur	Karur	Thanthoni	Jegadabi	10°50'30"	78°10'00"
73086	Karur	Krishnarayapuram	Krishnarayapuram	Velayudampalayam	10°49'10"	78°16'10"
73087	Karur	Kulithalai	Kulithalai	Kanakkappillaiyur	10°49'25"	78°21'15"
73088	Karur	Kulithalai	Kulithalai	Kalingappatti	10°49'45"	78°27'25"
73089	Karur	Kulithalai	Kulithalai	Panaiyur	10°50'00"	78°32'30"
73093	Karur	Aravakurichi	Aravakurichi	Puduppalaiyam	10°45'17"	77°49'50"
73094	Karur	Aravakurichi	Aravakurichi	Puduvadi	10°44'26"	77°54'50"
73095	Karur	Krishnarayapuram	Kadavur	Devarmalai	10°43'56"	78°10'25"
73096	Karur	Krishnarayapuram	Kadavur	Kannimarpalaiyam(kadavur)	10°44'10"	78°16'40"
73097	Karur	Kulithalai	Kulithalai	Kannimarpalayam	10°44'40"	78°21'50"
73097A	Karur	Kulithalai		Kannimarpalayam	10°44'40"	78°21'50"
73098	Karur	Kulithalai	Thogamalai	T. Idayapatti	10°44'25"	78°26'15"
73098A	Karur	Kulithalai	Thogamalai	Kalladai	10°43'37"	78°27'38"
73099	Karur	Kulithalai	Thogamalai	Puluderi	10°44'20"	78°33'00"
73103	Karur	Aravakurichi	Aravakurichi	Esanatham	10°42'20"	78°00'21"

73104	Karur	Aravakurichi	Aravakurichi	Paraiyur{paraippatti}	10°39'31"	77°50'40"
73105	Karur	Aravakurichi	Aravakurichi	Alamarathupatti	10°40'20"	77°55'30"
73106	Karur	Krishnarayapuram	Kadavur	Singampatti	10°38'15"	78°12'40"
73106A	Karur	Krishnarayapuram	Kadavur	Palavidhuthi	10°38'04"	78°13'31"
73115	Karur	Krishnarayapuram	Kadavur	Kadavur	10°35'34"	78°11'30"
73115A	Karur	Krishnarayapuram	Kadavur	Idaiyapatti	10°35'38"	78°11'24"
73116	Karur	Kulithalai	Kulithalai	Kumaramangalam	10°53'54"	78°27'46"
73117	Karur	Krishnarayapuram	Krishnarayapuram	Sivayam	10°51'52"	78°24'16"
73118	Karur	Kulithalai	Kulithalai	Thimmachipuram	10°57'04"	78°22'06"
73119	Karur	Karur	Thanthoni	Lingathur	10°54'40"	78°09'15"
73120	Karur	Aravakurichi	K.paramathi	Pavithram	10°58'15"	77°59'21"
73121	Karur	Kulithalai	Thogamalai	R.T.malai (Mellapatti)	10°45'19"	78°32'18"
73213 AY	Karur	Karur	Karur	Thirumanilayur	10°56'40"	78°04'00"
73213AY	Karur	Karur	Karur	Thirumanilayur	10°56'40"	78°04'00"
73272A	Karur	Karur	Karur	Andankovil	10°57'54"	78°03'12"
73337	Karur	Kulithalai	Kulithalai	Kumaramangalam	10°53'54"	78°27'46"
73338	Karur	Krishnarayapuram	Krishnarayapuram	Sivayam	10°51'52"	78°24'16"
73339	Karur	Kulithalai	Kulithalai	Thimmachipuram	10°57'04"	78°22'06"

73340	Karur	Karur	Thanthoni	Lingathur	10°54'40"	78°09'15"
73341	Karur	Aravakurichi	K.paramathi	Pavithram	10°58'15"	77°59'21"
73342	Karur	Kulithalai	Thogamalai	R.T.malai (Mellapatti)	10°45'19"	78°32'18"
73348	Karur	Kulithalai	Kadavur	Idaiyapatti	10°35'18"	78°09'02"
73349	Karur	Kulithalai	Kadavur	Idaiyapatti	10°35'53"	78°14'08"
73350	Karur	Karur	Aravakurichi	Pungampadi	10°45'51"	77°57'55"
73351	Karur	Karur	Aravakurichi	Aravakurichi	10°46'20"	77°54'37"
73352	Karur	Karur	Aravakurichi	Ponnapatti	10°42'42"	77°57'36"
73353	Karur	Karur	Aravakurichi	Seethapatti	10°51'32"	77°58'39"
73354	Karur	Karur	Aravakurichi	Santhapadi	10°45'44"	77°48'10"
73355	Karur	Karur	Aravakurichi	Inunganur	10°41'46"	77°56'01"
73356	Karur	Karur	Aravakurichi	Velambadi	10°42'10"	77°51'40"
73357	Karur	Karur	Aravakurichi	Kottapatti	10°40'15"	77°51'00"
MMWS KA1	Karur	Karur	Kadavur	Kuppachipalayam	11°01'34"	78°06'51"
MMWS KA10	Karur	Karur	Karur	Kalladai	10°43'39"	78°27'55"
MMWS KA11	Karur	Karur	Karur	Nallur	10°49'09"	78°28'02"
MMWS KA12	Karur	Kulithalai	Kulithalai	Sathyamangalam	10°53'39"	78°23'35"
MMWS KA13	Karur	Kulithalai	Kulithalai	Mullipadi	10°49'09"	78°28'02"
MMWS KA14	Karur	Kulithalai	Kulithalai	Palaviduthi	10°38'27"	78°15'24"
MMWS KA15	Karur	Kulithalai	Kulithalai	Kadavoor	10°38'27"	78°15'24"
MMWS KA16	Karur	Kulithalai	Kulithalai	Manja Nayakkan Patti	10°35'18"	78°11'37"

MMWS KA17	Karur	Krishnarayapuram	Krishnarayapuram	Nachalur	10°49'28"	78°29'18"
MMWS KA18	Karur	Krishnarayapuram	Krishnarayapuram	Kovikulam	10°55'19"	78°18'05"
MMWS KA19	Karur	Krishnarayapuram	Krishnarayapuram	Thalumba Kavundanur	10°45'31"	78°18'04"
MMWS KA2	Karur	Karur	Karur	Vettamangalam	11°01'34"	78°06'51"
MMWS KA20	Karur	Krishnarayapuram	Krishnarayapuram	Kumaramangalam	10°45'31"	78°18'04"
MMWS KA21	Karur	Aravankurichi	Aravankurichi	Chudamani	10°55'25"	77°53'27"
MMWS KA22	Karur	Aravankurichi	Aravankurichi	Chinnadharapuram	10°51'19"	77°51'03"
MMWS KA23	Karur	Aravankurichi	Aravankurichi	Pallapatti	11°43'27"	77°53'30"
MMWS KA24	Karur	Aravankurichi	Aravankurichi	Senthamangalam	10°40'55"	77°51'38"
MMWS KA25	Karur	Aravankurichi	Aravankurichi	Aravakurichi	10°46'28"	77°54'27"
MMWS KA26	Karur	Aravankurichi	Aravankurichi	Santhapadi	10°45'39"	77°49'18"
MMWS KA27	Karur	Aravankurichi	Aravankurichi	Venjamaggudalur	10°47'44"	77°59'45"
MMWS KA28	Karur	Aravankurichi	Aravankurichi	Thethupatti	10°42'38"	77°56'47"
MMWS KA3	Karur	Karur	Karur	Kodandur	10°56'28"	77°47'26"
MMWS KA4	Karur	Karur	Karur	Karudaiyampalayam	10°57'48"	77°56'57"
MMWS KA5	Karur	Karur	Karur	Andankovil	10°57'20"	78°04'27"
MMWS KA6	Karur	Karur	Karur	Nerur	10°57'48"	78°10'42"
MMWS KA7	Karur	Karur	Karur	Thalapatti	10°52'37"	78°00'29"
MMWS KA8	Karur	Karur	Karur	Uppidamangalam	10°54'19"	78°09'40"
MMWS KA9	Karur	Karur	Karur	Paganatham	10°49'08"	78°00'45"

MMWSKA29	Karur	Aravankurichi	Aravankurichi	Ammapatti	10°40'46"	77°59'04"
N107	Karur	Aravakurichi	K.paramathi	Noyil	11°03'08"	77°55'33"
N108	Karur	Aravakurichi	K.paramathi	Sakkaraipalaiyam	11°01'03"	77°55'20"
N110	Karur	Aravakurichi	K.paramathi	K.paramathi	10°57'35"	77°54'40"
N111	Karur	Aravakurichi	K.paramathi	Madaikattupudur	10°56'15"	77°50'05"
N112	Karur	Aravakkurichchi	K.paramathi	Thennilai	10°56'45"	77°49'50"
N113	Karur	Aravakurichi	K.paramathi	Karvizhi	11°00'40"	77°48'32"

Karur District - Piezometers - Location and Co-ordinates

Well no	District	Tashil/Taluk	Block/Mandal	Village	Latitude	Longitude
14001 D	Karur	Kulithalai	Thogamalai	Puluderi	10.737500	78.536111
14002	Karur	Kulithalai	Thogamalai	T.Edaiyapatti	10.736111	78.427778
14003 D	Karur	Kulithalai	Thogamalai	Naganur	10.754167	78.373611
14004 D	Karur	Kulithalai	Kulithalai	Nallur	10.819444	78.458333
14005	Karur	Krishnarayapuram	Krishnarayapuram	Kovakkulam	10.922222	78.273611
14006 D	Karur	Aravakurichi	K.Paramathi	Karvazhi	11.012500	77.808333
14007 D	Karur	Aravakurichi	K.Paramathi	Kodanthur	10.925000	77.777778
14008 D	Karur	Aravakurichi	K.Paramathi	Karudayampalayam	10.950000	77.963889
14009 D	Karur	Aravakurichi	Aravakurichi	Esanatham	10.704167	78000000
14010	Karur	Aravakurichi	Aravakurichi	Santhapadi	10.761111	77.822222
14011 D	Karur	Aravakurichi	Aravakurichi	Senthamangalam	10.658333	77.872222
14012 D	Karur	Karur	Thanthoni	Kakkavadi	10.918056	78.038889
14013 D	Karur	Karur	Thanthoni	Puliyur	10.941667	78.141667
14014 D	Karur	Karur	Karur	Kuppuchipalayam	11.027778	78.113889
14015 D	Karur	Aravakurichi	K.Paramathi	Vettamangalam	11.050000	77.950000
14016	Karur	Krishnarayapuram	Krishnarayapuram	Vayaloor	10.870833	78.344444
14017 D	Karur	Krishnarayapuram	Kadavur	Palaviduthi	10.643056	78.252778
14018 D	Karur	Krishnarayapuram	Kadavur	Manjanaikanpatti	10.756944	78.200000
14019 D	Karur	Krishnarayapuram	Kadavur	Devarmalai	10.730556	78.173611
14020 D	Karur	Kulithalai	Kulithalai	Nachchalur	10.826389	78.504167
14021	Karur	Aravakurichi	Aravakurichi	Venjamangudalur	10.800000	77.980556
14022 D	Karur	Aravakurichi	K.Paramathi	Chinna Darapuram	10.851389	77.854167
14023 D	Karur	Krishnarayapuram	Kadavur	Keeranur	10.756944	78.300000
MWS 14024	Karur	Krishnarayapuram	Kadavur	Venjamangudalur	10.788889	77.996389
MWS 14025	Karur	Karur	Thanthoni	Mookanankurichi	10.864444	78.065278
MWS 14026	Karur	Karur	Thanthoni	Paganatham	11.823333	78.048056
MWS 14027	Karur	Aravakurichi	Aravakurichi	Erumarpatti	10.712222	77.959167

MWS 14028	Karur	Aravakurichi	Aravakurichi	Ammapatti	10.712222	77.959167
MWS 14029	Karur	Aravakurichi	Aravakurichi	Pallapatti	11.723889	77.890833
MWS 14030	Karur	Aravakurichi	Aravakurichi	Aravakurichi	11.777500	77.909722
MWS 14031	Karur	Aravakurichi	K.Paramathi	Thennilai (s)	10.948333	77.832500
MWS 14032	Karur	Aravakurichi	K.Paramathi	Thukkachi	11.012500	77.846389
MWS 14033	Karur	Aravakurichi	K.Paramathi	Kuppam	11.011944	77.923611
MWS 14034	Karur	Karur	Karur	Nerur	11.000833	78.153333
MWS 14035	Karur	Krishnarayapuram	Krishnarayapuram	Sengal	10.864167	78.240833
MWS 14036	Karur	Kulithalai	Kulithalai	Kadavur	10.579444	78.221667
MWS 14037	Karur	Kulithalai	Kulithalai	Iranyamangalam	11.870278	78.429167
MWS 14038	Karur	Kulithalai	Kulithalai	Sathyamangalam	10.889722	78.391111
MWS 14039	Karur	Kulithalai	Thogamalai	Thalinji	10.788889	78.500000
MWS 14040	Karur	Aravakurichi	K.Paramathi	Punjaikalakurichi	10.878056	77.936667
MWS 14041	Karur	Aravakurichi	K.Paramathi	Chudamani	10.873889	77.882500
MWS 14042	Karur	Karur	Thanthoni	Pallapalayam	10.925556	77.998611

(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 Erode 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)

KARUR 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	KARUR	31,327.18	28,365.87	1,921.71	30,287.58	97	10

Firka Wise Summary

(in ha.m)

KARUR 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	ARAVAKURICHI	1,930.05	1,093.05	44.52	1,137.57	59	SAFE
2	CHINNADHARAPURAM	2,630.53	1,535.25	65.54	1,600.79	61	SAFE
3	CHINTHALAVADI	1,320.87	801.38	54.97	856.35	65	SAFE
4	K.PARAMATHY	1,032.89	1,024.80	45.49	1,070.29	104	OVER EXPLOITED
5	KADAVUR	1,370.29	1,892.51	47.97	1,940.48	142	OVER EXPLOITED
6	KARUR	749.16	586.65	42.86	629.51	84	SEMI CRITICAL

7	KATTALAI	1,709.28	1,502.70	56.23	1,558.93	91	CRITICAL

KARUR 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	KULITHALAI	3,770.80	1,353.10	67.86	1,420.96	38	SAFE
9	MAILAMPATTI	2,256.86	3,510.45	102.66	3,613.11	160	OVER EXPLOITED
10	NANGAVARAM	3,983.77	1,939.00	69.87	2,008.87	50	SAFE
11	PALLAPATTI	1,438.35	2,279.80	45.88	2,325.68	162	OVER EXPLOITED
12	PANJAPATTI	1,144.91	1,289.85	53.34	1,343.19	117	OVER EXPLOITED
13	PUGALUR	1,329.84	1,209.06	14.08	1,223.15	92	CRITICAL
14	THALAPATTI	491.24	423.99	24.50	448.49	91	CRITICAL
15	THENNILAI	1,178.68	1,471.25	33.82	1,505.07	128	OVER EXPLOITED
16	THOGAIMALAI	1,756.04	2,381.10	94.85	2,475.95	141	OVER EXPLOITED
17	THORANAKALPATTI	827.87	1,637.06	30.43	1,667.49	201	OVER EXPLOITED
18	VANGAL	915.53	1,046.38	58.49	1,104.86	121	OVER EXPLOITED
19	VELLIYANAI	1,490.22	1,388.50	968.35	2,356.85	158	OVER EXPLOITED
TOTAL		**31,327.18**	**28,365.87**	**1,921.71**	**30,287.58**	**97**	

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 Karur 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) <u>Statute/Law/Policy/Regulations if any</u>:

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) <u>Suggestions for improvement of groundwater governance</u>.

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) <u>Institutions governing/managing/monitoring the resources and Institutional structure, gaps if any</u> :

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) <u>Areas of people/private participation if any</u>:

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 8 blocks in Karur District, 5 blocks are categorized as Over Exploited and Critical blocks and remaining 3 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 Karur District, totally 19 Firkas, 10 Firkas are categorized as Over Exploited and remaining 9 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 62.5%, but, the total percentage of over exploited and critical Firkas as on March 2011 Assessment is 52.63%, in the Karur 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 19 Firkas, the total percentage of over exploited and critical Firkas is 52.63%, but, In 2013 assessment, out of 19 Firkas, it has been come down marginally to 68.42%, in the Karur 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 19 Firkas in the District, 9 Firkas are categorized as “Over Exploited Firkas”, 1 Firkas are categorized as “Critical Firkas”, 5 Firkas are categorized as “Semi Critical Firkas”, 4 Firkas are categorized as “Safe Firkas”.

Based on the Estimation of Ground Water Resources of Tamil Nadu State as on March 2011, Out of 19 Firkas in the District, 10 Firkas are categorized as “Over Exploited Firkas”, 3 Firkas are categorized as “Critical Firkas”, 1 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” increased from 9 to 10 Firkas, the “Critical Firkas” increased from 1 to 3 Firkas, the “Semi Critical Firkas” decreased from 5 to 1 Firkas, the “Safe Firkas” increased from 4 to 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	9	10
2	Critical	1	3
3	Semi Critical	5	1
4	Safe	4	5
5	Saline	Nil	Nil
TOTAL		19	19

(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.