भारत सरकार
Government of India
जल शक्ति मंत्रालय,
Ministry of Jal Shakti,
जल संसाधन, नदी विकास और गंगा संरक्षण विभाग,
Department of Water Resources,
River Development and
Ganga Rejuvenation

केंद्रीय भूमि जल बोर्ड
Central Ground Water Board

NAQUIM 2.0

अरियालुर, सेंदुरई और तिरुमनूर ब्लॉक की जलभृत प्रबंधन योजना, अरियालुर जिला, तमिलनाडु

Aquifer Management Plan of Ariyalur, Sendurai and Thirumanur Blocks, Ariyalur District, Tamil Nadu

South Eastern Coastal Region (SECR)
Chennai
2024

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South Eastern Coastal Region (SECR)

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Report on

Aquifer Management Plan of Ariyalur, Sendurai and Thirumanur Blocks, Ariyalur District, Tamil Nadu

Contributor's page

Overall Supervision and Guidance

M.Sivakumar, Regional Director

Mentor

Ms D Dhayamalar, Scientist E (HG)

Dr M. Senthilkumar, Scientist D (HG)

Composition of the Team

Team Leader	Dr. K. Ravichandran, Scientist – D (HG)
	Shri. J. Sivaramakrishnan, Scientist – D (HG)
Hydrogeologists	Dr. Sk. Md. Sartaj Basha, Scientist – B (HG)
	Dr. G. Vijayakumar, Scientist – B (HG)
	Smt. Athira R, Scientist – C (HG)
Geophysicist	Shri. T.S.N. Murthy, Scientist – B (GP)
Chemist	Sh. Dinesh Kumar, Scientist – B (Chem)
Map preparation	Mrs. M. Navaneetham, Draughtsman
Report Processing & Scrutiny	Dr M Senthilkumar, Scientist – D (HG)

डॉ. सुनील कुमार अम्बष्ट
अध्यक्ष
Dr. Sunil Kumar Ambast
Chairman

सत्यमेव जयते

भारत सरकार
जल शक्ति मंत्रालय
जल संसाधन,
नदी विकास और गंगा संरक्षण विभाग
केन्द्रीय भूमि जल बोर्ड
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Ministry of Jal Shakti
Department of Water Resources,
River Development & Ganga Rejuvention
Central Ground Water Board

Message

National Aquifer Mapping and Management Programme (NAQUIM) was initiated by Central Ground Water Board (CGWB) in 2012 with the goal of mapping and managing aquifers across India to promote sustainable groundwater use. So far the entire mappable area of 25 lakh km^2 has been covered under the NAQUIM programme. While these initial efforts have been highly impactful, they faced certain limitations especially in terms of spatial resolution.

Taking it forward, CGWB has now initiated **NAQUIM 2.0,** the next phase of aquifer mapping designed to provide a deeper, more detailed understanding of India's groundwater systems. During 2023-24, CGWB had completed NAQUIM 2.0 studies in 68 study areas. The study areas were selected in consultation with the State/UT government agencies.

I am confident that this report of NAQUIM 2.0 study will serve as a critical resource for government agencies, research institutions, NGOs, and the general public. By fostering a collaborative approach to groundwater management, this report will play a key role in safeguarding and sustaining India's precious ground water resources.

(Dr. Sunil Kumar Ambast)
Chairman, CGWB

Bhujal Bhawan, NH-IV, Faridabad-121001 (Haryana) Tel : 0129-2477101, 0129-2477104
E-mail : chmn-cgwb@nic.in | Fax 0129-2477200

Member's Message

Groundwater is the common resource for all living beings of the earth. In Indida, water is being treated as divine. However, ground water is being exploited indiscrementlly due to huge demand for fresh water in all sectors. The contribution of ground water is nearly 62% in irrigation, 85% in rural water supply and 50% in urban water supply. Considering the situation, CGWB has taken up the NAQUIM 1.0 to map the aquifers in the entire country and completed. Further, to find solution to specific issues in micro level, NAQUIM 2.0 has been taken up.

The report titled "Aquifer mapping in Mining areas in Ariyalur District, Tamil Nadu" is a comprehensive scientific study has been carried out in coordination with State Govermment and stake holders. The study covers the area of 991Sq.KM. representing three blocks of Ariyalur district namely Sendurai, Ariyalur and Thirumanur. The Study area is the cement manufacturing hub of Tamil Nadu and Lime stone mining is one of the primary sources for cement. The Mining activities eventually affect the ground water availability and its movement. This comprehensive report will provide suitable management plans for sustainable ground water management in mining areas of Ariyalur district.

I sincerely appreciate the work done by the officers of CGWB, SECR.

T. S. Anitha Shyam,

Member (South)

Foreword

Ground water is the life line for the human beings due to its contribution in irrigation and drinking is huge. In many parts of the county, the groundwater been jeopardized due to various activities of humans, one such acitivity is the Mining of resources for manufacturing industries and place a important in the GDP growth of the country. After successful completion of NAQUIM 1.0, providing solution to the specific issues is need of the hour. Accordingly, CGWB has taken NAQUIM 2.0 for providing suitable mangamenet plans at village level.

Since Ariyalur is the hub of Cement Manufacturing in Tamil Nadu, the raw material is being supplied from the mines of ariyalur district. In order to understand the impact of mining on ground water, three blocks of Ariyalur district has been taken up for detailed study under NAQUIM 2.0.

In the study area, 73 major mines and 7 minor mines exists which covers about 60 sq.km area in 48 Gram Panchayats. All the mines are open cast mines with maximum excavated depth upto 65 metres. The major mines are mining the limestone which is a unconfined aquifer of the study area. Mining of aquifer material is eventually affects the availability of ground water and its movements.

The out come of the study reveals that out of 254 habitations, dried wells exist in 98 habitations (40 %) and about 60% of dried dug wells of the depth range of 10 – 22 meters depth. It has been estimated that the total aquifer material (limestone) lost due to mining activities is 2272 Million Cubic Metre. The total volume of ground water permanently lost has been estimated as is 217 MCM. The estimated total volume of ground water withdrawal by the mining industries is about 34 MCM/Year. The Block wise withdrawal is 8.57 MCM/year from Sendurai, 15.37 MCM/year from Ariyalur and 9.90 MCM/year from Thirumanur.

The re-estimation of Ground Water Resource revealed that two firkas namely Ariyalur and Sendurai have been re-categorisated as over exploited from safe and critical categories respectively. Mathur firka re-categorised as semi-critical from Safe. The total estimated volume of ground water lost from the deeper aquifer is about 112 MCM which is 120% of the total extraction from study area while comparing the dynamic ground water resources 2023.

This report carries the suitable ground water management plans and I hope NAQUIM 2.0 report will be useful for the district administration, water managers, stake holders in understanding the aquifers and managing it resources in Sendurai, Ariyalur and Thirumanur blocks of Ariyalur district.

M. Sivakumar

Regional Director

Executive Summary

NAQUIM 2.0 has been taken up to find and provide the tangible solution to the specific issues. Any manufacturing industries thriving on the availability of the raw materials, the primary raw materials for cement manufacturers are limestone, gypsum, clay, etc. which are available at Ariyalur District. These materials are being mined through open cast mines for a very long period which has its own impact on ground water over the area. In order to understand the impact three blocks namely Ariyalur, Thirumanur and Sendurai of Ariyalur district have been taken up under NAQUIM 2.0.

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In Premonsoon, out of total 63 nos. ground water samples, 4 samples (6%) have EC more than 3000 µs/cm. 18 (29%) sample have Magnesium more than BIS permissible limit, whereas 5 (8%) samples have Nitrate and 7 (12%) sample have Fluoride above permissible limit. During Postmonsoon, out of total 144 nos. ground water samples, 6 samples (4%) have EC more than 3000 µs/cm. 18 (12%) samples have Magnesium more than BIS permissible limit, whereas 15 (10%) samples have Nitrate and 11 (8%) samples have Fluoride above permissible limit

The knowledge acquired from this study assisted to devise various management plans as follows. 1. Conversion of all the abandoned mines into recharge sanctuaries with recharge shafts which will recharge the deeper aquifer. 2. A total number of 74 nos. recharge shafts in 36 GPs, 547 nos. of desiltation of Tanks in 60 GPs, 119 nos. of Nalaband in 48 Gps and 29 nos. of Percolation Tanks in 20 Gps have been envisaged in the areas other than Mining activities in the study area. 3. Policies should be strengthened by making the establishment of recharge sanctuaries a mandatory condition for granting the No Objection Certificate (N.O.C.) to mining industries. 4. Motivate industrialists to utilise the C.S.R. fund for ground water recharge activities in these areas.

कार्यकारी सारांश

नैक्यूम (NAQUIM) 2.0 की शुरुआत एक विशिष्ट विषय से संबंधित सटीक समाधान उपलब्धः कराने के उद्देश्य से की गई है। कोई भी विनिर्माण उद्योग कच्चे माल की उपलब्धता पर ही विकसित हो सकता है, सीमेंट निर्माताओं के लिए प्राथमिक कच्चा माल चूना पत्थर, जिप्सम, मिट्टी आदि हैं जो अरियालुर जिले में उपलब्ध हैं। इन सामग्रियों का खनन बहुत लंबी अवधि के लिए ओपनकास्ट खानों के माध्यम से किया जा रहा है जिससे इस क्षेत्र के भूजल पर व्यापक प्रभाव पड़ा है। इस प्रभाव को समझने के लिए अरियालुर जिले के तीन ब्लॉक अर्थात् अरियालुर, थिरुमानूर और सेंदुरई को नैक्यूम 2.0 के तहत शामिल किया गया है।

इस अध्ययन से पता चल है कि खनन कार्यकलापों के कारण नष्ट हुई कुल जलभृत्त सामग्री (चूना पत्थर) 2272 मिलियन घनमीटर है। स्थायी रूप से नष्ट हुए भूजल की कुल मात्रा 217 एमसीएम आंकी गई है। खनन उद्योगों द्वारा भूजल निकासी की अनुमानित कुल मात्रा लगभग 34 एमसीएम/वर्ष है। सेंदुरई से ब्लॉकवार निकासी 8.57 एमसीएम/वर्ष, अरियालुर से 15.37 एमसीएम/वर्ष और तिरुमानूर से 9.90 एमसीएम/वर्ष है।

भूजल संसाधन के पुनः आकलन से पता चला है कि दो फिरकों नामत अरियालुर और सेंदुरई को क्रमशः सुरक्षित और गंभीर श्रेणियों से अतिदोहित के रूप में वर्गीकृत कर दिया गया है। माथुर फिरका को सुरक्षित से अर्ध गंभीर के रूप में वर्गीकृत किया गया है । गहरे जलभृत से नष्ट हुए भूजल की कुल अनुमानित मात्रा लगभग 112 एमसीएम है जो डॉयनेमिक भूजल संसाधन 2023 की तुलना में इस अध्ययन क्षेत्र से हुए कुल निष्कर्षण का 120% है।

मानसून पूर्व में भूजल के कुल 63 नमूनों में से 4 नमूनों (6%) में विद्युतीय चालकता 3000 µs/cm से अधिक है। 18 (29%) नमूनों में मैग्नीशियम बीआईएस की अनुमत्य सीमा से अधिक है, जबकि 5 (8%) नमूनों में नाइट्रेट और 7 (12%) नमूनों में फ्लोराइड अनुमेय सीमा से अधिक है। मानसून पश्चात के दौरान लिए गए 144 भूजल नमूनों में से 6 नमूनों (4%) में विद्युतीय चालकता 3000 µs/cm से अधिक है, 18 (12%) नमूनों में मैग्नीशियम बीआईएस की अनुमेय सीमा से अधिक है, जबकि 15 (10%) नमूनों में नाइट्रेट है और 11 (8%) नमूनों में फ्लोराइड अनुमेय सीमा से अधिक है।

इस अध्ययन से प्राप्त ज्ञान से विभिन्न प्रबंधन योजनाओं को तैयार करने में निम्नानुसार सहायता प्राप्त हुआ है : 1. सभी परित्यक्त खानों को पुनर्भरण शाफ्ट के साथ पुनर्भरण संरचनाओं में परिवर्तित करना जिससे गहरे जलभृत का पुनर्भरण होगा। 2. अध्ययन क्षेत्रों में खनन गतिविधियों के अतिरिक्त 36 ग्राम पंचायतों में कुल 74 पुनर्भरण शाफ्ट, 60 ग्राम पंचायतों में 547 विलवणीकरण टैंक, 48 ग्राम पंचायतों में 119 नालाबंद , 20 ग्राम पंचायतों में 29 परकोलेशन टैंक की परिकल्पना की गई है। 3. खनन उद्योगों को अनापत्ति प्रमाण पत्र (एन.ओ.सी.) प्रदान करने के लिए पुनर्भरण संरचनाओं की स्थापना को अनिवार्य शर्त बनाकर नीतियों को सुदृढ़ किया जाना चाहिए। 4. इन क्षेत्रों में भूजल पुनर्भरण गतिविधियों के लिए सीएसआर निधि का उपयोग करने के लिए उद्योगपतियों को प्रेरित करना।

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1.0 Introduction

Groundwater is the major source of freshwater that caters to the demand of ever growing domestic, agricultural and industrial sectors of the country. This renewable resource has been indiscriminated exploitation in some parts of the country by several users as it is easily available and reliable. Intensive and unregulated groundwater pumping in many areas have caused rapid and widespread groundwater decline. This has in turn led to an emergent need for comprehensive and realistic information pertaining to various aspects of groundwater resources available in different hydro-geological settings through a process of systematic data collection, compilation, data generation, analysis and synthesis which together brings in the concept of Aquifer Mapping and Management Plan.

Though the NAQUIM 1.0 outputs have been beneficial for sustainable ground water management in numerous ways, large scale implementation of its recommendations at ground level by the user agencies has been strenuous. As per the feedback received from the user agencies utilising the NAQUIM outputs, major limitations of the ongoing studies include i) non-availability of printed maps at implementable level and ii) lack of site-specific recommendations for implementation at Panchayat or village level.

Keeping the above limitations in mind and considering the future requirements, broad objectives of NAQUIM 2.0 studies are i) providing information in higher granularity with a focus on increasing density of dynamic data like ground water level, ground water quality etc. ii) providing issue based scientific inputs for ground water management upto Panchayat level, iii) providing implementable printed maps to the users and iv)putting in place a strategy to ensure implementation of the recommended strategies. The state agencies have been involved in the studies to sense the ownership.

The study aims to identify the alternate sources of drinking water in the aquifer where it has higher concentration of Fluoride in Veerapandi, Omalur and Kadayampatty block of Salem district. The outcome of finding and management plans will be shared to the state Government, farmers and stake holders.

1.1 About the study area

In the year 1995 Tiruchirappalli district was trifurcated into Tiruchirapalli, Perambalur and Karur districts. Later Perambalur district was divided into Perambalur and Ariyalur districts in the year 2001 and merged with Perambaluragain in the year 2002. Presently, the Ariyalur district is bifurcated from Perambalur and it is functioning separately as the district of Ariyalur from 23rd November 2007. It is located in central Tamil Nadu, spreading over 1934 Sq.kms. The boundaries are Cuddalore district in north, Thanjavur district in east and south, Perambalur and Tiruchirappalli district in west.

The present study area falling in Ariyalur District, the major portion of the study area (80%) falls in Lower Cauvery Basin and remaining (20%) falls in Vellar-Paravanar river basin. The present NAQUIM 2.0 study area covers around three blocks namely: Ariyalur, Sendurai and Thirumanur with an area of 991 Sq.km. The study area is comprising 8 Firkas of Sendurai, Ariyalur, Ponparappi, Mathur, Keelpalur, Elakurichi, Thirumanur and Nagamangalam of Ariyalur district.The study arealies between latitude 10°53' to 11°23' and longitude78°56'to 79°17'and falls in the survey of India toposheet numbers 58M/3, 58M/4, 58M/7, 58M/8, 58N/1, 58N/5 and 58J/13.The study area is shown in location map **Fig 1.1.** and the details of the study area is shown in **Table 1.1**.

Table 1.1. The details of the study area (Based on GIS)

Sl.No	Taluk	Block	No. of Village Panchayat	No. of Habitation	Area in Sq.Km	Firka Name
1	Sendurai	Sendurai	30	93	292	Mathur
						Sendurai
						Ponparappi
2	Ariyalur	Ariyalur	37	143	325	Ariyalur
						Nagamangalam
		Thirumanur	36	93	374	Keelapalur
						Elakurichi
						Thirumanur

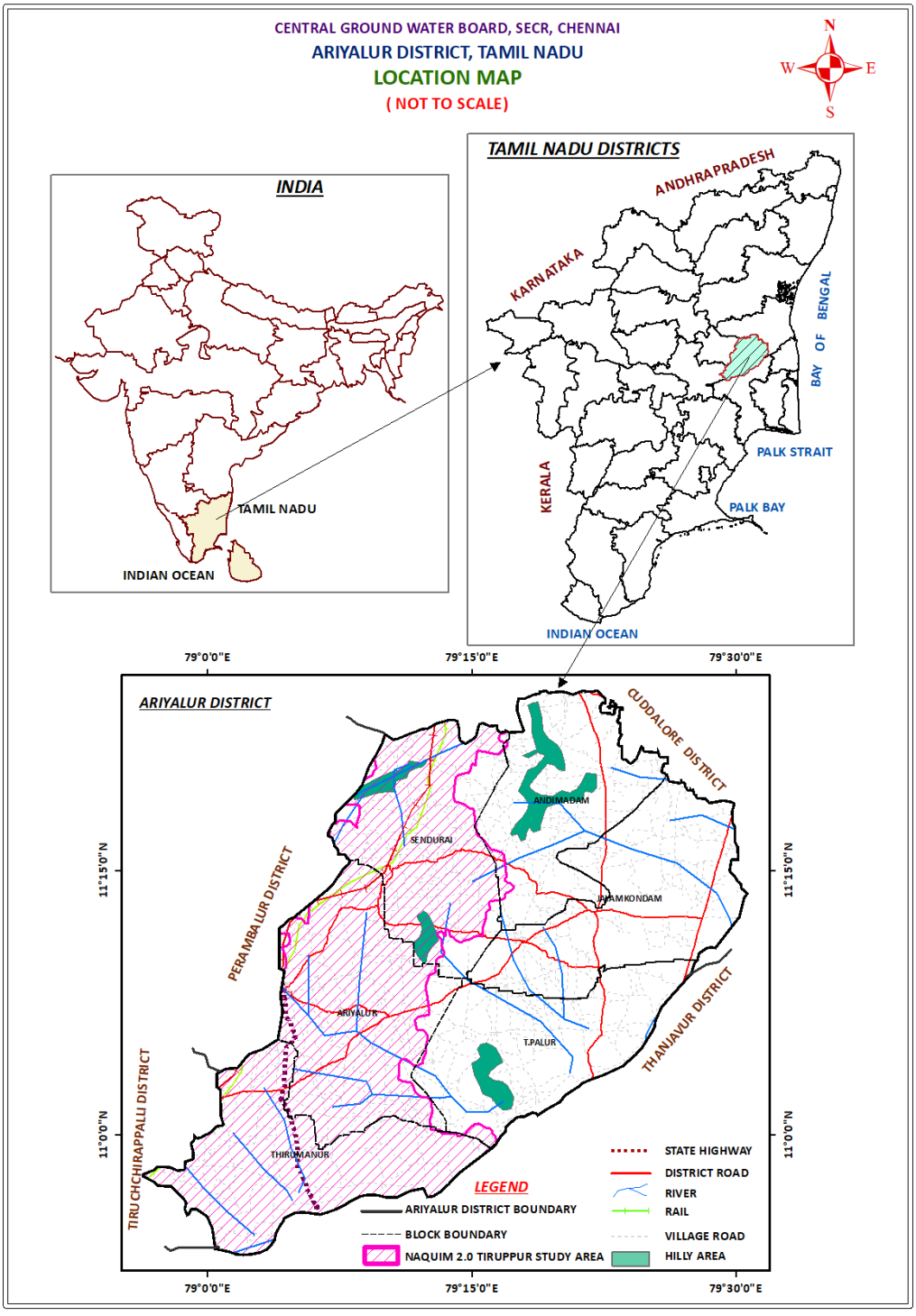


Fig 1.1. Location map

1.2 Objective of the present study:

- Demarcation of Gram Panchayat wise aquifer dispositions & ground water quality
- Impact of Mining activities
- Delineation of Recharge and Discharge Areas
- Preparation of Sustainable Management Plans

1.3 Priority Types:

The studies under NAQIUM 2.0 are proposed as issue specific and will be undertaken in prioritized focus area. Broadly priorities are identified based on impact of mining activities and vulnerability of aquifers. Accordingly, this study area falls under the category of: **I. IMPACT OF MINING ON AQUIFERS**

Minerals of economic importance found in the study area are mainly Celestite, Limestone, Shale, Sandstone, Kankar and Phosphate nodules. Sedimentary Limestone is found to occur in Ariyalur and Sendurai Taluks, which ranges from cement grade to plus cement grade in quality and is consumed by the cement manufacturing units.

There are 73 major and 7 minor mines in the study area (**Fig 1.2.**) including acitveand inactive (about 26 inactive mines). The deepest occurrence of limestone in the study area is 65 m bgl and the average depth of occurrence of limestone in the study area is 40 m bgl. Since, all the mines are open cast mines, dewatering of the ground water is necessitate and removing of the aquifer material affects the prevailing hydrogelogical condition of the study are especiallyin the phreatic aquifer (aquifer 1).

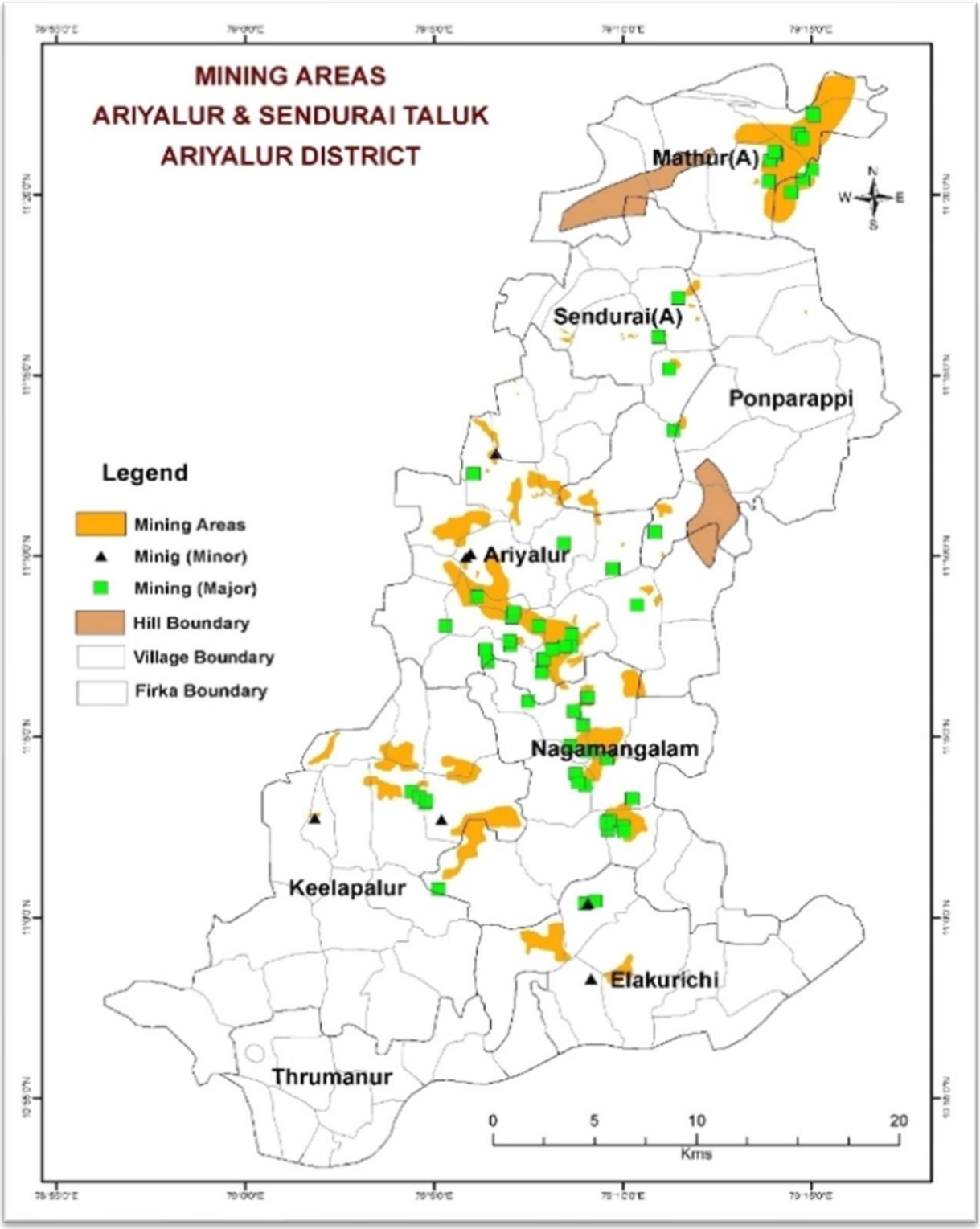


Fig 1.2. Location of limestone mines in the study area

1.4 Previous Studies:

Systematic hydrogeological surveys have been taken up in the area during late fiftiesand established the occurrence of groundwater under both in phreatic and confined conditions (confined Tertiary aquifers).

Groundwater exploration studies were taken up in Ariyalur district in different phases and the details are as follows **(Table 1.2)**-

Table 1.2. Wells constructed by the CGWB in the study area

S.No	FSP / AAP	Number of wells / Pz constructed
1	1957	7
2	1983-85	6
3	1992-94	10
4	2000-2001	5
5	NHP	2 (1 Hard rock + 1 Soft rock)
6	2007-08	13
7	2008-09	2
8	2010-11	6
9	2023-24	4 (Current AAP)

1.5 Data Adequacy and Data Gap Analysis

The available inhouse data from Central Ground Water Board like Exploratory tube wells , Vertical Electrical Sounding (VES), ground water monitoring stations and ground water quality stations of Central Ground Water Board (CGWB), Tamil Nadu Water Supply and Drainage Board (TWAD), State Ground and Surface Water Resources Data Centre of Water Resources Department (SG&SWRDC), Government of Tamil Nadu,were collected, compiled and analysed as per the nomenclature for finding out adequacy of the data and data gap in the study area. The summarised detail on Data Adequacy and Data Gap Analysis is presented in the **Table 1.3**.

Table 1.3. Data Adequacy and Data Gap Analysis

Sl. No	Data	Existing Data	Additional data generated
1	Exploratory well	CGWB : 4 State Govt.: 8	4
2	Geophysical survey	CGWB : 4	51(VES) 236 (TEM)
3	Groundwater Monitoring well	CGWB : 4 State Govt.: 8	167
4	Groundwater Quality Monitoring well	CGWB :4	392 (Pre & Post Monsoon)

1.6 Rainfall:

The study area generally experiences humid climate (hot summer tomoderately cool winter). The winter season is from January to the end of February. This is followed by summer, which is from March to May. The southwest monsoon season is from June to September. The period from October to December is the north-east monsoon season. The hottest season is from March to May, during this period the maximum temperature often exceeds 40° C, while the normalminimum and maximum temperatures in the study area are 19.5 and 37.6° C respectively. The Average annual rainfall in the study area is 954 mm.

1.7 Geomorphology:

The geomorphology of an area is the external appearance of landforms that gives a reliablepicture of the underground strata and its physio-chemical condition. The different formationsand the layer confirm and cogent to its geomorphology.The prominent geomorphic units identified in the study area through interpretation of Satellite Imagery are 1) Piedmont Zone and 2) Plains.The alluvial plains are confined to the northern bank of Cauvery River in the study area. Buried Pediments are available in Sendurai block of the study area. Pediments, both shallow and deep, constitute the prominent geomorphic unit in the district and are evenly distributed in the Thirumanur andSendurai blocks. Nearly 14% of the region is covered by Plains. 86% of the study area is covered by piedmont zone.The geomorphological map of the area is given in **Fig 1.3.**

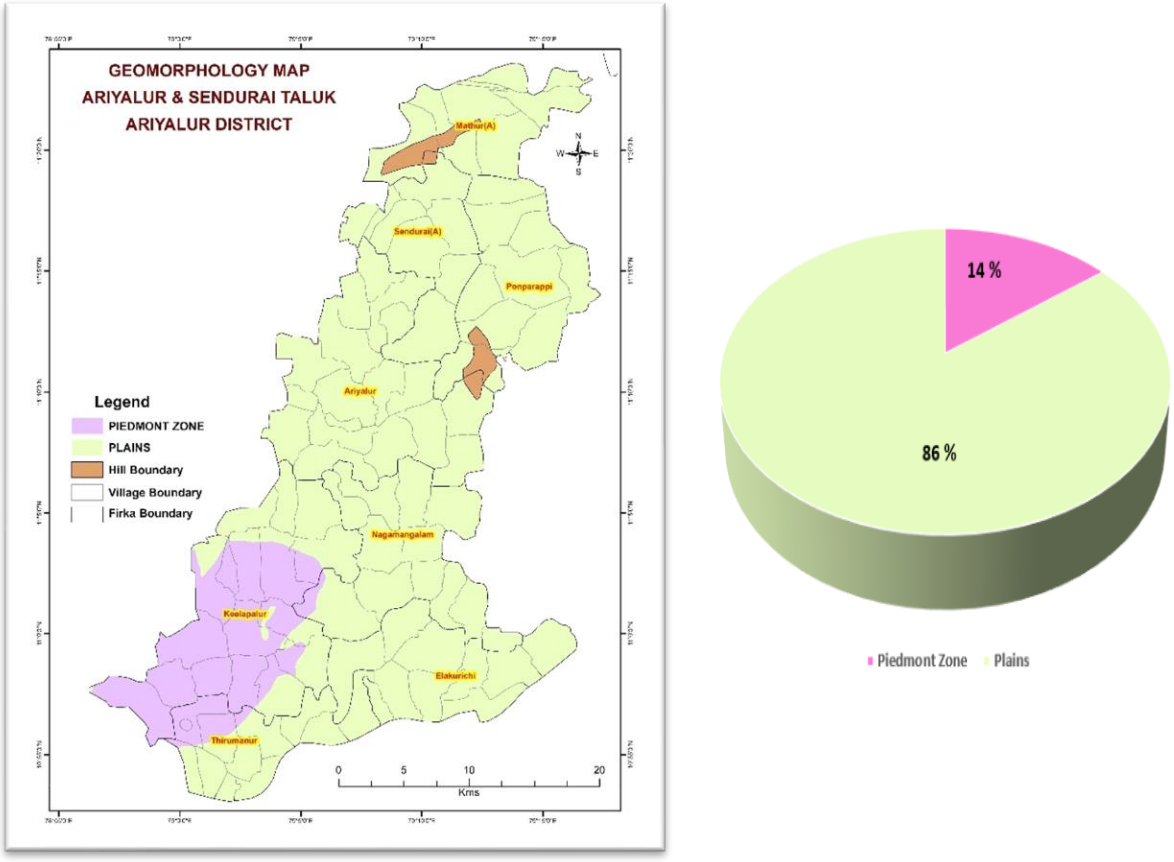


Fig 1.3. Geomorphology Map of the Study Area

1.8 Land Use and Land Cover:

Agricultural land occupies nearly 70% of the area and spread throughout the study area. Water bodies occupy nearly 10% ofthe area, wastelands occupy nearly 9 % of the area, and built-up land and forest occupies 8 and 3 % respectively (**Fig 1.4.**).

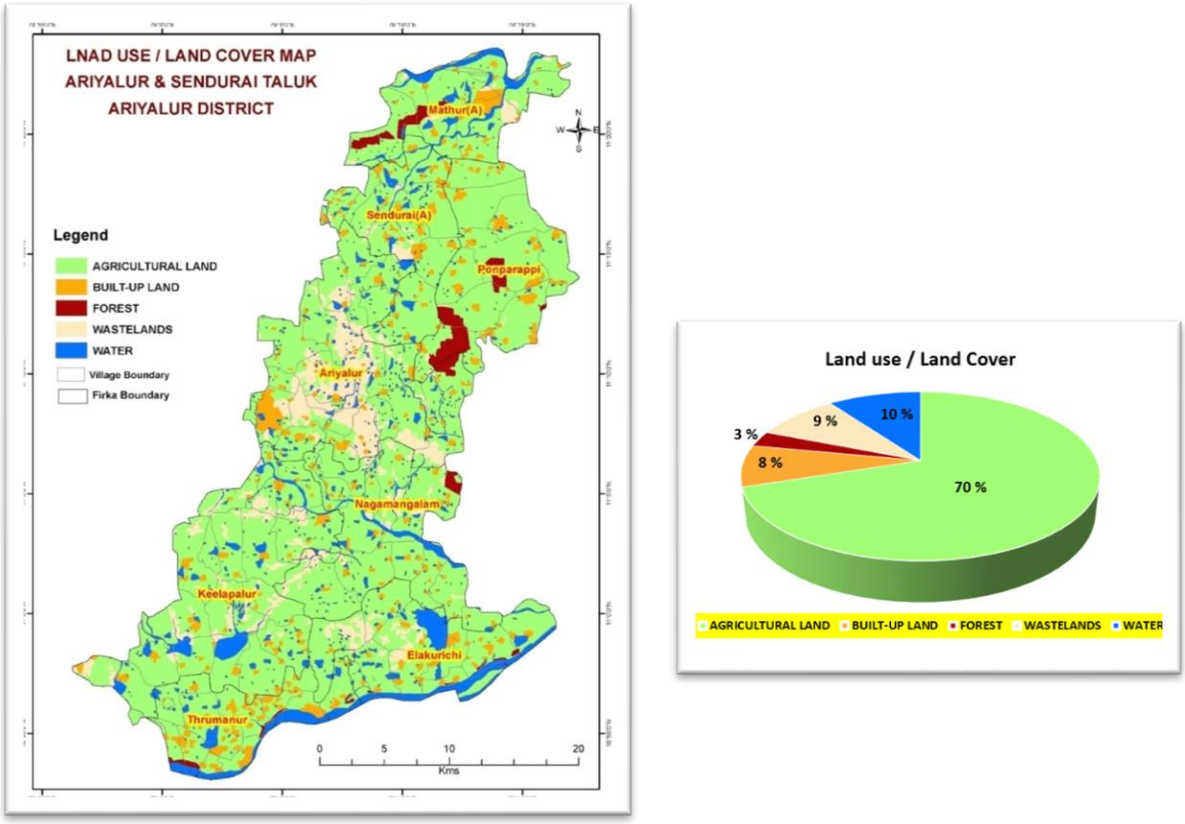


Fig 1.4. Land Use / Land Cover map of study area

1.9 Soils:

Soil plays a major role in hydrologic control of the infiltrating water. Soils are generallyclassified by taking their colour, texture, fertilities and chemical combinations which includessalt, minerals and the solution effect over them. The major soil types in the study area are alfisols followed by vertisols, entisols and inceptisols (**Fig 1.5.**).

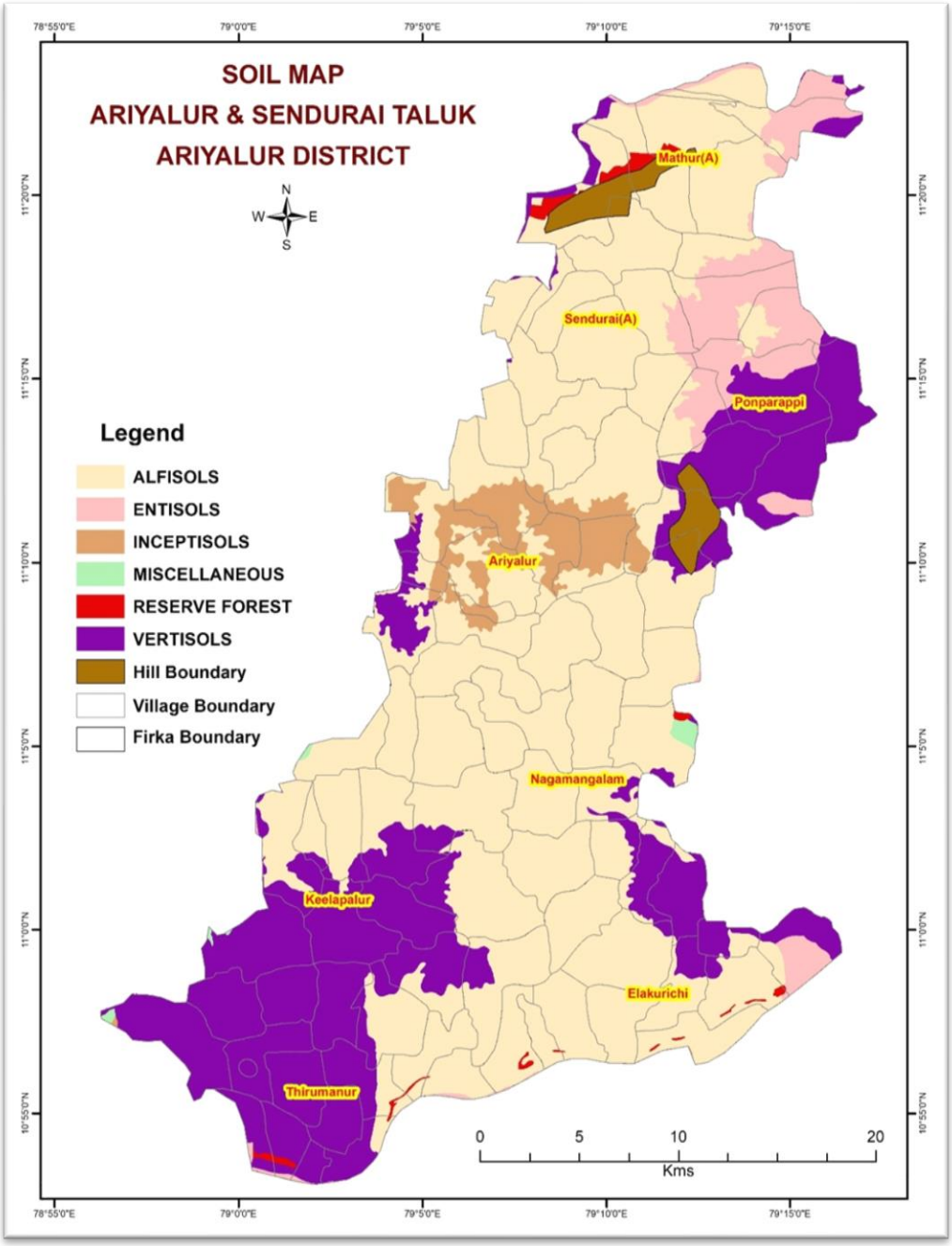


Fig 1.5. Soil map of the study area

1.10 Slope:

The slope of any terrain plays a vital role in allowing the infiltration of water into the subsurface system. In regions of gentle slope, the runoff will be slow and will have more time forpercolation of rainwater, whereas steep slope facilitates high runoff allowing less residence timefor rainwater to percolate. The DEM map of study area was prepared from the Cartosat DEM of 30 m spatial resolution (**Fig 1.6**.).The elevation of the study area ranges from 15 m amsl and in the north to 119 m amsl in the east. The general slope of the study area is from west to east.

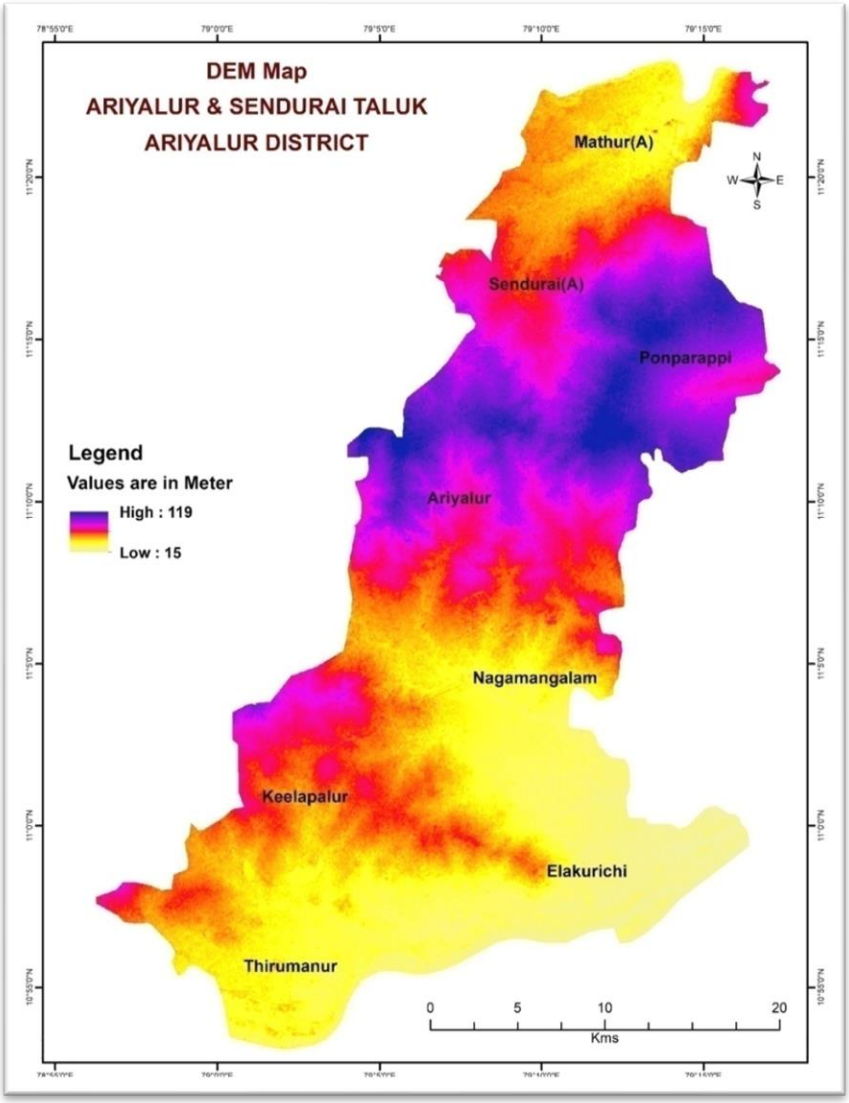


Fig 1.6. Elevation map of the study area

1.11 Drianage:

The study area falls under Cauvery River Basin (Lower Cauvery) &Vellar-Paravanar. All the rivers except Cauvery are ephemeral in nature, Vellar river forms the northern boundary of the study area. Marudhaiyar river originates from south west of Perambalur town and flows towards east crossing the Ariyalur district and mergeswith river Coleroon. The drainage pattern is dendritic in nature (**Fig 1.7.**).

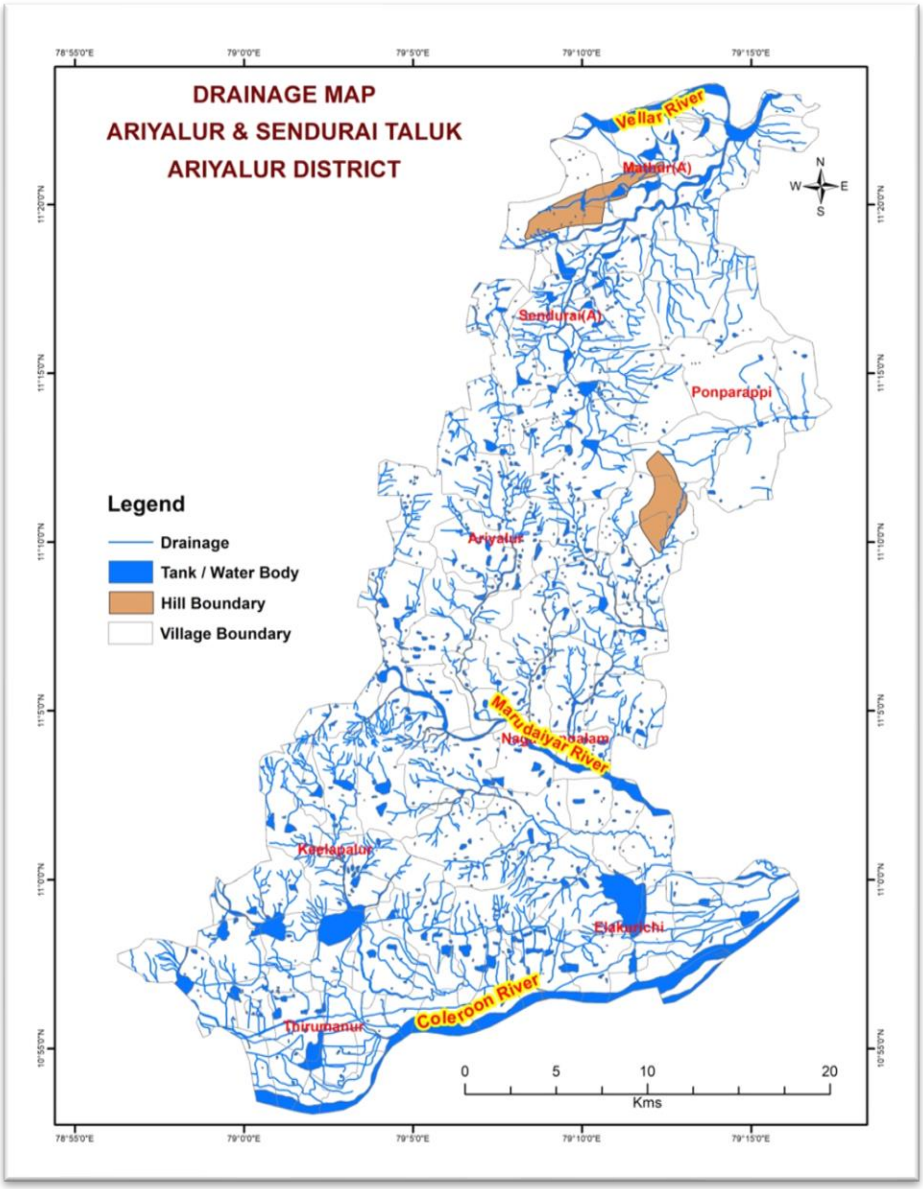


Fig 1.7. Drainage map of the study area

1.12 Irrigation:

In the present study area both surface and ground water are being used for the irrigation purposes. However, about 70% of the study area is being irrigated soley from groundwater source. The principal crops are Cashew, Paddy, Groundnut and Maize and in certian places sugarcane is cultivated. The cropping pattern in the study area is mainly depends on availability of water by first turn (August -December) generally paddy is cultivated, during the second turn (December-May) based on the availability of water, dry crops such as groundnut, cotton and millets etc., are grown.

1.13 Geology:

The Cretaceous formations, consisting of marine sediments deposited during the marine transgressions commenced during the upper part of lower Cretaceous age. These are rich in fossils and form a type area for shallow marine sediments of the Cretaceous age, depicting in particular the evolution of Brachiopods, Lamellibranches, Gastropods and Cephalopods. These formations are well exposed near Uttattur, Kunnam and Ariyalur villages and have been divided into four stages Viz., Niniyur, Ariyalur, Trichinopoly and Uttattur. These formations, in general, consist of shell limestones, sandstones and clays containing several fossiliferous horizons (**Fig 1.8**).

The tertiary sedimentary rocks occurring in the area are referred to as Cuddalore formation. They consist of pink to red mottled sandstone. Ferruginous sand stone, hard compact shale/claystone and light greenish clay with bands and lenses of whitish limestone and occur in the eastern parts of the area. The rocks are exposed along the nala section and high ground.

The river alluvium is confined to the bank of the Coleroon, Vellar and Marudhaiyar rivers. The alluvium is pale reddish or brown to black in colour. Sandy clay that increasingly becomes sandy with increase in depth. The extent of Vellar alluvium in the northern parts of the area is very much limited, due to steeper slopes of the ground towards Vellar river, whereas in the south the extent of the Coleroon alluvium is well developed due to gentle slopes.

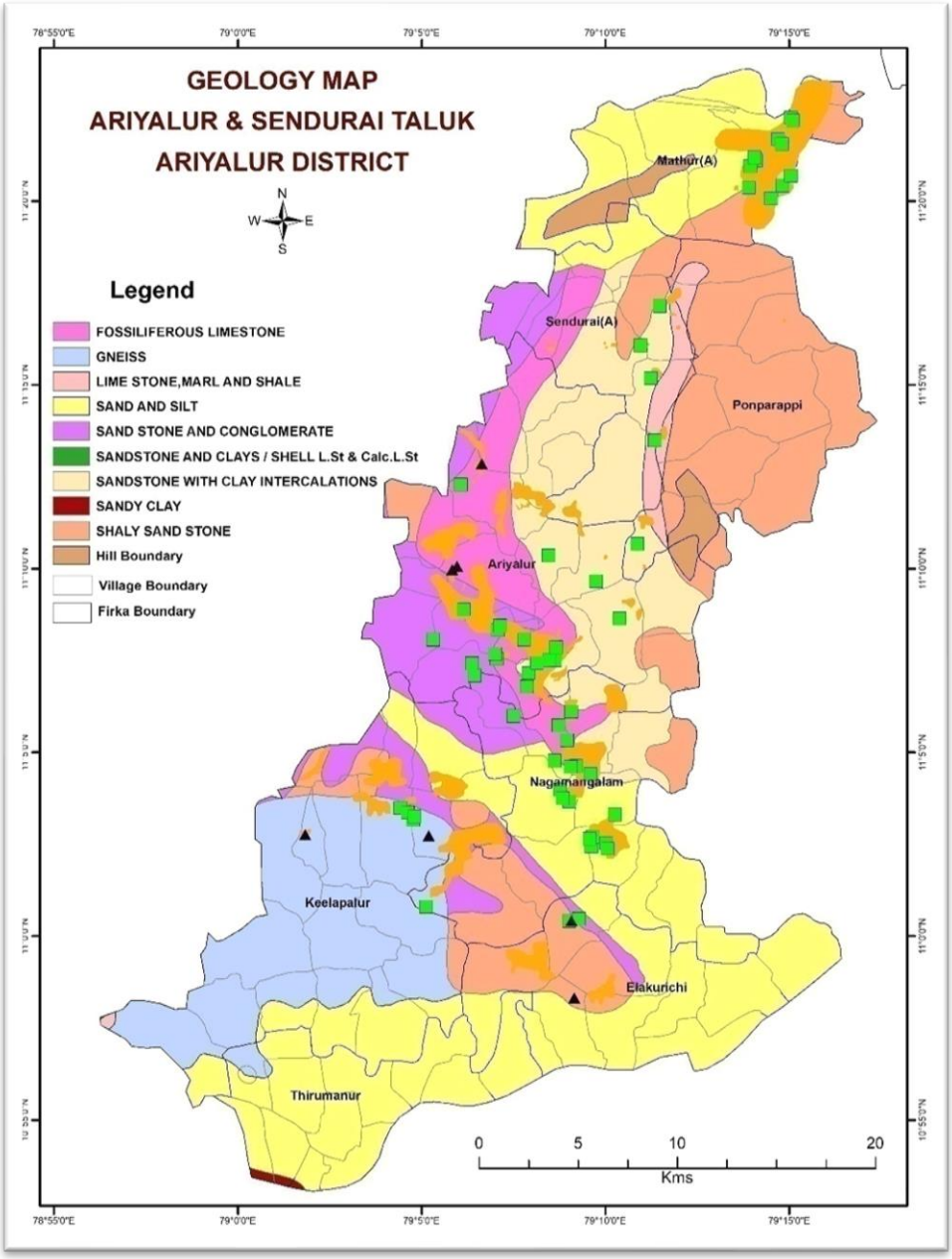


Fig 1.8. Geology map of the study area

1.14 Hydrogeology:

The thickness of weathered zone in the district is in the range of 2 to 15 m. The porous formations in the study area include shales, sandstones and clay of Jurassic age (Upper Gondwana), marine sediment of Cretaceous age, sandstones of Tertiary age and Recent alluvial formations. As the Gondwana formations are well compacted and poorly jointed, the movement of groundwater in these formations is highlyrestricted. Groundwater occurs under phreatic to semi confined conditions in the inter-granular pore spaces in sands andsandstones and the bedding planes and thin fractures in shales. In the area underlain by Cretaceous sediments, ground water development is rather poor due to the rugged nature of the terrain and the poor quality of the formation water.

Quaternary formations comprising mainly sand, clay and gravels are confined to semi confined in the major drainage courses in the district. The maximum thickness of alluvium is –upto 25 m whereas the average thickness is about 15 m. Groundwater in these formations is being developed by means of dug wells. The yield of large diameter wells in the study area, tapping the weathered mantle of semi consolidated rocks or the unconsolidated formations ranges from 180 to 900 lpm withdrawdown ranging from 2 to 10 m.

2.0 Groundwater Abstraction Structures (Usage-Wise) and it's Draft:

Dugwells and Borewells are being used for groundwater Extraction in the study area and the block wise details are given below **(Table 2.1.)**:

Table 2.1. Block wise details of the exsisting wells in the study area

Block	Population	No. of Tube wells used for drinking water supply	Depth of tube wells (mbgl)	Depth of Zones Tapped (mts)	Yield ranges (lps)	No. of Gram panchayats supply is maintained	Quantity of water supplied (lpd)	No. of Mini pumps	No. of handpumps constructed	Remarks
Sendurai	110421	268	45 - 150	25 - 90	2 - 17	30	7289000	320	202	Urological issues have been reported in certain areas
Ariyalur	118961	250	80 - 200	50 - 120	1 - 20	37	7076000	317	119	
Thirumanur	145433	212	20 - 90	12 - 60	10 - 18	36	145433	315	302	

2.1 Aquifer Parameters:

The thickness of phreatic aquifer in the study area varies between 15 m and 65m below ground level. The details of aquifer parameters in sedimentary formations are given below (**Table 2.2.)**:

Table 2.2. Aquifer Parameters in sedimentary formations

Formation	Sp. Capacity (lpm/d)	Specific Yield (%)	T (m^2/d)	K (m/day)	Yield of wells (lps)
Alluvium	2.058	7.2	98	19.7	2.5
Tertiary	78 – 173	1.4 – 3.5	46 -134	16 -33	2.3 – 3.14
Cretaceous	33-782	0.3-2.56	33-782	10 - 66	1.1 – 3.5

2.2 Drilling:

Most part of the study area is underlain by sedimentary formation hence; rotary rigs were deployed for drilling. Under NAQUIM 2.0, 4 nos. of Exploratory wells have been constructed in the study area with depth ranging from 64 mbgl to 301.5 m bgl. The details of Exploratory wells constructed by the CGWB in the study including wells constructed under NAQUIM 2.0 are given in **Table 2.3**.

Table 2.3. Details of Exploratory wells in the Study Area

Sl. No	Village Name	Block Name	Latitude	Longitude	Depth Drilled m bgl	Depth of Construction in mbgl	Zones Tapped m bgl	Major Geology	Discharge in LPS
1	Marudur	Sendurai	11.2667	79.2750	154.53	120.27	56.63-65.01, 67.75-75.28, 93.87-104.42, 110.58-117.19	SandClay, Cuddalore Sandstone with Calcareous nature at bottom	38
2	Ariyalur	Ariyalur	11.1333	79.0750	450	289	154-160, 199-205, 240-246, 252-258, 282-288	Alternate layers of sand, Sandstone, Clay	3.34

3	Venkata narayana puram	Ariyalur	11.0072	79.1125	728.50	363	99-106, 152-168, 196-227, 237-250, 287-292, 298-301, 315-318, 348-360	Cuddalore, Sandstone with clay intercalations	6.89
4	Sendurai	Sendurai	11.2497	79.1778	150	143	134-140	Clay, Sand & limestone	2.11
5	Maruvathur	Sendurai	11.259	79.217	79	79	32-38, 60-66	Sandstone, Clay and Limestone	3.14
6	Tular	Sendurai	11.310	79.231	64	64	56-62	Sandstone and Limestone	2.1
7	Orathur	Ariyalur	11.105	79.190	226.5	225	40-46, 90-93, 200-206, 209-212, 217-220	Sandstone, Sticky clay and Limestone	3.14
8	Sennivanam	Ariyalur	11.2085	79.162	301.50	300	206-212, 230-236, 240-246, 261-267	Sandstone, Sticky clay and Limestone	0.07

2.3 Geophysics:

In order to delineate the aquifer geometry of the study area, under NAQUIM 2.0, geophysical survey has been carried out in Sendurai and Ariyalur blocks of Ariyalur district A total of 51 Vertical Electrical Sounding (VES)were carried out in the study area by using Schlumberger array (VES) with the maximum spread length of half current electrode separation (AB/2) of 300m and 127 Transient Electromagnetic Method (TEM) were conducted using 40X40 coincident loop of Transmitter and receiver method.

The interpreted results of the VES data indicated 5 to 6 geoelectric model and in many cases the bottom most layer couldn't be estimated due to the extending nature of the curve with depth.

Whereas in case of TEM data, the interpreted results indicated 4 to 5 geoelectric model and limited to the depth of 50m.

The major findings during the study revealed that in the South Western part of the study area are underlined by crystalline hard rock formation whereas North, East, South and Western parts are covered by alluvial formation. Limestone occurs in North and Central part of the study area up to a maximum depth of 65mwhere mining activity is active.

2.4 Methodology & Interpretation:

The geophysical survey in the study area was conducted by employing collinear symmetrical four electrode Schlumberger configuration method with a maximum spread length of half current electrode separation (AB/2) of 300m. The data was collected by deploying the resistivity meter of SSR MP-ATS of IGIS make with a maximum stacking of 4. The raw data obtained was plotted on double logarithmic graph sheet of modulus 62.5mm, simultaneously in the field while carrying outthe survey so as to avoid the erratic nature of the data. Further the data collected was interpreted by using the iterative technique of IPI2 Win software till the best fit of the field curve.

The interpreted results indicated 5 to 6 geoelectric layers with curve types of AA, HA, HKH and KH. The Map showing the sites covered by geophysical survey in Ariyalur district is given as **VES Location Map (Fig 2.1).** Three cross sections were prepared and marked on the location map. Some of the model curves are incorporated with interpreted layer results. The interpreted results of VES data is furnished in the form of **Table 2.4**.

A total of 127 TEM soundings were carried out in the study area by covering 25 sites. The obtained TEM data was interpreted by using the Software **TEM PLOT** for pseudo sections and **IX1D** for iterative interpretation. The TEM soundings were carried out with an interval of 5m. The interpreted result of the TEM data is furnished in the form of **Table 2.7**. Some of the pseudo sections with interpreted results are incorporated in the report.

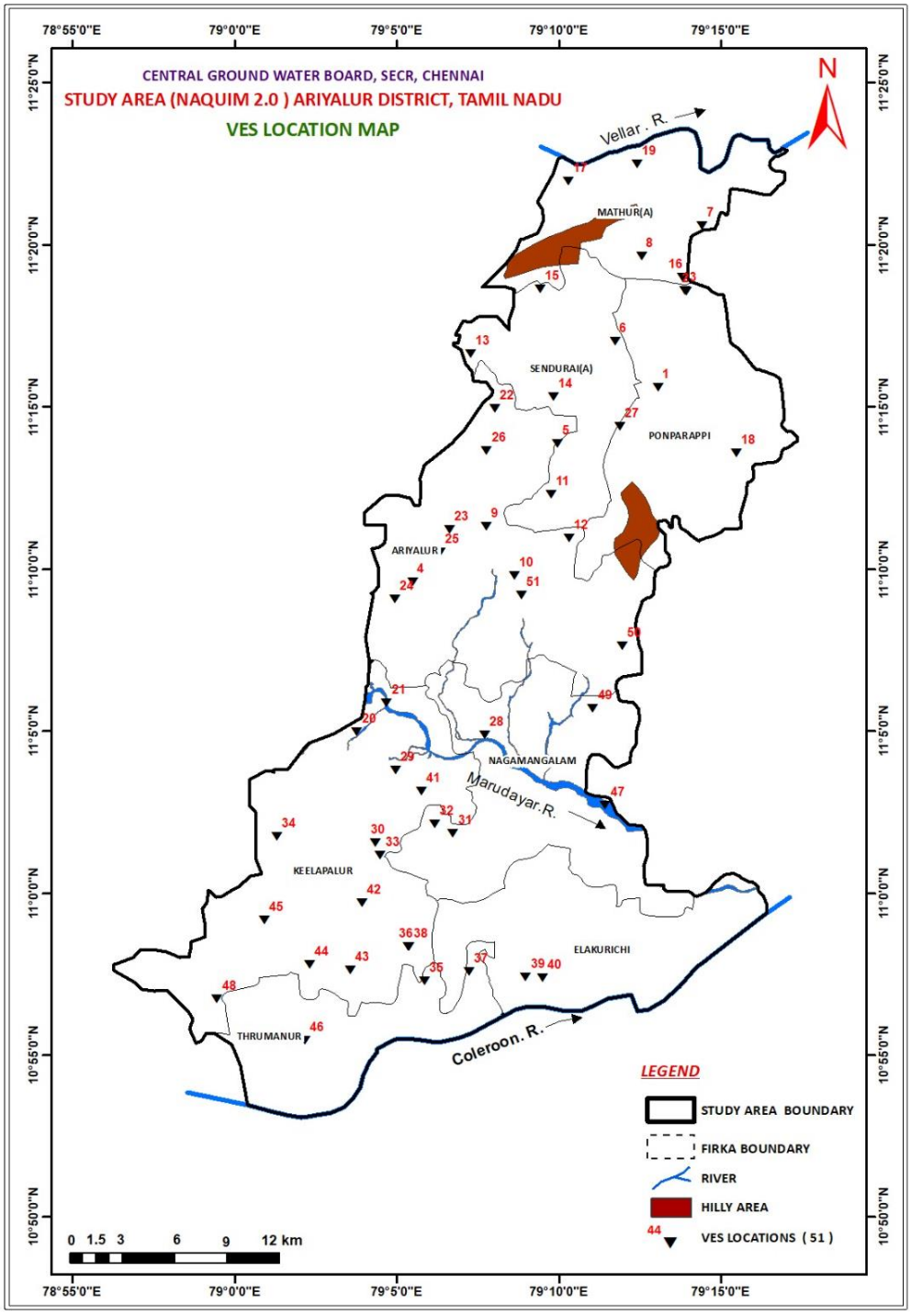


Fig 2.1. VES location map

2.5 Geophysical Observations:

As per the AAP 2023-'24, the geophysical survey has been carried out in Ariyalur district to delineate the aquifer disposition by carrying out Vertical Electrical Sounding **(VES)**& Transient Electro Magnetic **(TEM)** methods. A total of 51 VES and 127 TEM were carried out in the study area of Ariyalur and Sendurai blocks covering Mathur, Sendurai, Ponparapi, Ariyalur, Keelpalur, Nagamangalam, Tirumanur and Elakurichifirkas of Ariyalur district.

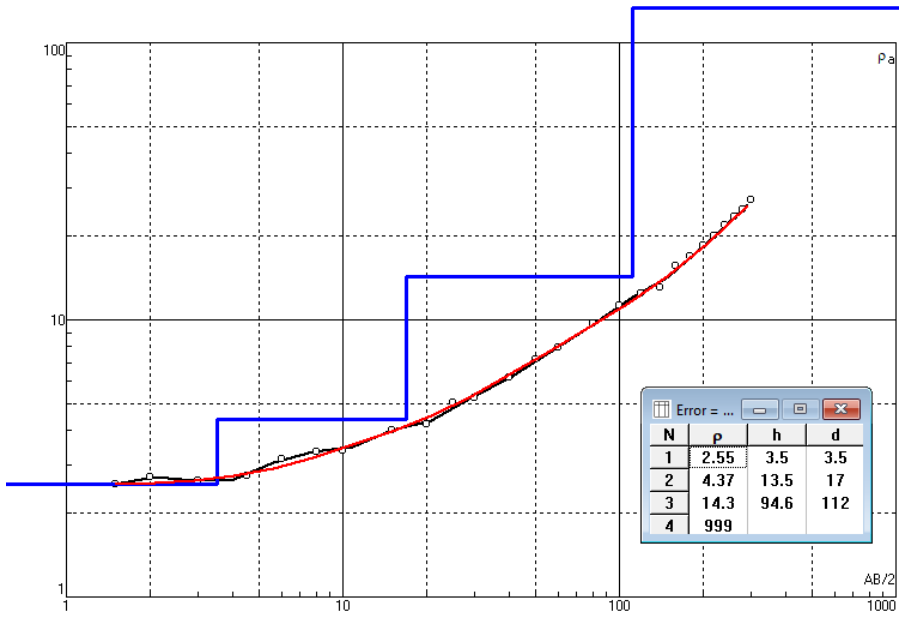
The interpreted results of VES data indicating 5 to 6 geoelectric layered model in the study area are given in **Table 2.4.** and the model curves obtained are given in **Fig 2.2.** The first layer is showing a resistivity in the range of 1.1 to 320 Ohm.m. except at 1 site which is more than 1000 Ohm.m. with a thickness in the range of 0.6 to 3.5m. can be considered as top soil. This is followed by a resistivity in the range of 1.3 to 141 Ohm.m. except at one site which is 756 Ohm.m. and extended upto a maximum depth of 30m. which is considered as Sandy clay. This is followed by the third layer with a resistivity in the range of 2.93 to 90.7 Ohm.m. extended up to a depth of 80m. which can be considered as Limestone. This is followed by a resistivity in the range of 3.5 to 15.4 Ohm.m. extended up to a maximum depth of 300m. can be considered as Clayey sand. The bottom most layer is having a resistivity in the range of 10.2 to 63.1 Ohm.m. extended up to a maximum depth of 300m. can be considered as Sandstone.

Hard rock formation is observed in South Western part of the study area and interpreted results is showing 3 to 4 geoelectrical layers. The first layer is showing a resistivity in the range of 1.1 to 320 Ohm.m. with a maximum thickness of 0.8 to 3.5 which can be considered as Top soil. This is followed by a resistivity in the range of 3 to 44 Ohm.m. extended up to a maximum depth of 17m. which can be considered as weathered formation. This is followed by a layer with a resistivity in the range of 7.9 to 177 extended to a maximum depth of 140m. which can be considered as fractured formation in nature. The bottom most layer is considered as massive formation due to high resistivity.

Table 2.4. Interpreted results of VES data

INTERPRETED RESULTS OF VES DATA COLLECTED IN PARTS OF ARIYALUR DISTRICT																
S. No.	Village	VES	Interpreted Results											Lat	Long	RL in m.
			Resistivity (Ohm.m.)						Thickness (m.)							
			ρ_1	ρ_2	ρ_3	ρ_4	ρ_5	ρ_6	h_1	h_2	h_3	h_4	h_5			
1	Maruvathur	1	1060	137	90.7	26.8	128	-	1.1	4.2	9.2	117.5	Extd.	11.26	79.218	131
2	Thular															
3	Thular1		Uninterpretable													
4	Palayakudi	4	80	36.5	12.7	5.8	9	-	1.5	3.2	5.5	34.8	Extd.	11.16	79.092	122
5	Pottaveli	5	26.7	11	7.6	3.5	7	-	0.9	3.5	6.5	99.1	Extd.	11.232	79.166	101
6	Periyakurichi	6	47.5	17.8	902	15.4	-	-	1.8	9.4	164	-	Extd.	11.284	79.196	105
7	Athankurichi	7	288	141	29.7	9.5	63.1	-	1.6	1.5	13.4	85.5	Extd.	11.344	79.24	77
8	Irungulakurichi	8	7.1	4.1	11	4	7.7	-	0.9	2.9	7.8	88.4	Extd.	11.328	79.209	78
9	Kallamedu	9	24	7.2	4.5	15.5	-	-	2.8	5	51.1	Extd.	-	11.189	79.129	109
10	Kadugur	10	9.2	2.1	12.4	-	-	-	1.7	17	Extd.	-	-	11.163	79.144	103
11	Sennivanam	11	16	9.7	2.5	11.6	-	-	2.1	22	76.7	Extd.	-	11.205	79.163	125
12	Anandhavadi	12	6.3	10.2	3.1	14.5	-	-	1.3	6.6	127	Extd.	-	11.183	79.172	115
13	Namangalam	13	25.4	5.3	8	5.95	-	-	0.9	2.1	3.8	Extd.	-	11.275	79.113	92
14	Nakkambadi	14	5.45	11.2	27	8.55	-	-	2	2.6	40.4	Extd.	-	11.256	79.164	99
15	Kulumur	15	1.4	2.3	5.6	11.6	-	-	4	13	22.8	Extd.	-	11.311	79.157	315
16	Thular3	16	83.6	15	38.4	13.1	35	7.8	0.9	2	3.7	18.9	39.5	11.312	79.234	101
17	sannasinallur	17	4.5	2.75	7.8	5.6	15	-	1.1	1.7	19	29	Extd.	11.367	79.172	81
18	Veeraakkan	18	55	80	21.3	47.4	-	-	1	6.1	25.3	Extd.	-	11.227	79.258	99
19	Melvarappankurichi	19	2.8	1.6	7.2	11.7	29.2	-	0.8	1.3	7	131.9	Extd.	10.953	79.186	55
20	Papanchery	20	18	6.7	13	5.3	17	-	0.7	5.9	19.4	134	Extd.	11.095	79.068	80
21	Varanavaasi	21	4	8.9	14.5	8.7	-	-	1.7	1.1	12.4	Extd.	Extd.	11.098	79.078	83
22	Vellur	22	5.2	11.2	3.8	14.8	-	-	1.2	4.3	36.8	Extd.	-	11.25	79.134	107
23	Ottakovil	23	2.2	6.4	2.93	10.6	-	-	1	6.2	8.8	Extd.	-	11.187	79.111	119
24	Kollapuram	24	120	34.4	4.5	8.5	-	-	1	5.4	24.8	Extd.	-	11.151	79.082	106
25	Thamaraikulam	25	11	1.7	6.8	15.5	5.4	-	0.7	1.1	7	45.2	Extd.	11.176	79.106	112
26	Poyyaandanallur	26	4	2.5	7.7	1.5	4.6	10.2	0.9	2.1	3.8	14.1	43.6	11.228	79.13	116
27	Nallampaalayam	27	13.6	5	9	4.5	-	-	3	14	31.8	Extd.	-	11.24	79.198	121
28	Siruvaalur	28	320	756	27.6	187	-	-	1	8.7	79.3	Extd.	-	11.081	79.129	69
29	Poyyur	29	57.6	14	7.1	999	-	-	0.8	6.8	55.6	-	-	11.063	79.083	81
30	Melavannam	30	1.1	12.2	99	500	-	-	1.6	10	38.4	-	-	11.026	79.072	90
31	Veppam	31	9.8	5.3	17.1	4.8	25	-	0.9	1.8	4.8	92.5	Extd.	11.031	79.112	81
32	Arangaal	32	2.55	4.4	14.3	999	-	-	3.5	14	95	-	-	11.035	79.103	74
33	Keelpalur	33	4.75	44	150	-	-	-	1.8	14	Extd.	-	-	11.02	79.075	94
34	Poondi	34	39.3	22	308	105	567	-	0.9	1.8	29.4	112.9	Extd.	11.029	79.022	89
35	Mudigondaan	35	3.5	1.3	3.7	27.6	-	-	0.8	2.2	47	Extd.	-	10.955	79.098	60
36	Kallur	36	2.7	10.3	1.8	50	-	-	3.3	43	81.6	Extd.	-	10.972	79.09	72
37	Vadagupaalayam	37	6.9	3.3	11.7	3.2	15	-	0.8	1.4	3.8	55.5	-	10.96	79.12	60
38	K.Viragaalur	38	1.3	4.5	1.75	25	-	-	1	4.8	54.2	Extd.	-	10.972	79.089	69
39	Sullankudi	39	4.8	19.9	4.5	8.1	49	-	1	4.2	12.8	206	-	10.957	79.15	59
40	Elaankurichi	40	4.85	15.4	7	17.8	-	-	1	12	98.3	Extd.	-	10.956	79.158	59
41	Karuppur	41	4.75	15	8.3	222	-	-	1	6	43.8	Extd.	-	11.052	79.096	79
42	Erakkudi	42	133	18.4	177	300	-	-	0.9	15	64.9	Extd.	-	10.995	79.065	78
43	Kizhakavuttaankurichi	43	3.95	27.3	999	-	-	-	1.3	30	-	-	-	10.961	79.059	70
44	Venganur	44	3.8	5.7	999	-	-	-	3.4	26	-	-	-	10.963	79.038	69
45	Aangiyanur	45	2.4	24.9	105	999	-	-	0.9	8.1	20.2	-	-	10.986	79.015	71
46	Illandaikkudam	46	3.9	9.9	58.1	999	-	-	1.2	9.8	64.8	-	-	10.924	79.036	69
47	Vilaagam	47	2.15	19.9	999	-	-	-	1.9	13	-	-	-	10.942	79.001	75
48	Sembaikkudi	48	5.4	3	7.9	999	-	-	0.8	2	21.2	-	-	10.946	78.991	109
49	Naagamangalam	49	19.1	6.7	19.6	7.6	16.2	-	0.6	2.4	2.3	124.7	-	11.095	79.184	86
50	Vilaangudi	50	28.7	11.4	25.4	11.1	4	17.1	0.9	0.8	13	22.2	106	11.127	79.199	84
51	Kovilankudikkadu	51	36.3	15.2	31.8	6	31.2	-	1	2	4	87.5	Extd.	11.154	79.148	100

a)


ρa
100
10
1
1
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100
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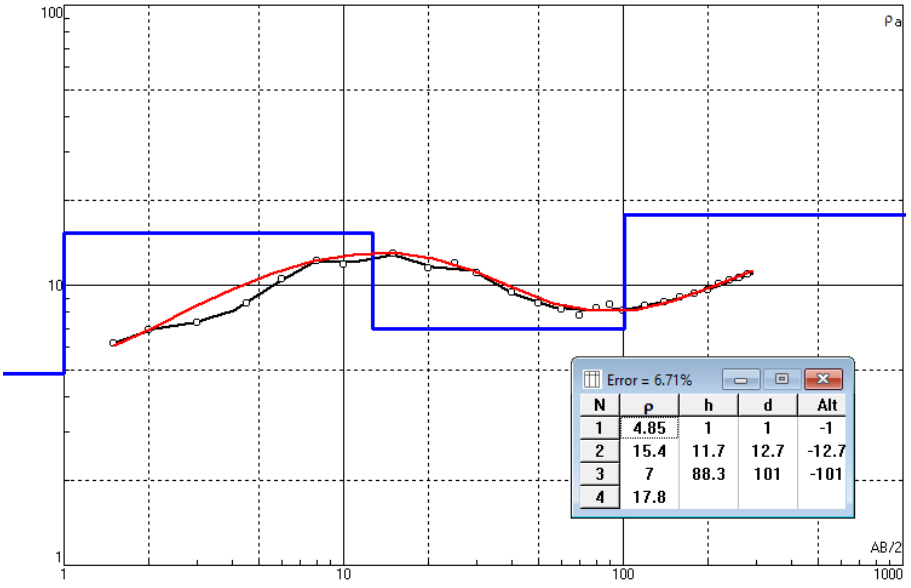
AB/2
Error = ...
N | ρ | h | d
1 | 2.55 | 3.5 | 3.5
2 | 4.37 | 13.5 | 17
3 | 14.3 | 94.6 | 112
4 | 999

b)


ρa
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Error = 6.71%
N | ρ | h | d | Alt
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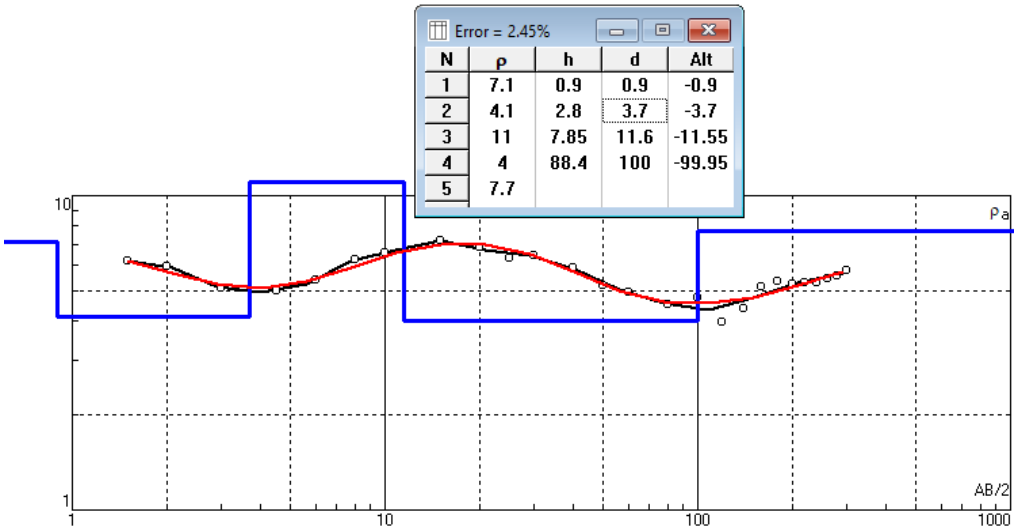
2 | 15.4 | 11.7 | 12.7 | -12.7
3 | 7 | 88.3 | 101 | -101
4 | 17.8

c)



d)

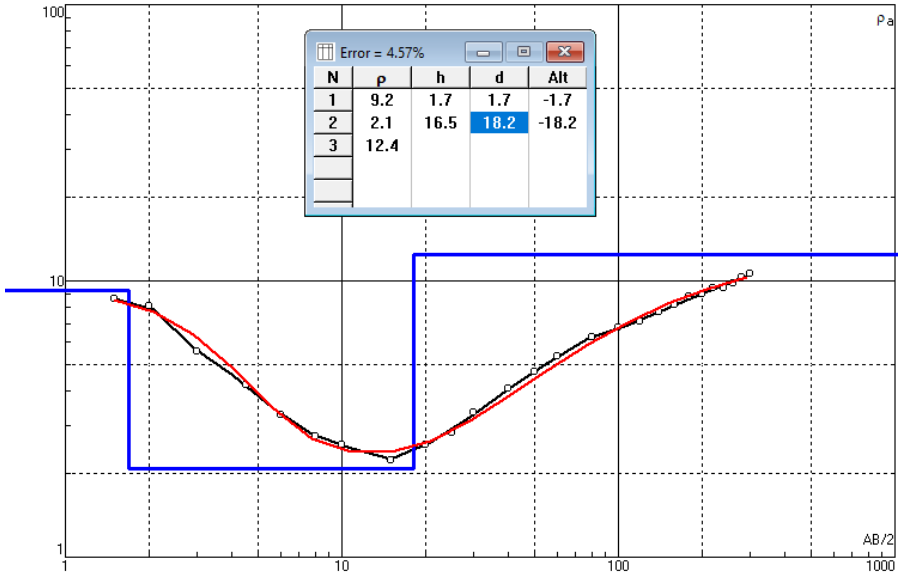


Fig 2.2. Model curves obtained in the study area, Ariyalur District

The depth wise information of each site is furnished in **Table 2.5** (soft rock formation) **& Table 2.6** (hard rock formation) for the preparation of cross sections of **2D & 3D**. Five thematic maps **(Fig 2.3, 2.4, 2.5, 2.6 & 2.7)** and three 2D cross sections (**Fig 2.8, 2.9 & 2.10)** are prepared for subsurface aquifer geometry of the study area.

Table 2.5. Geophysical observations in soft rock formations

S. No.	Village	RL in m.	Top soil thickness	Sandy Clay	Lime stone	Clayey Sand	Sand Stone
1	Maruvathur	131	1.1	20	60	50	170
2	Palayakudi	122	1.5	25	55	100	120
3	Pottaveli	101	0.9	25	50	225	0
4	Periyakurichi	105	1.8	25	50	60	165
5	Athankurichi	77	1.6	20	60	120	100
6	Irungulakurichi	78	0.9	20	60	40	180
7	Kallamedu	109	2.8	25	35	140	100
8	Kadugur	103	1.7	6	9	105	180
9	Sennivanam	125	2.1	20	60	100	120
10	Anandhavadi	115	1.3	10	50	100	140
11	Namangalam	92	0.9	15	35	30	220
12	Nakkambadi	99	2	15	10	75	200
13	Kulumur	315	4	25	0	0	271
14	Thular3	101	0.9	20	60	220	0
15	sannasinallur	81	1.1	20	40	0	240
16	Veeraakkan	99	1	10	30	260	0
17	Melvarappankurichi	55	0.8	30	30	180	60
18	Papanchery	80	0.7	30	50	100	180
19	Varanavaasi	83	1.7	0	50	230	0
20	Vellur	107	1.2	15	45	60	180
21	Ottakovil	119	1	20	40	260	0

22	Kollapuram	106	1	20	50	90	140
23	Thamaraikulam	112	0.7	30	50	120	100
24	Poyyaandanallur	116	0.9	10	50	100	140
25	Nallampaalayam	121	3	15	45	240	0
26	Poyyur	81	0.8	25	0	55	220
27	Veppam	81	0.9	10	0	70	220
28	Mudigondaan	60	0.8	5	0	55	240
29	Kallur	72	3.3	25	0	130	145
30	Vadagupaalayam	60	0.8	10	0	50	240
31	K.Viragaalur	69	1	25	0	75	200
32	Sullankudi	59	1	25	0	0	275
33	Elaankurichi	59	1	0	0	0	180
34	Kizhakavuttaankurichi	70	1.3	0	0	25	275
35	Venganur	69	3.4	0	0	20	280
36	Naagamangalam	86	0.6	20	50	230	0
37	Vilaangudi	84	0.9	0	50	75	175
38	Kovilankudikkadu	100	1	0	50	75	175

Table 2.6. Geophysical observations in hard rock formations

S.No.	Village	Lat	Long	RL in m.	Top soil in m.	Hard	Weathered formation thickness in m.	Fractured formation thickness in m.	Massive formation thickness in m.
1	Siruvaalur	11.08141	79.12857	69	1	9	80	100	110
2	Melavannam	11.02608	79.07245	90	1.5	0	18.5	140	140
3	Arangaal	11.03543	79.102823	74	3.5	0	26.5	110	160
4	Keelpalur	11.01955	79.07492	94	2	0	18	120	160
5	Poondi	11.02911	79.0216	89	1	0	49	90	160
6	Karuppur	11.05236	79.0961	79	1	14	35	150	100
7	Erakkudi	10.994918	79.065446	78	1	0	14	245	40
8	Aangiyanur	10.986193	79.01523	71	1	0	14	225	60
9	Illandaikkudam	10.9242	79.03608	69	1.5	0	13.5	245	40
10	Vilaagam	10.941834	79.001162	75	2	0	18	80	200
11	Sembaikkudi	10.94551	78.99085	109	1	0	19	80	200

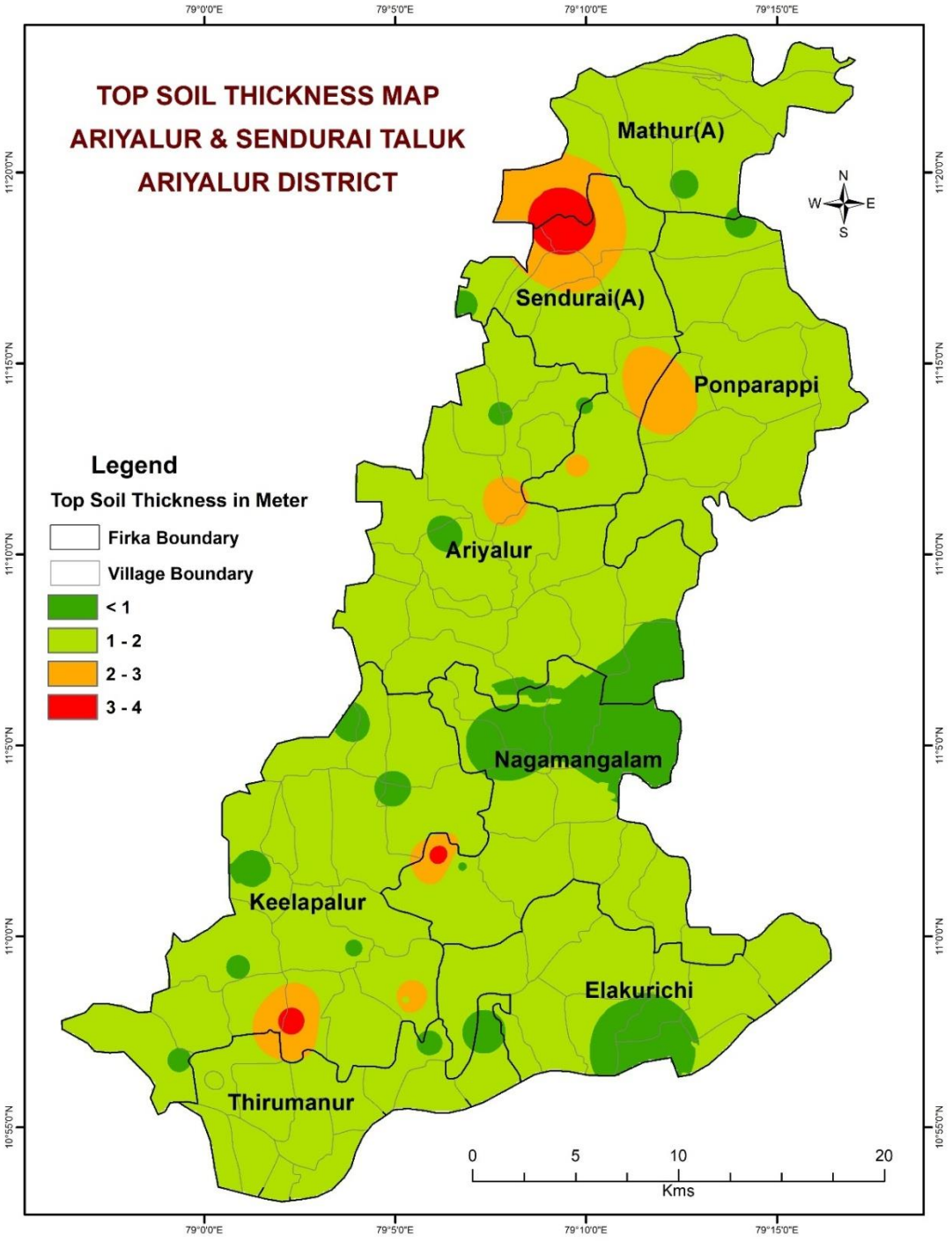


Fig 2.3. Top Soil thickness map of the study area

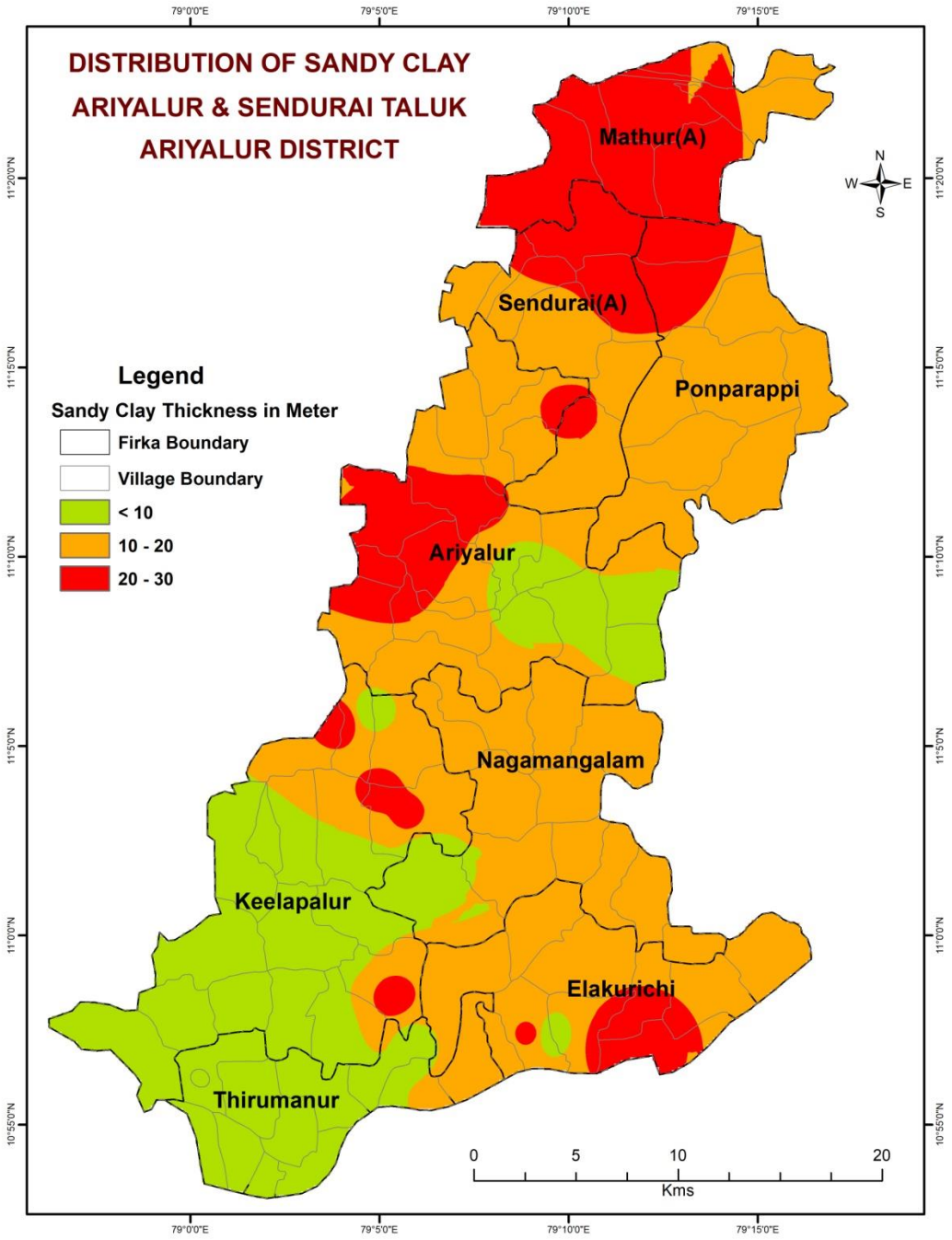


Fig 2.4. Sandy Clay thickness map of the study area

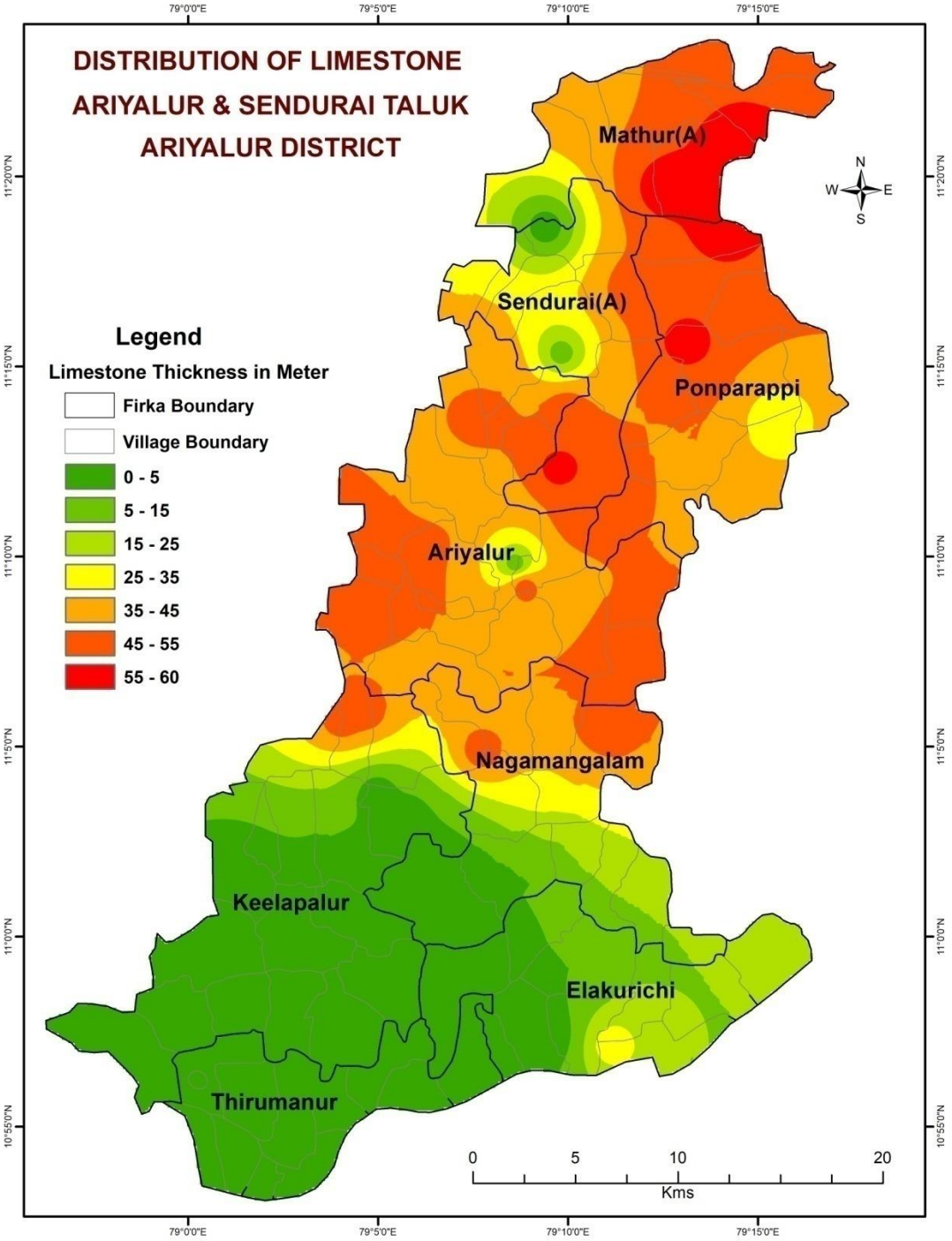


Fig 2.5. Limestone thickness map of the study area

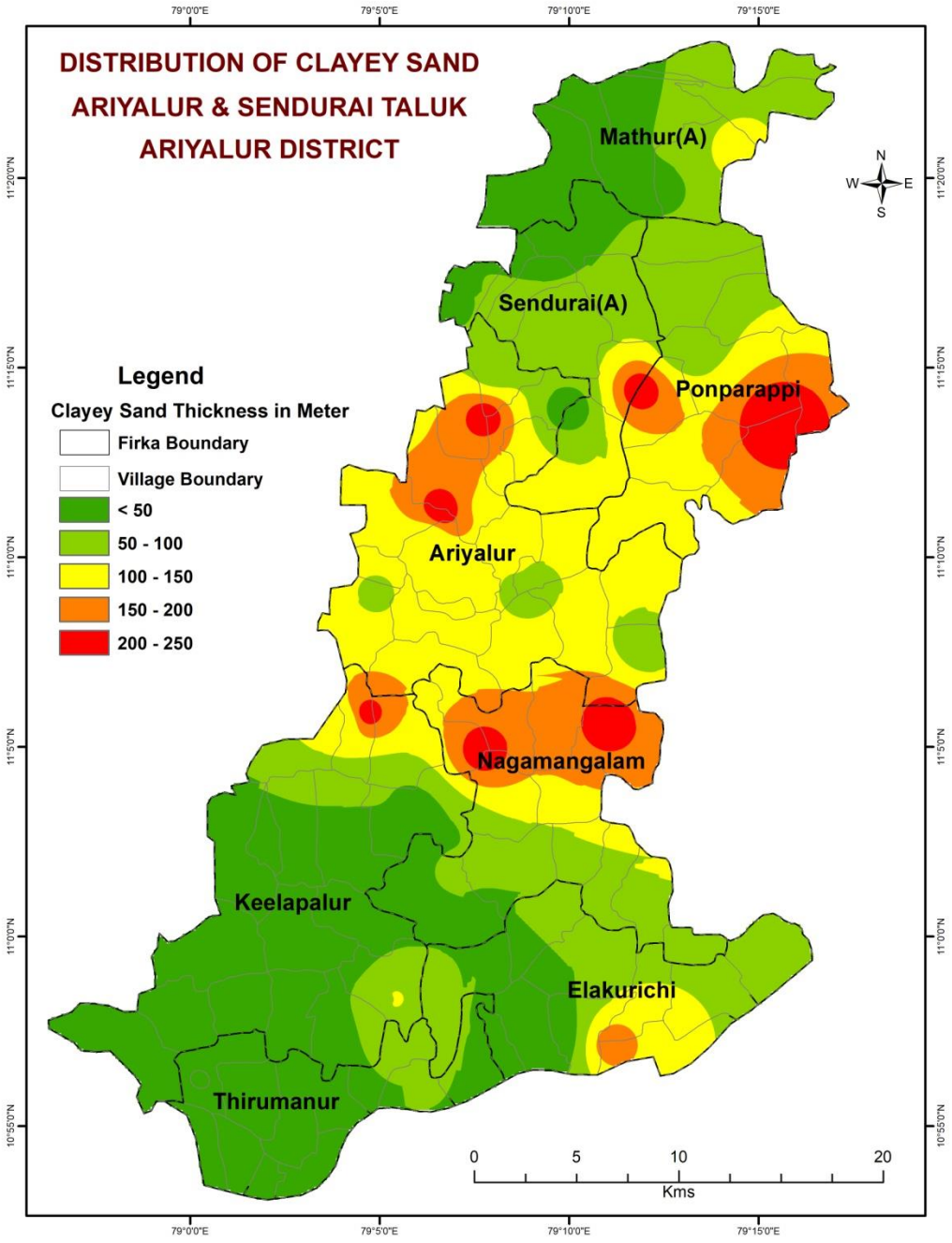


Fig 2.6. Clayey Sand thickness map of the study area

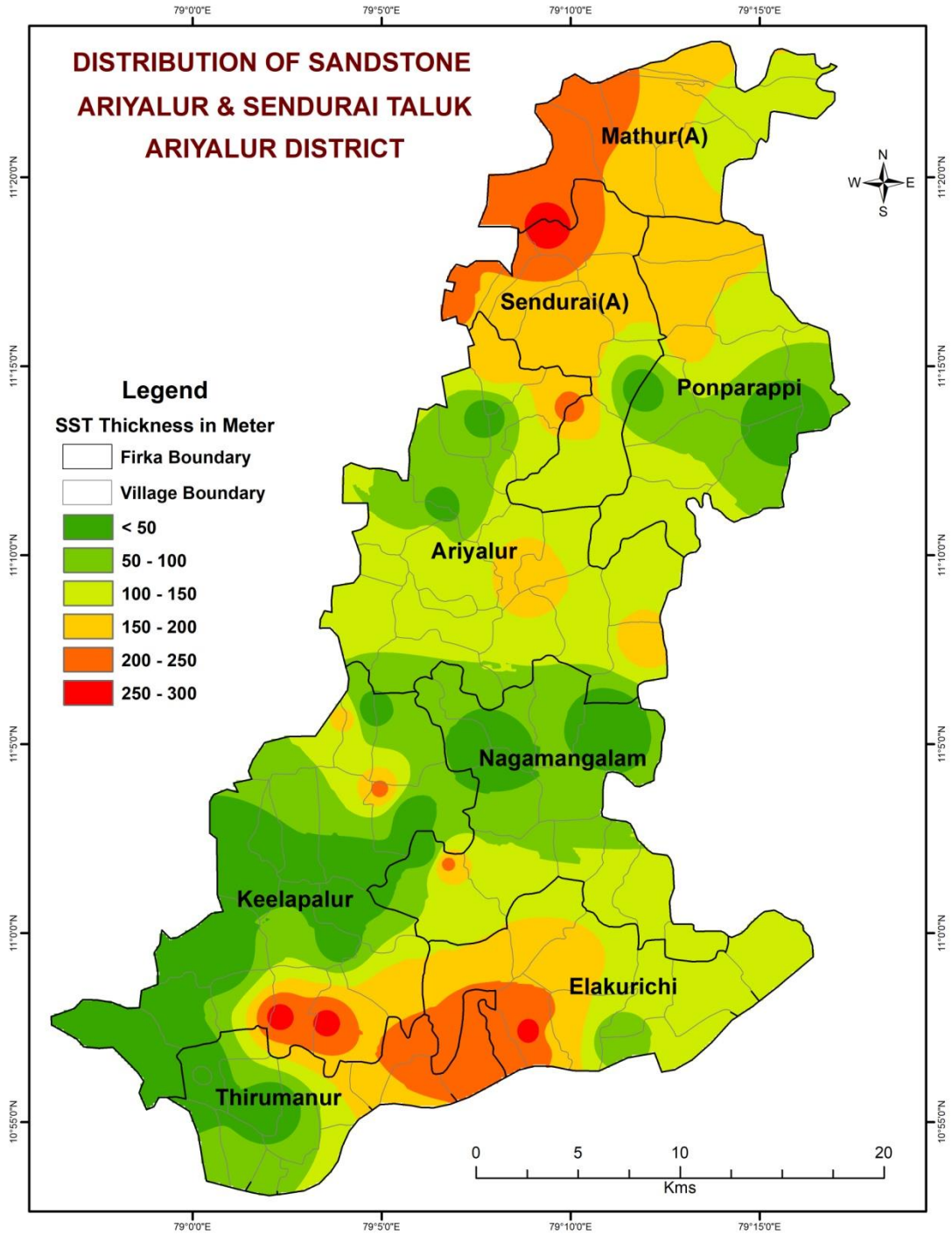


Fig 2.7. Sandstone thickness map of the study area

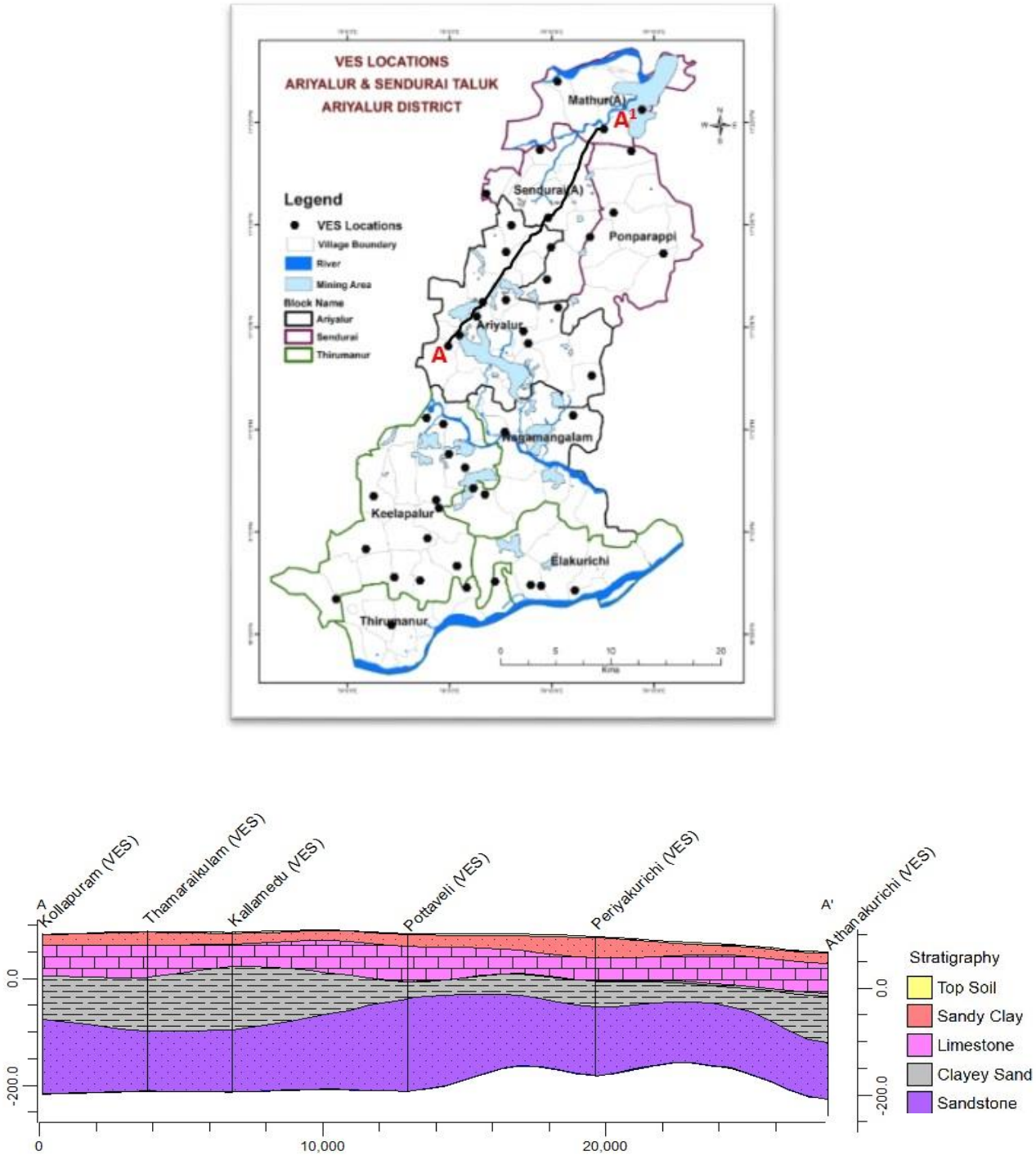
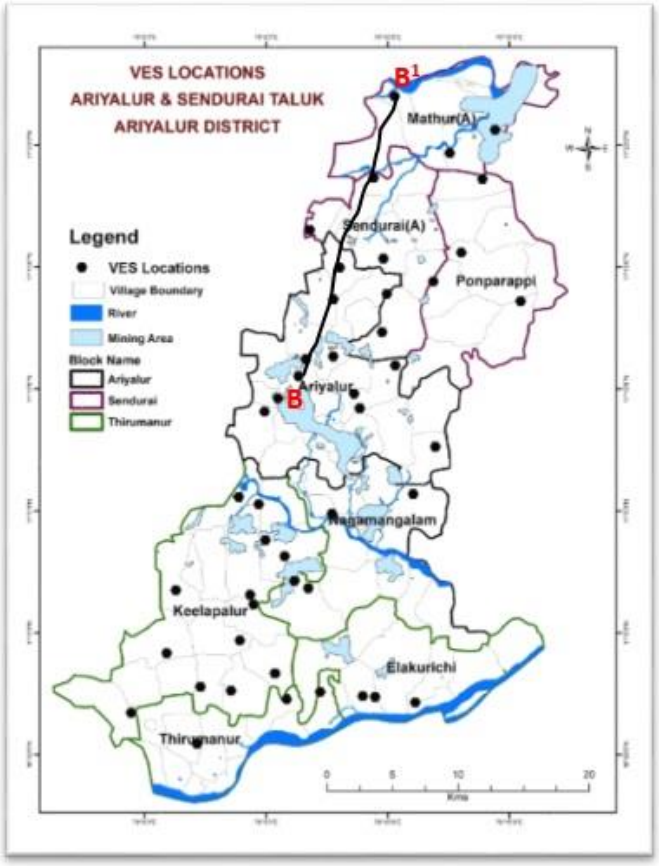


Fig 2.8. 2D Cross section prepared from Kollapuram to Athanakurichi



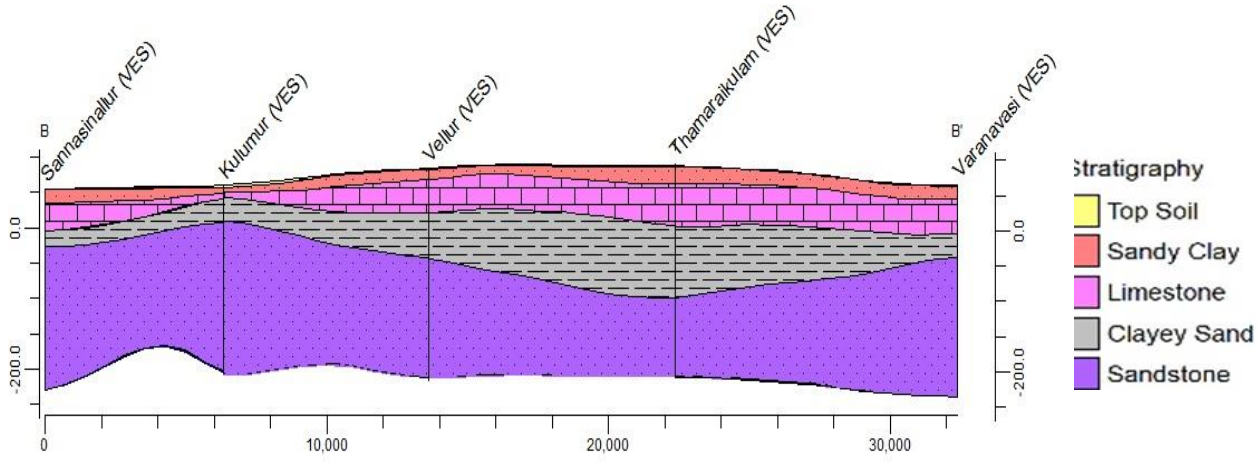


Fig 2.9. 2D cross section prepared from Sannasinallur to Vaaranavasi

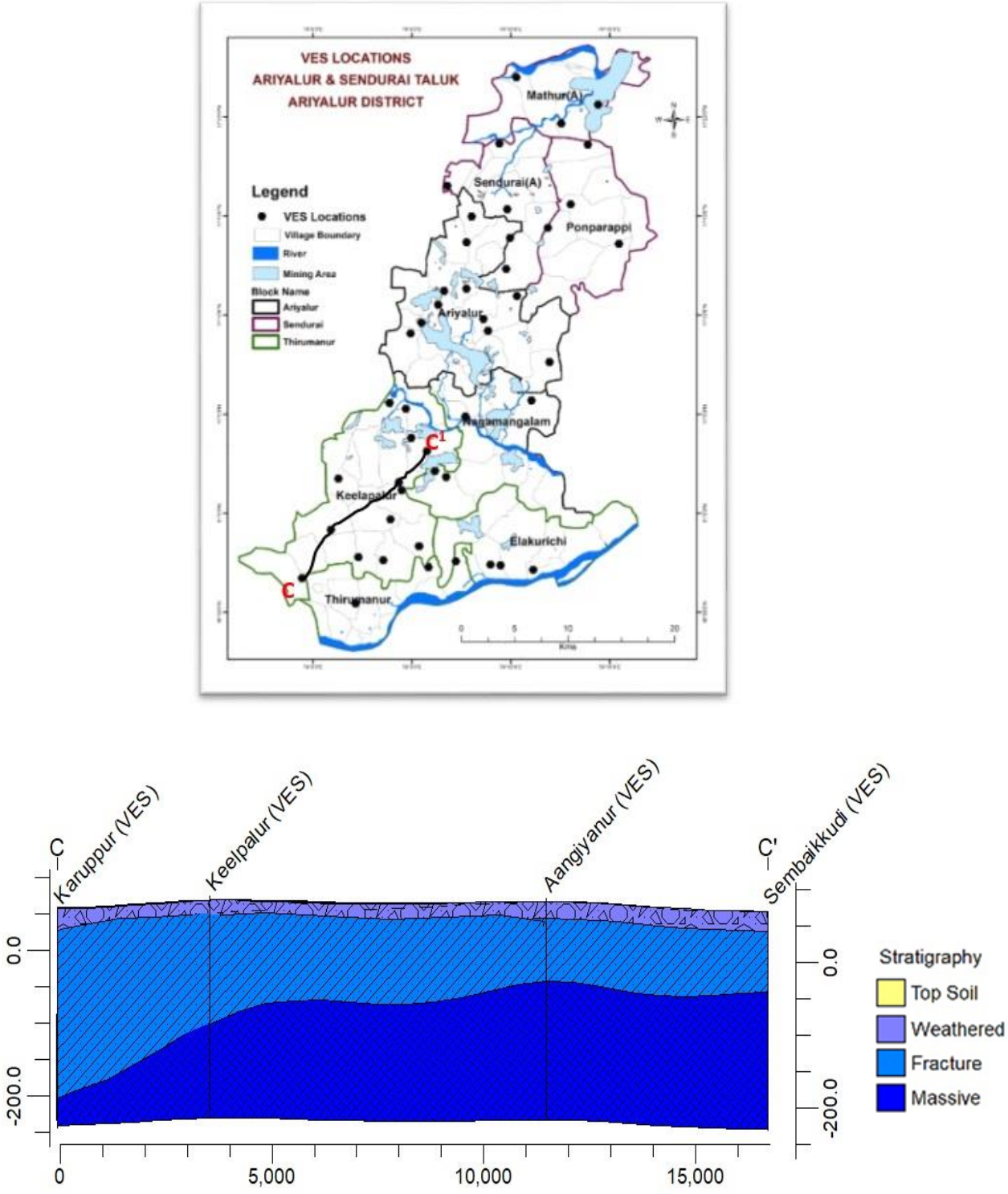


Fig 2.10. 2D cross section prepared from Karuppur to Sembaikkudi

The TEM data was interpreted by using the IX1D software and the obtained results are furnished in the form of **Table 2.7**. While comparing the TEM & VES results of the study area, it is observed that both results are not matching with each other and correlation of the same is not possible as formation wise bifurcation could not be done in TEM at par with VES.

Table 2.7. Interpreted data of TEM in the study area

INTERPRETED RESULTS OF TEM DATA COLLECTED IN PARTS OF ARIYALUR DISTRICT													
S. No.	**Village**	**Interpreted Results**									**Lat**	**Long**	**RL in m.**
		Resistivity (Ohm.m.)					**Thickness (m.)**						
		ρ_1	ρ_2	ρ_3	ρ_4	ρ_5	h_1	h_2	h_3	h_4			
1	Ammakulam	14	4.6	1.9	6.7	4	1	1.5	7.7	21.8	11.113	79.08	83
2	Anandavadi	74.3	125.5	3.4	3.9	2.5	1	2.1	6.9	21.1	11.1855	79.18	120
3	Ariyalur	54.1	11.5	2.3	3.6	7	1	2.1	6.8	21.7	11.1388	79.0741	105
4	Jayaramapuram	21	51.2	8.3	5.2	4.1	1	2.1	7	21.4	11.1783	79.0763	111
5	Kavanur	8.3	10.6	2.1	3.7	-	1	3.6	16.5	-	11.16	79.1947	100
6	Kadugur	18.4	56.4	3.1	5.6	7.3	1	2.2	7	21	11.175	79.0763	113
7	Kaikatti	8.55	14.2	1	3.8	6.8	1	2.1	7	22	11.1127	79.0221	89
8	Kallankurichi	78.9	240	7.9	9.7	4.2	1	2	7.4	30.2	11.1477	79.1352	96
9	kattupirangiyam	2.9	13.5	3.6	11.3	-	1	1.8	29	-	11.1133	79.1408	82
10	Kollapuram	75	133	37	2.1	4.8	1.3	5	3.5	4.1	11.1525	79.085	108
11	Manakkal	72	106	7.5	13.2	3.7	0.9	1.6	20	21	11.1852	79.0786	114
12	Ottakovil	30.3	51.2	3.5	5	10	1	2.1	6.7	22.2	11.1863	79.1316	110
13	Periyathirukkonam	8.6	4	5	9.9	-	1	3.7	16.7	-	11.0663	79.168	70
14	Poyyandanallur	8.9	11.9	2.5	5.5	-	1	3.7	16.7	-	11.0505	79.2252	70
15	Vaaranavaasi	26.7	9.4	5.7	110	-	1.4	2.5	56.3	-	11.8427	79.8938	69
16	Velur	72.9	109.5	1.4	4.7	10.6	1.2	5	4.2	26.1	11.1388	79.0741	105
17	Venkatakrishnapuram	6.7	8.3	6.3	7.2	-	1	3.7	16.6	-	11.1216	79.1011	86
18	Kallakudi	23.5	53.1	8.5	5.6	18.3	0.9	3.1	8.7	77.4	10.9769	78.9516	101
19	Rayapuram	30.2	6.1	1.2	3.3	2.9	1.5	2	3.8	5.9	11.2188	79.1558	118
20	Sundakkudi	34.5	109.7	2.7	5.9	12.4	1.4	5.7	3.2	76.3	11.0327	79.1911	60
21	Thamaraikulam	19.7	17.4	5.9	7.7	4.4	1	2.1	6.8	22	11.1752	79.105	114

The interpreted results of the TEM data is giving a shallow depth information after iterative interpretation of IX1D and TEM Interpretation of Kaikatti, Kollapuram and Ottakovil is given in **Fig. 2.11.** While comparing with the results of the VES data, it is observed that both resistivity and thickness of each formation is not matching at the sites wherever both the surveys have been conducted.

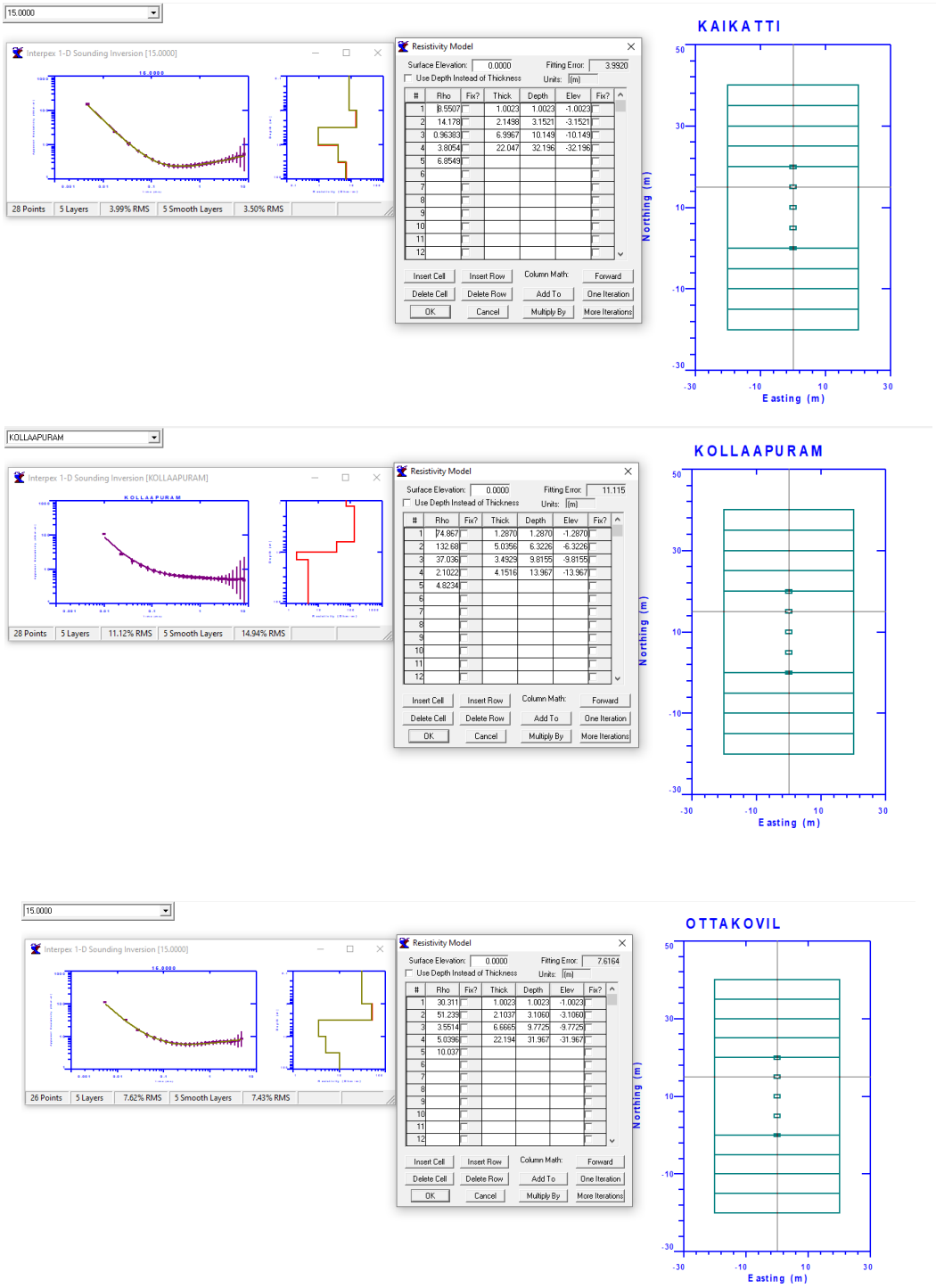


Fig 2.11. TEM Interpretation of Kaikatti, Kollapuram and Ottakovil

2.6 Aquifer Disposition:

The lithological data collected from CGWB (4 Wells), State Govt. (5 wells) and VES data, etc.were compiled,studied, and integrated using the Rockworks software and prepared the 3-Dimensional Stratigraphic Models, 2-Dimensional Cross sections (**Fig 2.12 & 2.13**) and Fence diagrams. The sub-surface lithology of the study area as inferred from the 3-D Model, 2-D Section and Fence diagram is presented.

Aquifer Unit I: This aquifer unit comprises of Sandstones, Shale, Limestones and Laterite of different age group. The top of this aquifer unit occurs from ground level to 2 m bgl. The thickness of this aquifer unit ranges from 10 to 40 m bgl.

Aquifer Unit II: This aquifer unit comprises of Sandstones with intercalations of shale and clay deposited in the different age period. Basically, these are good reservoir rocks. This aquifer unit II occurs below the unconfined aquifer and extends beyond 728.50 m (drilled at Venkatanarayanapuram, Ariyalur district). The top of this aquifer unit extends upto 60 mbgl. Salient features of this aquifer units are presented in **Table 2.8.**

Table 2.8. Aquifer Properties

Type of Aquifer	Formation	Thickness	Range of Yield(Liters/h)	Sustainability (hrs)	GW Quality (µs/cm)	Suitability
Aquifer – 1 (Unconfined)	Laterite /L.st/ S.st	12-45	9000 – 50,000	5 to 8 hours	E.C. Range 126 – 5900 (in general <3000 uS/cm)	Potable
Aquifer – 2 (Confined)	Sandstone with shale intercalations	45 - 300	20,000 to 1,60,000	8 to 12 hours	E.C. Range 188 – 7140 (in general <3000 uS/cm)	Potable

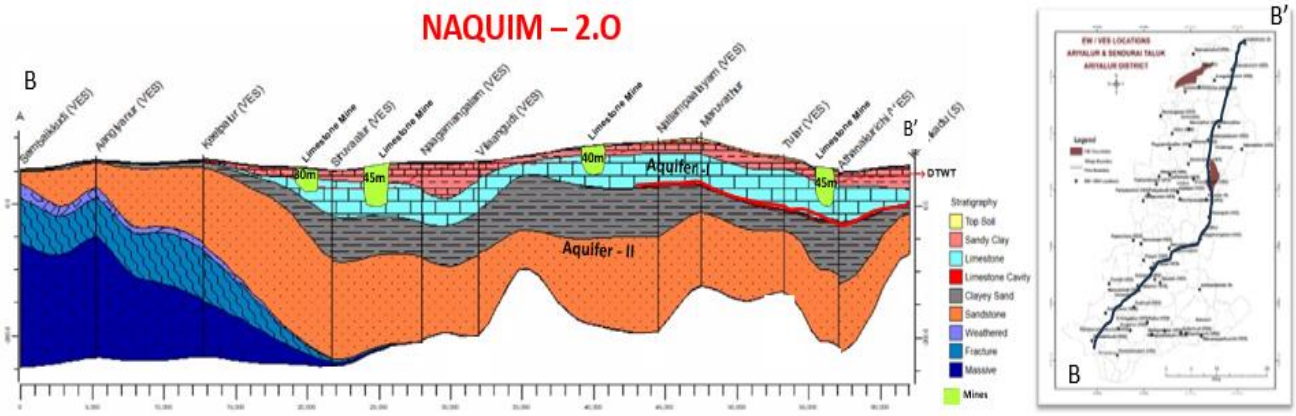


Fig 2.12. 2D representation of aquifer units along northeast - southwest direction of study area

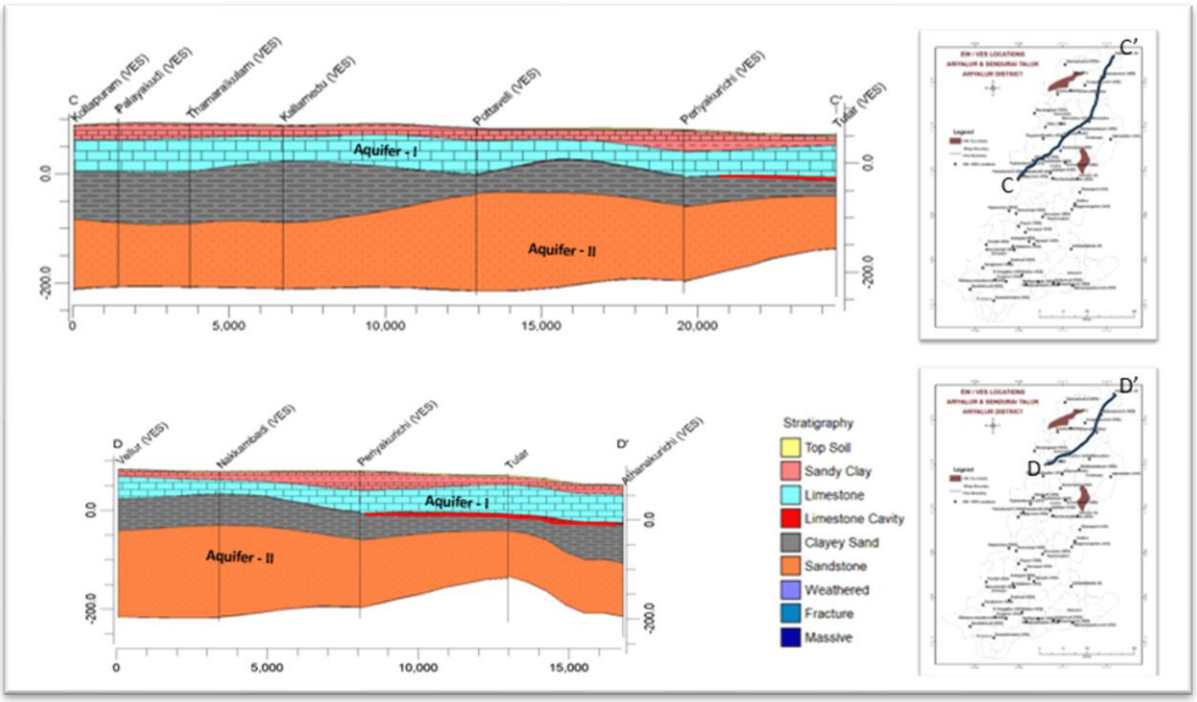


Fig 2.13. Aquifer disposition along cross section of the study area

2.7 3D Lithological Model:

3-Dimensional lithological model was prepared for the present study area after detailed analysis of the pre-existing and available bore-log data collected from the Basic Data Reports, VES of CGWB and state government data (**Fig 2.14.**). A comprehensive analysis was made as per lithology and stratigraphy of the area.

The 3-D Model results showed that the region is dominantly occupied by Laterite, Alluvium and Sandstone respectively. The sub-surface lithology has been broadly classified into Top soil/ Limestone / Shale / Sandstone which has been considered as shallow aquifer (up to a depth of 10mts). Lateritic soil was encountered in few bore wells mainly occupying the northern region Study area. This overlies sandy clay with Limestone as a shallow aquifer and fallowed by Sandstone as a deeper aquifer.

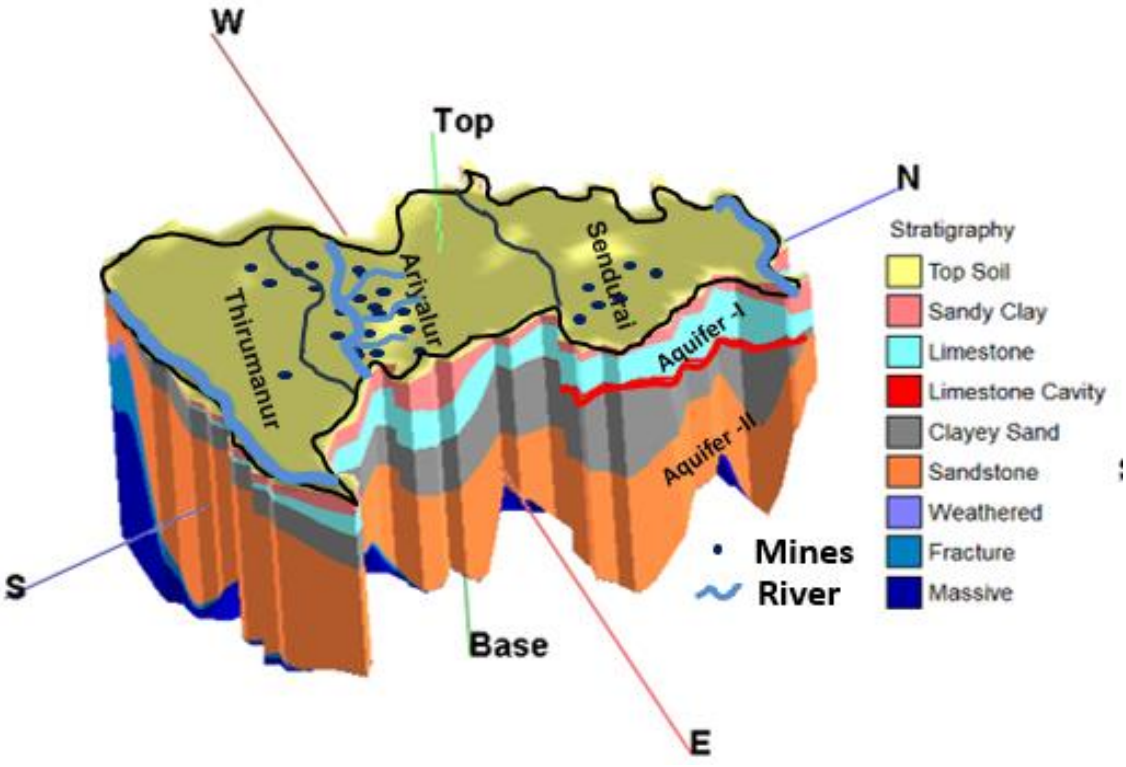


Fig 2.14. 3D lithological representation of the study area

2.8 Fence Diagram:

The Fence diagram was also prepared using the Rockworks software (**Figure. 2.15**). The pattern for the Fence was chosen as such to cover the maximum portion of the region to represent the enhanced picture of the sub-surface as deciphered from the 3-D stratigraphic model. It has also been interpreted from the diagram that the shallow and deeper aquifers are not in connection to each other.

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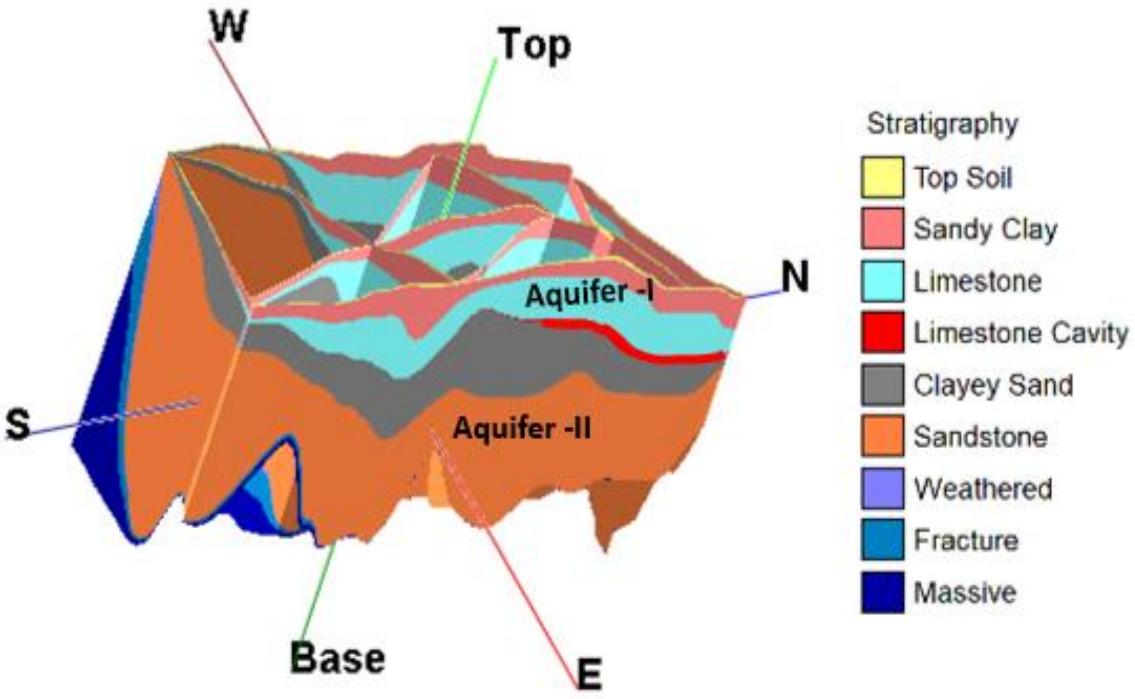


Fig 2.15. Fence diagram of the study area

3.0 Ground Water Regime Monitoring:

The periodical monitoring of ground water level implies the groundwater recharge and discharge (natural and manmade) occurring in the aquifer systems. It also reveals that the interaction between surface and sub-surface water systems. In the study area, 47 nos. of observation wells (39 NAQUIM CGWB & 8 State Government) and 04 nos. of Exploratory Wells and 9 nos. of PZ (4 CGWB and 9 State Government) have been constructed. A total of 60 nos. of wells were monitored periodically. This was aided to record the temporal variation and spatial distribution of ground water in aquifer system. During May 2023, about 87% of the total area fall in 2 to 4 m range when NHS and State Government wells (a total of 9 nos. of wells) considered. However, it is about 88% of the area fall in more than 10 m range when NAQUIM keys wells taken into the consideration and the same conditions exist during January 2024. The NAQUIM wells data has changed the entire scenario of the ground water level regime in the study area. The statistical anaylysis of May 2023 and January 2024 ground water level are given in **Table 3.1, 3.2** & **3.3** respectively. The ground water level data collected during NAQUIM 2.0 stuides are given in **Table 3.4**. The ground water level of May 2023 has considered as pre-monsoon and January2024 as post-monsoon for detailed analysis.

In order to understand the spatial difference between periodically monitoring of water level by CGWB and the water level monitoring carried out during the NAQUIM 2.0. Two separate water level map have been prepared for both Pre-monsoon and Post-monsoon period. **Fig 3.1.** has been prepared based on pre-monsoon water level collected from the NHS wells and State Government wells, whereas, **Fig 3.2.** including NHS wells, State Government wells and key wells established under NAQUIM 2.0.

Fig 3.3. has been prepared based on post-monsoon water level collected from the NHS wells and State Government wells, whereas **Fig 3.4.** including NHS wells, State Government wells and key wells established under NAQUIM 2.0.

3.1 Pre-monsoon Water level:

Before integration of key well data, during pre monsoon (May 2023) major part of the study area was having water level in the range of 2-4 mbgl but after integrating well inventory data of Naquim 2.0, major part of the study area showed water level in the range of 10-20 m bgl (561 sq.km.) (57 % of the total study area).

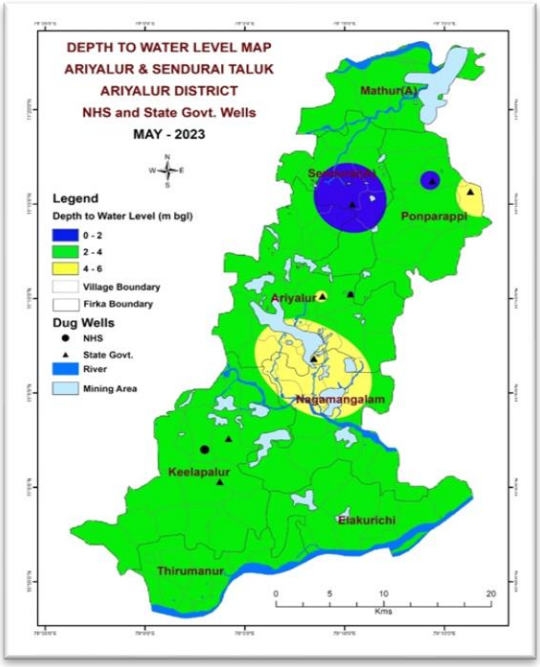


Fig 3.1. May 2023 Water Level map (NHS & State Data)

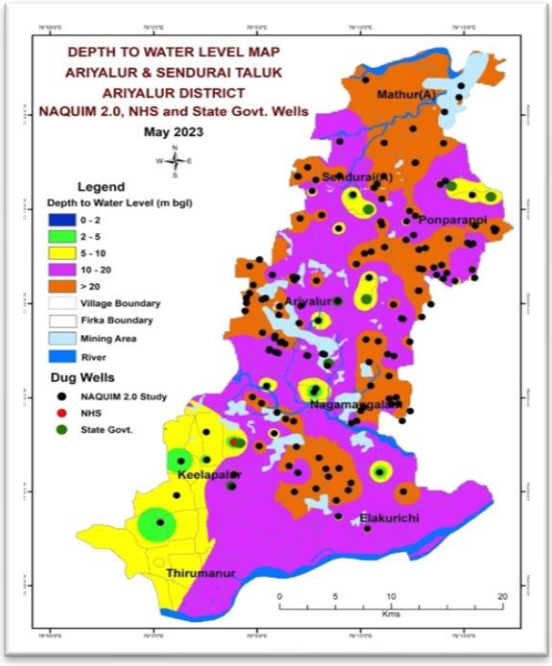


Fig 3.2. May 2023 Water level map (including NAQUIM data)

Table 3.1. Aquifer I, May 2023 (NHS & State Data)

Range (mbgl)	No. of G.Ps	No. of Wells	Area (Sq, km)	%
0 - 2	6	2	42.22	4 %
2 to 4	85	4	861.32	87 %
4 to 6	12	3	87.46	9 %
Total	**103**	**9**	**991**	**100**

Table 3.2 Aquifer I, May 2023 (including NAQUIM data)

Range (mbgl)	No. of G.Ps	No. of Wells	Area (Sq. km)	%
0 - 2	1	3	0.23	0.02 %
2 to 5	3	15	6.30	0.64 %
5 to 10	13	16	112.26	11 %
10 to 20	60	27	561.50	57 %
> 20	26	106	310.71	31 %
Total	**103**	**167**	**991**	**100 %**

3.2 Post-monsoon Water level:

Similarly for the post monsoon, (January 2024), major part of the study area having water level in the range of 10-20 m bgl covering an area of 551 Sq Km (57.6% of the study area) followed by water level more than 20 mbgl (31.6 % of the study area). Deeper water levels of more than 20 mbgl is found to occur in Tirumanur area during post monsoon, due to the intensive irrigation activity.

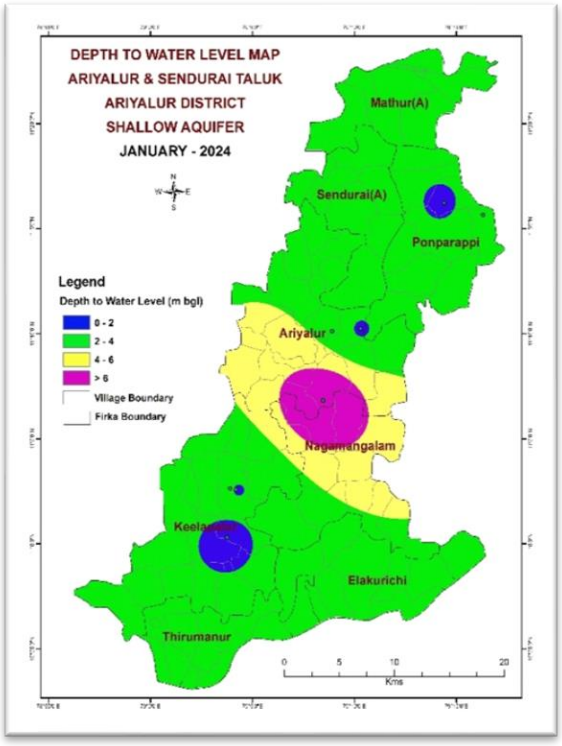


Fig 3.3. January, 2024 Water Level map (NHS & State Data)

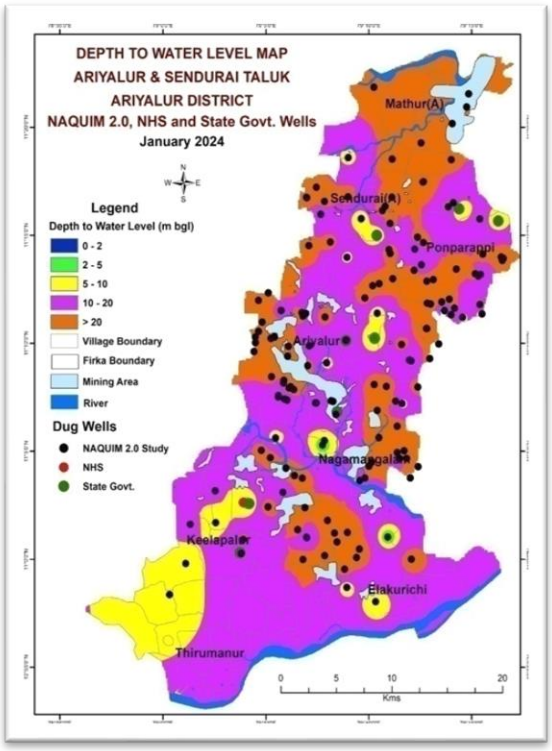


Fig 3.4. Januray, 2024 Water level map (including NAQUIM data)

Table 3.3. Aquifer I, January 2023 (including NAQUIM key wells)

Range (mbgl)	No. of G.P.s	No. of Wells	Area (Sq. km)	%
0 – 2	0	7	0.22	0.02
2 to 5	0	18	5.3	0.5
5 to 10	7	18	102	10.3
10 to 20	64	19	551	57.6
> 20	39	105	305	31.6
Total	**103**	**167**	**991**	**100**

Table 3.4. Water level data collected during NAQUIM 2.0 stuides

Sl.No	Location Name	Latitude	Longitude	Type of Well	Depth in Meter	May 2023 (mbgl)	January, 2024 (mbgl)
1	Siruvalur	11.087908	79.12909	D.W	8.35	2.05	2.00
2	Pudupalayam	11.09137	79.130692	D.W	12.30	3.23	4.03
3	Arungal Colony	11.016736	79.116136	D.W	6.60	6.60	6.60
4	Andipattakadu	11.016994	79.18204	D.W	4.15	0.72	1.20
5	Manakkal	11.191959	79.09569	D.W	14.08	14.08	14.08
6	Ottakoil	11.189542	79.115222	D.W	15.75	9.36	11.60
7	Pottavalli	11.232942	79.14904	D.W	10.60	7.46	8.37
8	Kayarlapath	11.135958	79.097426	D.W	14.70	14.70	14.70
9	Srinivasapuram	11.164472	79.118397	D.W	10.97	10.97	10.97
10	Mankudi	11.151515	79.132496	D.W	7.30	1.63	7.30
11	Valajanagaram	11.126134	79.093349	D.W	12.70	4.21	5.70
12	Venkatakrishnapuram	11.122697	79.100482	D.W	10.50	10.50	10.50
13	Asthinapuram	11.120493	79.124118	D.W	14.10	14.10	14.10
14	Periyanagular	11.121625	79.13767	D.W	9.21	9.21	9.21
15	Periyathirukonam	11.06062	79.159228	D.W	9.75	4.90	5.00
16	Nagamangalam	11.07729	79.191434	D.W	9.80	9.80	9.80
17	Vilangudi	11.120082	79.193722	D.W	5.90	5.90	4.35
18	Kavanur	11.153508	79.199563	D.W	7.10	1.50	3.25
19	Anandawadi	11.189673	79.173508	D.W	8.30	2.51	4.15
20	Sokkanadapuram	11.266125	79.127687	D.W	12.19	5.60	11.30
21	Keelamaligai	11.262485	79.25661	D.W	14.36	7.48	12.50
22	Ponparapi	11.270455	79.23989	D.W	15.40	1.67	2.60
23	Kumuliam	11.18659	79.242717	D.W	13.71	5.10	5.90
24	Paranam	11.189268	79.258544	D.W	10.20	3.15	4.20
25	Pilakurichi	11.2196615	79.257348	D.W	9.55	6.00	6.35
26	Sendurai	11.249789	79.173	D.W	18.28	2.50	3.30
27	Nakkambadi	11.26272	79.160562	D.W	11.06	1.43	2.80
28	Kulumur	11.309875	79.149975	D.W	13.00	10.20	7.20
29	Nallampalayam	11.239177	79.203843	D.W	15.50	4.28	7.27
30	Unjini	11.227126	79.209345	D.W	11.58	9.91	11.10
31	Irumbulikurichi	11.191849	79.227992	D.W	8.70	2.08	4.37
32	Melapulur	11.052738	79.042405	D.W	14.00	5.78	11.55
33	Keelapalur	11.043783	79.06516	D.W	8.80	1.91	3.90
34	Malathankulam	11.028148	79.042753	D.W	12.90	4.15	5.00
35	Poondi	11.026856	79.022083	D.W	20.50	2.45	11.70
36	Anginoor	10.99661	79.018495	D.W	10.50	5.80	7.50

Table 3.4. Water level data collected during NAQUIM 2.0 stuides

Sl.No	Location Name	Latitude	Longitude	Type of Well	Depth in Meter	May 2023 (mbgl)	January, 2024 (mbgl)
37	Venganur	10.972481	79.005345	D.W	9.80	2.85	6.50
38	Melakarupur	11.051567	79.097055	D.W	19.20	3.80	11.55
39	Rangasamudram	11.093508	79.09105	D.W	15.00	2.00	4.55
40	Sendurai (S)	11.249922	79.173287	D.W	1.28	1.28	2.72
41	Ponparapi (S)	11.270333	79.23997	D.W	1.84	1.84	1.70
42	Maruthur (S)	11.261018	79.271767	D.W	4.68	4.68	3.82
43	Kadugur (S)	11.168686	79.148234	D.W	4.09	4.09	3.95
44	Ayan Athur (S)	11.17049	79.171552	D.W	1.97	1.97	1.80
45	Kattuprangaym (S)	11.113694	79.14106	D.W	5.68	5.68	9.19
46	Kelapalur (S)	11.04294	79.06987	D.W	2.61	2.61	1.33
47	Puththur (S)	11.005029	79.062508	D.W	2.83	2.83	1.52

(S)State Govt. Wells

4.0 Dynamic Ground Water Resource:

Ground water available in the zone of water level fluctuation is the dynamic ground water resource which gets replenished every year primarily through recharge from rainfall. Hence, the sustainable utilization of ground water resources demands a realistic quantitative assessment of ground water availability in this zone based on reasonably valid scientific principles. Dynamic Ground Water Resource is being assessed periodically by the CGWB jointly with State Government for the entire country including Tamil Nadu.

Firkas in the basic assessment unit in Tamil Nadu for dynamic ground water resource. There are 8 firkas in the study area namely Ariyalur, Elakurichi, Keelapalur, Mathur, Nagamangalam, Ponparappi, Sendurai and Thirumanur.

As per the 2023 (latest) assessment, in the study area, the Annual Extractable Ground Water Resource is 19924 Hectare Meter. The Annual Ground Water Extraction for all uses is 9272.45 Ham, out of which 8681 Ham (94%) of ground water have been utilized for irrigation purposes. The Stage of Ground Water Extraction, which is a measure of Annual Ground Water Extraction for all uses (irrigation, industrial and domestic uses) over Annual Extractable Ground Water Resource is 47% as a whole. The firkas wise details are given in **Table 4.1.**

Out of the total 8 assessment units (Firkas) in the study area, only one firka namely Sendurai has been categorised as “Critical” (GW Extraction between >70% and ≤90%). Rest of the firkas have been categorised as “Safe” (GW Extraction between <70%). As a whole, the study area has been categorised as “Safe”.

Table 4.1. Dynamic Ground Water Resource 2023

SI. No.	Assessment Unit Name	Total Area of Assessment Unit (Ha)	Annual Extractable Ground Water Resource (Ham)	Ground water Extraction (Ham)			Total Extraction (Ham)	Stage of Ground Water Extraction (%)	Categorisation
				Irrigation	Industries	Domestic			
1	Ariyalur	19017.84	2412.3	1181.6	22.4	92	1295.99	53.72	SAFE
2	Elakkurichi	10008.27	3704.91	1152	1.44	75.7	1229.14	33.18	SAFE
3	Keelapalur	17741.41	3253.98	1626.4	16.3	74.5	1717.15	52.77	SAFE
4	Mathur(A)	12529.57	2514.91	1251.6	3	48.2	1302.77	51.8	SAFE
5	Nagamangalam	13664.03	2691.63	1114.8	8.3	74.4	1197.48	44.49	SAFE
6	Ponparppi	10267.89	1478.32	370.2	0	46.5	416.73	28.19	SAFE
7	Sendurai(A)	8684.94	1011.65	880.6	0.5	62.1	943.16	93.23	CRITICAL
8	Thirumanur	7214.82	2856.56	1104	0	66	1170.03	40.96	SAFE
	Total	**99128.77**	**19924.26**	**8681.2**	**51.94**	**539.4**	**9272.45**	**46.54**	**SAFE**

Further, it is observed that, out of 991 sq.km of the total area, about 86.8 sq. km (9%) area (Sendurai Firka) has been categorized as ‘Critical’. Rest of the area (91%) has been categorized ‘Safe’. Beside, in Sendurai Firka, out of total 943.16 Ham ground water extraction, 0.5 Ham (0.05%) has been utilized for Industrial purposes.

4.1 Change in Dynamic Ground Water Resource over time:

To decipher the long term changes in dynamic ground water resource in the study area, the Stage of Extraction (SOE) has been compared for the years 2013, 2017, 2020, 2022 and 2023 (**Table 4.2**). The graphical comparison is depicted in **Fig 4.1**.

Table 4.2. Comparison of SOE

Sl.No	Firka Name (Assessment Unit)	Stage of Extraction (%)				
		2013	2017	2020	2022	2023
1	Ariyalur	55	45.03	51.25	52.252	53.72
2	Elakurichi	39	37.16	34.99	36.134	33.18
3	Keelapalur	51	56.92	59.41	51.192	52.77
4	Mathur	54	58.68	43.96	48.085	51.80
5	Nagamangalam	28	29.93	23.10	42.28	44.49
6	Ponparappi	42	42.42	35.40	26.059	28.19
7	Sendurai	83	88.19	76.50	75.583	93.23
8	Thrumanur	38	43.18	32.86	40.457	40.96

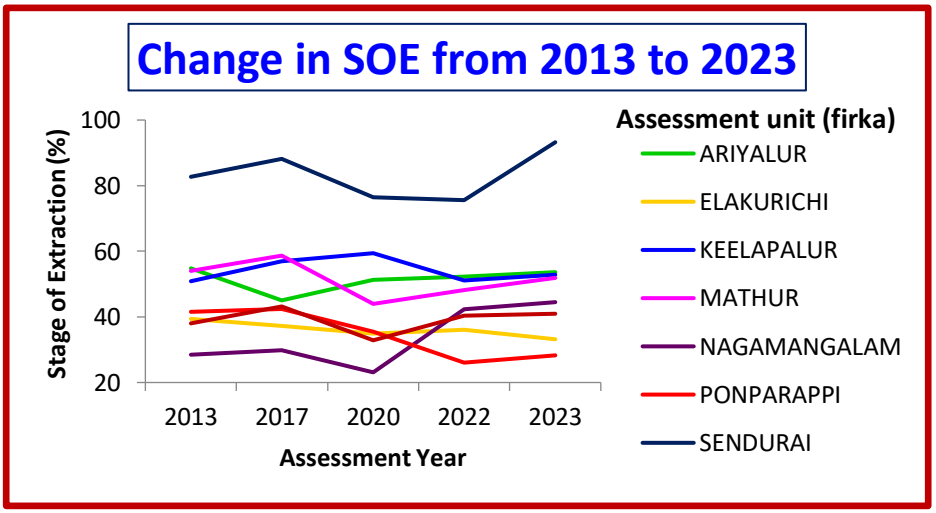


Fig 4.1. Graphical comparison of SOE

The comparison revealed that all the firkas except Sendurai have been categorised as 'SAFE' from 2013 to 2023, where ground water extraction is less than 70% of the extractable ground water resource. The Sendurai firka has been categarised as 'Semi-Critical' (GW Extraction between >70% and ≤90%) during 2013, 2017, 2020 and 2022, 'Critical' (GW Extraction between >90% and ≤ 100%)

during 2023. However, no significant change has been observed as a whole. The spatial distribution of categorization in the study area from 2013 to 2023 is given in **Fig 4.2**.

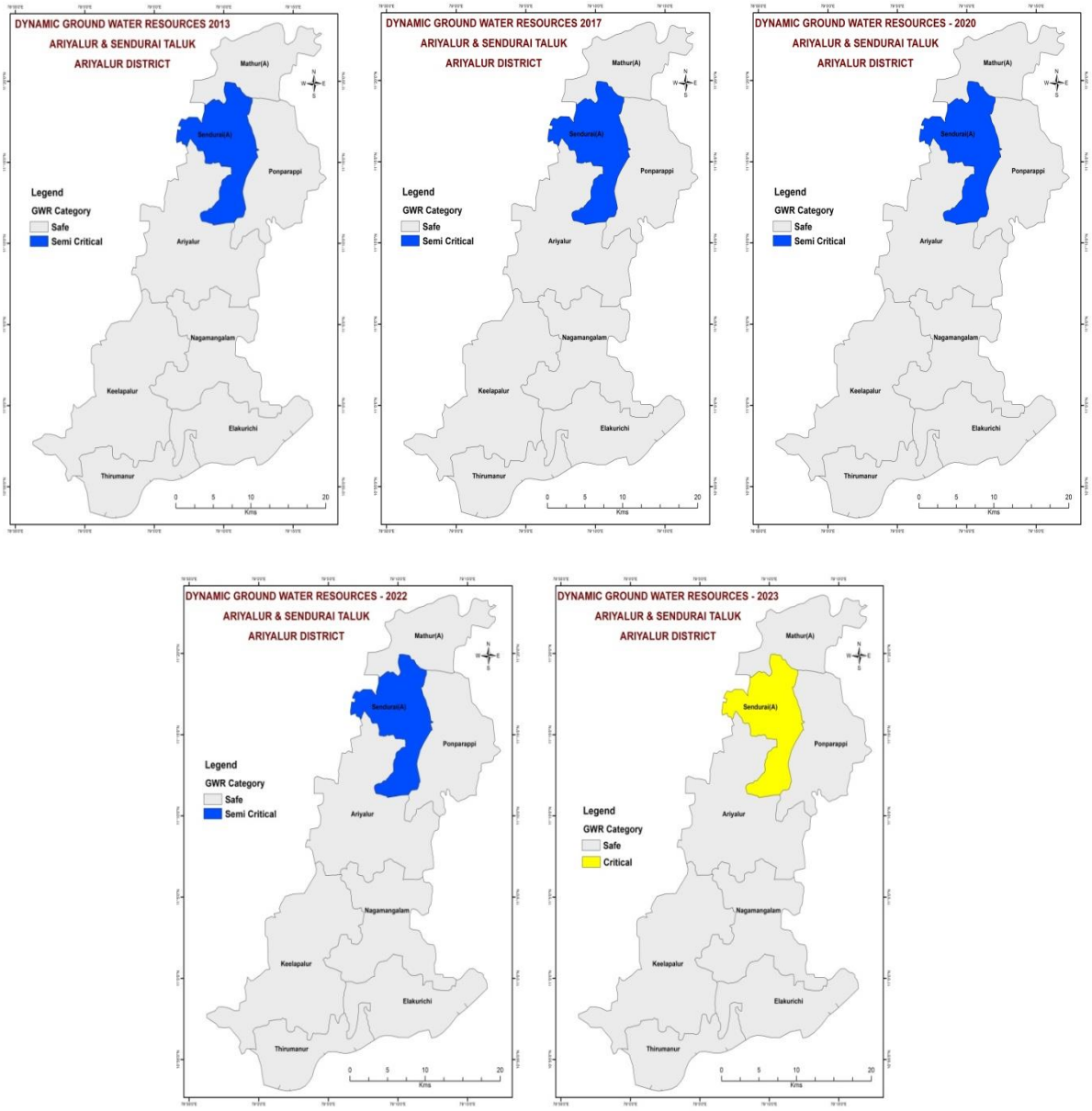


Fig 4.2. Categorisation of firkas from 2013 to 2023

5.0 Ground Water Quality:

Ground Water Quality is a major concern to any community if contaminated ground water is the only source for drinking. As per the laest dynamic ground water resource assessment, about 11.5% of ground water extraction utilized for domestic purposes including driking water. The largest consumer

of the ground water is the agriculture sector, which is about 87% of total ground water extraction. The contribution of ground water is nearly 62% in irrigation, 85% in rural water supply and 50% in urban water supply which makes special significance for sustainable ground water management including quality.

5.1 Ground Water Sampling:

In order to assess the ground water quality in different aquifers in the study area under NAQUIM 2.0, total 392 number of ground water samples have been collected which includes pre & post monsoon period ie., Pre-monsoon 352 no. of samples for basic and heavy metal analysis followed by 40 no. of hot spot location. The water samples collected are from various depth consisting of 1st& 2nd aquifer, which includes Dug well, Bore well, Hand pump, Surface water and Mining pit samples. The locations where ground water samples are collected can be seen in **Fig 5.1.**

5.2 Methodology:

The sample containers used are made from high-density polyethylene (for major ions, total elemental analysis). The containers were pre-cleaned by soaking in 2 mol HNO_3 for 24 hrs and washed with de-ionized water for 3-4 times. Before collecting samples, the containers were rinsed with the samples. Groundwater samples were collected from the wells at 10 cm below the static water level using a water sampler. The sampling depth of 10 cm below the water level was chosen to avoid any suspended matter entering into the container. The samples for major ion analysis were collected in 1 litre containers and no preservative were added. The samples for total trace elemental analyses were collected, filtered using 0.45 μm membrane filter using a Millipore vacuum filtration unit into 1 litre containers and acidified with HNO_3 to pH <2. For the collection of sample, preservation and analysis, the standard methods (APHA, 2024) were followed. Separate samples were collected and preserved for major ions and trace elemental analysis.

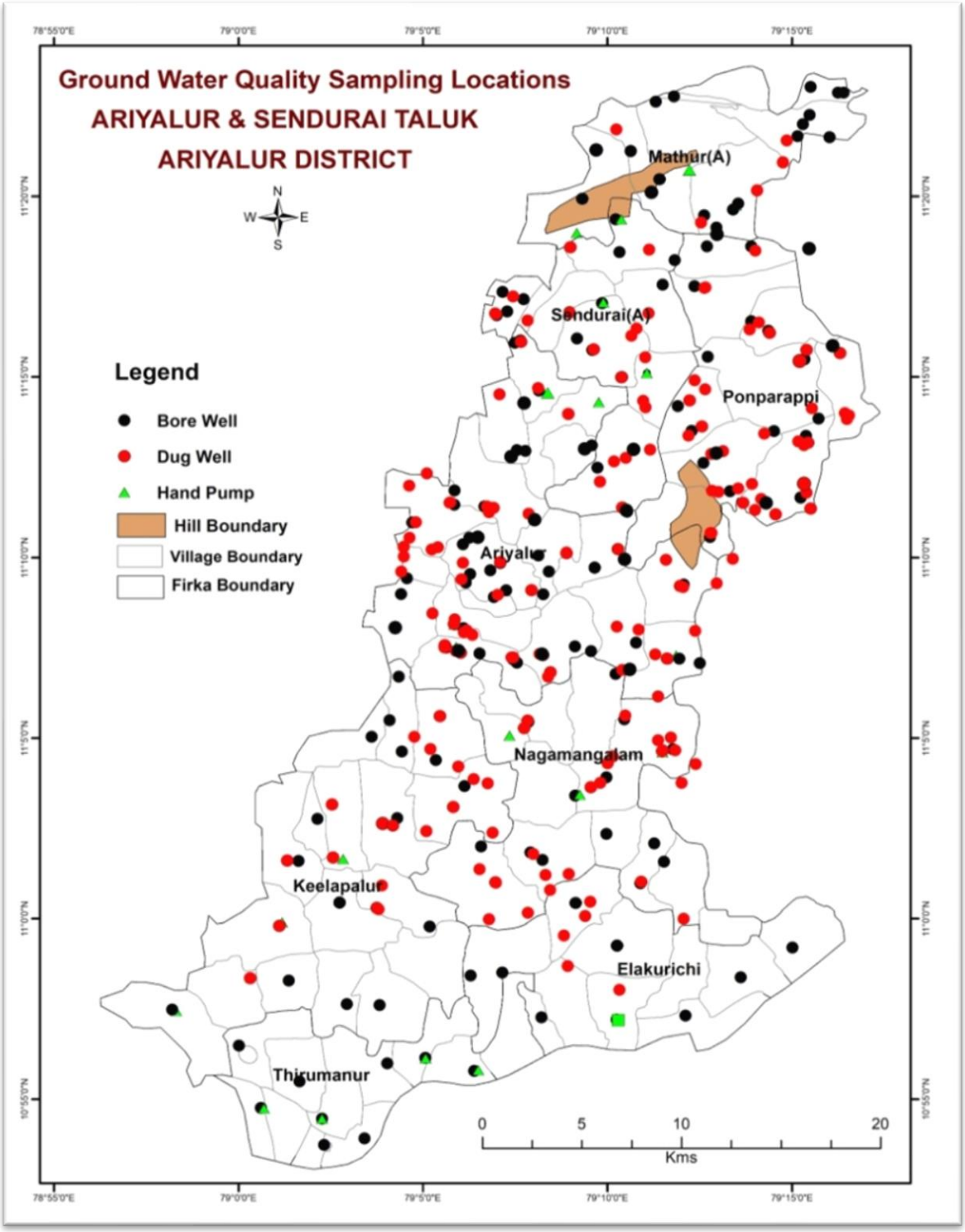

Ground Water Quality Sampling Locations
ARIYALUR & SENDURAI TALUK
ARIYALUR DISTRICT
N
W
E
S
Legend
Bore Well
Dug Well
Hand Pump
Hill Boundary
Village Boundary
Firka Boundary
Mathur(A)
Sendurai(A)
Ponparappi
Ariyalur
Nagamangalam
Keelapalur
Elakurichi
Thirumanur
0
5
10
20
Kms
78°55'0"E
79°0'0"E
79°5'0"E
79°10'0"E
79°15'0"E

Fig. 5.1 Ground water sample location map

5.3 Determination of water quality parameters:

The samples were stored at a temperature below 4°C. Before each measurement, pH meter was calibrated with reference buffer solution of pH 4 and pH 9. Alkali metal ions (Na^+ and K^+) were measured using a flame photometer. Ca^{2+} and Mg^{2+} were determined by EDTA Complexometric Titration method. Chloride was estimated by $AgNO_3$ Argentometric titration. Nephelometric turbidity method was used for the analysis of Sulphate. Nitrate was analyzed using UV-Vis spectrophotometer. Fluoride content was determined by Ion selective electrode method. Standard solutions for the above analysis were prepared from the respective salts of Analytical reagent grade. All the parameters are expressed in milligrams per liter (mg/l), except pH (units). Electrical Conductivity (µS/cm) and Uranium (ppb). Trace metals were determined by Atomic Absorption Spectrophotometer. Merck standard solutions were used for the estimation of trace metals. Analytical methods and equipments used for chemical analysis is given in **Table 5.1.**

Table 5.1. Analytical methods and equipments used for chemical analysis

Sl. No.	Parameter	Method (APHA 2024)	Instruments / Equipment used
A	**Physico-chemical**		
1	pH	Electrometric	pH Meter
2	Conductivity	Electrometric	Conductivity Meter
3	Hardness	Titration by EDTA	-
4	Calcium	Titration by EDTA	-
5	Magnesium	Calculation Method	-
6	Sodium	Flame emission	Flame Photometer
7	Potassium	Flame emission	Flame Photometer
8	Alkalinity	Titration by H_2SO_4	-
9	Chloride	Titration by $AgNO_3$	-
10	Sulphate	Nephelometric turbidity	Turbidity Meter
11	Nitrate	Ultraviolet screening	UV-VIS Spectrophotometer
12	Fluoride	Electrode	Ion selective electrode method.
13	Uranium	BARC method	Fluorimetry
B	**Heavy Metals**		
14	Copper	Digestion followed by Atomic Absorption spectrometry	Atomic Absorption Spectrometer
15	Lead		
16	Zinc		

Sl. No.	Parameter	Method (APHA 2024)	Instruments / Equipment used
17	Nickel		
18	Cadmium		
19	Chromium		
20	Manganese		
21	Iron		

5.4 Water quality criteria for drinking water purpose:

With the objective of safeguarding water from degradation and to establish a basis for improvement in water quality, standards / guide lines / regulations have been laid down by various national and international organizations such as; Bureau of Indian Standards (BIS), World Health Organization (WHO), European Economic Community (EEC), Environmental Protection Agency (EPA), United States, and Inland Waters Directorate, Canada. The Bureau of Indian Standards (BIS) earlier known as Indian Standards Institutions (ISI) has laid down the standard specification for drinking water during 1983, which have been revised and updated from time to time. In order to enable the users, to exercise their discretion towards water quality criteria, the maximum permissible limit has been prescribed especially where no alternative sources are available. The national water quality standards describe essential and desirable characteristics required to be evaluated to assess suitability of water for drinking purposes. The important water quality characteristics as laid down in BIS standard (IS 10500: 2012) are summarized in **Table 5.2.**

Table 5.2. BIS Standard (IS 10500: 2012) for Drinking Water Specification

Sl. No.	Characteristics	Requirement acceptable Limit	Permissible Limit in the absence of alternate source
1	Colour Hazen Unit	5	25
2	Odour	Unobjectionable	-
3	Taste	Agreeable	-
4	Turbidity (NTU)	5	10
5	pH	6.5-8.5	No relaxation
6	Total Hardness, $CaCO_3$, mg/l	300	600
7	Iron (Fe), mg/l	0.3	No relaxation
8	Chloride (Cl), mg/l	250	1000

Sl. No.	Characteristics	Requirement acceptable Limit	Permissible Limit in the absence of alternate source
9	Fluoride (F), mg/l	1.0	1.5
10	Dissolved Solids, mg/l	500	2000
11	Calcium (Ca), mg/l	75	200
12	Magnesium (Mg), mg/l	30	100
13	Copper (Cu), mg/l	0.5	1.5
14	Manganese (Mn), mg/l	0.1	0.3
15	Sulphate (SO_4), mg/l	200	400
16	Nitrate (NO_3), mg/l	45	No relaxation
17	Mercury (Hg), mg/l	0.001	No relaxation
18	Cadmium (Cd), mg/l	0.003	No relaxation
19	Selenium (Se), mg/l	0.01	No relaxation
20	Arsenic (As), mg/l	0.01	0.05
21	Cyanide (CN), mg/l	0.05	No relaxation
22	Lead (Pb), mg/l	0.01	No relaxation
23	Zinc (Zn), mg/l	5.0	15
24	Alkalinity, mg/l	200	600
25	Aluminum (Al), mg/l	0.03	0.2
26	Boron (B), mg/l	1.0	5.0

5.5 Water Quality Criteria for Irrigation Purpose:

Water quality plays a significant role in irrigated agriculture. Many problems originate due to inefficient management of water for agriculture use, especially when it carries high salt loads. The effect of total dissolved salts in irrigation water (measured in terms of electrical conductance) on crop growth is extremely important. Soil water passes into the plant through the root zone due to osmotic pressure and the plants root membrane are able to assimilate water and nutrients. Thus, the dissolved solid contents of the residual water in the root zone also have to be maintained within limits by proper leaching. These effects are visible in plants by their stunted growth, low yield, discoloration and even leaf burns at margin or top. The safe limits of electrical conductivity for crops of different degrees of salt tolerances under varying soil textures and drainage conditions are presented in **Table 5.3.**

Table 5.3. Desirable Limit of Electrical Conductivity for irrigation water

S. No.	Nature of soil	Crop Growth	Upper permissible safe limit of electrical conductivity in water μs/cm at 25°C
1	Deep black soil and alluvial soils having clay content more than 30%; soils that are fairly to moderately well drained	Semi-tolerant	1500
		Tolerant	2000
2	Textured soils having clay contents of 20-30% ;soils that are well drained internally and have good surface drainage system	Semi-tolerant	2000
		Tolerant	4000
3	Medium textured soils having clay 10-20%; internally very well drained and having good surface drainage system	Semi-tolerant	4000
		Tolerant	6000
4	Light textured soils having clay less than 10%; soils that have excellent internal and surface drainage system.	Semi-tolerant	6000
		Tolerant	8000

5.6 Aquifer-wise Ground Water Quality:

During pre-monsoon period of May-June 2023, total 211 no. of samples have been collected for basic parameters and 141 nos for heavy metal analysis. Out of 211 no. of samples, 106 nos from Aquifer-I of depth range 4 to 39m and 250 nos from Aquifer-II of depth range 45 to 210m and 4 nos of Mining pit samples have also been collected from M/s. Tamilnadu Minerals Pvt. Ltd, Ariyalur, M/s Ramco Cements Ltd, Periyanagalur village and Tular village. The details of samples collected for quality analysis is given in **Table 5.4**. Chemical analysis data are given in the **Annexure-I**.

Table 5.4. Details of samples collected for quality analysis

S. No	Period of Samples	Aquifer Type	Depth Range (m)	Samples Source	No. of Samples	
					Basic	HM
1	Pre-Monsoon (May-June'2023)	I	4 - 39 m	DW	32	25
				BW	22	10
				HP	10	7
		II	45 - 210 m	BW	131	88
				HP	12	11
	Mining pit samples				4	0
				(A)	211	141
2	Post-Monsoon (Jan' 2024)- Sampling from Hotspot	I	4.5 - 30 m	DW	10	..
				BW	5	..
				HP	1	..
		II	45 - 138 m	BW	19	..
				HP	5	..
				(B)	40	
				(C)	251	141
				Total (A+B+C) =	**392**	

DW- Dug Well, BW-Bore Well, HP-Hand pump

5.7 Electrical conductivity:

Conductivity measurements are used routinely in many industrial and environmental applications as a fast, inexpensive and reliable way of measuring the ionic content in a solution. In many cases, conductivity is linked directly to the total dissolved solids (TDS).Salinity is the saltiness or dissolved salt contents of a water body.

Salt content is an important factor in water use. Salinity can be technically defined as the total mass in grams of all the dissolved substances per Kilogram of water. Different substances dissolve in water giving it taste and odour.

Salinity always exists in ground water but in variable amounts. It is mostly influenced by aquifer material, solubility of minerals, duration of contact and factors such as the permeability of soil, drainage facilities, and quantity of rainfall and above all, the climate of the area.

BIS has recommended a drinking water standard for total dissolved solids a limit of 500 mg/L (corresponding to about EC of 750 μS/cm at 25^0C) that can be extended to a TDS of 2000 mg/L (corresponding to EC of about 3000 μS/cm at 25^0C) in case of no alternate source. Water having TDS more than 2000 mg/L are not suitable for drinking purpose. The distribution pattern of electrical conductivity is shown in **Fig 5.2** & **5.3** for aquifer –I and aquifer-II respectively.

The summarized results of ground water quality and its suitability as per BIS 10500: 2012 are given in **Table 5.5** & **5.6** for aquifer-I and aquifer-II respectively. It is apparent from the above table and map that majority(94% in aq-I and 96% in aq-II) of the waters having EC values less than 3000μS/cm at 25^0C and 6% of wells in aquifer-I and 4% of wells in aquifer II having EC values more than 3000 μS/cm at 25^0C . It is also observed that the elevated electrical conductivity values were noticed for both the aquifers in the same area assumes the interconnectivity of aquifers.

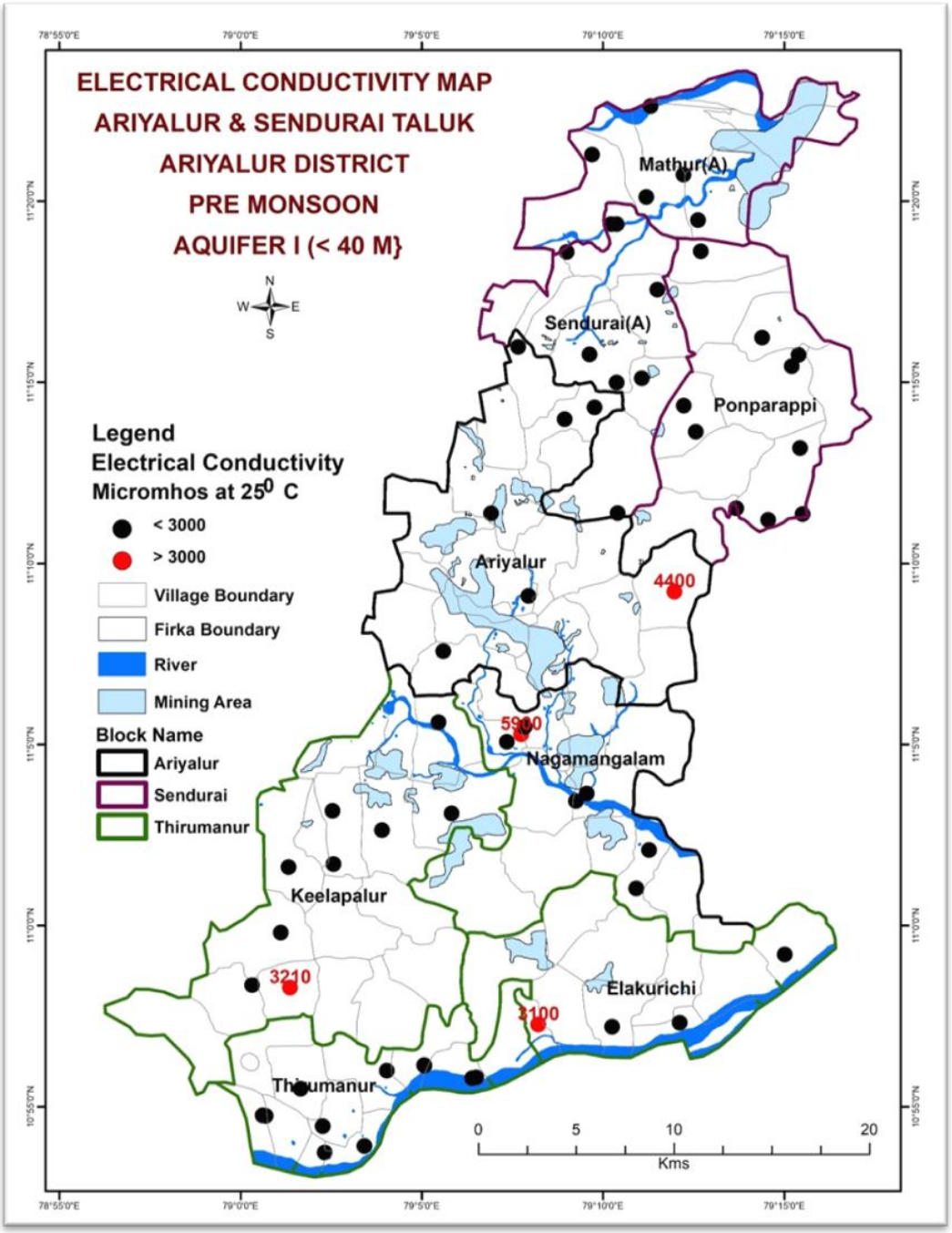


Fig 5.2. Distribution of Electrical conductivity in aquifer-I

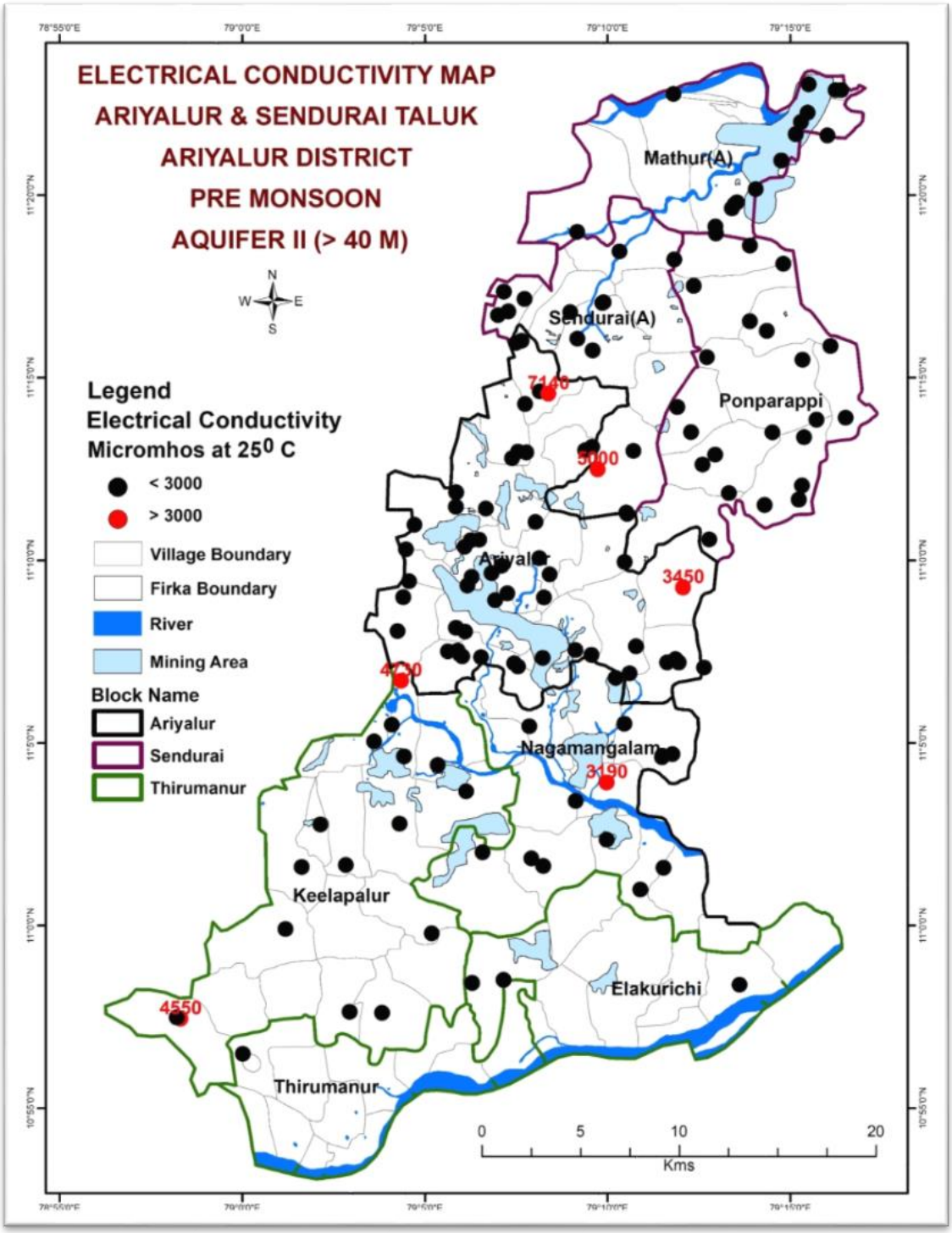


Fig 5.3. Distribution of Electrical conductivity in aquifer-II

Table 5.5. Summarized results of ground water quality and its suitability as per BIS 10500: 2012 (Aq-I)

Parameters	Min	Max	Average	BIS limits (10500:2012)	Desirable limits		Above permissible limit	
					No of Samples	%	No of Samples	%
pH	6.8	8.5	7.4	6.5-8.5	59	94	4	6
Electrical Conductivity	126	5900	1459	750 -3000 µs/cm	59	94	4	6
Total Hardness	55	1210	457	300-600, mg/l	48	76	15	24
Calcium	16	272	66	75-200, mg/l	62	98	1	2
Magnesium	4	202	71	30-100, mg/l	45	71	18	29
Sodium	1	612	118	NA	NA	NA	NA	NA
Potassium	0.1	89.6	12.8	NA	NA	NA	NA	NA
Carbonate	0	9	0	NA	NA	NA	NA	NA
Bicarbonate	24	720	305	NA	NA	NA	NA	NA
Chloride	18	1496	242	250-1000, mg/l	62	98	1	2
Sulphate	7	432	131	200-400, mg/l	60	95	3	5
Nitrate	1	64	18	45-45, mg/l	58	92	5	8
Fluoride	0.12	1.91	0.88	1.0-1.50, mg/l	56	88	7	12
Uranium	0.0	28.1	6.2	30 µg/l	63	100	0	0

Table 5.6. Summarized results of ground water quality and its suitability as per BIS 10500: 2012 (Aq-II)

Parameters	Min	Max	Average	BIS limits (10500:2012)	Desirable limits		Above permissible limit	
					No of Samples	%	No of Samples	%
pH	6.8	8.2	7.3	6.5-8.5	142	99	2	1
Electrical Conductivity	188	7140	1443	750 -3000 µs/cm	138	96	6	4
Total Hardness	70	1680	424	300-600, mg/l	123	85	21	15
Calcium	16	288	79	75-200, mg/l	141	98	3	2
Magnesium	6	233	55	30-100, mg/l	126	88	18	12
Sodium	2	1021	135	NA	NA	NA	NA	NA
Potassium	0.6	121.9	11.3	NA	NA	NA	NA	NA
Carbonate	0.0	0.0	0.0	NA	NA	NA	NA	NA
Bicarbonate	24	732	294	NA	NA	NA	NA	NA
Chloride	14	1659	219	250-1000, mg/l	142	99	2	1
Sulphate	7	884	171	200-400, mg/l	137	95	7	5
Nitrate	1	82	26	45-45, mg/l	129	90	15	10
Fluoride	0.1	1.9	0.9	1.0-1.50, mg/l	133	92	11	8
Uranium	0.2	56.4	6.9	30 µg/l	144	100	0	0

5.8 Total Hardness:

Hardness of water is mainly due to the presence of alkaline – earth metals and other polyvalent cations. Generally, most of the ground waters are rich in Calcium and Magnesium ions. These ions react with soap and forms precipitate thus preventing foam formation. Such type of waters is called hard waters. Hard waters may form scaling in industrial process and forms incrustations in water supply lines and well screens resulting in decreased yield of the well. BIS has specified 300 mg/L as the desirable limit and 600 mg/L as the maximum permissible limit for drinking water in the absence of alternative sources. Total hardness of groundwater varied between 55-1210 mg/L and 70-1680 mg/L as $CaCO_3$ for aquifer-I and aquifer –II respectively. More than the permissible limit of 600 mg/L was noticed more in aquifer- I (24%) than aquifer-II (15%).

5.9 Nitrate:

Nitrate is one of the major indicators of anthropogenic sources of pollution. The negative charge and high mobility favours its persistent nature and transport along the ground water flow path. Nitrate is the ultimate oxidized product of all nitrogen containing matter and its occurrence in ground water can be fairly attributed to infiltration of water through soils containing domestic vegetable, and animal waste, fertilizer and industrial pollution. As the lithogenic sources of nitrogen are very rare, its presence in ground water is almost due to anthropogenic activity. It is difficult to identify the natural and man-made sources of nitrogen contamination of ground water. Some chemical and micro-biological processes such as nitrification and denitrification also influence the nitrate concentration in ground water.

As per the BIS Standard for drinking water the maximum desirable limit of Nitrate concentration in ground water is 45 mg/L with no relaxation. Though, Nitrate is considered relatively non-toxic, a high nitrate concentration in drinking water is an environmental health concern arising from increased risks of matheomoglobinemia particularly to infants. Adults can tolerate little higher concentrations. The specified limits are not to be exceeded in public water supply. If the limit is exceeded, water is considered to be unfit for human consumption. The occurrences of Nitrate in ground water beyond permissible limit (45 mg /L) was 8% and 10 % for aquifer-I and aquifer-II respectively. The distribution of nitrate has been shown on the map as a point source in **Fig 5.4 & 5.5** for aquifer –I and aquifer-II respectively. It is observed from the maps that elevated values of nitrate concentration was more from the sample collected from the residential area of Ariyalur and Sendurai block, infers domestic waste leads to more nitrate contamination to groundwater.

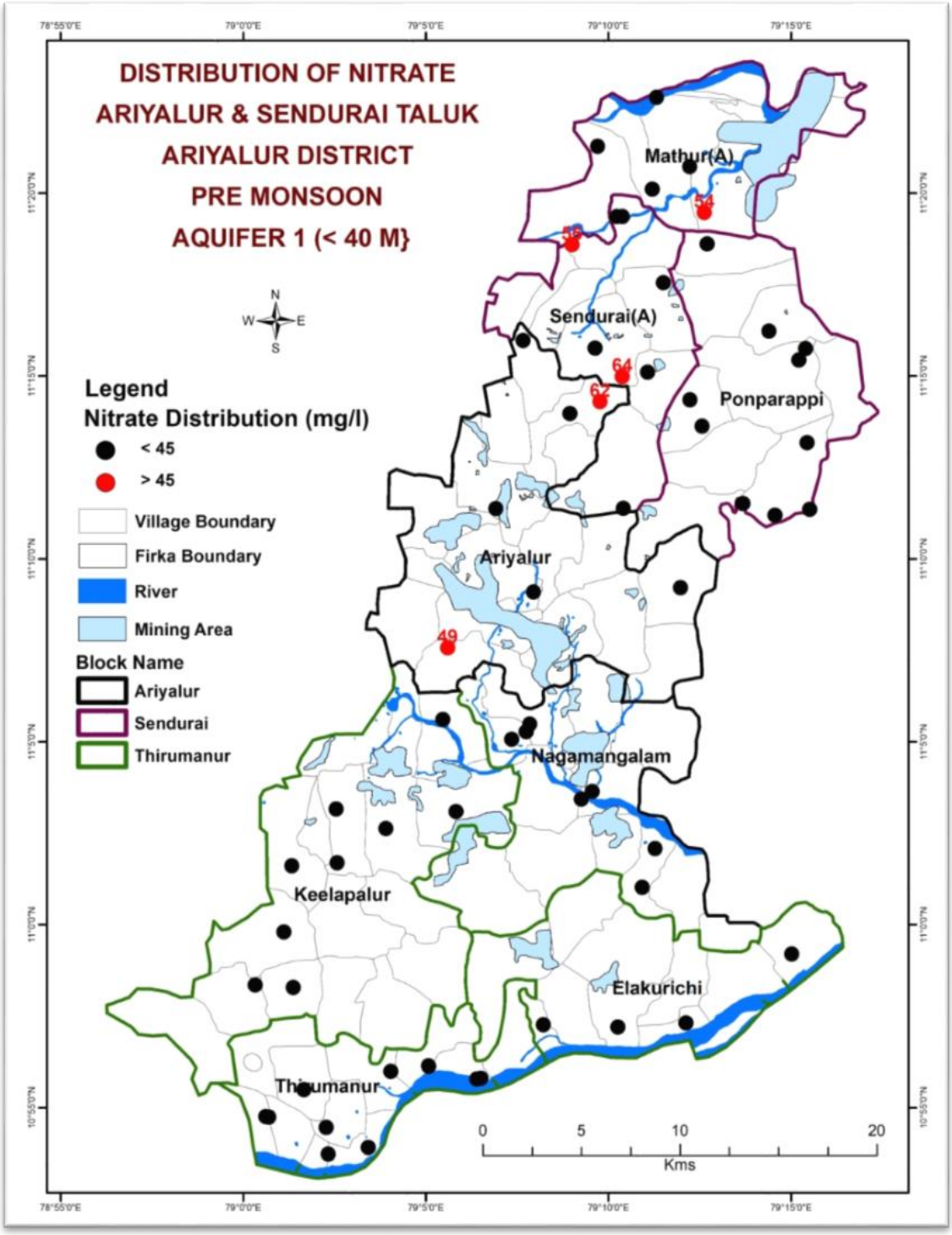


Fig 5.4. Distribution of Nitrate in Aquifer-I

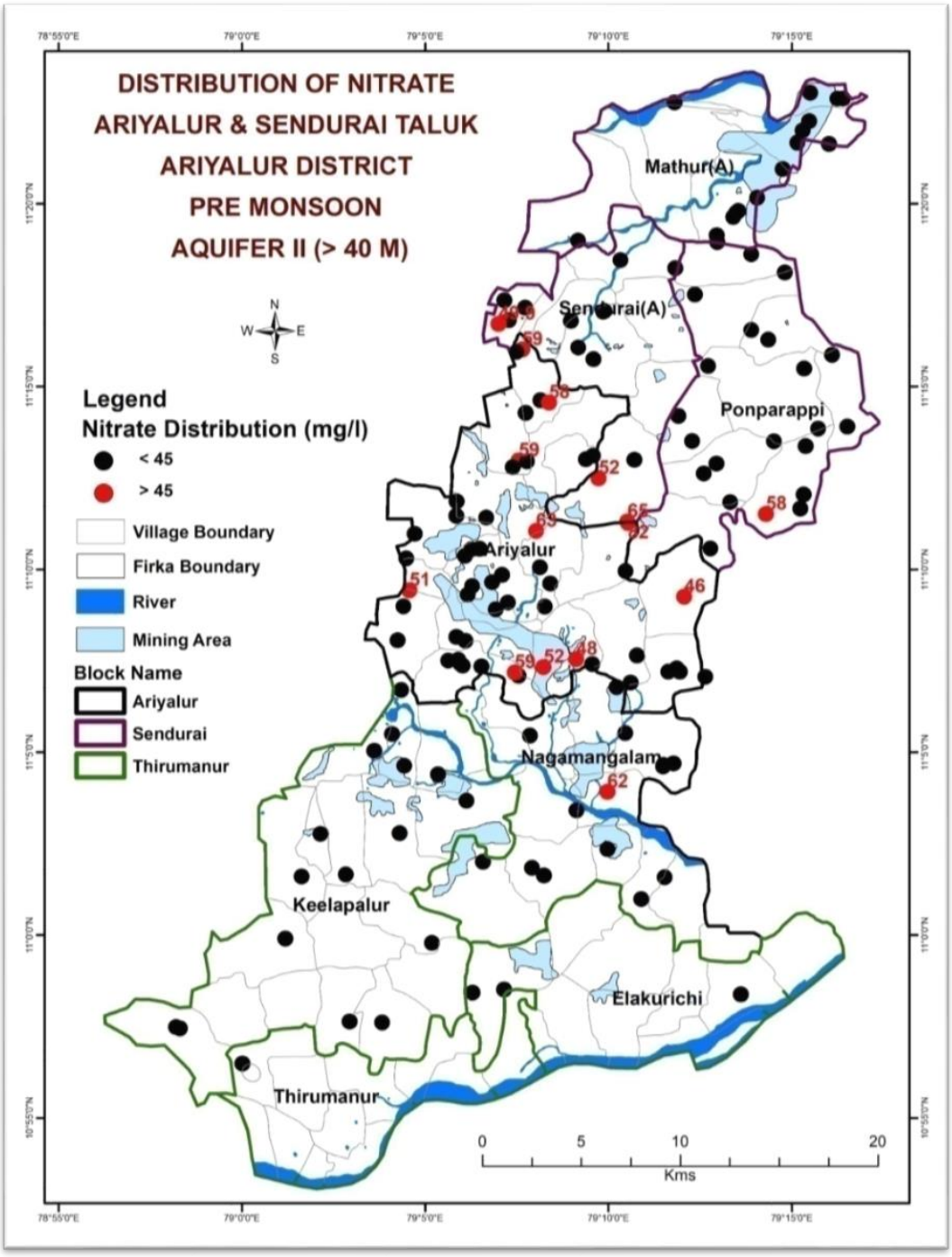


Fig 5.5. Distribution of Nitrate in Aquifer-II

5.10 Heavy Metals:

During May 2023, 118 acidified samples were also collected from the study area for heavy metal analysis. The samples were analyzed for copper, cadmium, nickel, iron, manganese, lead, zinc and chromium. The analytical results are given in annexure –V. Most of the samples, copper, lead, zinc, nickel and chromium were not detected (ND). The concentration of Manganese beyond the BIS permissible limit of 0.3 mg/L was noticed in 7 (6.7%) samples and all are from deeper aquifers. It may be due to geogenic contamination.

Iron is a common constituent in soil and ground water. It is present in water either as soluble ferrous iron or the insoluble ferric iron. Water containing ferrous iron is clear and colorless because the iron is completely dissolved. When exposed to air, the water turns cloudy due to oxidation of ferrous iron into reddish brown ferric oxide. The concentration of iron in natural water is controlled by both physico chemical and microbiological factors. It is contributed to ground water mainly from weathering of ferruginous minerals of igneous rocks such as hematite, magnetite and sulphide ores of sedimentary and metamorphic rocks.

The concentration of Iron more than the BIS permissible limit of 1.0 mg/L was observed in 9 samples, in which 8 samples are from Hand Pump and one sample from Bore well. It indicates that leaching of iron from casing and hand pump materials may also be one of the contributors for iron contamination in addition to geogenic origin. The distribution of Iron and Manganese are shown in **Fig 5.6 and 5.7** respectively.

All the samples collected for basic parameters from both aquifers were also analysed for uranium. The uranium concentration was ranged between BDL – 56.4 µg/L. All the samples were within the BIS permissible limit of 30µg/L, except one sample at Irungalakuruchi village from Sendurai block and the concentration of Uranium was 56.4µg/L.

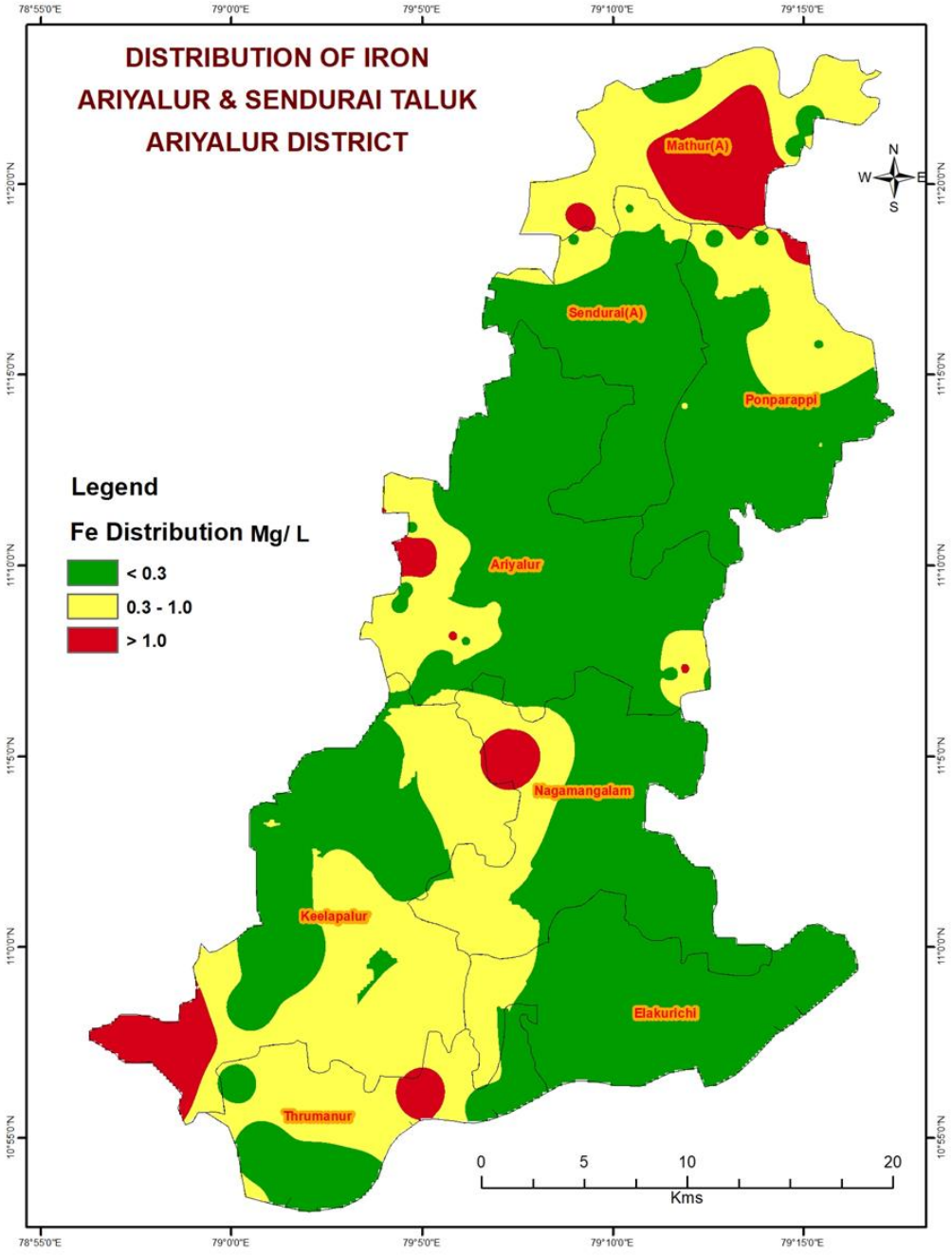


Fig 5.6. Distribution of Iron

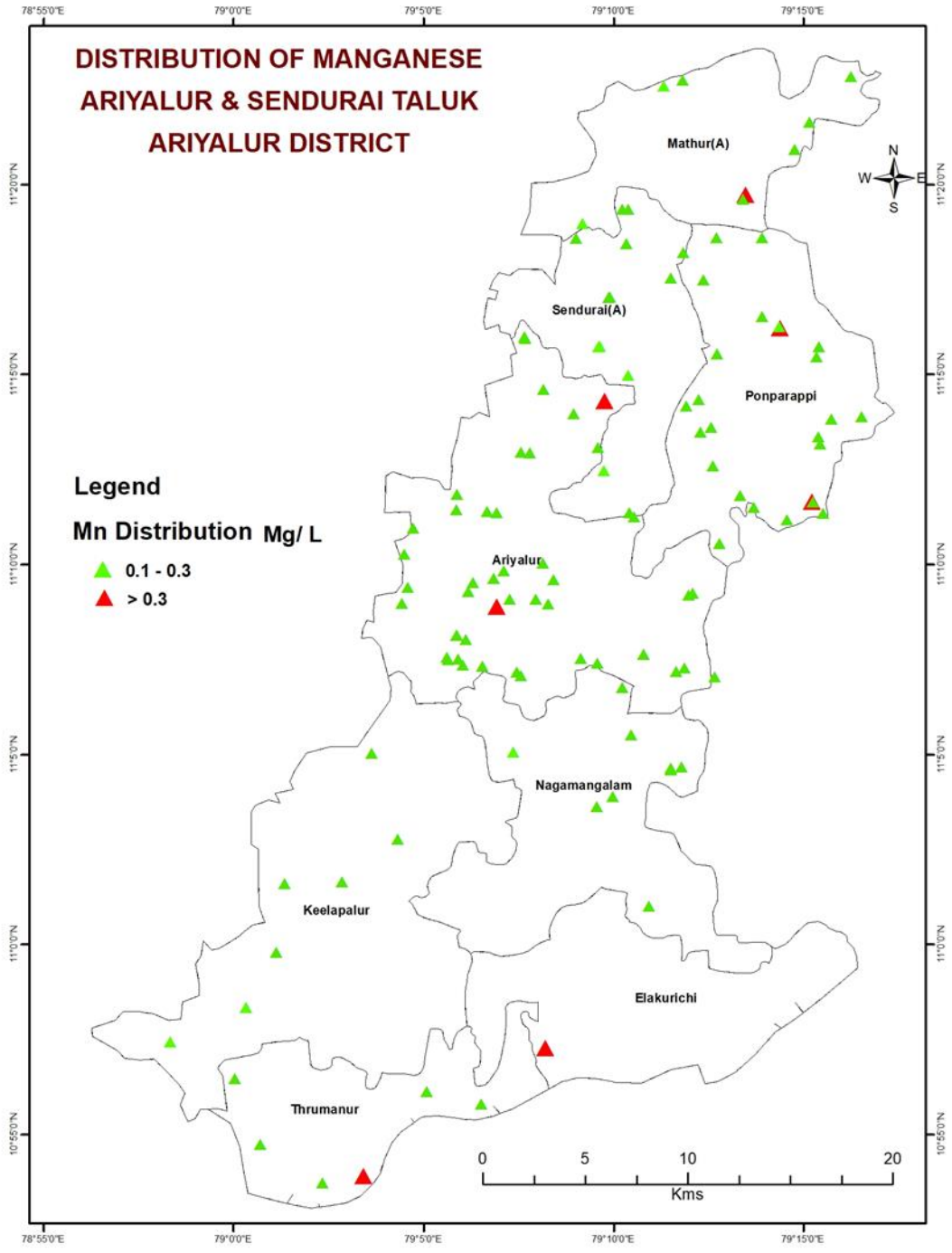


Fig 5.7. Distribution of Manganese

5.11 Sodium Absorption Ratio

The chemical quality of water is an important factor to be considered in evaluating its usefulness for irrigation purposes. Plants grown by irrigation absorb and transpire water but leave nearly all the salts behind in the soil, where they accumulate and eventually prevent plant growth. Excessive concentrations of solute interfere with the osmotic process by which plant root membranes are able to assimilate water and nutrients.

In areas where natural drainage is inadequate, the irrigation water infiltrating the root zone will cause water table to rise excessively. In addition to problems caused by excessive concentration of dissolved solids, certain constituents in irrigation water are especially undesirable and some may be damaging even when present in small concentrations. Irrigation indices viz. Sodium Adsorption Ratio (SAR) and Residual Sodium Carbonate (RSC) have been evaluated to assess the suitability of ground water for irrigation purposes.

In the irrigation water, it is characterized by absolute and relative concentrations of cations. If the sodium concentrations are high, the alkali hazard is high and if the calcium & magnesium levels are high, this hazard is low. The alkali soils are formed by the accumulation of exchangeable sodium and are characterized by poor tilt and low permeability. The U.S. Salinity laboratory has recommended the use of sodium adsorption ratio (SAR) as it is closely related to adsorption of sodium by the soil.

SAR is derived by the following equation:

$$SAR = \frac{Na^{+}}{\sqrt{\frac{Ca^{2+}Mg^{2+}}{2}}}$$

The water with regard to SAR is classified into four categories

- **S_1 – Low Sodium Water** (SAR <10)

Such waters can be used on practically all kinds of soils without any risk or increase in exchangeable sodium.

- **S_2 – Medium Sodium Water** (SAR 10-18)

Such waters may produce an appreciable sodium hazard in fine textured soil having high cation exchange capacity under low leaching.

- **S_3 – High Sodium Water** (SAR >18-26)

Such waters indicate harmful concentrations of exchangeable sodium in most of the soil and would require special management, good drainage, high leaching and addition of organic matter to the soil. If such waters are used on gypsiferrous soils the exchangeable sodium could not produce harmful effects.

- **S_4 – Very High Sodium Waters** (SAR >26)

Generally, such waters are unsatisfactory for irrigation purposes except at low or perhaps at medium salinity where the solution of calcium from the soil or addition of gypsum or other amendments makes the use of such waters feasible.

The computed SAR values ranges from 0.08 to 12.81 and 0.12 to 18.90 in aquifer I and II respectively. The maximum SAR value has been found at Thirumanur Block. It is observed that about 94% samples belong to excellent category (S_1) and only 1.6% water samples are associated with very high sodium category (S_4) and is unsuitable for irrigation.

6.0 Impact of Mining on Ground Water:

Human civilization is being thrived by innovative infrastructure development. Such development ensured by availability of affordable construction materials including iron, bricks, cement, etc., especially the role of cement in the infrastructure development is massive. For cement manufacturing lime stone is the primary source which comes from the mining of the earth and it is inevitable. In Tamil Nadu, Ariyalur is the hub of cement manufacturing industries and mining of High grade to low grade lime stone. In Ariyalur, 73 major mines and 7 minor mines exists which covers about 60 sq.km area in 48 Gram Panchayats in three Blocks namely Ariyalur, Sendurai and Thirumanur. These mines are open cast mines which directly affects the availability, movement of the ground water because of it its presence from ground level to > 40 mts at places.

In order measure the impact of these lime stone mining activities on ground water in the study area, intensive field work has been carried out; field photos are depicted in **Fig 6.1**. The field work revealed that due to mining activities most of dug wells in the vicinity of the mines and on the downstream side have dried up, out of 254 habitations, dried wells exist in 98 habitations (40 %). About 60% of dried dug wells of the depth range of 10 – 22 meters depth. The details of block wise habitations having dried wells and their statistical analysis are given in **Table 6.1 & 6.2.**

Fig 6.1. Ground truth verification in the mines

Table 6.1. Details of block wise habitations having dried wells

Block	No. of Habitation	No. of Habitation having Dry Wells	% of habitations with dry wells
Sendurai	93	29	31
Ariyalur	143	60	40
Thirumanur	18	9	50
Total	**254**	**98**	**38.5**

Table 6.2. Statistical analysis of the dry wells

Depth Range	No. Of Dry wells	Percentage
< 5 m	**5**	**4 %**
5 – 10	**45**	**36 %**
10 - 22	**75**	**60 %**

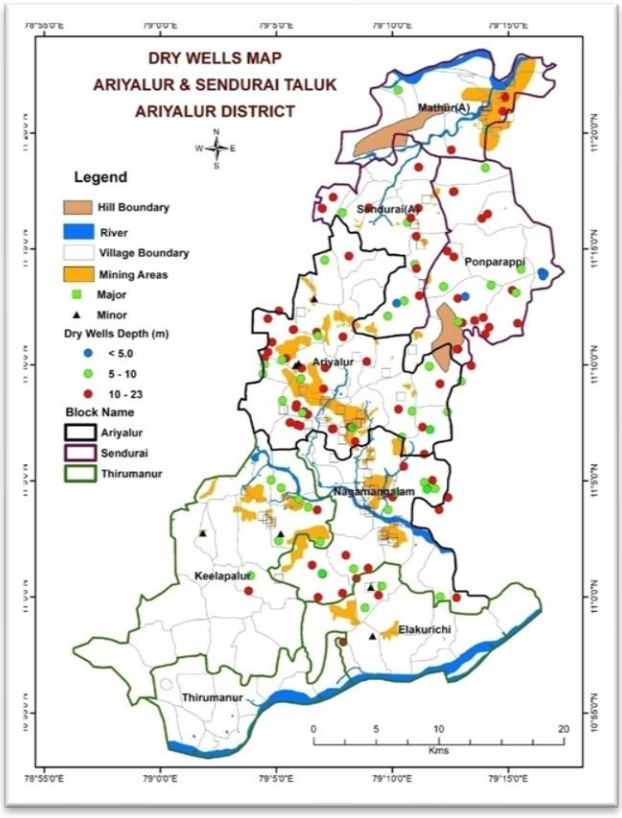


Fig 6.2. Dry Wells in the study area

The data on water withdrawal from the mining industries in Ariyalur, Sendurai and Thirumanur blocks collected from Department of Mining and Geology, Government of Tamil Naduhas revealed that most of the major mining industries mentioned the withdrawal of water from mining as surface water and not ground water. In order to figure out the reality ground truth verification has been carried out, which revealed that the ground water accumulated on the bottom of the mines and in the mine pits are claimed as surface water in the application submitted for NOC to dewater it.

6.1 Loss of Aquifer Material due to Mining of Limestone:

Ariyalur Limestone is an aquifer exists in unconfined condition. The mining of the Limestone is significantly affects the unconfined aquifer system. The average depth of the lime stone mines is ground level to 40 metre below ground level and it has been estimated that the total aquifer material (limestone) lost due to mining activities is 2272 Million Cubic Metre. The firka wise (smallest assessment unit / administrative unit in tamilnadu) aquifer material lost due to mining activities is given in **Table 6.3**.

Table 6.3. Firka wise aquifer material lost due to mining activities

Firka	Total no of GPs	GPs with mining activity	Volume of Aquifer material lost (Ham)
Ariyalur	18	16	78186
Elakurichi	10	5	13773
Keelapalur	16	8	34057
Mathur	11	4	53455
Nagamangalam	13	6	37406
Ponparappi	9	5	4637
Sendurai	8	4	5775
Total	**85**	**48**	**227290**
			2272 MCM

6.2 Estimation of dewatering from the Mines:

An attempt has been made to estimate the necessitate dewatering of ground water being collected in Mines by adopting the Darcy's Equation (Q = KiA). The estimated total volume of ground water withdrawal is about 33.83 MCM/Year. This estimate value has been arrived based on the following evaluated parameters –

Mining Area = 60 sq.km Perimeter = (2l + 2w) = 82.6 km (l=38.9 km, w = 1.5 km) K = 20 m/day Saturated thickness = 17 m Gradient = 3.3:1000

The block wise details are 8.57 MCM/year from Sendurai, 15.37 MCM/year from Ariyalur and 9.90 MCM/year from Thirumanur. Further, the total volume of ground water estimated in the limestone aquifer is 217 MCM. This has been estimated adopting the following equation.

Total volume of GW available in L. St Aquifer	=	Lst area x saturated thickness X Sy
(in the Study area)	=	(850 x 10^6sq m) x 17 m X 0.015
	=	216750000 cubic meter = 217 MCM

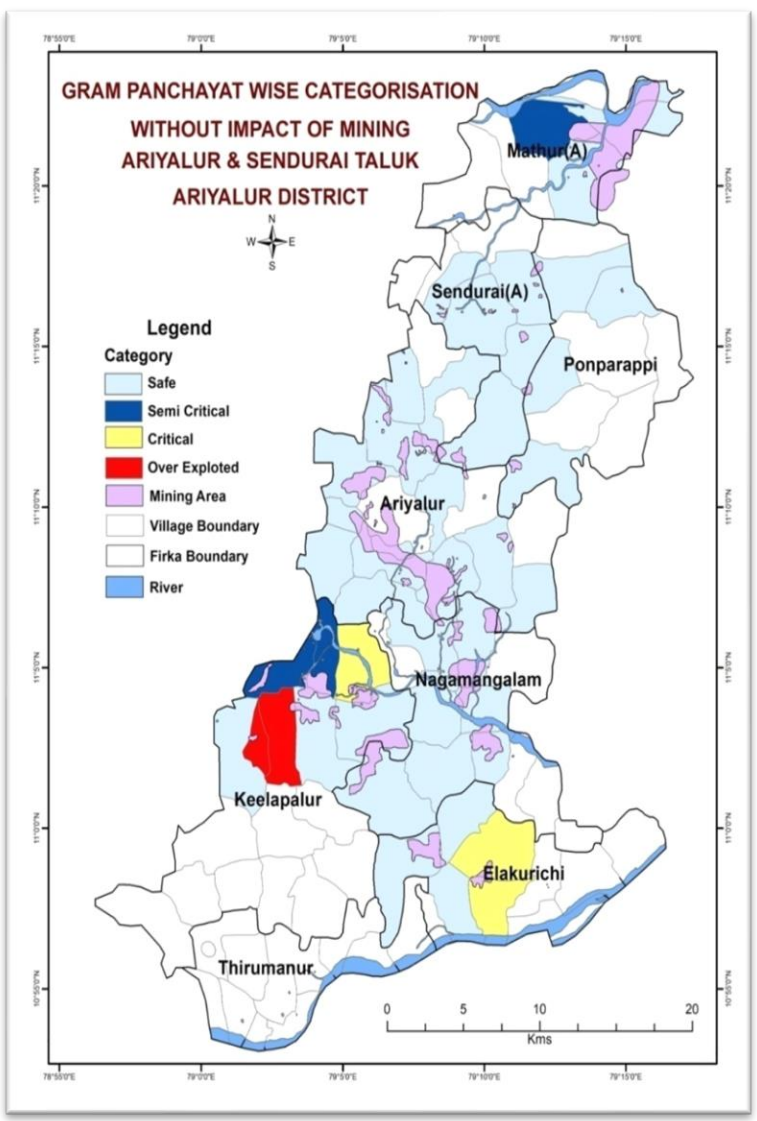
6.3 Deciphering the effect of Mining on Ground water resource:

The dewatering of the ground water has devastating effect on the ground water resource. The dynamic ground water resource of 2023 for the following firkas having mining activities has been re-estimated based on the impact of dewatering from the mines. The re-estimation revealed that two firkas namely Ariyalur and Sendurai have been re-categorisated as Over exploited from safe and critical categories respectively. Further, Mathur firka re-categorised as semi-critical from Safe and baring Thirumanurfirka, all the firkas have been significantly affected due to mining activities. The

assessment unit wise details are given in **Table 6.4.** The categorisation map of mining areas are given in **Fig 6.2** and the pictorial representation of change in categorization are given in **Fig 6.3.**

Table 6.4. Firka wise impact of mining on GWRA

Sl.No	Assessment Unit	Annual Extractable Ground Water Resource (Ham)	Ground Water dewatered during mining activities(Ham)	Total Extraction after modification (Ham)	Stage of Ground Water Extraction (%)	Categorization	Stage of Ground Water Extraction after modification (%)	Categorization after modification
1	ARIYALUR	2412.3	1172.8	2468.8	53.7	safe	102.3	Over-Exploited
2	ELAKKURICHI	3704.91	206.6	1435.7	33.2	safe	38.8	Safe
3	KEELAPALUR	3253.98	510.9	2228.0	52.8	safe	68.5	Safe
4	NAGAMANGALAM	2691.63	561.1	1758.6	44.5	safe	65.3	Safe
5	THIRUMANUR	2856.56		1170.0	41.0	safe	41.0	Safe
6	MATHUR(A)	2514.91	801.8	2104.6	51.8	safe	83.7	Semi-Critical
7	PONPARPPI	1478.32	69.6	486.3	28.2	safe	32.9	Safe
8	SENDURAI(A)	1011.65	86.6	1029.8	93.2	critical	101.8	Over-Exploited



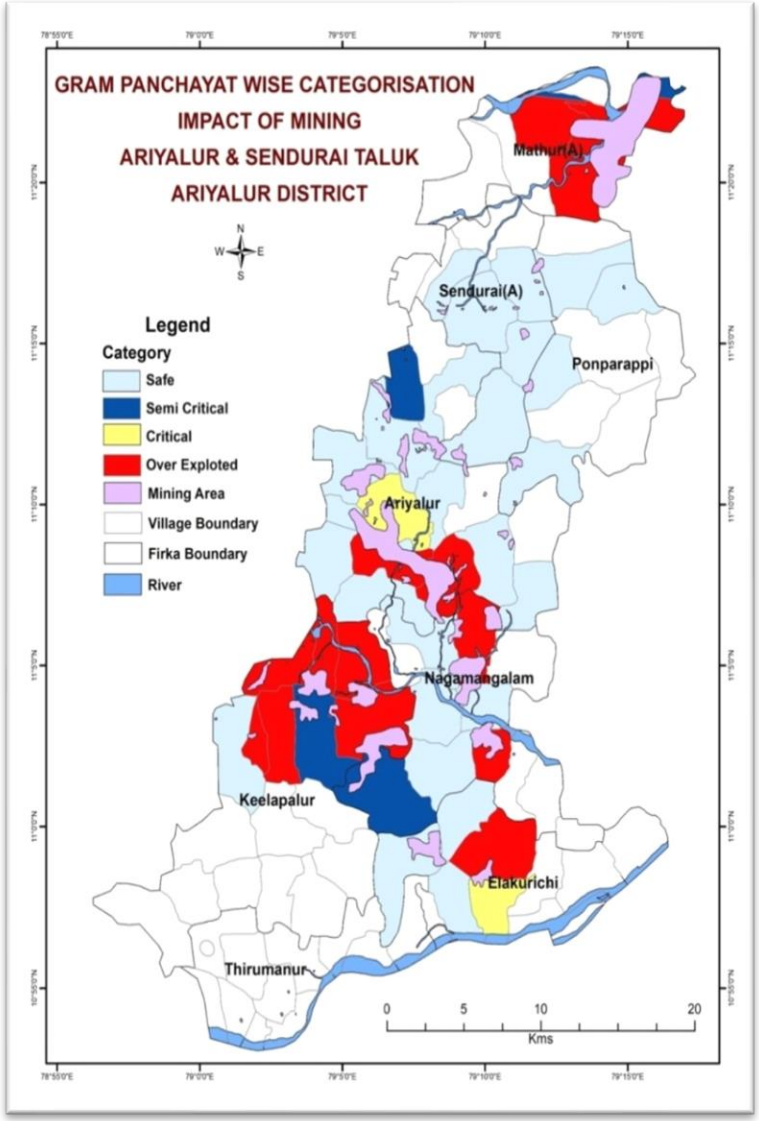


Fig 6.2. Categorisation map of mining areas

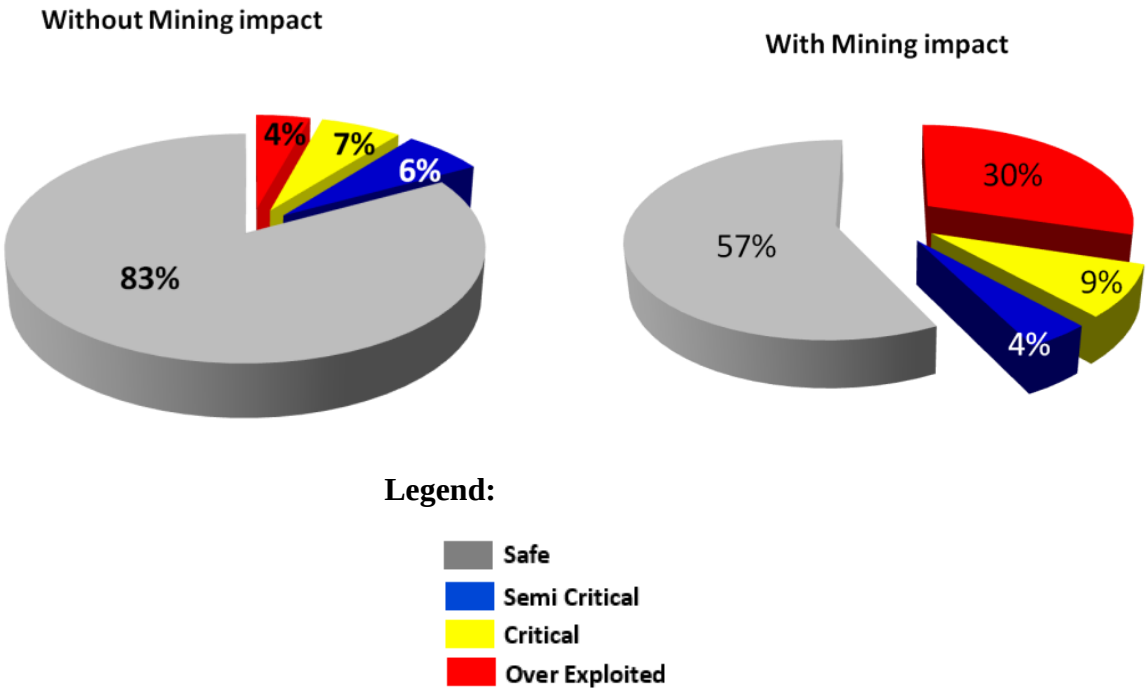


Fig 6.3. Pictorial representation of change in categorization

6.4 Effect of mining activities on the deeper aquifer of the study area:

In the year 2010, CGWB has constructed an exploratory well in Kallakurichi, T Palur Block of Ariyalur District which was in artesian condition with manometer reading of 2.7 meter above mean sea level (amsl). The artesian nature of the well has slowly reduced from 2.7 mamsl in 2010 to 6.1 mbgl in 2024, and loss of peizometric head of about 8.8 m in 15 years. The mining activities in the study area has created tremendous stress on the unconfined aquifer leading to drying up of the once saturated aquifer, which eventually leads people to search water from the deeper aquifer system which made the deeper aquifer gradually being exploited indiscriminately. The total estimated volume of ground water lost from the deeper aquifer is about 112 MCM which is 120% of the total extraction from study area while comparing the dynamic ground water resources 2023. The artesian condition of the well is depicted in the **Fig 6.4.**

Fig 6.4. Change of artesian condition to non-artesian condition of the exploratory well

7.0 Delineation of recharge and discharge areas:

In GIS platform, various data including Aquifer-wise Contours of water table, DEM (SRTM, ASTER) R L Survey data Toposheet, Google Map, Satellite Data (TM-7/8 or LISS-III) for drainage & water body mapping Land have been incorporated adopting standard methodology. The recharge and discharge area have been demarcated and the map is depicted in **Fig 7.1**. The recharge worthy area falls under 68 Gram Panchayats of the study area and the area delineated for recharge of ground water is 566 sq. km which represent 57% of the study area. About 90 sq. km (15%) area have been demarcated for the recharging the deeper aquifer in the study area. The discharge area also has been delineated in the study area which is 69 sq. km. (7%).

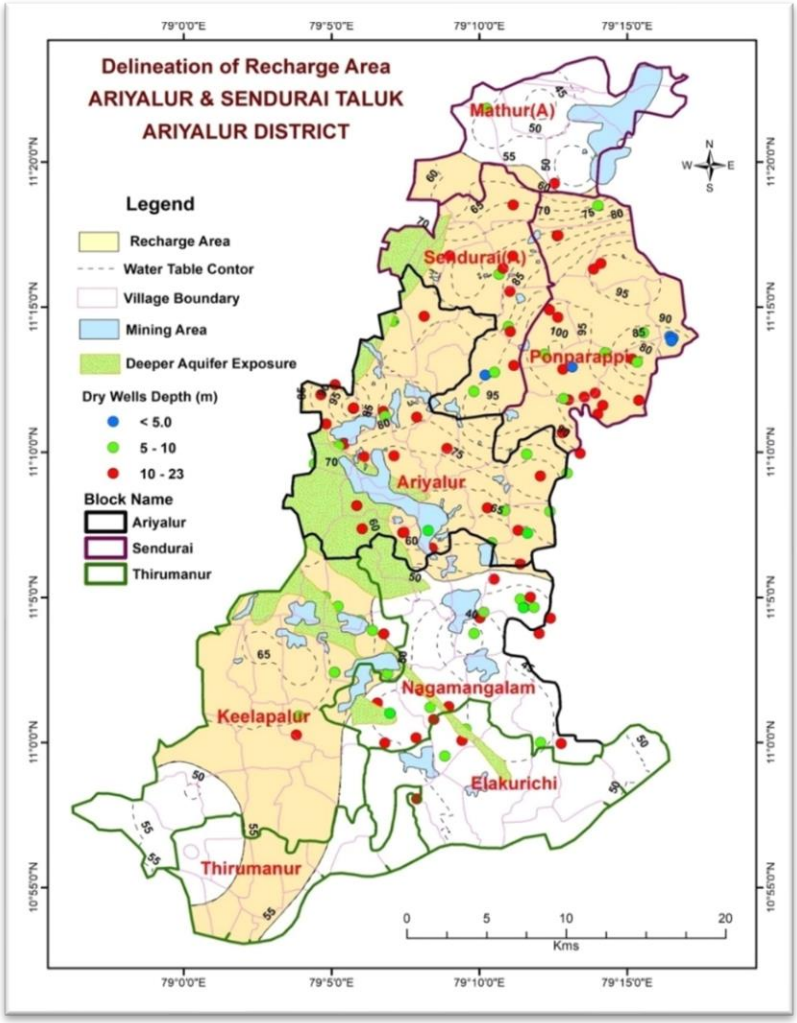


Fig 7.1. Delineation of Recharge and Discharge area

8.0 Sustainable Ground Water Management:

Sustainable Ground water management in the mining areas is crucial and an arduous task. Since, the study area comprises of open cast mining which results loss of the phreatic aquifer material which in turn significantly reduced the scope of recharging it in the mining areas. Hence, as a major supply side intervention is the conversion of all the abandoned mines into recharge sanctuaries with recharge shafts which will recharge the deeper aquifer. The design is depicted in the **Fig 8.1**.

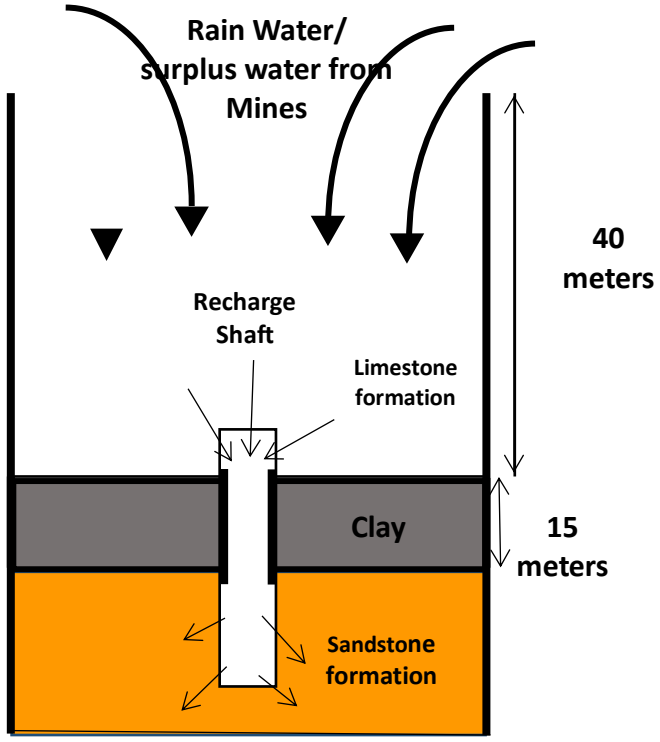


Fig 8.1. Recharge Shaft design

In areas other than mining activities, various recharge structures is envisaged which is presented in **Table 8.1** and the map showing locations for recharge structures are depicted in **Fig 8.2**.

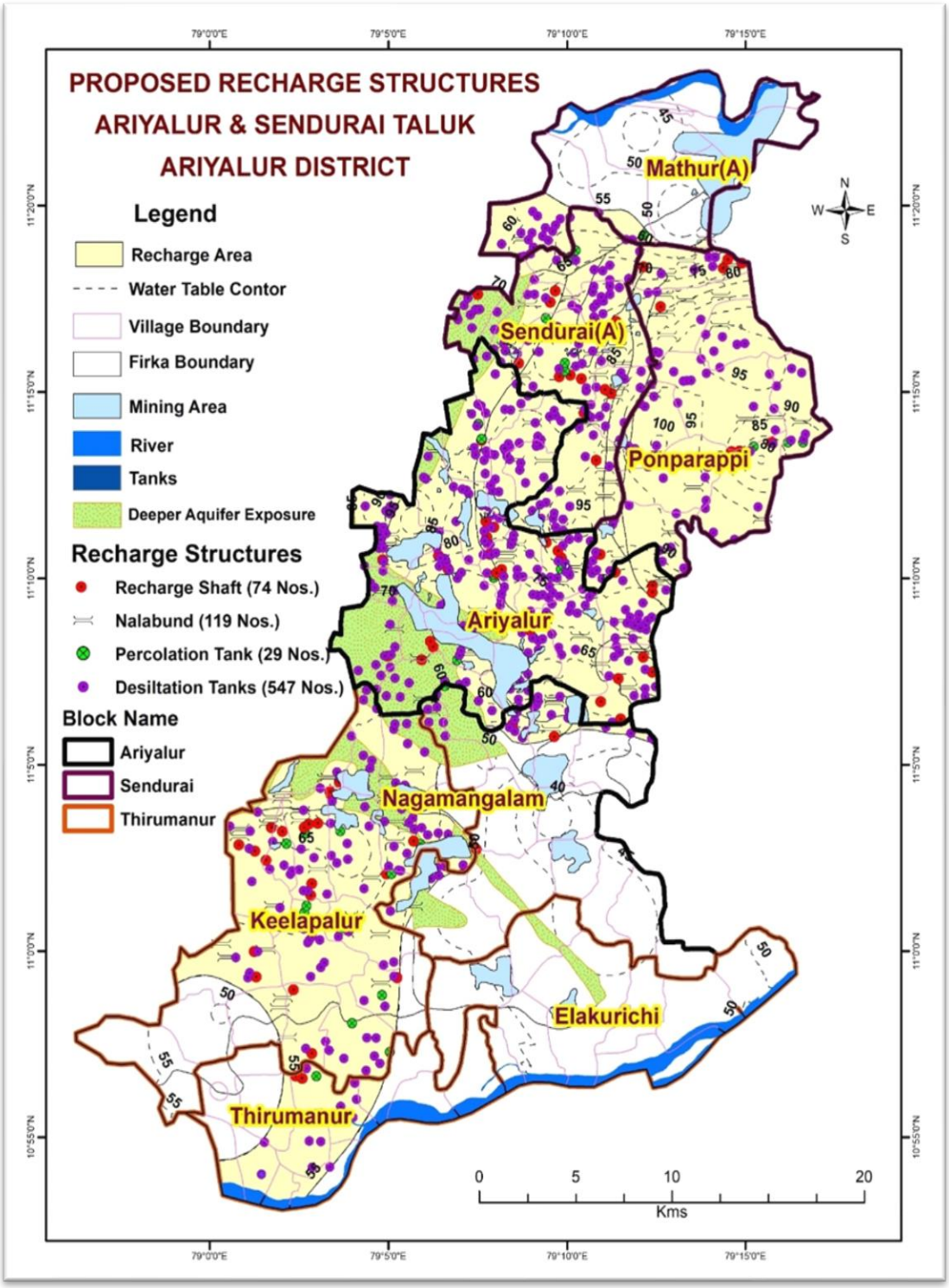


Fig 8.2. Proposed recharge structures in Ariyalur and Sendurai Blocks

Total No. of Gram Panchayat	**103**
Total Area (Sq.Km)	**991**
No. of Gram Panchayat delineated for Recharge	**68**
Area delineated for Recharge (Sq.km)	**566 (57%)**
Area of Deeper Aquifer Exposure within the Recharge area (Sq.km)	**92 (15%)**
Area delineated for Discharge (Sq.km) & Percentage	**69 (07%)**

Table 8.1. Recharge structures proposed in areas not associated with mining activities

S. No.	Recharge Structures/Measures	No.s	GPs
1	Recharge shaft	74	36
2	Desiltation of Tanks	547	60
3	Nalaband	119	48
4	Percolation Tanks	29	20

As elucidated above, the mining is inevitable for mankind development. However, ensuring minimum damages to the environment shall be mandatory. This is possible through various interventions and regulations. The demand side management are as follows –

1. Strengthening the policies by making the recharge Sanctuaries as mandatory while granting the No Objection Certificate (N.O.C.) is one of the regulations measure.

2. Motivate industrialists to utilise the C.S.R. fund for ground water recharge activities in these areas.

9.0 Conlcusions and Recommendations:

- Study are comprises of 103 Gram Panchayats in 8 Firkas namely Sendurai, Ariyalur, Ponparappi, Mathur, Keelpalur, Elakurichi, Thirumanur and Nagamangalam in Sendurai, Ariyalur and Thirumanur Blocks of Ariyalur district with an area a total of 991 Sq.km.

- The study area falls under Cauvery River Basin (Lower Cauvery) &Vellar-Paravanar.

- All the rivers except Cauvery are ephemeral in nature, Vellar river forms the northern boundary of the study area. Marudhaiyar river originates from south west of Perambalur town and flows towards east crossing the Ariyalur district and mergeswith river Coleroon.

- The primary objectives of the study area are 1. Demarcation of Gram Panchayat wise aquifer dispositions & ground water quality, 2. Impact of Mining activities, 3. Delineation of Recharge and Discharge Areas and 4. Preparation of Sustainable Management Plans.

- To accomplish the objectives mentioned above, Gram Panchayat wise various works have been carried out which include Hydrogeological investigations, intensive well inventory, Geophysical survey, Exploratory wells, GW Quality survey, Mines survey, Farmers feedback and data collection from various state agencies.

- The most of the study area is underlined by Cretaceous, Tertiary formations and Quaternary deposits. The southern part of the study area underlined by Archean formations.

- A total of 51 VES and 127 TEM were carried out in the study area. The first layer is showing a resistivity in the range of 1.1 to 320 Ohm.m. with the thickness ranges from thickness in the range of 0.6 to 3.5m.

- The resistivity of the second layer ranges from 1.3 to 141 Ohm.m. and extended up to 30m. The third layer ranges from 2.93 to 90.7 Ohm.m. and extended up to a depth of 80m. The fourth layer resistivity ranges from 3.5 to 15.4 Ohm.m. extended up to a maximum depth of 300m.

- In Hard formations, the first layer resistivity ranges from of 1.1 to 320 Ohm.m. with a maximum thickness of 0.8 to 3.5 which can be considered as Top soil. This is followed by a resistivity in the range of 3 to 44 Ohm.m. extended up to a maximum depth of 17m. which is the weathered formation. This is followed by a layer with a resistivity in the range of 7.9 to 177 extended to a maximum depth of 140m. which are considered as fractured formation in nature. The bottom most layer is considered as massive formation due to high resistivity.

- In sedimentary formation, two aquifer systems have been identified. Sandstones, Shale, Limestones and Laterite of different age group being Aquifer I ranging from 2 to 65 mts with discharge ranges from 9K to 50 K Litres/Hour. The aquifer unit comprises of Sandstones with intercalations of shale and clay deposited in the different age period being Aquifer II ranging from 45 – 700 mts with discharge ranges from 20K to 160K Litres/Hour.

- In hard formation, the occurrence of Ground Water is limited to top weathered, fissured and fractured zone which extends to maximum 30 m on an average it is about 10-15 m.

- During pre-monsoon, the depth to Water levels in Aquifer I ranging from 1.20 mbgl to 14.7 m bgl, 57% of the study area falls between 10 and 20 mbgl. In post-monsoon, the depth to Water levels ranges from m bgl to m bgl, about 58% of the study area falls between 10 and 20 mbgl.

- Delineation of recharge and discharge areas have been carried out. The recharge worthy area falls under 68 Gram Panchayats of the study area and the area delineated for recharge of ground water is 566 sq. km which represent 57% of the study area. About 90 sq. km (15%) area have been demarcated for the recharging the deeper aquifer in the study area. The discharge area also has been delineated in the study area which is 69 sq. km. (7%).

- Gram Panchayat wise Ground Water Resource Assessment has been carried out. Out of 103GPs, GPs have been categorized as Over-Exploited, as Critical, as Semi-Critical and remaining are Safe.

- In the study area, 73 major mines and 7 minor mines exists which covers about 60 sq.km area in 48 Gram Panchayats. The study area is a hub of cement manufacturing industries and mining of High grade to low grade lime stone.

- Out of 254 habitations, dried wells exist in 98 habitations (40 %) and about 60% of dried dug wells of the depth range of 10 – 22 meters depth.

- It has been estimated that the total aquifer material (limestone) lost due to mining activities is 2272 Million Cubic Metre. The total volume of ground water permanently lost has been estimated as is 217 MCM.

- The estimated total volume of ground water withdrawal by the mining industries is about 34 MCM/Year. The Block wise withdrawal is 8.57 MCM/year from Sendurai, 15.37 MCM/year from Ariyalur and 9.90 MCM/year from Thirumanur.

- The re-estimation of Ground Water Resource revealed that two firkas namely Ariyalur and Sendurai have been re-categorisated as over exploited from safe and critical categories respectively. Mathur firka re-categorised as semi-critical from Safe.

- The total estimated volume of ground water lost from the deeper aquifer is about 112 MCM which is 120% of the total extraction from study area while comparing the dynamic ground water resources 2023.
- In Premonsoon, out of total 63 nos. ground water samples, 4 samples (6%) have EC more than 3000 µs/cm. 18 (29%) sample have Magnesium more than BIS permissible limit, whereas 5 (8%) samples have Nitrate and 7 (12%) sample have Fluoride above permissible limit

- During Postmonsoon, out of total 144 nos. ground water samples, 6 samples (4%) have EC more than 3000 µs/cm. 18 (12%) samples have Magnesium more than BIS permissible limit, whereas 15 (10%) samples have Nitrate and 11 (8%) samples have Fluoride above permissible limit

- The concentration of Manganese beyond the BIS permissible limit of 0.3 mg/L was noticed in 7 (6.7%) samples and all are from deeper aquifers.

- The computed SAR values ranges from 0.08 to 12.81 and 0.12 to 18.90 in aquifer I and II respectively. The maximum SAR value has been found at Thirumanur Block. It is observed that about 94% samples belong to excellent category (S_1) and about 2% water samples are associated with very high sodium category (S_4) and is unsuitable for irrigation.

9.1 Management Plans:

- A total number of 74 nos. recharge shafts in 36 GPs, 547 nos. of desiltation of Tanks in 60 GPs, 119 nos. of Nalaband in 48 Gps and 29 nos. of Percolation Tanks in 20 Gps have been envisaged in the areas other than Mining activities in the study area.

- Conversion of all the abandoned mines into recharge sanctuaries with recharge shafts which will recharge the deeper aquifer.

- Policies should be strengthened by making the establishment of recharge sanctuaries a mandatory condition for granting the No Objection Certificate (N.O.C.) to mining industries.

- Motivate industrialists to utilise the C.S.R. fund for ground water recharge activities in these areas.

Annexure: I

Table 3.4. Water level data collected during NAQUIM 2.0 stuides

Sl.No	Location Name	Latitude	Longitude	Type of Well	Depth in Meter	May 2023 (mbgl)	January, 2024 (mbgl)
1	Siruvalur	11.087908	79.12909	D.W	8.35	2.05	2.00
2	Pudupalayam	11.09137	79.130692	D.W	12.30	3.23	4.03
3	Arungal Colony	11.016736	79.116136	D.W	6.60	6.60	6.60
4	Andipattakadu	11.016994	79.18204	D.W	4.15	0.72	1.20
5	Manakkal	11.191959	79.09569	D.W	14.08	14.08	14.08
6	Ottakoil	11.189542	79.115222	D.W	15.75	9.36	11.60
7	Pottavalli	11.232942	79.14904	D.W	10.60	7.46	8.37
8	Kayarlapath	11.135958	79.097426	D.W	14.70	14.70	14.70
9	Srinivasapuram	11.164472	79.118397	D.W	10.97	10.97	10.97
10	Mankudi	11.151515	79.132496	D.W	7.30	1.63	7.30
11	Valajanagaram	11.126134	79.093349	D.W	12.70	4.21	5.70
12	Venkatakrishnapuram	11.122697	79.100482	D.W	10.50	10.50	10.50
13	Asthinapuram	11.120493	79.124118	D.W	14.10	14.10	14.10
14	Periyanagular	11.121625	79.13767	D.W	9.21	9.21	9.21
15	Periyathirukonam	11.06062	79.159228	D.W	9.75	4.90	5.00
16	Nagamangalam	11.07729	79.191434	D.W	9.80	9.80	9.80
17	Vilangudi	11.120082	79.193722	D.W	5.90	5.90	4.35
18	Kavanur	11.153508	79.199563	D.W	7.10	1.50	3.25
19	Anandawadi	11.189673	79.173508	D.W	8.30	2.51	4.15
20	Sokkanadapuram	11.266125	79.127687	D.W	12.19	5.60	11.30
21	Keelamaligai	11.262485	79.25661	D.W	14.36	7.48	12.50
22	Ponparapi	11.270455	79.23989	D.W	15.40	1.67	2.60
23	Kumuliam	11.18659	79.242717	D.W	13.71	5.10	5.90
24	Paranam	11.189268	79.258544	D.W	10.20	3.15	4.20

Annexure: I

Table 3.4. Water level data collected during NAQUIM 2.0 stuides

Sl.No	Location Name	Latitude	Longitude	Type of Well	Depth in Meter	May 2023 (mbgl)	January, 2024 (mbgl)
25	Pilakurichi	11.2196615	79.257348	D.W	9.55	6.00	6.35
26	Sendurai	11.249789	79.173	D.W	18.28	2.50	3.30
27	Nakkambadi	11.26272	79.160562	D.W	11.06	1.43	2.80
28	Kulumur	11.309875	79.149975	D.W	13.00	10.20	7.20
29	Nallampalayam	11.239177	79.203843	D.W	15.50	4.28	7.27
30	Unjini	11.227126	79.209345	D.W	11.58	9.91	11.10
31	Irumbulikurichi	11.191849	79.227992	D.W	8.70	2.08	4.37
32	Melapulur	11.052738	79.042405	D.W	14.00	5.78	11.55
33	Keelapalur	11.043783	79.06516	D.W	8.80	1.91	3.90
34	Malathankulam	11.028148	79.042753	D.W	12.90	4.15	5.00
35	Poondi	11.026856	79.022083	D.W	20.50	2.45	11.70
36	Anginoor	10.99661	79.018495	D.W	10.50	5.80	7.50
37	Venganur	10.972481	79.005345	D.W	9.80	2.85	6.50
38	Melakarupur	11.051567	79.097055	D.W	19.20	3.80	11.55
39	Rangasamudram	11.093508	79.09105	D.W	15.00	2.00	4.55
40	Sendurai (S)	11.249922	79.173287	D.W	1.28	1.28	2.72
41	Ponparapi (S)	11.270333	79.23997	D.W	1.84	1.84	1.70
42	Maruthur (S)	11.261018	79.271767	D.W	4.68	4.68	3.82
43	Kadugur (S)	11.168686	79.148234	D.W	4.09	4.09	3.95
44	Ayan Athur (S)	11.17049	79.171552	D.W	1.97	1.97	1.80
45	Kattuprangaym (S)	11.113694	79.14106	D.W	5.68	5.68	9.19
46	Kelapalur (S)	11.04294	79.06987	D.W	2.61	2.61	1.33
47	Puththur (S)	11.005029	79.062508	D.W	2.83	2.83	1.52

(S)State Govt. Wells

Annexure: II

Details of Exploratory wells in the Study Area

Sl. No	Village Name	Block Name	Latitude	Longitude	Depth Drilled m bgl	Depth of Construction in mbgl	Zones Tapped m bgl	Major Geology	Discharge in LPS
1	Marudur	Sendurai	11.2667	79.2750	154.53	120.27	56.63-65.01, 67.75-75.28, 93.87-104.42, 110.58-117.19	SandClay, Cuddalore Sandstone with Calcareous nature at bottom	38
2	Ariyalur	Ariyalur	11.1333	79.0750	450	289	154-160, 199-205, 240-246, 252-258,282-288	Alternate layers of sand, Sandstone, Clay	3.34
3	Venkatanarayanapuram	Ariyalur	11.0072	79.1125	728.50	363	99-106, 152-168, 196-227, 237-250, 287-292, 298-301, 315-318,348-360	Cuddalore, Sandstone with clay intercalations	6.89
4	Sendurai	Sendurai	11.2497	79.1778	150	143	134-140	Clay, Sand & limestone	2.11
5	Maruvathur	Sendurai	11.259	79.217	79	79	32-38, 60-66	Sandstone, Clay and Limestone	3.14
6	Tular	Sendurai	11.310	79.231	64	64	56-62	Sandstone and Limestone	2.1
7	Orathur	Ariyalur	11.105	79.190	226.5	225	40-46, 90-93, 200-206, 209-212, 217-220	Sandstone, Sticky clay and Limestone	3.14

8	Sennivanam	Ariyalur	11.2085	79.162	301.50	300	206-212, 230-236, 240-246, 261-267	**Annexure: III (a)** Clay and Limestone	0.07

Summarized results of ground water quality and its suitability as per BIS 10500: 2012 (Aq-I)

Parameters	**Min**	**Max**	**Average**	**BIS limits (10500:2012)**	**Desirable limits**		**Above permissible limit**	
					No of Samples	**%**	**No of Samples**	**%**
pH	6.8	8.5	7.4	6.5-8.5	59	94	4	6
Electrical Conductivity	126	5900	1459	750 -3000 µs/cm	59	94	4	6
Total Hardness	55	1210	457	300-600, mg/l	48	76	15	24
Calcium	16	272	66	75-200, mg/l	62	98	1	2
Magnesium	4	202	71	30-100, mg/l	45	71	18	29
Sodium	1	612	118	NA	NA	NA	NA	NA
Potassium	0.1	89.6	12.8	NA	NA	NA	NA	NA
Carbonate	0	9	0	NA	NA	NA	NA	NA
Bicarbonate	24	720	305	NA	NA	NA	NA	NA
Chloride	18	1496	242	250-1000, mg/l	62	98	1	2
Sulphate	7	432	131	200-400, mg/l	60	95	3	5
Nitrate	1	64	18	45-45, mg/l	58	92	5	8

Fluoride	0.12	1.91	0.88	1.0-1.50, mg/l	56	88	7	12
Uranium	0.0	28.1	6.2	30 µg/l	63	100		

Annexure: III (b)

Summarized results of ground water quality and its suitability as per BIS 10500: 2012 (Aq-II)

Parameters	Min	Max	Average	BIS limits (10500:2012)	Desirable limits		Above permissible limit	
					No of Samples	%	No of Samples	%
pH	6.8	8.2	7.3	6.5-8.5	142	99	2	1
Electrical Conductivity	188	7140	1443	750 -3000 µs/cm	138	96	6	4
Total Hardness	70	1680	424	300-600, mg/l	123	85	21	15
Calcium	16	288	79	75-200, mg/l	141	98	3	2
Magnesium	6	233	55	30-100, mg/l	126	88	18	12
Sodium	2	1021	135	NA	NA	NA	NA	NA
Potassium	0.6	121.9	11.3	NA	NA	NA	NA	NA
Carbonate	0.0	0.0	0.0	NA	NA	NA	NA	NA
Bicarbonate	24	732	294	NA	NA	NA	NA	NA
Chloride	14	1659	219	250-1000, mg/l	142	99	2	1
Sulphate	7	884	171	200-400, mg/l	137	95	7	5
Nitrate	1	82	26	45-45, mg/l	129	90	15	10
Fluoride	0.1	1.9	0.9	1.0-1.50, mg/l	133	92	11	8
Uranium	0.2	56.4	6.9	30 µg/l	144	100	0	0

Annexure: IV (a)

Farmer's Feedback

Sl. No	Farmer Name	Village	Block	Address	Mob.No	Structure Type	Latitude	Longitude	Drill time discharg	Structure Depth in Meter	Depth of	Casing depth	Fracture	Slotted pipe	Slotted pipe To in	Pre mansoon	Post mansoon	The well is used for	is water available through the year	Rabi (no of months to be specified)	Kharif (no of months to be	Rabi (Area Irrigated & Type of crop taken)	Kharif (Area Irrigated & Type	Problem with water	Geology
1	A. Duraiswamy, S/O Elavarasan	Keelavilangudi	Ariyalur	211/4, Keelavilangudi (Post) Vilangudi	9751026825	Bore Well	11.113616	79.215144	2.5	97.54	85.34	N.A		45.72	48.76	60.96	76.2	Irrigation & Domestic	Yes	12 hrs 3 months	12 hrs 3 months	10 acrs Groundnut, drumstick, bringal,	Ground nut - 10 acrs	-	sand stone
2	Ganesan S/o Subramanian	Vilangudi	Ariyalur	114-1, 5 Vilangudi	9940742929	Bore Well	11.112408	79.202839		158.50	97.54	N.A		67.05	158.4	76.2	88.39	Irrigation	Yes	24 hrs 3 months	-	1 acrs - Rice, 2.5 acrs - Sugarcane	-	Kindney stone Problem	sand and silt
3	Palaniyandi S/o Thangaraj	Hasthinapuram	Ariyalur	Post Hasthinauram, North Street	9944877415	Bore Well	11.111147	79.120938	2.2	45.72	44.20	6.10	30.48	-	-	38.1	15.24	Irrigation	Yes	-	1/2 hrs for 3 months	-	Sugar cane	Limestone in water	sand stone
4	Vinod S/o Arumugam	Srinivasapuram	Ariyalur	Srinivasapuram, Kallankurichi via - 621705	9597571955	Bore Well	11.164953	79.102738	1	91.44	70.10	N.A	21.336	-	-	60.96	45.72	Irrigation	April, May, June not sufficient but remaining months ok	5 hrs 3 months	10 hrs 4 months	2 Acrs sugarcane	3 acrs Rice	Kindney stone Problem & Dust	sand and silt
5	Sadasivam Raja S/o Muthuswamy	Ariyalur North	Ariyalur	Ariyalur North, Ethiruthukarapatti	9524594274	Bore Well	11.154649	79.073041	0.17	228.60	121.92	9.	91.44	-	-	143.2	128.0	Irrigation	November to January not	6 hrs 3 months	6 hrs 3 months	1 Acrs - Mattu theni	1 Acrs - Mattu theni	-	sand stone

Sl. No	Farmer Name	Village	Block	Address	Mob.No	Structure Type	Latitude	Longitude	Drill time discharg	Structure Depth in Meter	Depth of	Casing depth	Fracture	Slotted pipe	Slotted pipe To in	Pre mansoon	Post mansoon	The well is used for	is water available through the year	Rabi (no of months to be specified)	Kharif (no of months to be	Rabi (Area Irrigated & Type of crop taken)	Kharif (Area Irrigated & Type	Problem with water	Geology
												14							sufficient			(Pilpannai)	(Pilpannai)		
6	A. Anbalagan S/O Adhimulam	Kallankurichi	Ariyalur	Kallankurichi Post	9843208540	Bore Well	11.148005	79.117304	3	97.54	35.05	12.19	32.004	-	-	45.72	33.52	Irrigation	yes	5 hrs 5 months	3 hrs 3 months	2 acrs Rice	2 acrs gengally	Kindney stone Problem	sand stone and conglomerate
7	K. Murugesan S/O Kanjamalai	Manakudi	Ariyalur	Ariyalur Taluka, Ariyalur District	9751410547	Bore Well	11.152767	79.131822	3.5	128.02	54.86	9.14	33.528	-	-	45.72	12.192	Irrigation	Yes	6 hrs 4 months	-	1 acrs Rice	3 acrs maize	-	sand stone
8	Annadurai S/O Chinnapillai	Kadugur	Ariyalur	1/47, East Street, Kadugur	9786163466	Bore Well	11.177399	79.147751	25	106.68	91.44	-	-	30.48	45.72	76.2	60.96	Irrigation	Yes	1 hrs in Sept., October and November	-	6 acrs maize	6 acrs maize	Kindney stone Problem	sand stone
9	Periyaswamy S/o Separumal	Mannuzhi	Ariyalur	Periyanagular Post, Mannuzhi	9787935616	Bore Well	11.140444	79.165942	2.5	198.12	60.96	6.10	152.4	-	-	76.2	60.96	Irrigation	Yes	10 hrs 3 months	12 hrs 9 months	3.5 acrs Maize & 2 acrs Ground nut and Drumstick	-	Kindney stone Problem	sandstone with clay intercalations
10	Tambidurai S/o Ramaswamy	Periyanagulur	Ariyalur	Periyanagulur post, Ariyalur Block, Ariyalur District.	9626375070	Bore Well	11.120751	79.154721	1.5	134.11	112.78	-	-	-	-	97.53	45.72	Irrigation	March, April & May not available	5 hrs 3 months	12 hrs with less yield 4 months	1 acrs, mirchi, 1/2 acr Paddy and 1/2 acrs onion	2 acrs maize	Kindney stone Problem	sandstone with clay intercalations
11	Manimaran S/o Govindaraj	P. Ottakoil	Ariyalur	P. Ottakoil, Pungankuzhi G.P - 621701	9626530613	Bore Well	11.018443	79.203042	0.2	158.50	140.21	-	-	76.2	158.84	36.57	18.28	Irrigation	Yes	-	-	-	10 acrs Maize	Kindney stone Problem	sand and silt

Sl. No	Farmer Name	Village	Block	Address	Mob.No	Structure Type	Latitude	Longitude	Drill time discharg	Structure Depth in Meter	Depth of	Casing depth	Fracture	Slotted pipe	Slotted pipe To in	Pre mansoon	Post mansoon	The well is used for	is water available through the year	Rabi (no of months to be specified)	Kharif (no of months to be	Rabi (Area Irrigated & Type of crop taken)	Kharif (Area Irrigated & Type	Problem with water	Geology
12	Pandiyan S/o Arunachalam	Siruvalur	Ariyalur	Siruvalur Post	9943406651	Bore Well	11.0823 74	79.1146 82	2	9.14	-	N.A	-	6.096	9.144	6.096	3.048	Irrigation	Yes	6 hrs 4 months	10 hrs 4 months	1 acrs Rice	1 acrs Ground Nut	Kindney stone Problem	sand stone
13	S. Uttandam S/o Swamynathan	Muniyamkurichi	Ariyalur	Muniyamkurichi post	9047481108	Bore Well	11.0777 51	79.1702 24	3.33	18 2.88	15 2.40	N.A	-	-	-	137.1	91.44	Irrigation	Yes	-	10 hrs 4 months	-	1.5 acrs Mirchi & 1.5 acrs ground nut	Kindney stone Problem	fossiliferous limestone
14	Ramesh S/o Govindaswamy	Malaiyadikottai	Ariyalur	Malaiyadikottai post	9626609290	Bore Well	11.1050 15	79.1576 8	1	12 4.97	97.54	-	-	30.48	54.86	121.9	91.44	Irrigation	March to May less yield	1/2 hrs 4 months	-	1 acrs Maize	-	Kindney stone Problem, Asthma problem	sand stone and conglomerate
15	Chinnadurai S/o Kasinathan	Reddipalayam middle street	Ariyalur	Reddipalayam middle street post	9629618885	Bore Well	11.1125 49	79.1592 41	12.5	10 6.68	60.96	-	-	-	-	60.96	45.72	Irrigation	Yes	-	6 hrs 6 months	2 acrs Mirchi	3 acrs Ground nut	Water level declining, Kidney stone Problem, Dust was huge	sandstone with clay intercalations
16	Sivakumar S/o Duraikannan	Pudupalayam	Ariyalur	Pudupalayam Post	9865393605	Bore Well	11.0911 58	79.1343 97	16.6	27.43	24.38	-	-	24.38	27.43	9.144	3.048	Irrigation	Yes	3 hrs 3 months	1/2 hrs 4 months	2 acrs mirch & Rice	1 acr maize	Salt water problem	sand stone and conglomerate
17	Muregasen S/o Sivaswamy	kottakadu	Ariyalur	kottakadu post	994355	Bore	11.09	79.14	20	12.19	Centri	-	-	9.1	12.	6.096	3.0	Irrigation	Yes	2 hrs 4 months	24 hrs 4	1.5 acrs rice & 2	2 acrs Rice	-	sandstone with clay

Sl. No	Farmer Name	Village	Block	Address	Mob.No	Structure Type	Latitude	Longitude	Drill time discharg	Structure Depth in Meter	Depth of	Casing depth	Fracture	Slotted pipe	Slotted pipe To in	Pre mansoon	Post mansoon	The well is used for	is water available through the year	Rabi (no of months to be specified)	Kharif (no of months to be	Rabi (Area Irrigated & Type of crop taken)	Kharif (Area Irrigated & Type	Problem with water	Geology
					0398	Well	0815	6285			fugal			44	19		48				months	acrs sugarcane			intercalations
18	Senthil S/o Appathurai	Kanakampalayam	Ariyalur	Kanakampalayam Post	9047650363	Bore Well	11.07 7684	79.18 6076	4	12 1.92	64.01	-	-	-	-	45.72	30.48	Irrigation	March to May less yield	12 hrs 3 months	24 hrs 4 months	3 acrs ground nut	3 acrs maize	Water level declining	sandstone with clay intercalations
19	Murugayan S/o Swamynathan	Nagamangalam	Ariyalur	Nagamangalam North Street	9944891062	Bore Well	11.08 2503	79.18 8028	17	12 1.92	54.86	-	-	97.53	12 1.9	76.2	36.57	Irrigation	March to May less yield	-	6 hrs 4 months	8 acts ground nut	-	Water level declining	sand stone
20	Sambandham S/o Selvarasu	Pattakttankurichi	Ariyalur	Pattakttankurichi post, Nagamangalam	9751347795	Bore Well	11.06 5999	79.20 1245	17	14 6.30	48.77	-	-	30.48	14 6.3	45.72	36.57	Irrigation & Drinking	Yes	10 minutes 4 months	9 hrs 4 months	2.5 acrs Ground nut	2.5 acrs Drumstic	-	sandstone with clay intercalations
21	Murugasen S/o Vaidhyalingam	South Kudisal	Ariyalur	South Kudisal, Nagamangalam	9952612393	Bore Well	11.06 6586	79.19 8136	5	76.20	53.34	-	-	45.72	76.2	36.57	30.48	Irrigation	March to May less yield	-	6 hrs 4 months	-	5 acrs Ground nut	-	sandstone with clay intercalations
22	Poomalai S/o Perumal	Arungal	Ariyalur	Arungal post	9965374664	Bore Well	11.00 0773	79.10 1942	2.5	10 9.73	64.01	-	-	45.72	10 9.7	27.43	12.19	Irrigation & Drinking	Yes	-	24 hrs 4 months	-	3 acrs cotton, 3 acrs Maize, 2 acrs Sugarcane, 1 acrs turmoric	Less rainfall	sand stone and conglomerate
23	Elangovan S/o Perumal	Poyyur	Ariyalur	Poyyur Post, Melakarupur G.P	9629294826	Bore Well	11.05 2907	79.11 384	12.5	60.96	45.72	6.10	60.96	-	-	45.72	30.48	Irrigation	Yes	10 hrs 4 months	12 hrs 4 months	2 acrs Ground nut & 1 acrs drum stick	2 acrs Ground nut	-	fossiliferous limestone

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24	Gopi S/o Natarajan	Meelakarupur	Ariyalur	Meelakarupur post	9489532110	Dug Well	11.0511 94	79.1014 96	10	18.29	12.19	4.57	15.24	-	-	12.19	6.096	Irrigation	March & April less yield	5 hrs 4 months	2 hrs 4 months	2 Acrs sugarcane	-	Kindney stone Problem	sand stone and conglomerate
25	Bhaskar S/o Dharman	Semmankudi	Ariyalur	Semmankudi post	8098218315	Bore Well	11.0395 85	79.1152 63	5	10 6.68	91.44	-	54.864	15.24	45.72	45.72	30.48	Irrigation	March to May less yield	6 hrs 3 months	4 hrs 4 months	2.5 acrs planting, 0.5 acrs mirchi	-	-	fossiliferous limestone
26	Swaminathan S/o Karuppaiyya mupanar	Vaippan	Ariyalur	Vaippan post - Edayathankudi	8940191636	Bore Well	11.0459 01	79.1269 79	8.3	33.53	28.96	6.10	15.24	-	-	22.86	15.24	Irrigation	March to May less yield	4 hrs 4 months	12 hrs 4 months	2 acrs Paddy	-	severe water	sandstone with clay intercalations
27	Karupayyan S/o Perumal	Karupplakattalai	Ariyalur	Karupplakattalai P.O	9626858668	Bore Well	11.0270 45	79.1374 77	10	73.15	57.91	-	-	-	-	29.87	24.38	Irrigation	Yes	9 hrs 4 months	6 hrs 4 months	4 acrs Sugarcane	-	-	sand stone
28	Selvaraj	Tamaraikulam	Ariyalur	Tamaraikulam P.O	9080381902	Bore Well	11.1726 96	79.1014 82	12	70.10	29.87	-	-	24.38	70.10	25.90	18.28	Irrigation	Yes	12 hrs 4 months	12 hrs 4 months	5 acrs Sugarcane	-	-	limestone/ dolomite
29	Duraiswamy S/o Padakattu	Manakkal	Ariyalur	Manakkal P.O	9655289359	Bore Well	11.1975 87	79.0976 93	15	76.20	67.06	-	-	27.43	76.2	48.76	38.1	Irrigation	Yes	10 hrs 4 months	8 hrs 4 months	6 acrs Sugarcane	-	-	limestone/ dolomite
30	Murugasan S/o Marudamuthu	Jayaramapuram	Ariyalur	Jayaramapuram P.O	9751348596	Bore Well	11.1715 12	79.0747 59	9.5	91.44	80.77	12.19	74.676	-	-	50.29	39.62	Irrigation	Yes	6 hrs 4 months	5 hrs 4 months	1.5 acrs Paddy	-	-	sand stone
31	Santhanam S/o	Eruthukaranpatti	Ariyalur	Eruthukaranpatti	759856	Bore	11.15	79.07	4.5	91.44	77.72	12	67.0	-	-	56.38	42.	Irrigation	Yes	6 hrs 4 months	4 hrs 4	1.5 acrs Sugarcane	1.5 Ground nut	-	sand stone

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	Muthuswamy				0568	Well	6947	6218				.19	56				67				months		* Maize		
32	Vishwanathan	Poyyur	Ariyalur	Poyyur P.O	9751867167	Bore Well	11.160172	79.140255	3	152.40	138.68	-	-	45.72	152.4	77.72	67.05	Irrigation	Yes	10 hrs 4 months	10 hrs 4 months	3 acrs Sugarcane	3 acrs Sugar cane	-	sand stone with clay
33	S. Rajendran	Husanabad	Ariyalur	Husanabad P.O	8940034937	Bore Well	11.158922	79.104768	8	121.92	108.20	-	-	54.86	121.9	76.2	64.00	Irrication	Yes	12 hrs 4 months	6 hrs 4 months	6 acrs Sugarcane	6 acrs Sugar cane	-	limestone/ dolomite
34	Chinnappa	Srinivasapuram	Ariyalur	Srinivasapuram P.O	9655180094	Bore Well	11.164081	79.118324	6	121.92	109.73	-	-	45.72	121.9	73.15	60.96	Irrication	Yes	15 hrs 4 months	12 hrs 4 months	4 acrs Ground Nut	4 acrs Paddy	-	limestone/ dolomite
35	Thamilarasan	Kallankurichi	Ariyalur	Kallankurichi P.O	9443048792	Bore Well	11.148343	79.115464	7	129.54	121.92	6.10	86.868	-	-	36.57	30.48	Irrigation	Yes	6 hrs 4 months	6 hrs 4 months	2 acrs Paddy	2 acrs Paddy	Limet one	limestone/ dolomite
36	Thangavel	Kayarlapath	Ariyalur	Kayarlapath P.O	8489134760	Bore Well	11.133936	79.101706	12	97.54	89.92	4.57	44.196	-	-	36.57	28.95	Irrigation	Yes	5 hrs 4 months	4 hrs 4 months	6 acrs Sugarcane	-	Alluvium & Limestone	sand stone
37	Venkat W/O Minalkudi	Thelur	Ariyalur	Thelur P.O		Bore Well	11.127325	79.179717	4.5	152.40	128.02	-	-	76.2	152.4	91.44	73.15	Irrigation	Yes	12 hrs 4 months	6 hrs 4 months	4 acrs Ground Nut	4 acrs Maize	-	sand stone with clay
38	Kolanginathan	Vilangudi	Ariyalur	Vilangudi	9787563251	Bore Well	11.117628	79.210818	2.5	155.45	121.92	-	-	45.72	151.81	48.76	67.05	Irrigation		5 hrs 4 months	6 hrs 4 months	3.5 acrs Maize	1.5 Maize	-	sand stone

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39	Agathiyur S/o Periyaswamy	Kottaikadu	Sendurai	1/151 Muniappar Kovil Street, Kottaikadu	9443445160	Borewell	11.383818	79.258506	1.5	48.77	47.24	-	-	-	-	18.28	12.19	Irrigation & Drinking	Yes	1 & 1/2 hrs 15 Days	-	3 acrs Paddy	-	Kindney stone Problem & Cancer Problem	sand stone
40	Nallathambi S/o Shanmugam	Alathiyur	Sendurai	Alathiyur Main road	9976266216	Borewell	11.370559	79.256323	2.2	70.10	41.15	60.10	33.5288	-	-	27.43	36.57	Irrigation	Yes	4 hrs 35 days	-	2.5 acrs Ground nut	2.5 acts Bajara	-	sand stone
41	Senthil S/o Chandrahasan	Thetheri	Sendurai	3/18-c, Mainroad Thetheri	9943894450	Borewell	11.366591	79.255022	6.5	60.96	54.86	12.19	42.672	-	-	13.71	10.66	Irrigation & Drinking	Yes	-	6 hrs 12 days	-	1.75 acrs blackgram	Kindney stone Problem & Cancer Problem	sand stone
42	Nallathambi S/o Shanmugam	Muthukulam	Sendurai	Main Road Mudukulam	9976266216	Borewell	11.361755	79.265429	3	121.92	91.44	-	-	60.96	121.9	18.28	13.71	Irrigation	Yes	6 hrs 25 days	-	3 acrs Ground nut	-	-	sand stone
43	Subramanian S/o Kandaswamy	Tamarapoondi	Sendurai	Main road, Manakudian	8883182752	Borewell	11.341425	79.230262	1.5	45.72	24.38	-	-	24.38	45.72	18.28	15.24	Irrigation	Yes	5 hrs 36 days	-	2 acrs Paddy	-	-	sand stone
44	Saravanan S/o Ramanathan	Irungalakurichi	Sendurai	Manakudian Post, Irungulakurichi	9626314527	Borewell	11.329971	79.225754	6.5	0.00	0.00	-	-	-	-	0	0								sand stone

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45	Radhakrishnan S/o Govindaswamy	Kurichikulam	Sendurai	Opp. to post office, Kurichikulam	9047912031	Borewell	11.318844	79.215976	5	67.06	45.72	-	-	24.38	30.48	33.52	38.1	Irrigation & Domestic	Yes	8 hrs 6 days	8 hrs 6 days	5 acrs Ground nut	5 acrs urud dal	-	sand stone
46	Baluswamy S/o Manickam	Namangunam	Sendurai	Namangunam P.O.	7094470766	Borewell	11.280635	79.126133	3	120.70	54.86	7.62	41.1488	-	-	45.72	39.62	Irrigation	Yes but in summer yield was less	24 hrs 20 days	1 hr 15 days	3 acrs Sugarcane & 1 acr Paddy	1 acrs Paddy	Kindney stone Problem	sand stone
47	Subramanian S/o Thirusangu	Palaimalainathapuram	Sendurai	Palaimalainathapuram, Namangunam P.O	7639545618	Borewell	11.284079	79.129451	4	60.96	30.48	-	-	15.24	60.96	22.86	18.28	Irrigation	Yes	24 hrs 35 days	-	2 hector Sugarcane	-	Kindney stone Problem	sand stone
48	Rajendran S/o Arumugam	Kudikadu	Sendurai	Kulumunur Road, Kudikadu	9843189557	Borewell	11.292967	79.120203	2.5	76.20	45.72	13.72	-	-	-	24.38	16.76	Irrigation	Yes	24 hrs 35 days	-	4 acrs Paddy	-	-	lime stone,marl and shale
49	Muruganathan S/o Murugesan	N. Paliur	Sendurai	N. Paliur P.O - 621716	9843411074	Borewell	11.274952	79.115002	3.5	91.44	73.15	-	-	60.96	91.44	50.29	45.72	Irrigation	Yes	12 hrs 6o days	12 hrs 30 days	4 acrs Paddy	4 acrs Paddy	-	sandstone with clay intercalations
50	Palamalai S/o Chinnapillai	Sokkanathapuram	Sendurai	Vellore Road, Sokkanathapuram	9655701219	Borewell	11.261361	79.122562	1.5	137.16	60.96	6.10	-	-	-	54.86	48.76	Irrigation	Yes	12 hrs 35 days	-	1.5 acrs Sugarcane, 2 acrs maize	-	-	sand stone
51	Mayavel S/o Kenkachalam	Perupondi	Sendurai	Perupondi, Vanjanapuram P.O.		Borewell	11.278487	79.137785	2	106.68	48.77	6.10	-	-	-	45.72	42.67	Irrigation	Yes	12 hrs 30 days	-	3 acrs sugarcane	-	Kindney stone Problem	sand stone

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52	Vasuki W/o Paramasivam	Nakkambadi	Sendurai	Siraimeetarkoil street	9442143950	Borewell	11.263421	79.161154	2.6	60.96	50.29	-	-	32.00	57.91	21.33	18.28	Irrigation	Yes but less yield	15 hrs 6d days	8 hrs 120 days	4 acrs Paddy	4 acrs Paddy	-	sandstone with clay intercalations
53	Subramanian S/o Chellappan	Sendurai East	Sendurai	Paramasivam Nagar, Sendurai East	9843453613	Borewell	11.250155	79.185937	1.5	79.25	42.67	-	-	45.72	79.24	39.62	30.48	Irrigation	Yes but less yield	2 hrs 90 days	5 hrs 40 days	1 acrs Bajara & 1 acr Ground nut	2 acrs Ground nut	-	sand stone
54	Manikantan S/o Muthuvel	Nallampalayam	Sendurai	Unjini to Sendurai raod, Nallampalayam	9843928472	Borewell	11.242465	79.197855	5	121.92	82.30	-	-	30.48	121.9	45.72	21.33	Irrigation	Yes	8 hrs 40 days	-	4 acrs Ground nut	4 acrs blackgram	-	sand stone and conglomerate
55	Senthil Kumar S/o Ramachandran	Unjini	Sendurai	East Street Unjini P.O Sendurai Taluk - 621714	9943449293	Borewell	11.231963	79.217448	8.3	140.21	70.10	-	-	-	-	60.96	39.62	Irrigation	Yes	24 hrs 90 days	24 hrs 90 days	15 acrs Sugarcane	-	-	sand stone and conglomerate
56	Malliyammal W/o Ramachandran	Srikadambur	Sendurai	Ponparapi road, Srikadambur	9943449293	Borewell	11.234997	79.220618	25	91.44	48.77	-	-	45.72	76.2	45.72	30.48	Irrigation	Yes	15 hrs 90 days	15 hrs 90 days	10 acrs Sugarcane	-	-	sand stone and conglomerate
57	Ramesh S/o Punnaswamy	Sathalavadi	Sendurai	colony street, Sathalavadi	9742988591	Borewell	11.225261	79.241695	4.5	76.20	48.77	-	-	-	-	38.1	27.43	Irrigation & Domestic	Yes	8 hrs 60 days	5 hrs 60 days	6 acrs Ground nut	8 acrs blackgram	-	sand stone and conglomerate
58	Nagasigamani	Veerakan	Sendurai	Pilakurichi post, Sendurai Taluk, Ariyalur District	9787961469	Borewell	11.229071	79.252256	1.75	91.44	54.86	-	-	-	-	54.86	30.48	Irrigation	Yes	12 hrs 6 months	-	2 acrs Mirchi, 6 acrs Ground nut	-	-	fossiliferous limestone
59	Veerachola n S/o Madyavalagan	Pilakurichi	Sendurai	Pilakurichi P.O. Veerakan	9786043665	Borewell	11.231983	79.266985	2	60.96	60.96	-	-	42.	60.96	45.72	42.67	Irrigation	Yes	6 hrs 15 days	-	6 acrs maize & 3 acts	-	-	lime stone,marl and shale

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				Gram Panchayat										67								Ground nut			
60	Vishwanathan S/o Rangaswamy	Periyakurichi	Sendurai	Periyakurichi P.O	9786268423	Bore well	11.292774	79.206197	16.6	73.76	54.86	-	-	36.57	60.96	51.81	45.72	Irrigation	Yes	1 hrs 4 months	18 hrs 4 months	2.5 acrs Ground nut	2.5 acrs bajara		sand stone and conglomerate
61	Muruganandam S/o Ramalingam	Tular	Sendurai	Tular P.O		Bore well	11.303821	79.234681	2.5	167.64	82.30	-	-	161.5	167.6	82.29	76.2	Iriigation	Yes	18 hrs 4 months	-	10 acrs Ground nut	-	-	sand stone
62	Madyagalagon S/o Kaliyaperumal	Nandiyankudikadu	Sendurai	Nandyankudikadu P.O Manaputhar Gram Panchayat	9786654189	Bore well	11.316643	79.203874	3.2	45.72	36.58	-	-	39.62	45.72	39.62	33.52	Irrigation	Yes	8 hrs 3 months	4 hrs 3 months	2 acrs Urad dal & 2 acrs gengally	4 acrs bajara	-	sand and silt
63	Saravanan S/o Katherivel	Ayanthathanur	Sendurai	Ayanthathanur P.O	8489230466	Bore well	11.330121	79.195449	16.6	30.48	15.24	-	-	24.38	30.48	12.19	6.096	Irrigation	Yes	5 hrs 4 months	-	3 acrs Paddy	-	-	sand stone
64	Anbalagan S/o Challamuthu	Kulumur	Sendurai	Kulumur G.P	9943134593	Bore well	11.305896	79.144637	20	54.86	42.67	9.14	50.292	-	-	18.28	12.19	Irrigation	Yes	-	24 hrs 4 months	-	7 acrs Paddy	Limestone available in water	sand stone
65	Dhanapal S/o Marudai	Nallanayagapuram	Sendurai	Nallanayagapuram P.O, Vinjanapuram Gram Panchayat	9159320004	Bore well	11.291567	79.149295	22	114.30	45.72	10.67	60.96	-	-	18.28	6.096	Irrigation	Yes	15 hrs 4 months	-	8 acrs Paddy	-	-	shaly sand stone
66	Selvaraj S/o Ramachan	Sannsinallur	Sendurai	Sannasinallur P.O., Sanninallur		Bore well	11.366751	79.173044	17	128.32	39.62	-	-	45.	51.81	48.76	42.67	Irrigation	Yes	8 hrs 4 months	-	3 acrs Paddy	-	-	sand and silt

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	dra Padiachi			Gram Panchayat										72											
67	Periyaswamy S/o Sannasi	Marvathur	Sendurai	Marvathur P.O Sendurai Block	6324516899	Bore well	11.25 7976	79.21 0575	2.35	91.44	85.34	9.14	76.2	-	-	82.29	73.15	Irrigation	Yes	4 hrs 4 months	5 hrs 4 months	1 acrs Ground nut	1 Acrs Gengally	-	sand and silt
68	Pari S/o Periyathambi	Ponparipi	Sendurai	Ponparipi P.O. Sendurai Block	-	Bore well	11.27 0112	79.23 3482	3.1	99.06	54.86	-	-	47.24	91.44	76.2	64.00	Irrigation & Drinking	Yes	6 hrs 4 months	8 hrs 4 months	1.5 acrs Blackgram	1 Acrs Gengally	-	Sand Stone
69	Chellamuthu S/o Jaganathan	Mathumadaki	Sendurai	Mathumadaki P.O Keelamaligai Gram Panchayat	7639745411	Bore well	11.25 418	79.25 1077	15	79.25	73.15	-	-	36.57	79.24	70.10	64.00	Irrigation	Yes	2 hrs 4 months	8 hrs 4 months	4 acrs Ground nut	2 acrs Ground nut		lime stone,marl and shale
70	Samuthiram S/o Kasinathan	Paranam	Sendurai	Paranam P.O and Gram Panchayat	9655564424	Bore well	11.18 2938	79.26 2562	10	97.54	79.25	-	-	67.05	97.53	24.38	12.19	Iriigation	Yes	-	10 hrs 4 months	4 acrs Ground nut	8 acrs cashew	Sand + Limestone	sand and silt
71	Elangovan S/o Dharmalingam	Kumuliam	Sendurai	Kumuliam P.O & Gram Panchayat	9444474446	Bore well	11.19 3658	79.24 8468	17	137.16	76.20	-	-	60.96	67.05	73.15	60.96	Irrigation	Yes	-	2 hrs 25 days	2.5 acrs lemon	-		lime stone,marl and shale
72	Tangadurai S/o Kalayaperumal	Irumulakurichi	Sendurai	Irumulakurichi P.O and Gram Panchayat	8190058574	Bore well	11.20 3188	79.22 3147	12	140.21	79.25	-	-	67.05	88.39	54.86	42.67	Irrigation	Yes	4 hrs 4 months	8 hrs 4 months	1 acr Ground nut, 1 Acr Brinzol, 1 Acr chilli	-	-	lime stone,marl and shale
73	Saravanan S/o Ravanan	Palayakudi	Sendurai	Palayakudi P.O & Gram Panchayat	8056845958	Bore well	11.17 8831	79.21 7666	10	146.30	67.06	-	-	45.72	146.3	45.72	36.57	Irrigation	Yes	6 hrs 4 months	2 hrs 4 months	3 acrs black gram	3 acrs Maize	-	lime stone,marl and shale

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74	T. Rajendran S/o Tangavel	Thirumanur	Thirumanur	Thirumanur, South street - 621715	9751131510	Bore well	10.939351	79.105045	17	18.29	9.14	-	-	12.19	18.28	7.62	6.096	Irrigation	yes	5 hrs 4 months	12 hrs 4 months	4 acrs Paddy	4 acrs Urud dal		Alluvium
75	Ashok Kumar S/o Punyamurthy	Manjemedu	Thirumanur	Manjemedu post - 621 715	9943964910	Bore well	10.936189	79.086913	18	16.76	10.67	-	-	9.144	16.76	7.62	4.572	Irrigation	Yes	18 hrs 4 months	12 hrs 4 months	4 acrs Paddy	4 acrs Urad Dal	During August - Septembr water was some salty	Alluvium
76	Rajmohan S/o Kaliamurthy	Annimangalam	Thirumanur	Annimangalam	9843663338	Bore well	10.930986	79.067274	15	29.26	21.34	0.00	-	10.66	29.26	7.62	5.486	Irrigation	Yes	6 hrs 4 months	12 hrs 4 months	2 acrs paddy	2 acrs paddy		Alluvium
77	Nagarajan S/o Jammuling am	K.Methitheru	Thirumanur	K.Methitheru, Kanderathitham Gram Panchayat - 621 851	8489837179	Bore well	10.919963	79.045002	12	24.38	21.34	-	-	7.62	24.38	13.71	10.66	Irrigation	Yes	10 hrs weekly once for 4 months	16 hrs 4 months	4.5 acrs Paddy & 4 acrs Sugarcane	4 acrs Urad Dal	Salt water problem	Alluvium
78	Natarajan S/o S.R. Manickayam	Thirumalapadi	Thirumanur	Thirumalapadi - 6218501	9443343229	Bore well	10.892765	79.049691	14	18.29	12.19	-	-	12.19	15.24	5.4864	4.572	Irrigation	Yes		4 hrs 4 months	5 acrs coconut	5 acrs sugar cane	Salt water problem	Alluvium
79	Kannan S/o Thangaraj	Sempiyakudi	Thirumanur	Sempiyakudi, Kulaminikyam G.P	7550320428	Bore well	10.942824	79.024026	15	19.81	12.19	-	-	12.19	19.812	9.144	7.62	Irrigation	yes	4 hrs 4 months	6 hrs 4 months	30 cent paddy, 50 cent Banana, 70 cent Mango	1.5 acrs onion & Brinzol	Salt water problem	Migmatitic Gneiss
80	Anandan S/o Manickan	Kovileasanai	Thirumanur	Kovileasanai P.O	984366	Bore	10.94	79.02	12	8.53	#VALUE!	-	-	4.5	8.53	3.6576	2.43	Irrigation	Yes	10 hrs 4 months	12 hrs 4	1 acrs musted	2 acrs paddy	-	Migmatitic Gneiss

Sl. No	Farmer Name	Village	Block	Address	Mob.No	Structure Type	Latitude	Longitude	Drill time discharg	Structure Depth in Meter	Depth of	Casing depth	Fracture	Slotted pipe	Slotted pipe To in	Pre mansoon	Post mansoon	The well is used for	is water available through the year	Rabi (no of months to be specified)	Kharif (no of months to be	Rabi (Area Irrigated & Type of crop taken)	Kharif (Area Irrigated & Type	Problem with water	Geology
			manur		9880	well	2985	3813						72	44		84				months				
81	Muthuswamy S/o Pitchai	Venganoor	Thirumanur	Venganoor P.O	9884038562	Bore well	10.9700 3	79.0196 01	14	33.53	15.24	-	-	12.19	33.528	9.144	3.048	Irrigation	Yes	10 hrs 4 months	8 hrs 4 months	1.40 acrs paddy	1.4 acrs sesame	-	Migmatitic Gneiss
82	Swamythurai S/o Muthuswamy	Sannavoor	Thirumanur	Sannavoor P.O	9600428096	Bore well	10.9741 46	78.9990 15	12	60.96	45.72	-	-	30.48	60.96	12.192	9.144	Irrigation	Yes	-	16 hrs 4 months	-	1 acrs Paddy & 4 acrs maize	-	Migmatitic Gneiss
83	Selvaraj S/o Pitchai	Karaivetti	Thirumanur	Karaivetti P.O	9965604229	Bore well	10.9634 48	79.0451 46	9	76.20	30.48	3.05	24.384	-	-	15.24	9.144	Irrigation	No in March & May, 2 months	-	3 hrs 3 months	-	6 acrs Paddy	Pond water they are using for crop	Migmatitic Gneiss
84	Govindam S/o Kailaiam	K.K. Kurichi	Thirumanur	K.K. Kurichi P.O	9790894877	Bore well	10.9622 53	79.0608 45	15	Centrifugal	24.38	-	-	18.288	24.384	18.288	9.144	Irrigation	Yes	3 hrs 4 months	-	1 acrs Paddy	-	Metur water for irrigation	Migmatitic Gneiss
85	Pandiyarajan S/o Ayyavi	Sathamangalam	Thirumanur	Sathamangalam P.O - 621707	9486343484	Bore well	10.9951 26	79.0843 18	15	60.96	42.67	-	-	9.144	60.96	12.192	6.096	Irrigation	Yes	8 hrs 4 months	10 hrs 4 months	50 cent vegetables 4.5 acrs maize com	50 cent vegetables 4.5 acrs maize com	Salt water problem	Sand stone
86	Krishnamurthy S/o Perumal	Kallur	Thirumanur	Kallur - 621707	9943305047	Bore well	10.9734 57	79.1046 03	14	76.20	53.34	-	-	24.38	76.2	22.86	12.192	Irrigation	Yes	15 hrs 4 months	18 hrs 4 months	10 acrs Paddy	-	Metur water for irrigation	Sand stone

Sl. No	Farmer Name	Village	Block	Address	Mob.No	Structure Type	Latitude	Longitude	Drill time discharg	Structure Depth in Meter	Depth of	Casing depth	Fracture	Slotted pipe	Slotted pipe To in	Pre mansoon	Post mansoon	The well is used for	is water available through the year	Rabi (no of months to be specified)	Kharif (no of months to be	Rabi (Area Irrigated & Type of crop taken)	Kharif (Area Irrigated & Type	Problem with water	Geology
87	Murilitharan S/o Mahalingam	Keelakolathur	Thirumanur	South Street, Keelakoluthur - 621 715	9585066407	Bore well	10.973682	79.115902	10	91.44	67.06	-	-	76.2	91.44	24.384	6.096	Irrigation	Yes	5 hrs 4 months	10 hrs 4 months	1.5 acrs Paddy	1.5 sesame	Metur water for irrigation	Sand stone
88	Kumaravel S/o Narayanan	Vedugapalayam	Thirumanur	Vedugapalayam - 621715	9092949050	Bore well	10.971017	79.120835	17	91.44	54.86	2.44	9.144	-	-	30.48	22.86	Irrigation	yes	10 hrs 4 months	-	-	1.5 acrs Paddy	-	Sand stone
89	Veerapillai S/o Swaminathan	Vilaparamakurichi	Thirumanur	Vilaparamakurichi PO	9626090873	Bore well	10.958214	79.132398	12	91.44	73.15	-	-	21.33	91.44	73.152	70.104	Irrigation	No, August & September	7 hrs 4 months	8 hrs 4 months	2 acrs paddy & 1 acr Ground Nut	3 acrs maize com	Metur water for irrigation	Alluvium
90	Rajkumar	Sullabkudi	Thirumanur	Sullabkudi	9585068749	Bore well	10.959579	79.144988	10	77.72	57.91	-	-	28.95	77.724	59.436	64.008	Irrigation	Yes	3 hrs 4 months	4 hrs 4 months	3 acrs Paddy	3 acrs Paddy	-	Alluvium
91	Gandhi S/o Marimuthu	Elakurichi	Thirumanur	Elakurichi P.O	9095706751	Bore well	10.954742	79.158601	14	10.97	Centri fugal	-	-	-	-	10.363 2	9.144	Irrigation	Yes	24 hrs 16 days	24 hrs 16 days	2 acrs Paddy	1 acr cotton	Metur water for irrigation	Alluvium
92	Murugaanantham S/o Krishnan	Kovilur	Thirumanur	Kovilur P.O	9790136964	Bore well	10.985791	79.157335	15	167.64	91.44	18.2	47.2444	-	-	67.056	60.96	Irrigation	yes	8 hrs 4 months	8 hrs 4 months	3 acrs Sugarcane	-	-	Sand stone
93	Suresh Kumar S/O Gandhi	Chinnapattakdu	Thirumanur	Chinnapattakdu P.O - 621715	9047769950	Bore well	11.004006	79.147077	16	146.30	73.15	12.1	56.3888	-	-	70.104	60.96	Irrigation	Yes but August to September less yield	12 hrs 4 months	-	3 acrs Sugarcane , 2 acrs Ground nut and 1	-	-	Sand stone

Sl. No	Farmer Name	Village	Block	Address	Mob.No	Structure Type	Latitude	Longitude	Drill time discharg	Structure Depth in Meter	Depth of	Casing depth	Fracture	Slotted pipe	Slotted pipe To in	Pre mansoon	Post mansoon	The well is used for	is water available through the year	Rabi (no of months to be specified)	Kharif (no of months to be	Rabi (Area Irrigated & Type of crop taken)	Kharif (Area Irrigated & Type	Problem with water	Geology
																						acrs Paddy			
94	Jayaprakash	Kamarasavalli	Thirumanur	Kamarasavalli P.O K. Mathur Gram Panchayat - 621715	9159227379	Borewell	10.972177	79.203945	11	30.48	6.10	-	-	24.38	30.48	9.144	6.096	Irrigation	Yes	12 hrs 4 months	3 hrs 4 months	15 acrs Paddy	-	Metur water for irrigation	Alluvium
95	Murugan S/o Kannaiyan	Kuruvadi	Thirumanur	Kuruvadi P.O 621715	8098264510	Borewell	10.976017	79.225047	15	60.96	12.19	-	-	57.91	60.96	9.144	6.096	Irrigation	Yes	5 hrs 4 months	10 hrs 4 months	4 acrs Paddy	4 acrs Paddy	Metur water for irrigation	Alluvium
96	Prabakaran S/o M. Govindarajan	Vaipur	Thirumanur	Vaipur P.O Thoothur Gram Panchayat - 621701	8940617138	Borewell	10.995783	79.268585	18	27.43	12.19	-	-	24.38	30.48	9.144	6.096	Irrigation	Yes	4 hrs 4 months	8 hrs 4 months	4 acrs Paddy	5 acrs Paddy	-	Alluvium
97	Hitlar Raj S/O Ponnivalavan	Alagayamanavalan	Thirumanur	Alagayamanavalan P.O. 621715	9626949112	Borewell	10.956625	79.203819	10	27.43	25.91	-	-	22.86	27.432	7.62	6.096	Irrigation	Yes	5 hrs 4 months	5 hrs 48 days	2 acrs Sugarcane	-		Alluvium
98	Prabakaran S/o Devendran	Keelapalur	Thirumanur	Keelapalur P.O	9655447471	Borewell	11.045319	79.064109	8.5	18.29	18.29	2.59	5.48644	-	-	16.764	13.716	Irrigation	Yes	5 hrs 4 months	3 hrs 4 months	3 acrs Paddy	3 acrs Sugar cane	-	Sand stone
99	Rajendran S/o Chellamuthu	Melapalur	Thirumanur	Melapalur - 621 707	7339208501	Borewell	11.042425	79.047668	6.5	13.72	13.72	3.05	5.48644	-	-	9.144	6.096	Irrigation	Yes	5 hrs 4 months	-	1 acrs Maize	-	-	Charnockite
100	Periyaswamy	Papanacheri	Ariyalur	Papanacheri	9751112480	Borewell	11.083922	79.060273	9	213.36	108.20	4.	97.5	-	-	50.292	38.1	Irrigation	Yes	5 hrs 4 months	8 hrs 4 months	5 acrs Paddy	-	-	Granitic Gneiss

Sl. No	Farmer Name	Village	Block	Address	Mob.No	Structure Type	Latitude	Longitude	Drill time discharg	Structure Depth in Meter	Depth of	Casing depth	Fracture	Slotted pipe	Slotted pipe To in	Pre mansoon	Post mansoon	The well is used for	is water available through the year	Rabi (no of months to be specified)	Kharif (no of months to be	Rabi (Area Irrigated & Type of crop taken)	Kharif (Area Irrigated & Type	Problem with water	Geology
												57	36												

Annexure: V

Demand and Supply position

Sl. No	Panchayat Name	Habitation Name	Total Population	Sources Available for Water Supply			Number of Functioning Sources			Total No. of Repair			Rectified			Water Supply From Own Sources (In Litres)	Water Supply From CWSS Source	Total Supply of Water / Day (In Litres)	Daily LPCD	Remarks (If Any Affected Village Action Taken For Rectification)
				Power Pump	Mini Power	Hand Pump	Power Pump	Mini Power	Hand Pump	Upto Yesterday	Today	Total	Upto Yesterday	Today	Total					
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**19**	**20**	**15=13+14**	**16=15/4**	**17**
1	**KULUMUR**	Kulumur	5052	8	9	5	8	9	5	2	0	2	2	0	2	360000	0	360000	71.26	-
		Total	**5052**	**8**	**9**	**5**	**8**	**9**	**5**	**2**	**0**	**2**	**2**	**0**	**2**	**360000**	**0**	**360000**	**71.26**	-
2	**NAKKAMBADI**	Nakkambadi	1669	4	6	9	4	6	9	1	0	1	1	0	1	120000	0	120000	71.9	-
		Ninniyur	1413	3	5	6	3	5	6	0	0	0	1	0	1	84000	0	84000	59.45	-
		Total	**3082**	**7**	**11**	**15**	**7**	**11**	**15**	**1**	**0**	**1**	**2**	**0**	**2**	**204000**	**0**	**204000**	**66.19**	-
3	**NALLAMPALAYAM**	Nallampalayam	1957	5	2	2	5	1	2	1	1	2	1	0	1	140000	0	140000	71.54	-
		Total	**1957**	**5**	**2**	**2**	**5**	**1**	**2**	**1**	**1**	**2**	**1**	**0**	**1**	**140000**	**0**	**140000**	**71.54**	

Sl. No	Panchayat Name	Habitation Name	Total Population	Sources Available for Water Supply			Number of Functioning Sources			Total No. of Repair			Rectified			Water Supply From Own Sources (In Litres)	Water Supply From CWSS Source	Total Supply of Water / Day (In Litres)	Daily LPCD	Remarks (If Any Affected Village Action Taken For Rectification)
				Power Pump	Mini Power	Hand Pump	Power Pump	Mini Power	Hand Pump	Upto Yesterday	Today	Total	Upto Yesterday	Today	Total					
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	19	20	15=13+14	16=15/4	17
4	NAMANGUNAM	Namangunam	1423	4	3	6	4	3	6	1	0	1	1	0	1	102000	0	102000	71.68	-
		Chokkanathapuram	1142	3	1	3	3	1	3	1	0	1	1	0	1	70000	0	70000	61.3	-
		Kudikadu	414	1	0	0	1	0	0	1	0	1	0	0	0	20000	0	20000	48.31	-
		Paalaiyur	196	1	0	1	1	0	1	0	0	0	0	0	0	14000	0	14000	71.43	-
		Pazhamaainathapuram	722	2	1	2	2	1	2	0	0	0	0	0	0	40000	0	40000	55.4	-
		Total	**3897**	**11**	**5**	**12**	**11**	**5**	**12**	**3**	**0**	**3**	**2**	**0**	**2**	**246000**	**0**	**246000**	**63.13**	-
5	PERIYAKURICHI	Periyakurichi	2183	5	8	3	5	8	3	2	0	2	2	0	2	180000	0	180000	82.46	-
		Ilaikkadampoor	1150	3	3	3	3	3	3	1	0	1	1	0	1	90000	0	90000	78.26	-

Sl. No	Panchayat Name	Habitation Name	Total Population	Sources Available for Water Supply			Number of Functioning Sources			Total No. of Repair			Rectified			Water Supply From Own Sources (In Litres)	Water Supply From CWSS Source	Total Supply of Water / Day (In Litres)	Daily LPCD	Remarks (If Any Affected Village Action Taken For Rectification)
				Power Pump	Mini Power	Hand Pump	Power Pump	Mini Power	Hand Pump	Upto Yesterday	Today	Total	Upto Yesterday	Today	Total					
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**19**	**20**	**15=13+14**	**16=15/4**	**17**
		Nallaan Colony	200	1	0	0	1	0	0	0	0	0	0	0	0	10000	0	10000	50	-
		Total	**3533**	**9**	**11**	**6**	**9**	**11**	**6**	**3**	**0**	**3**	**3**	**0**	**3**	**280000**	**0**	**280000**	**79.25**	-
6	**SENDURAI**	Sendurai	7795	10	15	11	10	15	11	4	0	4	4	0	4	420000	0	420000	53.88	-
		Kattaiyan Kudikadu	320	2	4	3	2	4	3	1	0	1	1	0	1	20000	0	20000	62.5	-
		Ilankaicheri	1342	1	8	5	1	8	5	2	0	2	2	0	2	75000	0	75000	55.89	-
		Udaiyaan Kudikadu	186	2	6	2	2	6	2	0	0	0	0	0	0	10000	0	10000	53.76	-
		Total	**9643**	**15**	**33**	**21**	**15**	**33**	**21**	**7**	**0**	**7**	**7**	**0**	**7**	**525000**	**0**	**525000**	**54.44**	-
7	**UNJINI**	Unjini	3064	9	5	6	9	5	6	1	0	1	1	0	1	220000	0	220000	71.8	-

Sl. No	Panchayat Name	Habitation Name	Total Population	Sources Available for Water Supply			Number of Functioning Sources			Total No. of Repair			Rectified			Water Supply From Own Sources (In Litres)	Water Supply From CWSS Source	Total Supply of Water / Day (In Litres)	Daily LPCD	Remarks (If Any Affected Village Action Taken For Rectification)
				Power Pump	Mini Power	Hand Pump	Power Pump	Mini Power	Hand Pump	Upto Yesterday	Today	Total	Upto Yesterday	Today	Total					
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**19**	**20**	**15=13+14**	**16=15/4**	**17**
		Total	**3064**	**9**	**5**	**6**	**9**	**5**	**6**	**1**	**0**	**1**	**1**	**0**	**1**	**220000**	**0**	**220000**	**71.8**	**-**
8	**VANJINAPURAM**	Vanjinapuram	1048	5	3	3	5	3	3	1	0	1	1	0	1	60000	0	60000	57.25	-
		Nallanayagapuram	1013	2	1	3	2	1	3	1	0	1	1	0	1	80000	0	80000	78.97	-
		Perumandi	846	1	1	1	1	1	1	0	0	0	0	0	0	60000	0	60000	70.92	-
		Total	**2907**	**8**	**5**	**7**	**8**	**5**	**7**	**2**	**0**	**2**	**2**	**0**	**2**	**200000**	**0**	**200000**	**68.8**	**-**
		Sub Total	**33135**	**72**	**81**	**74**	**72**	**80**	**74**	**20**	**1**	**21**	**20**	**0**	**20**	**2175000**	**0**	**2175000**	**65.6**	**-**
9	**ADHANAKURUCHI**	Adhanakurichi	1401	4	9	3	4	9	3	1	0	1	1	0	1	90000	0	90000	64.24	-
		Muthukulam	797	3	5	1	3	5	1	2	0	2	2	0	2	40000	0	40000	50.19	-

Sl. No	Panchayat Name	Habitation Name	Total Population	Sources Available for Water Supply			Number of Functioning Sources			Total No. of Repair			Rectified			Water Supply From Own Sources (In Litres)	Water Supply From CWSS Source	Total Supply of Water / Day (In Litres)	Daily LPCD	Remarks (If Any Affected Village Action Taken For Rectification)
				Power Pump	Mini Power	Hand Pump	Power Pump	Mini Power	Hand Pump	Upto Yesterday	Today	Total	Upto Yesterday	Today	Total					
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	19	20	15=13+14	16=15/4	17
		Chinna Melakudikadu	342	2	4	1	2	4	1	0	0	0	0	0	0	24000	0	24000	70.18	-
		Puthuppalaiyam	1132	4	6	2	4	6	2	1	0	1	1	0	1	74000	0	74000	65.37	-
		Total	**3672**	**13**	**24**	**7**	**13**	**24**	**7**	**4**	**0**	**4**	**4**	**0**	**4**	**228000**	**0**	**228000**	**62.09**	**-**
10	ALATHIYUR	Alathiyur	1215	2	6	6	2	6	6	1	0	1	1	0	1	73000	0	73000	60.08	-
		Mulukurichi	1432	0	5	4	0	5	4	1	0	1	1	0	1	120000	0	120000	83.8	-
		Kottaikadu	436	1	1	2	1	1	2	1	0	1	1	0	1	36000	0	36000	82.57	-
		Theththeri	283	1	1	1	1	1	1	0	0	0	0	0	0	20000	0	20000	70.67	-
		Vadakkeri	186	0	1	1	0	1	1	0	0	0	0	0	0	14000	0	14000	75.27	-

Sl. No	Panchayat Name	Habitation Name	Total Population	Sources Available for Water Supply			Number of Functioning Sources			Total No. of Repair			Rectified			Water Supply From Own Sources (In Litres)	Water Supply From CWSS Source	Total Supply of Water / Day (In Litres)	Daily LPCD	Remarks (If Any Affected Village Action Taken For Rectification)
				Power Pump	Mini Power	Hand Pump	Power Pump	Mini Power	Hand Pump	Upto Yesterday	Today	Total	Upto Yesterday	Today	Total					
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**19**	**20**	**15=13+14**	**16=15/4**	**17**
		Kanchiranpettai	154	1	0	1	1	0	1	0	0	0	0	0	0	8000	0	8000	51.95	-
		Total	**3706**	**5**	**14**	**15**	**5**	**14**	**15**	**3**	**0**	**3**	**3**	**0**	**3**	**271000**	**0**	**271000**	**73.12**	**-**
11	**ASAVEERANKUDIKADU**	Asaveerankudikadu	716	2	5	3	2	5	3	0	0	0	0	0	0	48000	0	48000	67.04	-
		Kanchamalaipatti	315	1	2	1	1	2	1	0	0	0	0	0	0	20000	0	20000	63.49	-
		Kurichchikulam	2110	5	12	6	5	12	6	1	0	1	0	1	1	140000	0	140000	66.35	-
		Nainaar Kudikkadu	180	1	1	1	1	1	1	1	0	1	1	0	1	12000	0	12000	66.67	-
		R.S. Maaththur	660	3	5	2	3	5	2	0	0	0	0	0	0	48000	0	48000	72.73	-
		Total	**3981**	**12**	**25**	**13**	**12**	**25**	**13**	**2**	**0**	**2**	**1**	**1**	**2**	**268000**	**0**	**268000**	**67.32**	**-**

Sl. No	Panchayat Name	Habitation Name	Total Population	Sources Available for Water Supply			Number of Functioning Sources			Total No. of Repair			Rectified			Water Supply From Own Sources (In Litres)	Water Supply From CWSS Source	Total Supply of Water / Day (In Litres)	Daily LPCD	Remarks (If Any Affected Village Action Taken For Rectification)
				Power Pump	Mini Power	Hand Pump	Power Pump	Mini Power	Hand Pump	Upto Yesterday	Today	Total	Upto Yesterday	Today	Total					
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**19**	**20**	**15=13+14**	**16=15/4**	**17**
12	**AYANTHATHANUR**	Aynathathanur	1216	2	3	2	2	3	2	1	0	1	1	0	1	96000	0	96000	78.95	-
		Mullaiyur	1021	1	2	1	1	2	1	0	0	0	0	0	0	72000	0	72000	70.52	-
		Vangaaram	1586	3	6	2	3	6	2	0	0	0	0	0	0	140000	0	140000	88.27	-
		Total	**3823**	**6**	**11**	**5**	**6**	**11**	**5**	**1**	**0**	**1**	**1**	**0**	**1**	**308000**	**0**	**308000**	**80.57**	**-**
13	**MANAKUDAIYAN**	Manakudaiyan	1113	4	5	8	4	5	8	0	0	0	0	0	0	70000	0	70000	62.89	-
		Thamaraippoondi	964	3	1	4	3	1	4	1	0	1	1	0	1	72000	0	72000	74.69	-
		Irungalaak Kurichchi	721	1	1	3	1	1	3	0	0	0	0	0	0	40000	0	40000	55.48	-
		Marakkurichi	354	1	0	3	1	0	3	1	0	1	1	0	1	20000	0	20000	56.50	-

Sl. No	Panchayat Name	Habitation Name	Total Population	Sources Available for Water Supply			Number of Functioning Sources			Total No. of Repair			Rectified			Water Supply From Own Sources (In Litres)	Water Supply From CWSS Source	Total Supply of Water / Day (In Litres)	Daily LPCD	Remarks (If Any Affected Village Action Taken For Rectification)
				Power Pump	Mini Power	Hand Pump	Power Pump	Mini Power	Hand Pump	Upto Yesterday	Today	Total	Upto Yesterday	Today	Total					
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**19**	**20**	**15=13+14**	**16=15/4**	**17**
		Sozhampatti	233	0	1	0	0	1	0	0	0	0	0	0	0	18000	0	18000	77.25	-
		Total	**3385**	**9**	**8**	**18**	**9**	**8**	**18**	**2**	**0**	**2**	**2**	**0**	**2**	**220000**	**0**	**220000**	**64.99**	**-**
14	**MANAPPATHUR**	Manappathur	1586	8	3	5	8	3	5	1	0	1	1	0	1	120000	0	120000	75.66	-
		Sithudaiyaar	713	1	2	2	1	2	2	0	0	0	0	0	0	56000	0	56000	78.54	-
		Chozhankudikadu	426	0	1	4	0	1	4	0	0	0	0	0	0	24000	0	24000	56.34	-
		Nanthiyankudikadu	538	3	2	3	3	2	3	1	0	1	1	0	1	31000	0	31000	57.62	-
		Nathkuzhi	315	0	1	2	0	1	2	1	0	1	1	0	1	20000	0	20000	63.49	-
		Padaivettikudikadu	1226	3	3	3	3	3	3	1	0	1	1	0	1	60000	0	60000	48.94	-

Sl. No	Panchayat Name	Habitation Name	Total Population	Sources Available for Water Supply			Number of Functioning Sources			Total No. of Repair			Rectified			Water Supply From Own Sources (In Litres)	Water Supply From CWSS Source	Total Supply of Water / Day (In Litres)	Daily LPCD	Remarks (If Any Affected Village Action Taken For Rectification)
				Power Pump	Mini Power	Hand Pump	Power Pump	Mini Power	Hand Pump	Upto Yesterday	Today	Total	Upto Yesterday	Today	Total					
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**19**	**20**	**15=13+14**	**16=15/4**	**17**
		Ukanthanyakan Kudikadu	639	1	0	0	1	0	0	0	0	0	0	0	0	40000	0	40000	62.6	-
		Total	**5443**	**16**	**12**	**19**	**16**	**12**	**19**	**4**	**0**	**4**	**4**	**0**	**4**	**351000**	**0**	**351000**	**64.49**	**-**
15	**SANNASINALLUR**	Sannasinallur	1118	2	2	1	2	2	1	0	0	0	0	0	0	64000	0	64000	57.25	-
		Anganur	1762	5	4	3	5	4	3	2	0	2	2	0	2	140000	0	140000	79.46	-
		Sivaraamapuram	1194	2	1	1	2	1	1	0	0	0	0	0	0	60000	0	60000	50.25	-
		Total	**4074**	**9**	**7**	**5**	**9**	**7**	**5**	**2**	**0**	**2**	**2**	**0**	**2**	**264000**	**0**	**264000**	**64.80**	**-**
16	**THALAVAI**	Thalavai	2114	2	2	3	2	2	3	1	0	1	1	0	1	98000	0	98000	46.36	-
		Ichchan Kadu	1135	3	2	3	3	2	3	2	0	2	2	0	2	76000	0	76000	66.96	-

Sl. No	Panchayat Name	Habitation Name	Total Population	Sources Available for Water Supply			Number of Functioning Sources			Total No. of Repair			Rectified			Water Supply From Own Sources (In Litres)	Water Supply From CWSS Source	Total Supply of Water / Day (In Litres)	Daily LPCD	Remarks (If Any Affected Village Action Taken For Rectification)
				Power Pump	Mini Power	Hand Pump	Power Pump	Mini Power	Hand Pump	Upto Yesterday	Today	Total	Upto Yesterday	Today	Total					
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	19	20	15=13+14	16=15/4	17
		Sengamedu	1128	0	0	0	0	0	0	0	0	0	0	0	0	84000	0	84000	74.47	-
		Senthamangalam	610	0	0	1	0	0	1	0	0	0	0	0	0	42000	0	42000	68.85	-
		Silippanoor	990	3	0	0	3	0	0	0	0	0	0	0	0	70000	0	70000	70.71	-
		Thalavai - Koodaloor	680	0	2	2	0	2	2	0	0	0	0	0	0	30000	0	30000	44.12	-
		Mathura Nagar	425	2	0	0	2	0	0	0	0	0	0	0	0	20000	0	20000	47.06	-
		Total	**7082**	**10**	**6**	**9**	**10**	**6**	**9**	**3**	**0**	**3**	**3**	**0**	**3**	**420000**	**0**	**420000**	**59.31**	**-**
		Sub Total	**35166**	**80**	**107**	**91**	**80**	**107**	**91**	**21**	**0**	**21**	**20**	**1**	**21**	**2330000**	**0**	**2330000**	**66.3**	
17	ANANDHAVADI	Anandhavadi	1241	3	5	3	3	5	3	1	0	1	1	0	1	84000	0	84000	67.69	-

Sl. No	Panchayat Name	Habitation Name	Total Population	Sources Available for Water Supply			Number of Functioning Sources			Total No. of Repair			Rectified			Water Supply From Own Sources (In Litres)	Water Supply From CWSS Source	Total Supply of Water / Day (In Litres)	Daily LPCD	Remarks (If Any Affected Village Action Taken For Rectification)
				Power Pump	Mini Power	Hand Pump	Power Pump	Mini Power	Hand Pump	Upto Yesterday	Today	Total	Upto Yesterday	Today	Total					
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**19**	**20**	**15=13+14**	**16=15/4**	**17**
		Cholakkurichchi	603	1	1	1	1	1	1	0	0	0	0	0	0	30000	0	30000	49.75	-
		Chinna Aanathavaddi	1521	3	4	2	3	4	2	1	0	1	1	0	1	90000	0	90000	59.17	-
		Keearayampuram	897	1	3	1	1	3	1	0	0	0	0	0	0	60000	0	60000	66.89	-
		Total	**4262**	**8**	**13**	**7**	**8**	**13**	**7**	**2**	**0**	**2**	**2**	**0**	**2**	**264000**	**0**	**264000**	**61.94**	**-**
18	**IRUMBILIKURUCHI**	Irumbilikuruchi	1336	3	4	1	3	4	1	1	0	1	1	0	1	90000	0	90000	67.37	-
		Kunnakkan Thondi	238	1	1	2	1	1	2	0	0	0	0	0	0	10000	0	10000	42.02	-
		Vadakku Irumbuli Kurichchi	1689	3	6	1	3	6	1	1	0	1	1	0	1	70000	0	70000	41.44	-
		Vennan Kurichchi	375	2	1	0	2	1	0	0	0	0	0	0	0	20000	0	20000	53.33	-

Sl. No	Panchayat Name	Habitation Name	Total Population	Sources Available for Water Supply			Number of Functioning Sources			Total No. of Repair			Rectified			Water Supply From Own Sources (In Litres)	Water Supply From CWSS Source	Total Supply of Water / Day (In Litres)	Daily LPCD	Remarks (If Any Affected Village Action Taken For Rectification)
				Power Pump	Mini Power	Hand Pump	Power Pump	Mini Power	Hand Pump	Upto Yesterday	Today	Total	Upto Yesterday	Today	Total					
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	19	20	15=13+14	16=15/4	17
		Total	**3638**	**9**	**12**	**4**	**9**	**12**	**4**	**2**	**0**	**2**	**2**	**0**	**2**	**190000**	**0**	**190000**	**52.23**	**-**
19	**KUMILIYAM**	Kumiliyam	1855	7	1	2	7	1	2	0	0	0	0	0	0	134000	0	134000	72.24	-
		Total	**1855**	**7**	**1**	**2**	**7**	**1**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**134000**	**0**	**134000**	**72.24**	**-**
20	**PALAYAKUDI**	Palayakudi	1312	3	12	0	3	12	0	1	0	1	1	0	1	100000	0	100000	76.22	-
		Kilimangalam	436	0	2	0	0	2	0	0	0	0	0	0	0	20000	0	20000	45.87	-
		Savaraikadu	152	2	0	0	2	0	0	0	0	0	0	0	0	10000	0	10000	65.79	-
		Valarak Kurichi	1026	1	7	0	1	7	0	1	0	1	1	0	1	78000	0	78000	76.02	-
		Total	**2926**	**6**	**21**	**0**	**6**	**21**	**0**	**2**	**0**	**2**	**2**	**0**	**2**	**208000**	**0**	**208000**	**71.09**	**-**

Sl. No	Panchayat Name	Habitation Name	Total Population	Sources Available for Water Supply			Number of Functioning Sources			Total No. of Repair			Rectified			Water Supply From Own Sources (In Litres)	Water Supply From CWSS Source	Total Supply of Water / Day (In Litres)	Daily LPCD	Remarks (If Any Affected Village Action Taken For Rectification)
				Power Pump	Mini Power	Hand Pump	Power Pump	Mini Power	Hand Pump	Upto Yesterday	Today	Total	Upto Yesterday	Today	Total					
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**19**	**20**	**15=13+14**	**16=15/4**	**17**
21	**PARANAM**	Paranam	2989	7	3	0	7	3	0	1	0	1	1	0	1	200000	0	200000	66.91	-
		Total	**2989**	**7**	**3**	**0**	**7**	**3**	**0**	**1**	**0**	**1**	**1**	**0**	**1**	**200000**	**0**	**200000**	**66.91**	**-**
22	**PILAKURICHI**	Pilakurichi	2159	6	11	0	6	11	0	2	0	2	2	0	2	140000	0	140000	64.84	-
		Total	**2159**	**6**	**11**	**0**	**6**	**11**	**0**	**2**	**0**	**2**	**2**	**0**	**2**	**140000**	**0**	**140000**	**64.84**	
23	**SIRUGADAMBUR**	Sirugadambur	2492	5	8	1	5	8	1	1	0	1	1	0	1	160000	0	160000	64.21	-
		Sethalavadi	763	2	1	0	2	1	0	0	0	0	0	0	0	50000	0	50000	65.53	-
		Total	**3255**	**7**	**9**	**1**	**7**	**9**	**1**	**1**	**0**	**1**	**1**	**0**	**1**	**210000**	**0**	**210000**	**64.52**	**-**
		Sub Total	**21084**	**50**	**70**	**14**	**50**	**70**	**14**	**10**	**0**	**10**	**10**	**0**	**10**	**1346000**	**0**	**1346000**	**63.8**	**-**

Sl. No	Panchayat Name	Habitation Name	Total Population	Sources Available for Water Supply			Number of Functioning Sources			Total No. of Repair			Rectified			Water Supply From Own Sources (In Litres)	Water Supply From CWSS Source	Total Supply of Water / Day (In Litres)	Daily LPCD	Remarks (If Any Affected Village Action Taken For Rectification)
				Power Pump	Mini Power	Hand Pump	Power Pump	Mini Power	Hand Pump	Upto Yesterday	Today	Total	Upto Yesterday	Today	Total					
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**19**	**20**	**15=13+14**	**16=15/4**	**17**
24	**KEELAMALIGAI**	Keelamaligai	1936	4	2	3	4	2	3	1	0	1	1	0	1	130000	0	130000	67.15	-
		Matthumadakki	679	3	1	2	3	1	2	1	0	1	1	0	1	40000	0	40000	58.91	-
		Raajapaalaiyam	550	2	1	2	2	1	2	0	0	0	0	0	0	30000	0	30000	54.55	-
		Total	**3165**	**9**	**4**	**7**	**9**	**4**	**7**	**2**	**0**	**2**	**2**	**0**	**2**	**200000**	**0**	**200000**	**63.19**	**-**
25	**MARUVATHUR**	Maruvathur	1626	3	5	1	3	5	1	1	0	1	1	0	1	120000	0	120000	73.80	-
		Pasalam	268	1	1	1	1	1	1	0	0	0	0	0	0	20000	0	20000	74.63	-
		Sedakudikadu	629	2	4	3	2	4	3	1	0	1	1	0	1	38000	0	38000	60.41	-
		Vizhuppanankurichi	335	2	3	1	2	3	1	0	0	0	0	0	0	20000	0	20000	59.7	-

Sl. No	Panchayat Name	Habitation Name	Total Population	Sources Available for Water Supply			Number of Functioning Sources			Total No. of Repair			Rectified			Water Supply From Own Sources (In Litres)	Water Supply From CWSS Source	Total Supply of Water / Day (In Litres)	Daily LPCD	Remarks (If Any Affected Village Action Taken For Rectification)
				Power Pump	Mini Power	Hand Pump	Power Pump	Mini Power	Hand Pump	Upto Yesterday	Today	Total	Upto Yesterday	Today	Total					
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**19**	**20**	**15=13+14**	**16=15/4**	**17**
		Total	**2858**	**8**	**13**	**6**	**8**	**13**	**6**	**2**	**0**	**2**	**2**	**0**	**2**	**198000**	**0**	**198000**	**69.28**	**-**
26	**NAGALKUZHI**	Nagalkuzhi	1468	5	8	1	5	8	1	1	0	1	1	0	1	120000	0	120000	81.74	-
		Semmanpallam	785	2	3	2	2	3	2	1	0	1	1	0	1	40000	0	40000	50.96	-
		Total	**2253**	**7**	**11**	**3**	**7**	**11**	**3**	**2**	**0**	**2**	**2**	**0**	**2**	**160000**	**0**	**160000**	**71.02**	**-**
27	**PONPARAPPI**	Ponparappi	3592	9	5	0	9	5	0	1	0	1	1	0	1	240000	0	240000	66.82	-
		Ponparappi Kudikadu	1162	6	5	0	6	5	0	1	0	1	1	0	1	80000	0	80000	68.85	-
		Total	**4754**	**15**	**10**	**0**	**15**	**10**	**0**	**2**	**0**	**2**	**2**	**0**	**2**	**320000**	**0**	**320000**	**67.31**	**-**
28	**SIRUKALATHUR**	Sirukalathur	3720	14	10	0	14	10	0	2	0	2	2	0	2	260000	0	260000	69.89	-

Sl. No	Panchayat Name	Habitation Name	Total Population	Sources Available for Water Supply			Number of Functioning Sources			Total No. of Repair			Rectified			Water Supply From Own Sources (In Litres)	Water Supply From CWSS Source	Total Supply of Water / Day (In Litres)	Daily LPCD	Remarks (If Any Affected Village Action Taken For Rectification)
				Power Pump	Mini Power	Hand Pump	Power Pump	Mini Power	Hand Pump	Upto Yesterday	Today	Total	Upto Yesterday	Today	Total					
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**19**	**20**	**15=13+14**	**16=15/4**	**17**
		Total	**3720**	**14**	**10**	**0**	**14**	**10**	**0**	**2**	**0**	**2**	**2**	**0**	**2**	**260000**	**0**	**260000**	**69.89**	**-**
29	**THULAR**	Thular	976	4	4	5	4	4	5	1	0	1	1	0	1	64000	0	64000	65.57	-
		Marunkur	821	3	3	2	3	3	2	1	0	1	1	0	1	62000	0	62000	75.52	
		Poomudaiyan Kudikadu	706	1	2	0	1	2	0	1	0	1	1	0	1	54000	0	54000	76.49	-
		Total	**2503**	**8**	**9**	**7**	**8**	**9**	**7**	**3**	**0**	**3**	**3**	**0**	**3**	**180000**	**0**	**180000**	**71.91**	**-**
30	**VEERAKKAN**	Veerakkan	1783	5	6	0	5	6	0	1	0	1	1	0	1	120000	0	120000	67.30	-
		Total	**1783**	**5**	**6**	**0**	**5**	**6**	**0**	**1**	**0**	**1**	**1**	**0**	**1**	**120000**	**0**	**120000**	**67.30**	**-**
		Sub Total	**21036**	**66**	**63**	**23**	**66**	**63**	**23**	**14**	**0**	**14**	**14**	**0**	**14**	**1438000**	**0**	**1438000**	**68.4**	**-**

Sl. No	Panchayat Name	Habitation Name	Total Population	Sources Available for Water Supply			Number of Functioning Sources			Total No. of Repair			Rectified			Water Supply From Own Sources (In Litres)	Water Supply From CWSS Source	Total Supply of Water / Day (In Litres)	Daily LPCD	Remarks (If Any Affected Village Action Taken For Rectification)
				Power Pump	Mini Power	Hand Pump	Power Pump	Mini Power	Hand Pump	Upto Yesterday	Today	Total	Upto Yesterday	Today	Total					
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	19	20	15=13+14	16=15/4	17
		Grand Total	110421	268	321	202	268	320	202	65	1	66	64	1	65	7289000	0	7289000	66	-

Annexure: VI (b)

Block Name: Ariyalur

S.No	Panchayat Name	RD Name of The Habitation	Total Housholds 01.01.2020	Existing No.of FHTC	Balance FHTC to be Provided	Total Water Available (In Litre)	Total Population as On 01.04.2020	Average LPCD
1	2	3	4	5	6	7	8	9=(7)(8)
1	ALANDURAIYARKATTALAI	Alanduraiyarkattalai	205	91	114	30000	811	37
		Keelakaangiyanur	136	60	76	16000	489	33
		Meelakaangiyanur	49	21	28	9000	231	39
		Panankoor	85	54	31	16000	344	47
		Siruthondan Kani	19	4	15	8500	123	69
		Vaazhaikuzhi	118	54	64	17000	424	40
Total			**612**	**284**	**328**	**96500**	**2422**	**40**
2	ANDIPATTAKADU	Andipattakadu	416	119	297	32000	1444	22
		Puththur	80	42	38	17500	293	60
		Vallakulam	76	76	0	32500	520	63
Total			**572**	**237**	**335**	**82000**	**2257**	**36**
3	ARUNGAL	Archunapuram	54	24	30	28000	260	108
		Arungal	609	0	609	77000	2101	37
		Paalaiyam	380	74	306	37000	1032	36
		Paappaankulam	67	28	39	27000	277	97
Total			**1110**	**126**	**984**	**169000**	**3670**	**46**

S.No	Panchayat Name	RD Name of The Habitation	Total Housholds 01.01.2020	Existing No.of FHTC	Balance FHTC to be Provided	Total Water Available (In Litre)	Total Population as On 01.04.2020	Average LPCD
4	EDAIYATHANGUDI	Aaranoor	120	0	120	20000	305	66
		Edayathangudi	295	0	295	50000	1135	44
		Vaippam	258	0	258	65000	1080	60
Total			**673**	**0**	**673**	**135000**	**2520**	**54**
5	ERTHUKARANPATTI	Aminabath	238	88	150	35000	637	55
		Annanagar	445	193	252	53500	1570	34
		Erthukaranpatti	488	212	276	34500	1235	28
		Kollaapuram	45	11	34	32000	639	50
		Kurumpansaavadi	481	104	377	36010	792	45
		Magalingapuram	129	48	81	35000	636	55
Total			**1826**	**656**	**1170**	**226010**	**5509**	**41**
6	GOVINDAPURAM	Gandhi Nagar	14	0	14	3500	55	64
		Govindapuram	287	168	119	70500	1005	70
		Jayaramapuram	115	54	61	27000	523	52
		Mahalingapuram	32	28	4	8500	105	81
Total			**448**	**250**	**198**	**109500**	**1688**	**65**
7	HASTHINAPURAM	Hasthinapuram	612	109	503	71500	2476	29
Total			**612**	**109**	**503**	**71500**	**2476**	**29**
8	ELUPPAIYUR	Iluppaiyur	835	78	757	54500	1451	38
		Poyyaathanallur	345	86	259	73000	3312	22
Total			**1180**	**164**	**1016**	**127500**	**4763**	**27**
9	KADUGUR	Ayanaatthur	524	134	390	69500	2125	33
		Kadugur	550	168	382	80000	2188	37

S.No	Panchayat Name	RD Name of The Habitation	Total Housholds 01.01.2020	Existing No.of FHTC	Balance FHTC to be Provided	Total Water Available (In Litre)	Total Population as On 01.04.2020	Average LPCD
		Ka.Pooyyur	150	124	26	49000	872	56
		Koppiliyankudikaadu	175	0	175	18000	1075	17
		Nuraiyur	30	30	0	16000	245	65
		Puvoodaiyan Paddi	32	31	1	15000	242	62
		Thalaiyaari Kudikadu	51	42	9	16000	455	35
Total			**1512**	**529**	**983**	**263500**	**7202**	**37**
10	**KALLANKURICHI**	Kallankurichi	427	157	270	69000	2149	32
Total			**427**	**157**	**270**	**69000**	**2149**	**32**
11	**KARUPILAKKATTALAI**	Ezheri	150	28	122	17000	491	35
		Kallahgudi	650	125	525	83000	2333	36
		Karupilakkattalai	305	102	203	33000	1050	31
		Keelavannam	140	24	116	17500	504	35
		Vanarapettai	105	22	83	16000	366	44
Total			**1350**	**301**	**1049**	**166500**	**4744**	**35**
12	**KAVANUR**	Alamelmangaipuram	20	0	20	6000	104	58
		Aykkaali	80	13	67	16000	291	55
		Ka.Ambapur	409	83	326	48000	1501	32
		Kaatthaankudikadu	253	73	180	32000	735	44
		Kavanur	318	58	260	43000	887	48
		Ponparappiyan Dheru	55	7	48	8500	212	40
Total			**1135**	**234**	**901**	**153500**	**3730**	**41**
13	**KAYARLABATH**	Kayarlabath	227	120	107	31000	918	34
		Mandaiyan Kudisal	65	23	42	23500	440	53

S.No	Panchayat Name	RD Name of The Habitation	Total Housholds 01.01.2020	Existing No.of FHTC	Balance FHTC to be Provided	Total Water Available (In Litre)	Total Population as On 01.04.2020	Average LPCD
		Valluvansalai	168	18	150	34000	536	63
Total			**460**	**161**	**299**	**88500**	**1894**	**47**
14	**MANAKKAL**	Manakkal	313	102	211	47000	1181	40
		Mana. Suburayapuram	147	15	132	16000	539	30
		Nallampathai	100	17	83	27500	628	44
Total			**560**	**134**	**426**	**90500**	**2348**	**39**
15	**MANAKKUDI**	Chinna Manakudi	90	0	90	16000	504	32
		Manakudi	331	76	255	65000	800	81
		Sc Colony	162	1	161	22500	435	52
Total			**583**	**77**	**506**	**103500**	**1739**	**60**
16	**MELAKARUPPUR**	Karuvidaiccheri	429	180	249	48000	1280	38
		K.Poyyur	576	270	306	92000	2215	42
		Melakkaruppur	373	190	183	67000	3194	21
		Semmanthankudi	140	36	104	35500	600	59
Total			**1518**	**676**	**842**	**242500**	**7289**	**33**
17	**NAGAMANGALAM**	Arasukaaran Kottai	50	21	29	17000	238	71
		Kanakkampalayam	60	21	39	17000	192	89
		Kanchilikottai	150	41	109	17000	539	32
		Nagamangalam	525	301	224	69500	2152	32
		Pattattankurichi	150	58	92	24500	720	34
		Therkukudisal	40	24	16	10500	170	62
Total			**975**	**466**	**509**	**155500**	**4011**	**39**
18	**OTTAKOVIl**	Kallamedu	114	55	59	15000	505	30

S.No	Panchayat Name	RD Name of The Habitation	Total Housholds 01.01.2020	Existing No.of FHTC	Balance FHTC to be Provided	Total Water Available (In Litre)	Total Population as On 01.04.2020	Average LPCD
		O.Kirushnaapuram	39	14	25	16000	223	72
		O.Koottur	451	164	287	63000	1670	38
		Ottakoil	484	96	388	50000	1788	28
		Salaikurichi	373	151	222	47000	1547	30
Total			**1461**	**480**	**981**	**191000**	**5733**	**33**
19	**PERIYANAGALUR**	Chinnanaagalur	305	0	305	33000	817	40
		Dr Ayya Nagar	85	0	85	17000	368	46
		Ganapathinagar	90	0	90	16000	374	43
		Kaattupirigiyam	213	0	213	70000	1239	56
		Periyanagalur	450	0	450	54500	1387	39
Total			**1143**	**0**	**1143**	**190500**	**4185**	**46**
20	**PERIYATHIRUKONAM**	Chettithirukkonam	310	95	215	38000	999	38
		Kamarajapuram	225	67	158	30500	815	37
		Periathirukkonam	300	145	155	51000	1300	39
Total			**835**	**307**	**528**	**119500**	**3114**	**38**
21	**PUNGANKUZHI**	Aathanur	350	158	192	93000	1179	79
		Naanaangur	150	33	117	31500	805	39
		Oriyur	250	61	189	93000	1186	78
		P.Ottakovil	375	134	241	107000	1257	85
		Pungankuzhi	25	2	23	52500	259	203
		Siluppanur	175	77	98	61000	749	81
Total			**1325**	**465**	**860**	**438000**	**5435**	**81**
22	**POTTAVELI**	Agaram	37	15	22	15000	208	72

S.No	Panchayat Name	RD Name of The Habitation	Total Housholds 01.01.2020	Existing No.of FHTC	Balance FHTC to be Provided	Total Water Available (In Litre)	Total Population as On 01.04.2020	Average LPCD
		Pottaveli	355	45	310	32000	1355	24
		Vellur	775	0	775	72000	3751	19
Total			**1167**	**60**	**1107**	**119000**	**5314**	**22**
23	**PUDUPALAYAM**	Kottakaadu	63	22	41	15000	714	21
		Nerunchikorai	168	19	149	23500	1006	23
		Pudupalayam	473	38	435	18000	1283	14
		Velippiringiyam	536	55	481	67000	1061	63
Total			**1240**	**134**	**1106**	**123500**	**4064**	**30**
24	**RAYAMPURAM**	Aathikudikaadu	375	78	297	63000	1814	35
		Kaaveripaalaiyam	80	44	36	16000	299	54
		Rayampuram	514	122	392	116000	2516	46
Total			**969**	**244**	**725**	**195000**	**4629**	**42**
25	**REDDIPALAYAM**	Malaiyadikottai	85	0	85	18000	301	60
		Muniyankurichi	312	33	279	38500	1270	30
		Naayakkarpalaiyam	106	26	80	8500	463	18
		Puthur	120	8	112	16000	491	33
		Reddipalayam	198	32	166	58500	882	66
		Santhiraapaalaiyam	60	1	59	16000	283	57
		V.Kaikatti	213	43	170	58000	1711	34
		Athithiyanagar	82	0	82	0	245	0
Total			**1176**	**143**	**1033**	**213500**	**5646**	**38**
26	**SENNIVANAM**	Mettuppaalaiyam	310	84	226	42500	934	46
		Sennivanam	306	73	233	53500	1217	44

S.No	Panchayat Name	RD Name of The Habitation	Total Housholds 01.01.2020	Existing No.of FHTC	Balance FHTC to be Provided	Total Water Available (In Litre)	Total Population as On 01.04.2020	Average LPCD
Total			**616**	**157**	**459**	**96000**	**2151**	**45**
27	**SIRUVALUR**	Siruvalur	399	0	399	52500	1701	31
Total			**399**	**0**	**399**	**52500**	**1701**	**31**
28	**SRINIVASAPURAM**	Mettukudisal (Srinivasapuram)	79	0	79	16000	288	56
		Srinivasapuram Kizhakku	72	35	37	23500	374	63
		Srinivasapuram Therku	85	37	48	17000	293	58
		Srinivasapuram North	47	21	26	12250	293	42
Total			**283**	**93**	**190**	**68750**	**1248**	**55**
29	**SUBBURAYAPURAM**	Kurichinattham	281	120	161	61000	626	97
		Pallakirushnaapuram	443	163	280	30000	779	39
		Rengasamuthiram	210	78	132	22500	569	40
		Subburayapuram	152	65	87	52500	1381	38
Total			**1086**	**426**	**660**	**166000**	**3355**	**49**
30	**SUNDAKUDI**	Anna Nagar	117	60	57	26500	960	28
		Sundakudi	453	199	254	57000	1213	47
Total			**570**	**259**	**311**	**83500**	**2173**	**38**
31	**THAMARAIKULAM**	Thamaraikulam	167	69	98	26500	631	42
		Venkataramanapuram	121	58	63	24500	403	61
		Venkataramapuram	135	63	72	19000	488	39
Total			**423**	**190**	**233**	**70000**	**1522**	**46**
32	**THAVUTHAIKULAM**	Ammakulam	189	155	34	16000	627	26
		Mettuthavuthaikulam	25	0	25	3000	93	32
		Thauvuthaikulam	183	135	48	30000	897	33

S.No	Panchayat Name	RD Name of The Habitation	Total Housholds 01.01.2020	Existing No.of FHTC	Balance FHTC to be Provided	Total Water Available (In Litre)	Total Population as On 01.04.2020	Average LPCD
Total			**397**	**290**	**107**	**49000**	**1617**	**30**
33	**THELUR**	Kudisal	275	2	273	17000	403	42
		Mannuzhi	500	0	500	69500	1834	38
		Thelur	952	13	939	100500	3364	30
Total			**1727**	**15**	**1712**	**187000**	**5601**	**33**
34	**USENABATH**	Kallangurichi	67	12	55	8500	76	112
		Morakkuzhi	32	8	24	8500	121	70
		Usenabath	188	25	163	36000	728	49
Total			**287**	**45**	**242**	**53000**	**925**	**57**
35	**VALAJANAGARAM**	Sasthirinagar	201	0	201	11500	472	24
		Indranagar	79	0	79	11000	325	34
		New Market Street	457	0	457	32000	1674	19
		Minnagar	274	0	274	45000	835	54
		Raavuththanpatti	141	0	141	23500	519	45
		Rajeevnagar	506	322	184	104000	1918	54
		Themmanam	283	0	283	31000	1026	30
		Valajanagaram	468	0	468	76000	1831	42
		Arasunagar	150	0	150	0	508	0
Total			**2559**	**322**	**2237**	**334000**	**9108**	**37**
36	**VENKATAKRISHNAPURAM**	Konerirayapuram	107	40	67	16000	414	39
		Venkadakrishnapuram	227	0	227	23500	615	38
Total			**334**	**40**	**294**	**39500**	**1029**	**38**
37	**VILLANGUDI**	Keezhavilaankudi	405	29	376	16000	1010	16

S.No	Panchayat Name	RD Name of The Habitation	Total Housholds 01.01.2020	Existing No.of FHTC	Balance FHTC to be Provided	Total Water Available (In Litre)	Total Population as On 01.04.2020	Average LPCD
		Oraththur	319	22	297	17000	945	18
		Villangudi	1930	55	1875	79000	[illegible]	[illegible]
Total			**2654**	**106**	**2548**	**112000**		
Grand Total			**36204**	**8337**	**27867**	**5251260**	**132125**	**40**

Annexure: IV (c)

Block Name : Thirumanur

Sl. No	Panchayat Name	Habitatin Name	Total Population	Sources Available for Water Supply			Number of Functioning Sources			Total No. of Repair			Rectified			Water Supply From Own Sources (In Litres)	Water Supply From CWSS Source	Total Supply of Water / Day (In Litres)	Daily LPCD
				Power Pump	Mini Power Pump	Hand Pump	Power Pump	Mini Power Pump	Hand Pump	Upto Yesterday	Today	Total	Upto Yesterday	Today	Total				
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**0**	**0**	**0**	**0**	**0**	**0**	**13**	**14**	**15=13+14**	**16=15/4**
1	**ANNIMANGALAM**	Annimangalam	1390	2	4	5	2	4	5	0	0	0	0	0	0	90000	0	90000	65
		Palayapadi	1153	2	0	3	2	0	3	0	0	0	0	0	0	90000	0	90000	78

Sl. No	Panchayat Name	Habitatin Name	Total Population	Sources Available for Water Supply			Number of Functioning Sources			Total No. of Repair			Rectified			Water Supply From Own Sources (In Litres)	Water Supply From CWSS Source	Total Supply of Water / Day (In Litres)	Daily LPCD
				Power Pump	Mini Power Pump	Hand Pump	Power Pump	Mini Power Pump	Hand Pump	Upto Yesterday	Today	Total	Upto Yesterday	Today	Total				
1	2	3	4	5	6	7	8	9	10	0	0	0	0	0	0	13	14	15=13+14	16=15/4
		AaranmanaiKurichi	1208	2	3	7	2	3	7	0	0	0	0	0	0	88000	0	88000	73
2	KEELAKAVATTANKURICHI	keelakavattankurichi	1626	3	5	7	3	5	7	0	0	0	0	0	0	124000	0	124000	76
		Melakavattankurichi	419	1	1	3	1	1	3	0	1	1	0	1	1	24500	0	24500	58
		Kunthapuram	1432	2	5	6	2	5	6	0	0	0	0	0	0	71500	0	71500	50
		Senapathy	1432	2	4	6	2	4	6	0	0	0	0	0	0	94000	0	94000	66
		Thatanchavadi	322	1	1	3	1	1	3	0	0	0	0	0	0	24500	0	24500	76
3	KEELAKOLATHUR	Keelakolathur	3804	7	2	4	7	2	4	0	0	0	0	0	0	158800	0	158800	42
4	MANJAMEDU	Manjamedu	712	2	1	5	2	1	5	0	0	0	0	0	0	32000	0	32000	45

Sl. No	Panchayat Name	Habitatin Name	Total Population	Sources Available for Water Supply			Number of Functioning Sources			Total No. of Repair			Rectified			Water Supply From Own Sources (In Litres)	Water Supply From CWSS Source	Total Supply of Water / Day (In Litres)	Daily LPCD
				Power Pump	Mini Power Pump	Hand Pump	Power Pump	Mini Power Pump	Hand Pump	Upto Yesterday	Today	Total	Upto Yesterday	Today	Total				
1	2	3	4	5	6	7	8	9	10	0	0	0	0	0	0	13	14	15=13+14	16=15/4
		Mudikondan	956	2	2	0	2	2	0	0	2	2	0	2	2	66000	0	66000	69
		Karaipakkam	1190	1	2	7	1	2	7	0	0	0	0	0	0	92000	0	92000	77
5	SATHAMANGALAM	Sathamangalam	1878	1	8	1	1	8	1	0	0	0	0	0	0	84500	0	84500	45
		Melavannam	528	1	6	2	1	6	2	0	3	3	0	3	3	29100	0	29100	55
		Puthur	866	2	7	5	2	7	5	0	0	0	0	0	0	49600	0	49600	57
6	THIRUMANUR	Thirumanur	7489	8	3	2	8	3	2	0	0	0	0	0	0	322560	50000	372560	50
7	VADUGAPALAYAM	Vadugapalayam	1625	1	4	0	1	4	0	0	2	2	0	2	2	72350	5000	77350	48
		Thiruvenganur	1594	1	2	0	1	2	0	0	0	0	0	0	0	75000	0	75000	47

Sl. No	Panchayat Name	Habitatin Name	Total Population	Sources Available for Water Supply			Number of Functioning Sources			Total No. of Repair			Rectified			Water Supply From Own Sources (In Litres)	Water Supply From CWSS Source	Total Supply of Water / Day (In Litres)	Daily LPCD
				Power Pump	Mini Power Pump	Hand Pump	Power Pump	Mini Power Pump	Hand Pump	Upto Yesterday	Today	Total	Upto Yesterday	Today	Total				
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**0**	**0**	**0**	**0**	**0**	**0**	**13**	**14**	**15=13+14**	**16=15/4**
		Kumaramangalam	454	1	1	0	1	1	0	0	0	0	0	0	0	42000	0	42000	93
8	**VILUPANKURICHI**	Vilupankurichi	1925	2	2	2	2	2	2	0	0	0	0	0	0	128200	0	128200	67
9	**VETRIYUR**	Vetriyur	1860	2	6	0	2	6	0	0	0	0	0	0	0	125000	0	125000	67
		Kallur	2364	1	4	2	1	4	2	0	1	1	0	1	1	145000	0	145000	61
		Viragalur	1321	2	3	0	2	3	0	0	0	0	0	0	0	62000	0	62000	47
		Thiruppeyar	1116	3	2	0	3	2	0	0	0	0	0	0	0	47000	0	47000	42
10	**AYANSUTHAMALLI**	Ayansuthamalli	833	2	5	1	2	5	1	0	0	0	0	0	0	48000	0	48000	58
		Yeragudi	1015	2	7	6	2	7	6	0	0	0	0	0	0	73000	0	73000	72

Sl. No	Panchayat Name	Habitatin Name	Total Population	Sources Available for Water Supply			Number of Functioning Sources			Total No. of Repair			Rectified			Water Supply From Own Sources (In Litres)	Water Supply From CWSS Source	Total Supply of Water / Day (In Litres)	Daily LPCD
				Power Pump	Mini Power Pump	Hand Pump	Power Pump	Mini Power Pump	Hand Pump	Upto Yesterday	Today	Total	Upto Yesterday	Today	Total				
1	2	3	4	5	6	7	8	9	10	0	0	0	0	0	0	13	14	15=13+14	16=15/4
		Vettagudi	492	1	3	2	1	3	2	0	0	0	0	0	0	30000	0	30000	61
11	KEELAPAMBUR	Keelapambur	7688	5	14	0	5	14	0	0	0	0	0	0	0	320000	50000	370000	48
12	MALATHANKULAM	Malathankulam	2512	4	9	11	4	9	11	0	0	0	0	0	0	200000	0	200000	80
13	MELAPAMPUR	Melapampur	1208	2	2	2	2	2	2	0	1	1	0	1	1	69000	0	69000	57
		Keelaiyur	3996	5	7	3	5	7	3	0	0	0	0	0	0	200000	0	200000	50
14	PALINGANATHAM	Paliganatham	2814	5	11	5	5	11	5	0	0	0	0	0	0	187000	0	187000	66
		Palaniyandi Nagar	557	2	4	1	2	4	1	0	0	0	0	0	0	42000	0	42000	75
		AVK Colony	1178	1	3	1	1	3	1	0	0	0	0	0	0	52000	0	52000	44

Sl. No	Panchayat Name	Habitatin Name	Total Population	Sources Available for Water Supply			Number of Functioning Sources			Total No. of Repair			Rectified			Water Supply From Own Sources (In Litres)	Water Supply From CWSS Source	Total Supply of Water / Day (In Litres)	Daily LPCD
				Power Pump	Mini Power Pump	Hand Pump	Power Pump	Mini Power Pump	Hand Pump	Upto Yesterday	Today	Total	Upto Yesterday	Today	Total				
1	2	3	4	5	6	7	8	9	10	0	0	0	0	0	0	13	14	15=13+14	16=15/4
15	PARPANACHERI	Parpanacheri	953	2	5	2	2	5	2	0	0	0	0	0	0	77500	0	77500	81
		Maravanur	1067	2	4	2	2	4	2	0	2	2	0	2	2	60500	0	60500	57
16	POONDI	Poondi	1881	3	4	8	3	4	8	0	0	0	0	0	0	90000	0	90000	48
		Kookudi	2052	4	4	3	4	4	3	0	0	0	0	0	0	120000	0	120000	58
		Kanikkai Puram	620	1	1	2	1	1	2	0	0	0	0	0	0	48000	0	48000	77
		Veppamkuli	761	1	3	0	1	3	0	0	0	0	0	0	0	45000	0	45000	59
17	SANNAVUR	Sannavur	2149	2	6	9	2	6	9	0	2	2	0	2	2	92000	0	92000	43
		Korathakudi	524	1	1	2	1	1	2	0	0	0	0	0	0	25000	0	25000	48

Sl. No	Panchayat Name	Habitatin Name	Total Population	Sources Available for Water Supply			Number of Functioning Sources			Total No. of Repair			Rectified			Water Supply From Own Sources (In Litres)	Water Supply From CWSS Source	Total Supply of Water / Day (In Litres)	Daily LPCD
				Power Pump	Mini Power Pump	Hand Pump	Power Pump	Mini Power Pump	Hand Pump	Upto Yesterday	Today	Total	Upto Yesterday	Today	Total				
1	2	3	4	5	6	7	8	9	10	0	0	0	0	0	0	13	14	15=13+14	16=15/4
		Ankiyanur	2241	6	5	8	6	5	8	0	0	0	0	0	0	95000	0	95000	42
18	VARANAVASI	Varanavasi	2721	5	7	3	5	7	3	0	0	0	0	0	0	154000	5000	159000	58
		Mallur	756	2	2	3	2	2	3	0	0	0	0	0	0	49000	0	49000	65
		Mettu Krishnapuram	35	1	0	1	1	0	1	0	0	0	0	0	0	2500	0	2500	67
		Samathuvapuram	664	1	2	0	1	2	0	0	0	0	0	0	0	37710	0	37710	57
19	ILANDAIKUDAM	Ilandaikudam	4812	4	9	10	4	9	10	0	3	3	0	3	3	200000	0	200000	42
		Vaithiyanathapuram	374	2	4	4	2	4	4	0	0	0	0	0	0	25000	0	25000	67
20	KANDARATHITHAM	K Mettutheru	1282	2	11	8	2	11	8	0	0	0	0	0	0	53000	0	53000	41

Sl. No	Panchayat Name	Habitatin Name	Total Population	Sources Available for Water Supply			Number of Functioning Sources			Total No. of Repair			Rectified			Water Supply From Own Sources (In Litres)	Water Supply From CWSS Source	Total Supply of Water / Day (In Litres)	Daily LPCD
				Power Pump	Mini Power Pump	Hand Pump	Power Pump	Mini Power Pump	Hand Pump	Upto Yesterday	Today	Total	Upto Yesterday	Today	Total				
1	2	3	4	5	6	7	8	9	10	0	0	0	0	0	0	13	14	15=13+14	16=15/4
		Kandarathitham	2013	3	5	17	3	5	17	0	0	0	0	0	0	122500	0	122500	61
		Manalmedu	1012	2	3	5	2	3	5	0	0	0	0	0	0	71500	0	71500	71
		Bakkiyanathapuram	236	1	2	2	1	2	2	0	0	0	0	0	0	15000	0	15000	64
21	KARAIVETTI	Karaivetti	3509	3	4	2	3	4	2	0	0	0	0	0	0	150000	0	150000	43
		Parathur	2169	2	2	1	2	2	1	0	0	0	0	0	0	95000	0	95000	44
22	KOVILESANAI	Kovilesanai	2133	3	5	4	3	5	4	0	2	2	0	2	2	90000	0	90000	42
		Vilagam	1944	4	2	2	4	2	2	0	0	0	0	0	0	95000	0	95000	49
23	KULAMANICKAM	Kulamanickam	2548	3	4	19	3	4	19	0	0	0	0	0	0	166000	0	166000	65

Sl. No	Panchayat Name	Habitatin Name	Total Population	Sources Available for Water Supply			Number of Functioning Sources			Total No. of Repair			Rectified			Water Supply From Own Sources (In Litres)	Water Supply From CWSS Source	Total Supply of Water / Day (In Litres)	Daily LPCD
				Power Pump	Mini Power Pump	Hand Pump	Power Pump	Mini Power Pump	Hand Pump	Upto Yesterday	Today	Total	Upto Yesterday	Today	Total				
1	2	3	4	5	6	7	8	9	10	0	0	0	0	0	0	13	14	15=13+14	16=15/4
		Adaikalapuram	289	1	1	3	1	1	3	0	0	0	0	0	0	14000	0	14000	48
24	PUTHUKOTTAI	Puthukottai	2102	4	2	6	4	2	6	0	0	0	0	0	0	110000	0	110000	52
		Bakkiyanathapuram	51	1	2	2	1	2	2	0	0	0	0	0	0	4000	0	4000	78
25	SEMBIYAKUDI	Sembiyakudi	2098	3	7	7	3	7	7	0	0	0	0	0	0	179000	0	179000	85
26	THIRUMAZHAPADI	Thirumazhapadi	3276	6	6	18	6	6	18	0	0	0	0	0	0	235000	0	235000	72
27	VENGANUR	Venganur	2770	4	6	7	4	6	7	0	0	0	0	0	0	150000	0	150000	54
28	ALAGIYAMANAVALAM	Alagiyamanavalam	960	1	0	5	1	0	5	0	2	2	0	2	2	62000	5000	67000	70
		Melaramanallur	1152	1	0	4	1	0	4	0	0	0	0	0	0	75000	0	75000	65

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				Power Pump	Mini Power Pump	Hand Pump	Power Pump	Mini Power Pump	Hand Pump	Upto Yesterday	Today	Total	Upto Yesterday	Today	Total				
1	2	3	4	5	6	7	8	9	10	0	0	0	0	0	0	13	14	15=13+14	16=15/4
		Kelaramanallur	246	1	0	3	1	0	3	0	0	0	0	0	0	15000	0	15000	61
		Melavarapankurichi	788	1	1	3	1	1	3	0	0	0	0	0	0	36000	0	36000	46
		Keelavarapankurichi	765	1	1	2	1	1	2	0	0	0	0	0	0	32000	0	32000	42
		Nathiyanur	696	1	1	1	1	1	1	0	0	0	0	0	0	36000	0	36000	52
29	CHINNAPATTAKADU	Keelaesanai	1203	2	5	0	2	5	0	0	0	0	0	0	0	55000	0	55000	46
		Chinnapattakadu	1065	2	4	0	2	4	0	0	0	0	0	0	0	49000	0	49000	46
		Periyapattakadu	682	1	3	2	1	3	2	0	2	2	0	2	2	42000	0	42000	62
		Narasingapuram	527	2	3	0	2	3	0	0	0	0	0	0	0	25000	0	25000	47

Sl. No	Panchayat Name	Habitatin Name	Total Population	Sources Available for Water Supply			Number of Functioning Sources			Total No. of Repair			Rectified			Water Supply From Own Sources (In Litres)	Water Supply From CWSS Source	Total Supply of Water / Day (In Litres)	Daily LPCD
				Power Pump	Mini Power Pump	Hand Pump	Power Pump	Mini Power Pump	Hand Pump	Upto Yesterday	Today	Total	Upto Yesterday	Today	Total				
1	2	3	4	5	6	7	8	9	10	0	0	0	0	0	0	13	14	15=13+14	16=15/4
30	ELAKURICHI	Elakurichi	2690	4	6	0	4	6	0	0	0	0	0	0	0	218000	5000	223000	83
		Karayankurichi	899	2	0	0	2	0	0	0	0	0	0	0	0	49000	0	49000	55
		Nayakarpalayam	850	1	1	0	1	1	0	0	1	1	0	1	1	45000	0	45000	53
		Sengarayankattalai	1458	1	2	0	1	2	0	0	0	0	0	0	0	75000	0	75000	51
		Vandarayankattalai	1308	2	1	0	2	1	0	0	0	0	0	0	0	58000	0	58000	44
31	KAMARASAVALLI	Kamarasavalli	2989	3	1	3	3	1	3	0	0	0	0	0	0	150500	5000	155500	52
		Mathur	922	1	0	1	1	0	1	0	0	0	0	0	0	80000	0	80000	87
		Arasanchery	175	1	0	0	1	0	0	0	0	0	0	0	0	8500	0	8500	49

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				Power Pump	Mini Power Pump	Hand Pump	Power Pump	Mini Power Pump	Hand Pump	Upto Yesterday	Today	Total	Upto Yesterday	Today	Total				
1	2	3	4	5	6	7	8	9	10	0	0	0	0	0	0	13	14	15=13+14	16=15/4
32	KOVILUR	Kovilur	3268	6	9	0	6	9	0	0	0	0	0	0	0	142000	0	142000	43
		Chettikuli	1061	2	3	0	2	3	0	0	0	0	0	0	0	71500	0	71500	67
33	KOOMAAN	Koomaan	853	2	0	0	2	0	0	0	0	0	0	0	0	45000	0	45000	53
34	KURUVADI	Kuruvadi	3141	3	1	4	3	1	4	0	2	2	0	2	2	150000	0	150000	48
		Thelur	488	1	1	2	1	1	2	0	0	0	0	0	0	22500	0	22500	46
35	KALLANGUDI	Kallangudi	1681	2	0	0	2	0	0	0	0	0	0	0	0	85000	0	85000	51
		Periyamarai	1244	2	1	0	2	1	0	0	0	0	0	0	0	58000	0	58000	47
		Elunachipuram	360	1	2	0	1	2	0	0	0	0	0	0	0	28500	0	28500	79

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				Power Pump	Mini Power Pump	Hand Pump	Power Pump	Mini Power Pump	Hand Pump	Upto Yesterday	Today	Total	Upto Yesterday	Today	Total				
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**0**	**0**	**0**	**0**	**0**	**0**	**13**	**14**	**15=13+14**	**16=15/4**
		Sengarandicolony	110	1	0	0	1	0	0	0	0	0	0	0	0	5000	0	5000	45
36	**THUTHUR**	Thuthur	3441	3	6	7	3	6	7	0	0	0	0	0	0	140000	0	140000	41
		Vaipur	412	1	1	3	1	1	3	0	0	0	0	0	0	35690	0	35690	87

CENTRAL GROUND WATER BOARD
SOUTH EASTERN COASTAL REGION
E1 C BLOCK RAJAJI BHAVAN
BESANT NAGAR
CHENNAI 600090 TAMILNADU
EMAIL: *rdsecr-cgwb@nic.in*
Phone: +91044-24914334