



## Groundwater and Wells in Vellore District

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### Abstract

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

### Introduction

With the ever-increasing demand for potable and agricultural water, the scarcity of accessible surface water, and the unpredictable seasonal rainfall, groundwater is becoming increasingly important. Groundwater resources in the many villages of the Vellore district of Tamil Nadu have similar climates and are the most critical water resources for drinking and agriculture. Unfortunately, tanneries discharge vast amounts of chromium, lead, and other metals from the wastewater and sludge from the tanning and leather industries, contaminating the soil and groundwater. According to the American Public Health Association (Alpha 1915), most heavy metals are hazardous. In addition, their exposure can impair many health issues, even a child's mental development.

### Physiography and Drainage

- ❖ Vellore district can be broadly classified as hilly terrains and plain regions
- ❖ The east of Eastern Ghats where lies the Palar plain region
- ❖ The region is mostly undulating and sloping towards east
- ❖ The river Palar in its course is successfully enriched by the tributaries Malattar, kaundinyamahanadhi, poiney, cheyyar and kallari.
- ❖ Palar is not a perennial river and occurrence of floods is very rare and of very short duration.
- ❖ River Cheyyar is the major tributaries of river Palar, originates from Javadhu hills.
- ❖ Vellore district is separated into four zones that are further subdivided into 60 wards, covering an area of 87.915 sq.km and housing population of 423,425 as reported by 2021 census.

### Groundwater Quality

- A. *Total dissolved salts (TDS)*: TDS value have been considered for the determination of good and bad quality areas. The TDS value less than or equal to 2000 mg/L have been considered as good quality and the TDS value greater than 2000 mg/L is considered as good quality areas.

*B. Presence of fluorides:* Presence of fluoride  $<1.0$  mg/l in drinking water reduces dental diseases whereas higher level  $> 1.50$  mg/l will affect the health and causes dental fluoridise. Arsenic is another poisonous heavy metal in Ground Water. Arsenic is another poisonous heavy metal in Ground Water. The allowable limits for drinking purposes are 0.05 mg/l. Nitrate is also found in groundwater due to the application of fertilizers for agricultural purposes.

Rainfall Collection In Vellore (5 Years) **IMD**, Chennai.

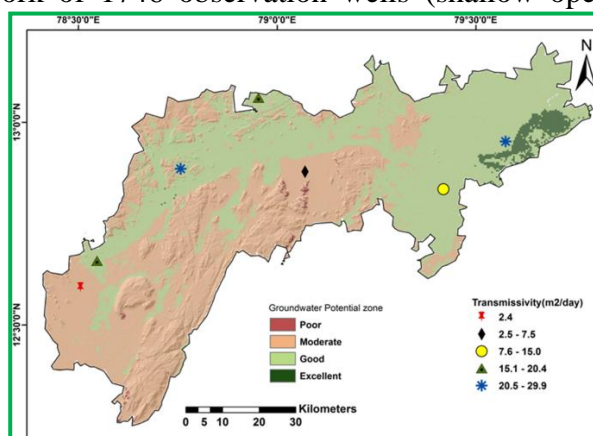
Actual Rainfall In mm					Normal Rainfall In mm
2017	2018	2019	2020	2021	
1042.4	601.2	827.2	1088.3	1433.6	985

## Groundwater Development

Based on the estimation of resources, 16 blocks viz. Alangayam, Anaicut, Arcot, Gudiyatham, Jolarpet, K.V.Kuppam, Kandhili, Kanniyambadi, Katpadi, Madhanur, Natrampalli, Pernampattu, Sholinghur, Thimiri, Thirupathur and Vellore have been Categorized as over exploited and the Nemili block has been categorized as Critical. As such, these blocks are not to be considered for any further development of ground water unless the re-estimation of the resources is completed and the balance potential computed. Ground water development therefore should be taken up in a judicious manner in the remaining 3 blocks viz., Arakonam, Kaveripakkam and Wallajah. The present stage of ground water development in Vellore district is 140 percent and 39454 ham ground water is available for future irrigation development. The present demand for domestic and industrial water supply is estimated as 4115 ham/annum and the ultimate water requirement for domestic and industrial uses up to 2025 is 4280 ham.

## Observatory Wells

- In Vellore District the existing number of monitoring wells is 269 wells, 158 wells are observation wells and 111 are piezometers. These wells are observed for every month water level.
- The water level is being monitored by State Ground and Surface Water Resources Data Centre from 1971 onwards from a network of 1746 observation wells (shallow open wells) located over the state.
- The water level readings are observed in the first week of every month by the field officers.
- They observe water level four times in a year (i.e January, May, August and November).
- The collected water level data are uploaded in GWDES software and database is maintained regularly for analysing the water level trend with rainfall.
- Common Groundwater abstraction structures are Dug wells / Borewells / Tubewells.
- Average depth of Dugwells are 12m to 16m and for Borewells / Tubewells are 120m to 250m.



**Fig. 1 Graph representing Groundwater Potential and Transmissivity of Vellore District.**

- 4.5 and 6 inches are typically the preferred borewell depths for residential purposes.
- The diameter of ordinary tube wells shall be 125 mm up to bottom level of the casing pipe and 115 mm in the rock below the casing.
- The district's major aquifer systems are composed of crystalline rocks that are weathered and fractured and of colluvial deposits.

### Categorization of Firkas based on extraction (As on 2020)

**Over exploited (> 100%):** Ambur, Agaram, Anaicut, Gudiyatham (West), Gudiyatham (East), K.V.Kuppam, Madhanur, Melasannankuppam, Melpatti, Odugathur, Pallikonda, Sathuvachari, Thuthipattu, Vellore, Vaduganthangal, Valathur

No of Firkas = 16.

**Critical (90%-100%):** Ussoor, Pennathur

No of Firkas = 2

**Semi Critical (70%-90%):** Kaniyambadi, Katpadi, Pernampattu, Thiruvalam

No of Firkas = 4

**Safe (<70%):** Melpadi Total No of Firkas = 23

### Groundwater Level

Groundwater levels of the 53 observatory wells from TWAD have been analysed for post and pre – monsoon. 5 years average groundwater level in m below ground level for pre and post monsoon as follows:

Jan 2017	12.5
May 2017	19.6
Jan 2018	8.1
May 2018	17.0
Jan 2019	12.6
May 2019	21.3
Jan 2020	13.7
May 2020	19.3
Jan 2021	26.4
May 2021	38.6
5 years pre – monsoon average	16.1
5 years post – monsoon average	10.1

### References

1. Vellore | TWAD
2. Water Bodies | Vellore District, Government of Tamil Nadu | India
3. Groundwater quality assessment for agricultural purposes at Vellore District of Southern India: A geospatial based study - ScienceDirect
4. Microsoft Word - Vellore.doc
5. Notes on Vellore District.pdf
6. ASSESSMENT OF GROUNDWATER-5550.pdf
7. Microsoft Word - 43.Vellore