



ANALYSIS OF GROUNDWATER QUALITY IN AND AROUND TAMBARAM TALUK, KANCHEEPURAM DISTRICT

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ABSTRACT

The most important natural resource essential for human being for secured and healthy living source is the groundwater. But nowadays the groundwater is contaminated by different reasons like urbanization and industrialization. The necessity of this study is to analyse the quality of water in the study area in and around Tambaram taluk, Kancheepuram district, because Tambaram taluk is a densely populated as well as a developing area so the possibilities of getting polluted are maximum. The groundwater samples were collected from twenty different locations from bore well and open well at different depth. In this study groundwater parameters like pH, Total Hardness, TDS, Chlorides etc., are considered to determine the water quality in the study area to create about the awareness of drinking water quality.

Keywords: Ground Water Quality

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1. INTRODUCTION

Urbanization, industrialization growth in the metropolitan city Chennai is increasingly growing too fast and this will lead to demand of many natural resources. Groundwater is one of the most important resources affected by the increasing rate of urbanization and industrialization. The pollution keeps on increasing every day because of population. The parameters like pH, electrical conductivity, turbidity, total hardness, total dissolved solids, dissolved oxygen, total alkalinity, sodium, chlorides and iron are most important to determine the quality of the water. If the groundwater parameters may increase or decrease from the standard limit will lead to be severe health problems to human beings. Therefore the goal of

this study to analyze the quality of water in the study area to create awareness about the drinking water quality by using standard methods.

2. STUDY AREA

The study area is Tambaram Taluk, Northeast part of Chennai. It lies between 12.93N and 80.14 E. Tambaram is in Kanchipuram district has a total geographical area of 4,432km². In this area the soil is mostly clay, shale and sandstone. Clay underlies most of the city. Sandy areas are found along the river banks and coasts. Since Tambaram taluk is a densely populated as well as a developing area so the possibilities of getting polluted are maximum. The Tambaram Taluk covers twenty revenue villages like Chitlapakkam, Kadapperi, Madampakkam, Mulacheri, Rajakizhpakkam, Thiruvancherri, Pulikoradu, Irumbuliyur, Kovilacheri, Perunkalathur, Selaiyur, Sembakkam, Vengapakkam, Gowrivakkam, Kaspapuram, Madurapakam, Peerkkarananai and Mudichur.

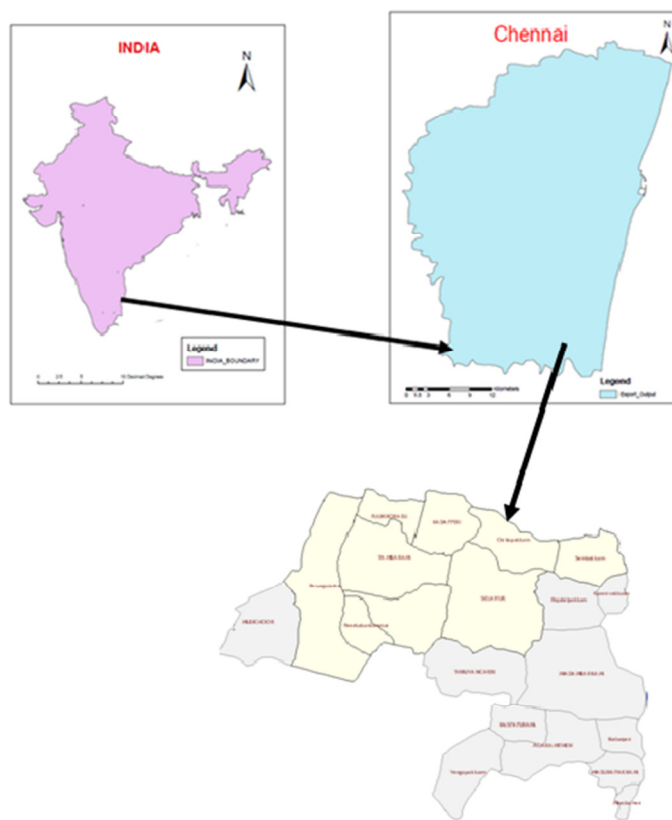


Figure 1 Study Area Map

3. DATA USED

The groundwater samples are collected from different locations from the study area during the year March 2016. Groundwater parameters such as pH, total hardness, total dissolved solids, total alkalinity, chlorides, fluorides, nitrates, phosphate and iron were analyzed to determine the groundwater quality in the study area as per the standard procedures.

4. RESULTS

The collected water samples were tested for various physical chemical parameters like pH, chloride, nitrate, iron, fluoride, phosphate, TDS, TH and total alkalinity and the results are shown in the table 3 and compared with BIS limits to determine the water quality in the study area.

The frequently used most important parameter to determine the water quality is the pH. The pH values for all the samples in the study area are well within the allowable range (6.5-8.5). Also it was noticed the pH is not only the parameter to fix the quality of the drinking water, many other parameters also taken into an account to fix the water quality for drinking purpose. The figure 2 shows the different concentrations of pH in the study area. The analyzed samples show the hardness range between 300 mg/l to 1150 mg/l. The figure 3 shows the different ranges of hardness in the study area. The desirable limit of TDS as per Indian standard is 500 mg/l. TDS in the study are falling in the range of 900 to 2580 mg/l. All Stations has the high TDS content that are not within the range. In this current study the alkalinity varies from 250 to 750 mg/l.

Cl varies from 200 to 1450 mg/l. The chloride level in the study area are higher than the desirable level in most of the locations as fixed by BIS, it indicates organic pollution. The figure 4 shows the different levels of chlorides in the study area. The desirable limit of iron content as per the drinking water standard is 0.3 mg/l. The study region is having very low amount of iron content and all the stations except 7 and 20, they are under the verge limit of 0.3 mg/l. The desirable limit of nitrate content in the drinking water study are in the within permissible limit. The fluoride concentration in the study area ranges between 0.5 to 1.5 mg/l.

5. CONCLUSION

The status of ground water quality in the study area is found to be good and critical in some areas. A groundwater estimation study should be conducted each year for better understanding of groundwater quality variation and also to conduct the public awareness programmes to develop and manage the groundwater source.

Table 1 Indian standard for drinking water parameters

S. NO	Parameter	Desirable limit	Permissible limits
1	pH	6.5-8.5	No relaxation
2	Total hardness(mg/l)	300	600
3	Chlorides (mg/l)	250	1000
4	TDS(mg/l)	500	1000
5	Nitrate(mg/l)	45	100
6	Total alkaline(mg/l)	200	350
7	Fluorides(mg/l)	0.6 to 1.2	1.5
8	Iron(mg/l)	0.3	1

Table 2 Location details of study area

Sample Station	Station Name	Latitude	Longitude	Type of well
S1	Gowrivakkam	12°55'13.23"	80°9'55.66"	Open well
S2	Sembakkam	12°55'36.54"	80°7'38.37"	Open well
S3	Rajakilpakkam	12°55'3.82"	80°9'20.37"	Open well
S4	Madambakkam	12°54'16.35"	80°9'33.78"	Bore well
S5	Chitlapakkam,	12°55'56.82"	80°8'33.65"	Open well
S6	Tambaram	12°55'23.2"	80°7'39.84"	Open well
S7	Kadapperi	12°56'26.4"	80°6'52.53"	Bore well

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S8	Thiruvancherri	13°2'41.47"	80°11'9.61"	Bore well
S9	Mudichoor	12°54'34.12"	80°4'12.92"	Bore well
S10	Selaiyur	12°55'13.23"	80°7'38.37"	Open well
S11	Agaramthen	12°53'11.73"	80°8'24.35"	Open well
S12	Kaspapuram	12°55'13.23"	80°7'38.37"	Bore well
S13	Irrumbuliyyur	12°54'44.35"	80°6'10.44"	Bore well
S14	Perungalthur	12°54'22.21"	80°5'21.49"	Open well
S15	Madurapakkam	12°54'0.55"	80°9'1.72"	Open well
S16	Kovilacherri	11°1'39.02"	79°24'36.91"	Open well
S17	Vengapakkam	12°54'26.43"	80°6'18.73"	Bore well
S18	Perkarkanai	12°54'33.43"	80°6'13.09"	Bore well
S19	Moolacheri	11°25'58.31"	77°52'15.59"	Bore well
S20	Polikoradu	12°55'13.23"	80°7'38.37"	Bore well

Table 3 Physical-chemical characteristics of Ground water in and around Tambaram Taluk

Sample No.	PARAMETERS								
	pH	TA (mg/l)	TH (mg/l)	Cl (mg/l)	TDS (mg/l)	F (mg/l)	Fe (mg/l)	NO ₃ (mg/l)	P (mg/l)
1	8.5	600	650	450	2040	1	BDL	20	1
2	7.5	350	400	200	1140	1	BDL	20	NIL
3	8	450	600	300	1620	1	BDL	20	3
4	8	500	300	250	1260	1	BDL	20	1
5	7.5	300	500	250	1260	1	BDL	20	0.5
6	7.5	450	550	250	1500	1.5	BDL	45	2
7	8	400	600	250	1500	1	0.3	20	0.5
8	8	500	500	400	1680	1	BDL	20	0.5
9	7.5	400	550	200	1380	1.5	BDL	20	0.3
10	7.5	250	300	200	900	0.5	BDL	20	1
11	7.5	400	550	250	1440	1	BDL	20	1
12	7	350	1150	650	2580	0.5	BDL	20	0.5
13	8	400	800	400	1920	0.5	BDL	20	5
14	8	400	450	400	1500	1	BDL	20	3
15	8	300	400	250	1140	1	BDL	20	0.5
16	7	350	450	200	1200	1	BDL	20	0.5
17	7.5	400	450	400	1500	0.5	BDL	20	1
18	8	500	500	400	1680	1	BDL	20	0.5
19	8	600	850	650	2520	1.5	BDL	20	0.5
20	8.5	750	350	1450	2250	1.5	2	20	1
Maximum	8.5	750	1150	1450	2580	1.5	2	45	5
Minimum	7	250	300	200	900	0.5	0.3	20	0.3

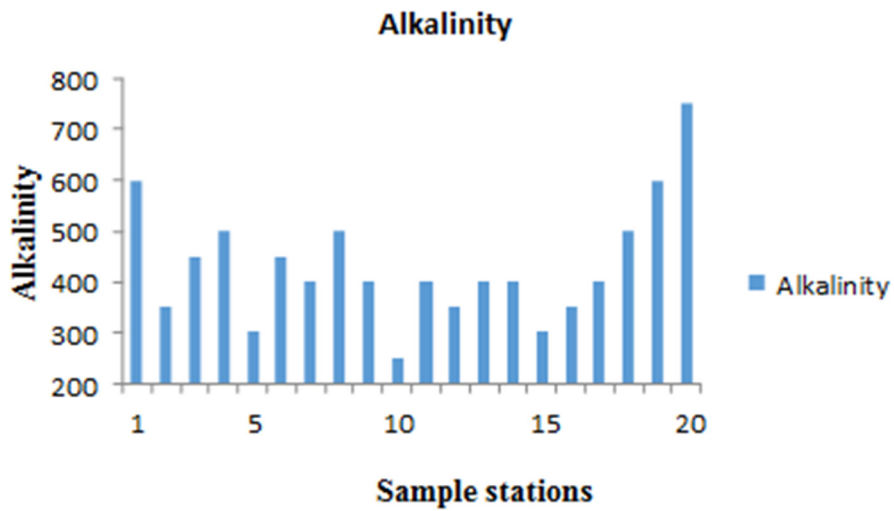


Figure 1 Alkalinity at different stations

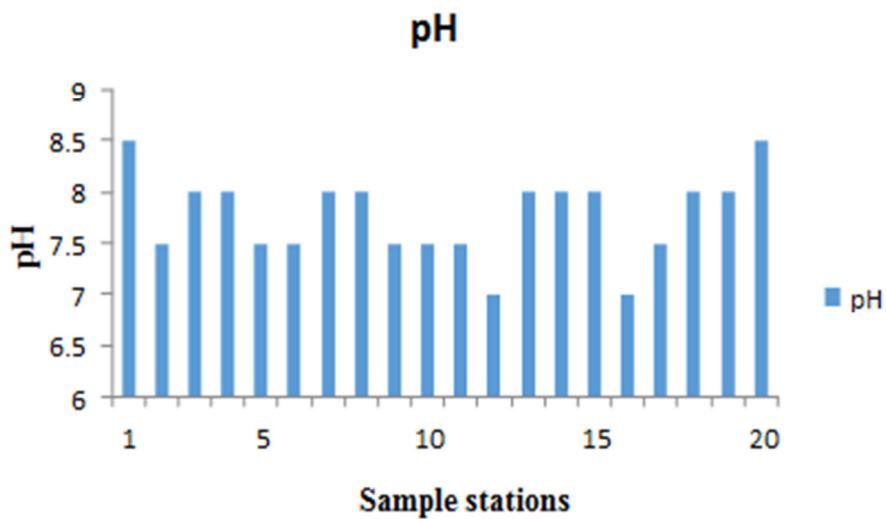


Figure 2 pH concentration at different stations

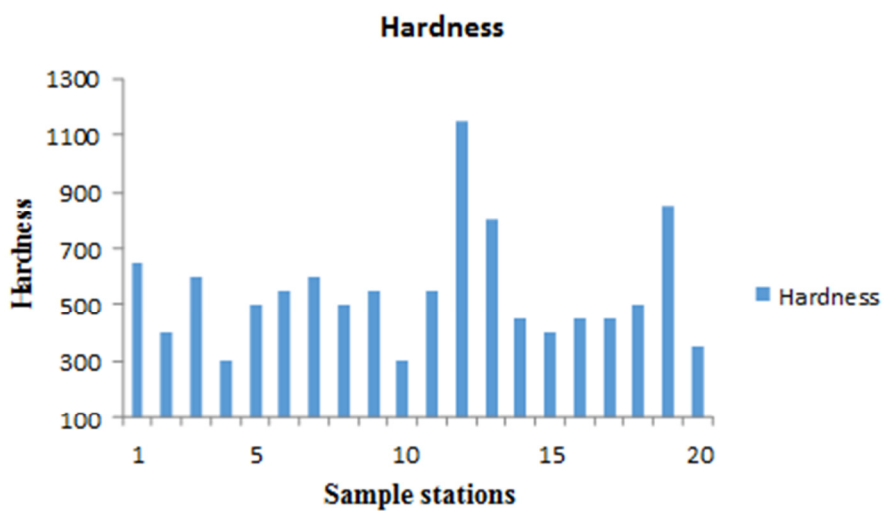


Figure 3 Total Hardness at different stations

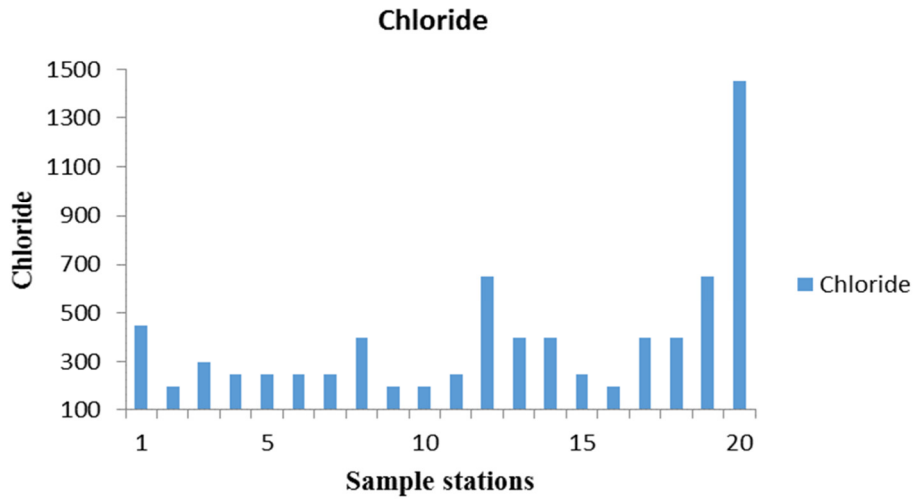


Figure 4 Levels of Chlorides at different stations

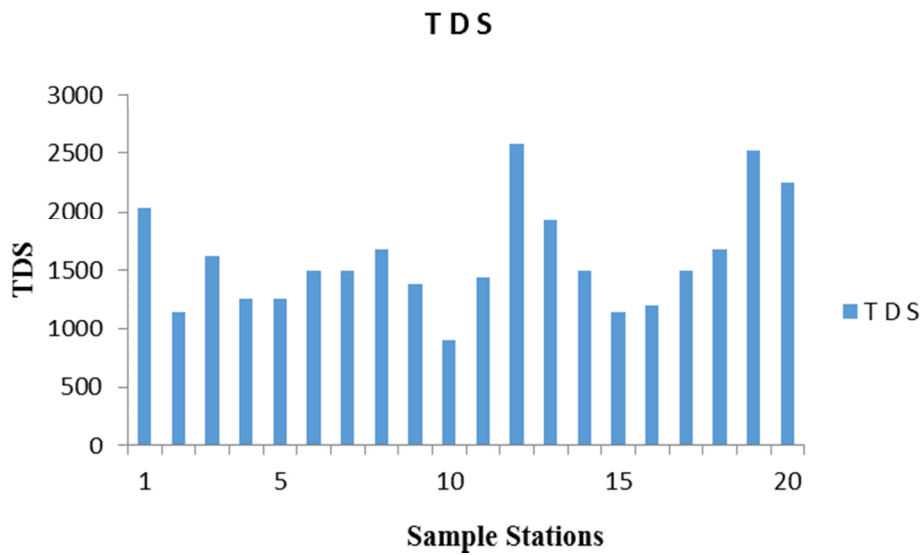


Figure 5 Total Dissolved Solids at different stations

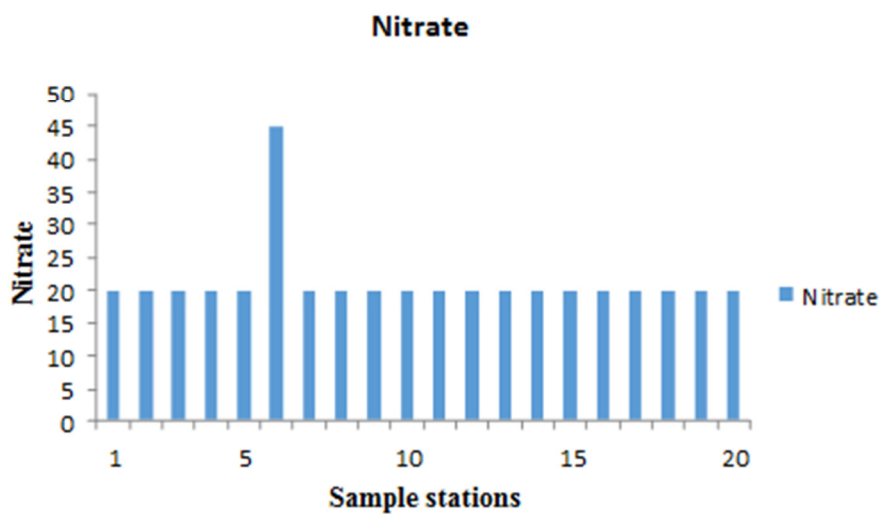


Figure 6 Nitrate Level at different stations

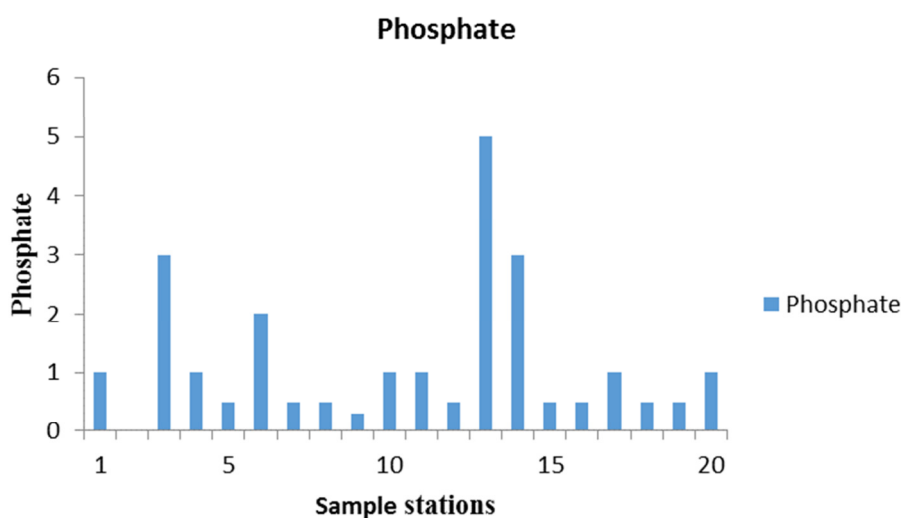


Figure 7 Phosphate Level at different stations

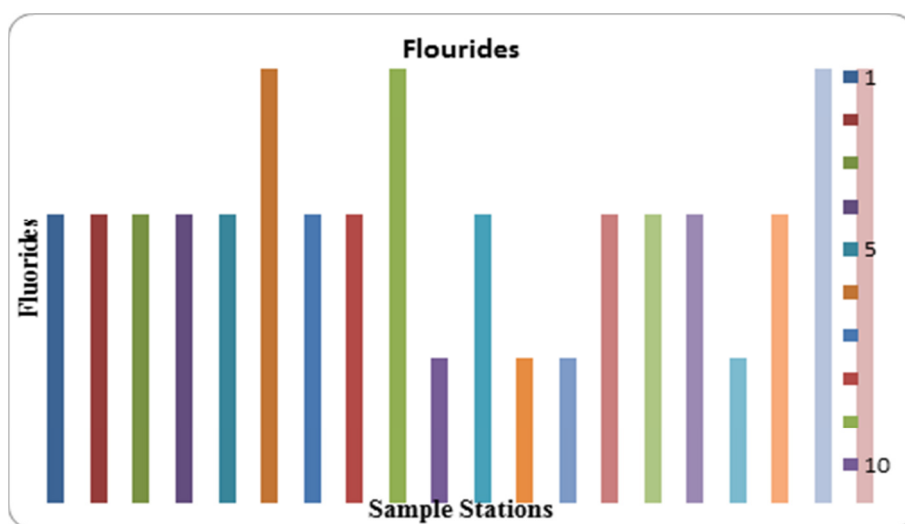


Figure 8 Fluoride Level at different stations

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