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Evaluation of Potability of Groundwater: A Case Study for Selected Regions of Tiruppur City, India

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ABSTRACT

The objective of the study is to detect any probable sources of contamination and to evaluate the palatability of subsurface water in Tiruppur city. An experimental investigation has been conducted to review the physio-chemical properties of 48 collected water samples from various sources. A spatial map of contaminated places has also been created using Geographic Information System (GIS) technology using the findings of a water quality analysis. The GIS-based mapping helped to categorize the contaminated areas and provide a better understanding of the spatial distribution of pollutants. The study's conclusions aided local government and business in determining the best course of action to take to avoid and control groundwater contamination. The findings of the study can also be used as a foundation for the creation of future remediation plans to regulate the quality of the subsurface water in this region. Overall, this case study improved our knowledge of the groundwater quality in Tiruppur industrial zones and provided insightful information for the sustainable management of subsurface water resources.

Key words: *Drinking water, GIS, Sub-surface water, Tiruppur, Water Quality Index*

Introduction

The most priceless natural resource and a crucial component of a State's and a nation's socioeconomic growth is water. Every aspect of the environment that supports life on Earth is influenced by water. Since fresh water is not a constant resource, humanity is concerned about its variable availability in time and place (Andjela Brancic *et al.*, 2018; Obialo Solomon Onwukaa *et al.*, 2021 and Shengbin Wang *et al.*, 2022). Access to clean, harmless drinking water is crucial for general health and wellness, making it one of humanity's fundamental needs, especially in urban places where a big population lives and consumes water at a high rate (Sreepathy and Naveen Chandra, 2014). Due to rising demand and limited supply, water supplies around the world, including in India, are under severe stress. The only way to guarantee a tight gap between supply and demand is through proper water management.

For industrial, irrigation and drinking use, groundwater is a valuable natural resource (Roohi Rawat *et al.*, 2019). Aquifers, which have porous rock or soil layers, are where it is normally kept underground. However, groundwater can be harmed by human or natural causes, which can lower its quality and render it unfit for its intended usage. The intended field of study Due to its semi-arid cli-

([1]Assistant Prof., [2]Senior Prof., [3]Prof. and Head, [4]Undergraduate Student) mate and more delicate eco-environment systems than humid places, Tiruppur struggles more than other semi-arid areas to balance present development with sustainability (Shengbin Wang, 2022; Zhanwei Wang *et al.*, 2019; Andjela Brancic *et al.*, 2018 and Qun *et al.*, 2021). On the other side, Tiruppur City's fast urbanization and industrialization raised the demand for ground water (Srinivas *et al.*, 2015). Additionally contributing to the decline in water quality was the population's lack of information, awareness, care, and accountability (Roohi Rawat *et al.*, 2019). Therefore, determining the quality of groundwater resources and assuring their suitability for human use requires conducting a groundwater analysis. In order to ascertain the chemical, physical, and biological characteristics of groundwater, a variety of tests and measurements are used in groundwater analysis. This entails testing for both physical properties like temperature, color, smell, and conductivity as well as for pollutants including minerals, metals, and organic compounds. The safety of the water for human use is then determined by comparing the groundwater analysis findings to legal requirements. This study's main objective is to evaluate the physio-chemical properties of the collected water samples in line with WHO and Indian standards to determine their palatability.

Materials and Methods

Selection of Area for Case Study

Tiruppur was chosen as the study area for this project for a number of reasons. First off, the city is expanding quickly, which has put a lot of strain on its water supplies. Evaluation of the local subsurface water sources quality is becoming more and more important in order to guarantee the provision of clean, safe drinking water. Second, Tiruppur is situated in an area with a reputation for having hard water. High concentrations of minerals, such as calcium and magnesium, are found in hard water. These substances can alter the taste of water, giving it an unpleasant or metallic flavor. By carrying out this study, we can learn more about the elements that affect the region's water's palatability and create plans for enhancing water quality. Finally, Tiruppur has a large population and a significant water demand. Numerous locals depend on underground water as their only reliable source of drinking water because they have limited access to other water sources. To assure the safety and taste of subsurface water, it is crucial to assess its quality.

Geographical Features of Research area

Tiruppur, an urban agglomeration in Tamilnadu, is the seventh-largest city in the state of Tamil Nadu. It is situated at 11.1075° N 77.3398° E on the Noyyal River bank and is well-known for its textile industry. It has a 159.6 km^2 area and an average elevation of 295 meters. 1559000 people called Tiruppur home as of the 2021 census. Tiruppur has a semi-arid climate with minimum, maximum and mean temperatures that range from 35° to 22 °C. The months of June to August are considered the monsoon season. The main characteristics of these months are light showers and lowered temperatures. September, October, November, December, and January are the post-monsoon or winter moth months. Due to the presence of the Palghat gap, these months typically offer a cooler environment with maximum temperatures rarely exceeding roughly 24 °C. From June to August, the city has some rain from the south-west monsoon. After a wet September, the north-east monsoons bring rainfall that last into early December. The total annual rainfall, which is roughly 700 mm is contributed by the north-east and south-west monsoons respectively at a rate of 47% and 28%.

Collection of Samples

The main sources of ground water recharge in the planned study region include: surface water and precipitation from the atmosphere. For this study, water samples were collected starting in March 2023 at Trippur city, Tamilnadu, India, from 48 different sampling points (Fig. 1). Plastic bottles were used to collect samples, which were then brought to a lab for physio-chemical analysis. Table 1 displays the address and the source.

Results and Discussion

Physical Test Results

The physical properties of 48 collected water samples are presented in Table 1.

Colour

To determine the sample's color, a visual inspection is conducted. There were no colored samples used in this experiment. The lack of colloidal substances and degraded plant matter is shown by this.

Odur

The samples' smell was determined through physical analysis. No objectionable or unpleasant smells were present in our water samples. As a result, it is clear that the water is pure and free of pollutants and soluble gases.

Temperature

Temperature affects how aquatic organisms in water behave chemically and biologically. Because of the seasonal temperature variations in the city in March, which are closely related to the weather conditions in force at the time of the study. The suggested research area's groundwater has a mean temperature of 32 ^{o} C.

Turbidity

The World Health Organization (WHO) claims that turbidity is a measurement of the water sample's ability to scatter and absorb light due to the presence of silt, clay, colloidal particles suspended debris, plankton, and other microbes (WHO 1984 and Olumuyiwa I. Ojo *et al.,* 2012). Turbidity can be measured with the Nepheleo Turbidity Meter. Water turbidity is caused by the type of soil it flows over and the speed at which runoff occurs. Gastric problems and waterborne illnesses are brought on by highly turbid water (Roohi Rawat *et al.,* 2019). The test findings showed that the acquired water samples had turbidities between 0.20 NTU and 1.10 NTU, according to the test results. The turbidity of the samples that were collected was satisfactory.

Electrical Conductivity

Water's electrical conductivity is caused by the presence of dissolved inorganic substances such as salts. Conductivity also increases in tandem with salinity. EC was measured using portable digital electrical conductivity meter without filtering the sample. Between 1.9 and 2.8 S/cm of measured EC are present in the proposed study location. The range that is acceptable is met by all values. This conclusion is braced by the research of (Falak Naeem *et al.,* 2021 and Ravi Kumar *et al.,* 2020).

Total Dissolved Solids (TDS)

Volatile and non-volatile solids are both a part of TDS. The investigation found that the samples' TDS readings varied between 178 mg/l and 723 mg/l, it is within the recommended limit for good quality water, which is less than 600 mg/l. TDS concentrations over the advised standard indicate a decline in water quality. Such high TDS levels frequently result from the discharge of untreated sewage and wastewater from home, commercial, and industrial sources.

Chemical Test Results

Table 2 displays the outcomes of the 48 water samples that were collected that underwent chemical testing.

pH

The pH of water affects how corrosive it is. The pH range of pure water is 6.5–8.5. Water becomes more corrosive and becomes acidic at a lower pH. EC and total alkalinity also exhibit a positive association with pH (Olumuyiwa I. Ojo *et al.,* 2012; Gupta, Sunita, and Saharan, 2009). The study findings showed that the pH range for the samples was between 6.1 to 7.5, demonstrating water that was only mildly alkaline. Ammapalayam has a pH of maximum. Water bodies that are productive have an alkaline pH. According to Roohi Rawat *et al.* (2019), this kind of water roots gastrointestinal problems and frequently occurs waterborne illnesses. While a low pH can result in corrosion and tuberculation, a high pH can cause incrustation, silt deposits and problems with chlorination (Gupta *et al.,* 2009; Olumuyiwa I. Ojo *et al.,* 2012). The increased pH values discovered during sample analysis indicate that the physiochemical condition modification had a greater impact on carbon dioxide, carbonate, and bicarbonate equilibrium (Ravikumar *et al.,* 2020; Nawale *et al.,* 2016).

Available and Residual chlorine (AC and RC)

The amount of residual chlorine and the flavor it gives drinking water must be balanced (Olumuyiwa I. Ojo *et al.,* 2012) in order to ensure microbiological safety. Natural water contains no chloride at all (Rani *et al.,* 2003). High chloride levels in drinking water may cause cardiovascular issues in addition to giving the water an unpleasant flavor (Oohi Rawat *et al.,* 2019). In this examination, there was no available or residual chlorine in any of the samples.

Sulphates (SO_4)

Sulphate content in water is a crucial factor in determining its quality and applicability for different uses. All of the samples were found to have sulphate concentrations between 1.0 and 9 mg/l, which is the standard permitted limit. According to studies by Nawalae *et al.* (2016), Sakthivel *et al.* (2021), and Nitish Sharma *et al.* (2021), water in the examined

Table 1. Source and Physical Test Results

S. No.	Samples	Used for	Source	Longitude	Latitude	Physical Properties Temperature (°C)	Turbidity	EC	TDS
1.	S1	Domestic	Bore Water	77.325438° N	11.13321° E	32.00	0.2	2.2	255
2.	S2	Domestic	Bore Water	77.47485° N	11.14578° E	32.00	0.3	2.1	204
3.	S3	Washing	Bore Water	77.32513° N	11.133588° E	32.00	1.1	1.9	516
4.	S4	Domestic	Bore Water	77.309581° N	11.152867° E	26.00	0.2	2.1	294
5.	S5	Domestic	Bore Water	77.10482° N	11.18321° E	32.00	0.8	2.3	316
6.	S6	Domestic	Bore Water	77.62324° N	11.16642° E	32.00	0.7	1.9	187
7.	S7	Washing	Bore Water	77.34421° N	11.17414° E	31.50	0.8	2.4	521
8.	S8	Domestic	Bore Water	77.335438° N	11.13441° E	32.00	0.6	2.2	326
9.	S9	Washing	Bore Water	77.37237° N	11.0591° E	31.50	0.7	2.7	641
10.	S10	Washing	Bore Water	77.21291° N	11.06166° E	32.00	0.9	2.8	723
11.	S11	Domestic	Bore Water	77.21482° N	11.06221° E	32.00	0.2	2.0	412
12.	S12	Domestic	Bore Water	77.22008° N	11.06241° E	32.00	0.4	2.3	229
13.	S13	Washing	Well Water	77.22193° N	11.06316° E	32.00	0.8	1.9	567
14.	S14	Domestic	Bore Water	77.22247° N	11.06365° E	32.00	0.5	2.4	355
15.	S15	Domestic	Bore Water	77.22551° N	11.06273° E	32.00	0.2	2.7	248
16.	S16	Washing	Bore Water	77.22428° N	11.06286° E	32.00	0.2	2.7	459
17.	S17	Domestic	Bore Water	77.305301° N	11.103744° E	32.00	0.6	2.4	197
18.	S18	Washing	Bore Water	77.311054° N	11.103677° E	32.00	0.8	2.2	645
19.	S19	Domestic	Bore Water	77.314622° N	11.104131° E	32.00	0.3	2.5	241
20.	S20	Washing	Bore Water	77.317273° N	11.10278° E	32.00	0.6	1.9	359
21.	S21	Domestic	Bore Water	77.322649° N	11.102042° E	32.00	0.3	2.3	251
22.	S22	Washing	Bore Water	77.326107° N	11.102391° E	32.00	0.4	2.1	242
23.	S23	Domestic	Well Water	77.328112° N	11.101852° E	32.00	0.7	2.0	294
24.	S24	Domestic	Bore Water	77.324016° N	11.13327° E	31.50	0.6	2.8	199
25.	S25	Domestic	Bore Water	77.325717° N	11.131095° E	32.00	0.3	2.2	214
26.	S26	Domestic	Bore Water	77.325168° N	11.134965° E	32.00	0.8	2.3	312
27.	S27	Washing	Well Water	77.325842° N	11.133626° E	32.00	1.1	2.0	431
28.	S28	Washing	Bore Water	77.326594° N	11.132247° E	32.00	0.6	2.7	206
29.	S29	Washing	Bore Water	77.333368° N	11.101649° E	32.00	0.9	2.7	357
30.	S30	Domestic	Bore Water	77.328311° N	11.127136° E	32.00	0.4	1.9	266
31.	S31	Washing	B ore Water	77.327541° N	11.130849° E	32.00	0.8	2.6	361
32.	S32	Washing	Bore Water	77.327783° N	11.13092° E	32.00	0.4	2.5	284
33.	S33	Domestic	Bore Water	77.327822° N	11.132115° E	32.00	0.3	2.1	188
34.	S34	Domestic	Bore Water	77.329064° N	11.129148° E	31.50	0.3	2.0	281
35.	S35	Washing	Bore Water	77.329794° N	11.128388° E	32.00	0.7	2.6	443
36.	S36	Washing	Well Water	77.333182° N	11.119331° E	32.00	1.0	2.4	335
37.	S37	Washing	Bore Water	77.336099° N	11.098659° E	32.00	0.5	2.8	287
38.	S38	Domestic	Bore Water	77.333691° N	11.116436° E	32.00	0.6	2.1	249
39.	S39	Washing	Well Water	77.336478° N	11.115056° E	31.50	0.6	2.7	551
40.	S40	Domestic	Bore Water	77.335583° N	11.122075° E	32.00	0.3	1.9	178
41.	S41	Domestic	Bore Water	77.337701° N	11.122448° E	32.00	0.5	2.3	237
42.	S42	Washing	Well Water	77.340091° N	11.113039° E	32.00	0.9	2.4	468
43	S43	Domestic	Bore Water	77.340253° N	11.115751° E	32.00	0.7	2.1	226
44.	S44	Domestic	Bore Water	77.340217° N	11.117709° E	32.00	0.2	2.3	214
45.	S45	Domestic	Bore Water	77.340217° N	11.117709° E	32.00	0.4	2.3	288
46.	S46	Domestic	Bore Water	77.34043° N	11.118851° E	32.00	0.6	2.6	193
47.	S47	Washing	Well Water	77.339856° N	11.122141° E	32.00	1.0	2.8	378
48.	S48	Domestic	Bore Water	77.34045° N	11.119779° E	32.00	0.5	2.0	247

locations is generally safe for consumption and other domestic applications because the sulphate levels are within the standard range.

Table 2. Chemical Test Results

S. No	Samples	Chemical Characteristics									Water Quality Index
									Heavy Metals		
		pH	RC	AC	SO_4	Iron	F	Lead	Cadmium	Chromium	
1.	S1	7.1	0	0	8.5	0.25	0.73	0.00	0.00	0.00	88.34
2.	S2	6.8	0	0	8.6	0.15	0.57	0.00	0.00	0.00	88.95
3.	S3	6.7	0	0	8.5	0.20	0.98	0.00	0.00	0.00	78.32
4.	S4	7.1	0	0	8.6	0.12	0.12	0.00	0.00	0.00	88.57
5.	S5	6.9	0	0	5.0	0.22	0.58	0.00	0.00	0.00	89.62
6.	S6	6.7	0	0	4.2	0.20	0.64	0.00	0.00	0.00	89.77
7.	S7	7.3	0	0	5.0	0.10	0.25	0.00	0.00	0.00	78.47
8.	S8	6.8	0	0	1.0	0.21	0.31	0.00	0.00	0.00	88.99
9.	S9	7.4	0	0	4.2	0.12	0.31	0.00	0.00	0.00	78.75
10.	S10	7.3	0	0	6.7	0.10	0.87	0.00	0.00	0.00	78.62
11.	S11	6.8	0	0	6.1	0.16	0.64	0.00	0.00	0.00	89.08
12.	S12	6.7	0	0	3.0	0.16	0.21	0.00	0.00	0.00	89.07
13.	S13	6.4	0	0	6.7	0.16	0.98	0.00	0.00	0.00	79.12
14.	S14	6.9	0	0	6.7	0.16	0.12	0.00	0.00	0.00	89.43
15.	S15	7.2	0	0	6.7	0.16	0.65	0.00	0.00	0.00	88.48
16.	S16	7.5	0	0	6.7	0.16	0.32	0.00	0.00	0.00	88.36
17.	S17	7.3	0	0	6.7	0.10	0.97	0.00	0.00	0.00	78.47
18.	S18	6.4	0	0	9.0	0.05	0.85	0.00	0.00	0.00	79.25
19.	S19	6.5	0	0	8.0	0.27	0.74	0.00	0.00	0.00	89.09
20.	S20	6.8	0	0	4.2	0.15	0.58	0.00	0.00	0.00	89.34
21.	S21	6.9	0	0	6.7	0.27	0.76	0.00	0.00	0.00	88.74
22.	S22	7.0	0	0	6.7	0.15	0.71	0.00	0.00	0.00	89.33
23.	S23	7.3	0	0	6.4	0.14	0.74	0.00	0.00	0.00	79.42
24.	S24	7.0	0	0	5.8	0.27	0.75	0.00	0.00	0.00	89.27
25.	S25	7.4	0	0	3.7	0.15	0.76	0.00	0.00	0.00	88.83
26	S26	7.2	0	0	4.2	0.50	0.76	0.00	0.00	0.00	88.84
27.	S27	6.7	0	0	6.1	0.40	0.76	0.00	0.00	0.00	89.57
28.	S28	7.3	0	0	8.5	0.17	0.70	0.00	0.00	0.00	89.44
29.	S29	7.4	0	0	8.5	0.27	0.87	0.00	0.00	0.00	78.62
30.	S30	7.1	0	0	10.2	0.28	1.01	0.00	0.00	0.00	89.14
31.	S31	6.5	0	0	7.5	0.27	1.20	0.00	0.00	0.00	89.49
32.	S32	7.4	0	0	6.1	0.17	0.87	0.00	0.00	0.00	89.04
33.	S33	6.6	0	0	5.0	0.17	0.95	0.00	0.00	0.00	89.02
34.	S34	6.8	0	0	4.2	0.05	0.54	0.00	0.00	0.00	88.97
35.	S35	6.3	0	0	6.7	0.15	0.21	0.00	0.00	0.00	89.42
36.	S36	6.7	0	0	6.1	0.05	0.64	0.00	0.00	0.00	89.56
37	S37	6.4	0	0	6.1	0.27	0.51	0.00	0.00	0.00	88.98
38.	S38	7.5	0	0	8.3	0.27	0.15	0.00	0.00	0.00	89.21
39.	S39	6.1	0	0	7.5	0.07	0.98	0.00	0.00	0.00	89.16
40.	S40	7.3	0	0	6.7	0.28	0.65	0.00	0.00	0.00	89.09
41.	S41	7.3	0	0	6.1	0.08	0.78	0.00	0.00	0.00	78.56
42.	S42	6.5	0	0	6.1	0.26	0.78	0.00	0.00	0.00	79.17
43.	S43	7.4	0	0	5.6	0.08	0.74	0.00	0.00	0.00	89.47
44.	S44	7.0	0	0	5.6	0.07	0.56	0.00	0.00	0.00	89.25
45.	S45	6.6	0	0	5.0	0.16	0.84	0.00	0.00	0.00	89.13
46.	S46	6.7	0	0	7.5	0.27	0.65	0.00	0.00	0.00	88.71
47.	S47	7.4	0	0	5.0	0.27	0.54	0.00	0.00	0.00	89.14
48.	S48	6.9	0	0	6.7	0.15	0.74	0.00	0.00	0.00	89.17

Iron

IS 10500: (2012) states that 0.3 mg/l is the maximum allowable level of iron concentration. The standard threshold was observed to be exceeded by all samples, with iron concentrations ranging between 0.1 and 0.28. The presence of industrial discharges, agricultural runoff, and natural geological factors can contribute to higher iron concentrations in water bodies (Olumuyiwa I. Ojo *et al.,* 2012).

Fluorides(F)

The fluoride levels in the gathered samples from several sites for our investigation were examined. All of the samples were found to fall within the generally accepted range, with fluoride amounts ranging from 0.12 to 1.01. Since the water in the researched regions, including has fluoride levels within the acceptable limit, it is typically safe to drink. When present in the proper concentrations, fluoride can aid in the promotion of dental health and the prevention of tooth decay (Nawale *et al.,* 2016).

Heavy Metals

Water contaminated by heavy metals can negatively affect both environmental and human health. This study examined the concentrations of heavy metals, such as lead, cadmium, and chromium, in the collected water samples. The fact that all of the samples had zero values for these heavy metal characteristics is remarkable. The lack of lead, cadmium, and chromium in the examined water samples suggests that the heavy metal pollution situation is favourable. These metals can infiltrate water sources through a variety of industrial operations, inappropriate waste disposal, or natural geological processes. They are known for their hazardous effects. However, the lack of these metals in the samples that were gathered implies that the analysed areas' water supplies are not seriously harmed by these heavy metal contaminants.

Water Quality Index (WQI)

The WQI, which is based on a number of physical, chemical, and biological characteristics, assesses the suitability of water for a certain usage. Better quality is indicated by higher values on the index, which ranges from 0 to 100. The WQI can be used to determine if a water body is suitable for drinking, swimming, or supporting aquatic life, and to identify areas where pollution control measures are needed. There are several methods for calculating the WQI. The Brown *et al.* (1970) method it is a widely used method for predicting the WQI because it takes into account the relative importance of each parameter based on its relevance to the intended use of the water. This method involves assigning weights to each parameter, which are then used to predict a weighted arithmetic mean of the parameter scores to obtain the WQI. This method is based on the weighted arithmetic mean method. It has been determined that the Brown et al. approach is a trustworthy indicator of water quality and has been applied in numerous contexts, including freshwater and marine situations. It is a flexible approach that may be modified to meet the unique requirements and data availability of the user and it can be easily adapted to accommodate different water quality standards and guidelines. Determining the trends and changes in water quality over time, as well as comparing the water of other bodies of water, are all possible using the Brown *et al.* (1970) approach, which is useful tool for assessing and monitoring water quality.

Steps to calculate WQI (Source: Brown *et al.*, 1970)

Step 1: Select Parameters

Choose a set of water quality metrics that are pertinent to the waters indented use. Examples of parameters that may be used include pH, hardness, temperature, total suspended solids, and Turbidity.

Step 2: Assign Weights

Assign weights to each parameter based on its relative importance to the intended use of the water. The sum of the weights should equal 1.0. For example, if there are five parameters, each parameter weight would be 0.2 (1/5).

Step 3: Calculate Sub-Index Scores

Calculate sub-index scores for each parameter by

Table 3. Brown *et al.*, (1970) Recommendations for Water Quality based on the WQI

Water Quality Index	Water quality status
0-25	Excellent
26-50	Good
51-75	Poor
76-100	Very poor
>100	Unfit for consumption

comparing the measured value of the parameter to established standards or guidelines. The following equation is used to determine the sub-index score:

Sub-Index = [(Measured Value - Minimum Value) / (Maximum Value - Minimum Value)] x 100.

Where:

Measured Value = the measured value of the parameter

Minimum Value = the minimum allowable value for the parameter

Maximum Value = the maximum allowable value for the parameter

Note: The sub-index is determined as follows if the measured values falls within the range of the minimum and maximum values:

Sub-Index = [(Measured Value - Minimum Value) / (Target Value - Minimum Value)] x 100

Where:

Target Value = the target value for the parameter.

Step 4: Calculate Weighted Sub-Index Scores

Calculate the weighted sub-index score for each parameter by multiplying the sub-index score by the corresponding weight. The weighted sub-index score is calculated using the following formula:

Weighted Sub-Index = Sub-Index x Parameter Weight

Where:

Sub-Index = the sub-index score for the parameter

Parameter Weight = the weight assigned to the parameter in Step 2

Step 5: Calculate the WQI

Calculate the overall WQI by summing the weighted sub-index scores for all parameters and dividing by the sum of the weights. The following formula is used to determine the WQI:

WQI = (Σ Weighted Sub-Index Scores)/(Σ Parameter Weights)

Where:

Σ Weighted Sub-Index Scores = the sum of the weighted sub-index scores for all parameters

Σ Parameter Weights = the sum of the weights assigned to all parameters

The resulting WQI value ranges from 0-100, with higher values Indicating better water quality (Table 3).

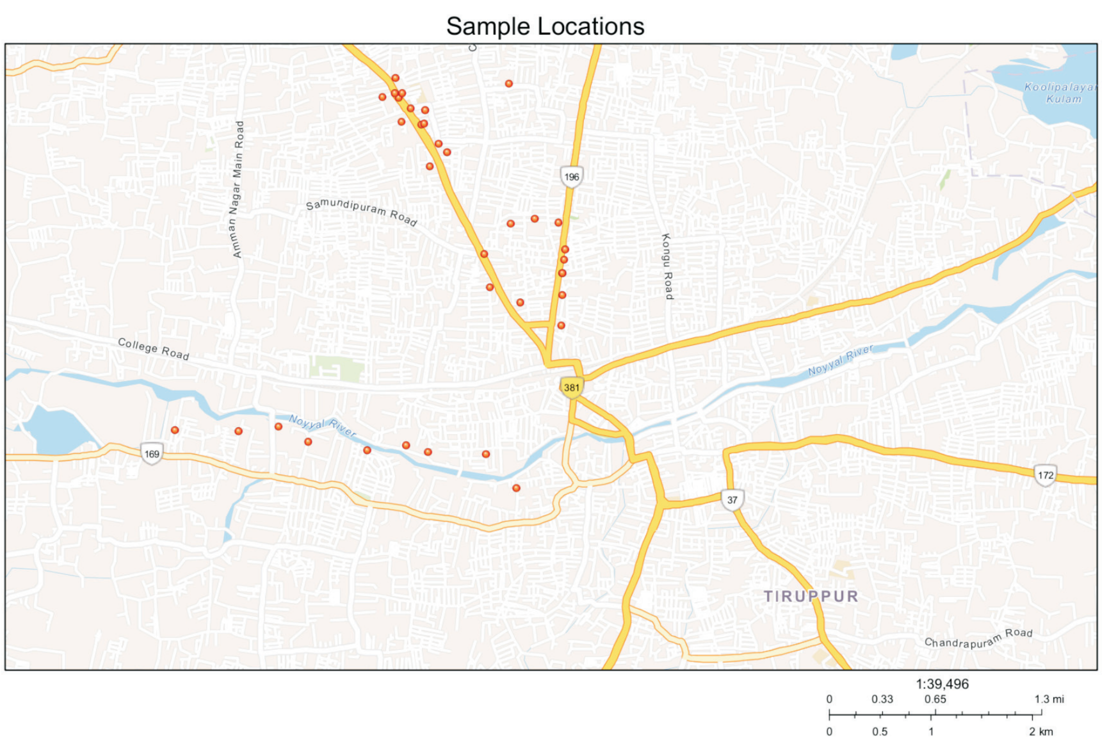

Fig. 1. Sample point locations

Conclusion

The groundwater quality in the area is rated as very bad according to the WQI, according to the physiochemical study of water samples taken from 48 locations near industrial area of Tiruppur city. Despite having a WQI value below 100, indicating the water's consumability, it is crucial to treat the water before usage to enhance its quality. But few samples exhibited higher levels of iron. This indicates a potential contamination issue in these areas, highlighting the necessity of treating water to increase its quality. By implementing appropriate treatment measures, such as filtration, sedimentation, or chemical processes, these places could benefit from improved groundwater quality. These measures should focus on reducing the levels of contaminants and improving parameters such as pH, turbidity, residual chlorine, and the presence of heavy metals like lead, cadmium, and chromium. It is crucial to prioritize the implementation of sustainable measures to address the poor water quality issue in these areas. This may involve collaborations between local authorities, industries, and communities to mitigate pollution sources, promote responsible water usage practices, and increase understanding of the value of water treatment and conservation.By implementing these measures, we can ensure the availability of safe and clean water for the surrounding communities and minimize the potential health risks associated with consuming poor-quality water.

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