GROUNDWATER QUALITY ASSESSMENT IN AND AROUND NAGAPATTINAM

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ABSTRACT - *Water is an essential component for all living organisms. It is involved in major processes all over the world. Among the various water sources, groundwater is the most widely used in many places. In recent years, the groundwater table has been lowering year after year due to over drafting, and it has also become contaminated due to leaching of various elements from the earth's surface. As a result, it is critical to protect groundwater quality while also implementing new groundwater recharging techniques. As aresult, the monitoring of ground water was prioritised in this study. The samples were gathered from various locations in and around Nagapattinam. The parameters were examinedin order to determine the quality of the groundwater. Based on the findings, we can take the necessary steps to improve the quality and quantity.*

Key Words **Groundwater quality, Nagapattinam**

1. INTRODUCTION

H20 - two parts hydrogen and one part oxygen, also known as water, which covers two-thirds of the earth'ssurface and makes up 75% of the human body. Water is clearly one of the primary elements responsible for life on Earth. Water is the basis of all life. Even today, far too many people spend their entire day looking for it all over the world. There is a scarcity of clean, safe drinking water. Currently, nearly 1 billion people in the developing world lack access to it.Yet we take it for granted, waste it, and even pay too much for it in small plastic bottles. Today's drinking water is far from pure, containing over 200 lethal commercial chemicals. Add bacteria, viruses, and inorganic minerals (which harden the water) and you have a chemical cocktail that is unfit for human consumption. Drinking or using such water in food preparation causes widespread acute and chronic illnesses and is a major cause of death for more than 14,000 people every day, with an estimated 580 people dying of water pollution-related illness in India every day.

Waterborne disease reduction and the development of safe water resources are major public health goals in developing countries like India. To achieve this goal, itis necessary to identify and develop the water quality standards of the sources in order to provide safe water. As a result, we chose Nagapattinam as our project area in this project. To accomplish this goal, it is necessary to identify the water quality standards of the sources and develop them in order to provide safe water.

2. STUDY AREA

Nagapattinam is the administrative headquarters of the Nagapattinam district in the Indian state of Tamil Nadu. Nagapattinam's latitude is 10.76 and its longitude is 79.84. Fishing, agriculture, and aquaculture are the maineconomic activities. Furthermore, this coastal town is part of the Cauvery Delta Zone (CDZ). The area's general slope is east and southeast, with a slope of less than 1°. The available soil series in Nagapattinam district consists of very dark grey brown to dark grey brown soils derived from alluvial deposits. The soils are very deep and moderately drained, with a clay to sandy clay loam texture and sand deposits in intermittent layers. Because of the influence of tidal waves, the soils are somewhat saline in nature.

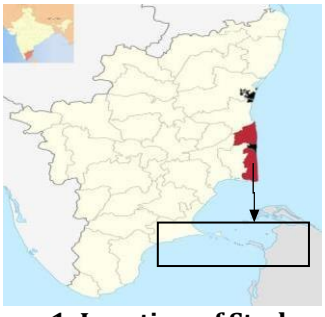

Figure-1: Location of Study area

The study area's annual temperature ranges from 19.3°C to 40.6°C. During the months of October and November, the relative humidity ranges from 70 to 77 percent. Nagapattinam receives 1500 mm of rain per year.

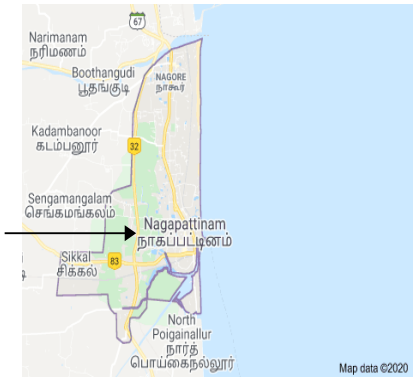

Figure-2: Nagapattinam town boundary

3. METHODOLOGY

3.1 SAMPLE COLLECTION

Groundwater samples were collected in order to assess the current groundwater situation. These samples were collected in various locations throughout Nagapattinam. Table-1 contains information about sampling locations. 14 groundwater samples were collected in total. All samples were collected in polyethylene containers and transported to the laboratory for analysis.

Table-1: Sample locations

Sample	Location	Sample	Location
A	Tata Nagar	H	Kadambadi
B	Perumal Sannathi Street	I	Mahalakshmi Nagar
C	Neela East Street	J	Thethi
D	Sellur Road	K	Sengamangalam
E	Sivan Street	L	Sellur
F	Maramalai Nagar	M	Palaivur
G	Nambiyar Nagar	N	Ivanallur

3.2 SAMPLE ANALYSIS

Using standard procedures, the collected samples were examined for the physical and chemical characteristics listed in table-2.

Table–2: Characteristics examined

S. No	Parameter	S. No	Parameter
1.	Appearance	11.	Magnesium
2.	Colour	12.	Iron
3.	Odour	13.	Manganese
4.	Turbidity	14.	Free ammonia
5.	Total suspended solids	15.	Nitrite
6.	Electrical conductivity	16.	Nitrate
7.	pH	17.	Chloride
8.	Total alkalinity	18.	Fluoride
9.	Total hardness	19.	Sulphate
10.	Calcium	20.	Phosphate

4. RESULTS AND DISCUSSION

According to the sample analysis, the pH ranges from 6.6 to 7.8, which is within the prescribed range given by WHO and BIS standards. The majority of the samples are slightly yellowish in colour and odourless. The turbidity is within the allowable range. Dissolved solids are higher in 50% of the samples collected. In many samples, the hardness is also above the limit. The majority of the samples have higher chloride concentrations, which could be due to saline water intrusion. All other parameters are within the allowable range,

Table-3: Characteristics of the collected Samples

Parameter	Permissible limits	Sample													
		A	B	C	D	E	F	G	H	I	J	K	L	M	N
Appearance	-	Slightly yellow	Slightly yellow	Slightly yellow	Slightly yellow	Slightly yellow	Slightly yellow	Slightly yellow	Slightly yellow	Clear	Slightly yellow	Clear	Clear	Clear	Clear
Colour	15	-	-		-	-	-	-	-	-	-	-	-	-	-
Odour	Agreeable	None	None	None	None	None	None	None	None	None	None	None	None	None	None
Turbidity NT units	5	25	34	0	02	25	92	10	2	2	15	3	2	14	10
Total dissolved solids mg/L	2000	3485	3850	2850	2890	3030	4450	5500	1325	505	685	225	260	995	2900
EC micro mho/cm	-	1060	890	1200	760	1500	1990	750	1850	710	1020	420	250	1400	1500
pH	6.5-8.5	6.7	6.7	6.8	6.6	6.6	6.9	7.9	6.5	6.5	6.5	6.8	6.9	6.8	6.8
Total alkalinity mg/L	600	380	280	0	0	0	0	260	640	0	0	120	120	428	335
Total Hardness mg/L	600	640	750	880	560	840	660	532	325	332	400	252	155	426	372
Calcium mg/L	200	99	40	79	62	124	56	46	83	45	32	42	37	93	97
Magnesium mg/L	100	25	35	39	28	64	16	29	47	25	46	16	18	43	39
Iron mg/L	0.3	2.82	1.90	0.20	0.00	0.1	0.12	0.23	0.26	0.20	0.3	0.12	0.06	1.27	1.01
Manganese mg/L	0.3	1.60	1.20	0.00	0.00	0.00	0.1	0.04	0.02	0.00	0.00	0.00	0.10	0.80	0.70
Free ammonia as NH_3 mg/L	0.5	1.29	3.04	0.00	0.04	0.00	6.71	1.39	5.04	0.00	1.18	0.00	0.00	0.53	0.33
Nitrite as NO_2 mg/L	-	0.00	0.12	0.08	0.37	0.46	1.01	0.00	0.96	0.07	0.10	0.00	0.00	0.00	0.00
Nitrite as NO_3 mg/L	45	4	25	18	26	14	12	1	09	30	5	2	3	3	3
Chloride mg/L	1000	1215	1575	1152	1175	2185	1332	1475	1256	859	1110	1125	1132	1128	2124
Fluoride mg/L	1.5	0.0	0.1	0.0	0.2	0.0	0.0	0.0	0.2	0.1	0.2	0.2	0.0	0.2	0.2
Sulphate mg/L	400	79	59	0.0	36	76	43	31	36	25	45	11	24	38	36
Phosphate mg/L	-	0.10	0.00	0.25	0.00	0.00	0.00	0.00	0.00	0.5	0.00	0.00	0.00	0.04	0.04

5. CONCLUSION

According to the findings of the experimental study, saline water intrusion occurred in areas closer to the coast. The intrusion is less severe when the location is far from the sea, as evidenced by the presence of chloride concentration. The concentration of the sample from the deeper wells is lower. The majority of locations clearly required proper water treatment prior to consumption. A groundwater recharge programme can only help those areas improve the quality of their groundwater. is a possible limit.

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