



Assessment of Water Quality Analysis In Kanchipuram District, Using GIS

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Abstract: Kanchipuram has many dyeing factories. The study area has no perennial river most of the people use ground water has drinking water. In this study area ground water samples were collected and tested for physico-chemical test such as pH, EC, Chloride, Total Hardness, Total Dissolved Solids, Dissolved oxygen, Fluoride, Turbidity, Alkalinity the results compared to BIS. GIS based analysis has been carried out to find the quality of water.

Keywords: GIS, Ground water, physico-chemical parameters.

I. INTRODUCTION

Water is the most important factor of all living organisms ground water plays a lead role in it the ground water gets contaminated then the environmental affects lot. In kanchipuram region dyeing factories disposing waste water in to lands the water percolated and mixing with ground water .ground water exploitation also leads decrease in the quality of ground water. The quality of ground water is determine by physico-chemical parameters such as pH, EC, chloride, total hardness, total dissolved solids, dissolved oxygen, fluoride, turbidity, alkalinity

II. STUDY AREA

The study area was carried out in kanchipuram district, tamil nadu. Which well know most industrialized districts in the country. The study area lies between 12.8756°N, 79.8746° E. 40 samples were collected in different places in kanchipuram district.

Table.1 sampling area

SAMPLE NO	SAMPLE LOCATION	SAMPLE NO	SAMPLE LOCATION
1	KANCHIPURAM BUS STAND	21	EAST RAJA STREET
2	VAIKUNTA PERUMAL STREET	22	MATHAGESWARA KOVIL STREET
3	LINGAPPAN ST	23	BIG KAMALA ST

4	PARANDUR ROAD	24	KANAGA DURKA STREET
5	KRISHNA STREET	25	BALAJI STREET
6	PAPPAN KUZHI	26	KAVANGARI STREET
7	MADAM STREET	27	PSK STREET
8	THIRUPAKUDAL STREET	28	CAR STREET
9	SUBBARAYAN STREET	29	KANCHIPURAM EAST
10	NEAR EB OFFICE	30	KALIASANATHAR TEMPLE
11	SRIPERMBUDUR	31	VALLAM
12	SUNGAVACHATRAM	32	SANTHA VELLORE
13	SINGAPERUMAL KOVIL	33	CHANGAL PATTU
14	MAMANDUR	34	OSIVAKKAM
15	KOLAMBAKKAM	35	PERIYAKATTU PAKKAM



16	THONDAMANALLUR	36	MURGAMPAKKAM
17	CHITTAMUR	37	ACHARAPAKKAM
18	PAKKAM	38	ALAPAKKAM
19	JANAKI PURAM	39	ATHUR
20	KUNDRATHUR	40	ORAGADAM

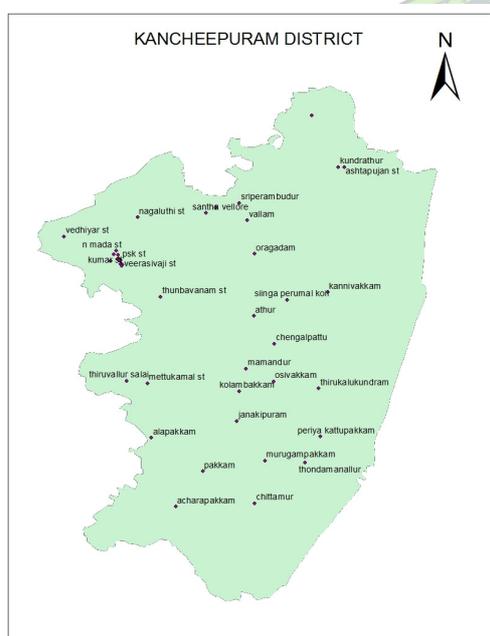


FIG.1 SAMPLING LOCATION

III. INTEGRATED OF SPATIAL AND ATTRIBUTE DATABASE

The samples were collected from 40 different places in study area and find out the physico-chemical parameters then the parameters compared to the bureau of Indian standards (BIS standard IS 10500-2012). The shape map of kanchipuram and sample collected areas are shown in fig 1

IV.RESULT AND DISCUSSION

The collected 40 samples were tested for various physicochemical parameters and compared to BIS TABLE 2 Shows the comparison between the tested parameters with BIS/IS standard.

4.1 pH

Fig.2 shows that the spatial distribution map of ph in the kanchipuram area. It was ranged 6.1 to 8.1. The range of ph in this area was within the desirable limit as per BIS standard.

4.2 Electrical Conductivity (EC)

The spatial variability of the electrical conductivity in kanchipuram has been showed in fig 3 the EC in the ranged from 843 mS/cm to 1930 mS/cm. The range of EC in this area was in the desirable limit as per BIS standard.

4.3 Chloride

Fig.4 Illustrated that spatial variability of chloride content. The chloride content lies between 277.4 mg/l to 942.2 mg/l. The range of chloride in this area was within the desirable limit as per BIS standard.

4.4 Total Hardness

The spatial distribution of the total hardness in the study area has been showed in fig 5. The total hardness range lie between 160 mg/l to 875.5 mg/l. The range of TH in this study area within desirable limit as per BIS standard.

4.5 Total Dissolved solids

Fig. 6 shows the spatial distribution of the TDS. The range of TDS lies between 565mg/l to 1200 mg/l. The range of TDS in this study area within desirable limit as per BIS standard.

4.6 Dissolved Oxygen (DO)

The spatial variability of dissolved oxygen has been showed in figure 7. The range of dissolved oxygen lies in between 3 mg/l to10 mg/l. the range of dissolved oxygen



in this study area with in desirable limit as per BIS/IS Standard.

4.7 Fluoride

Fig. 8 shows the spatial variability of fluoride in this study area. The range of fluoride lies in between 0.2 0.9 mg/l to mg/l. The range of fluoride in this study area within desirable limit as per BIS/IS.

4.8 Turbidity

The spatial variation map of turbidity has been showed in figure 9. The range of turbidity lies in between 0.5 NTU to 4.4 NTU. The range of turbidity in this study area within desirable limit as per BIS/IS.

4.9 Alkalinity

Fig. 10 shows the spatial variation map of alkalinity. The range of alkalinity lies in between 30 mg/l to 270 mg/l. The range of alkalinity in this study area within desirable limit as per BIS/IS.

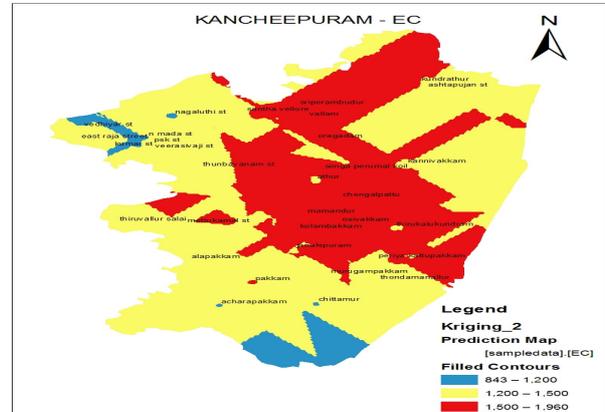


Fig. 3 Spatial distribution of EC

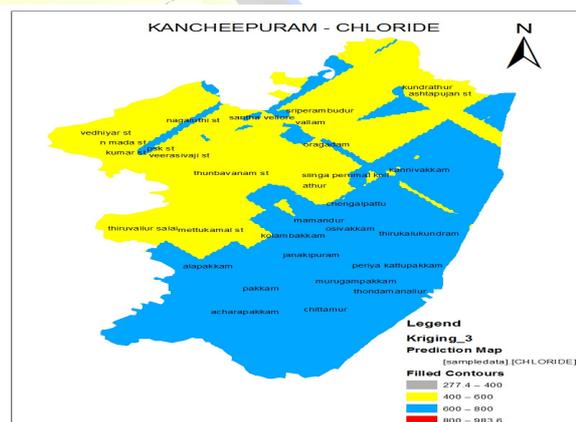


Fig. 4 Spatial distribution of chloride

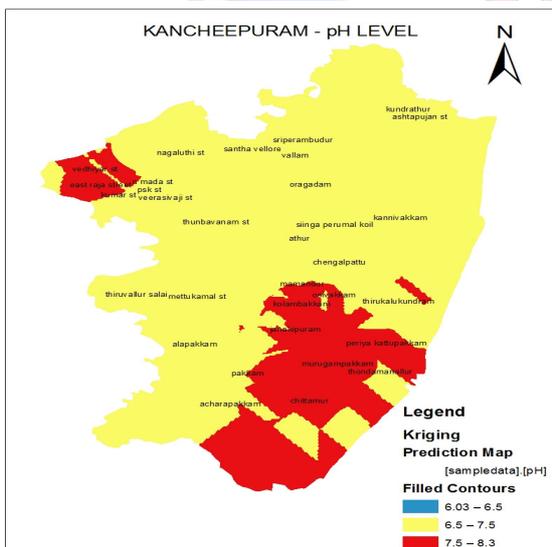


Fig.2 Spatial distribution of pH

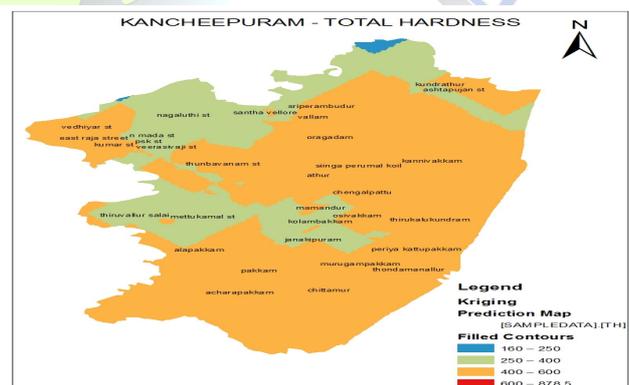


Fig. 5 spatial distribution of Total Hardness

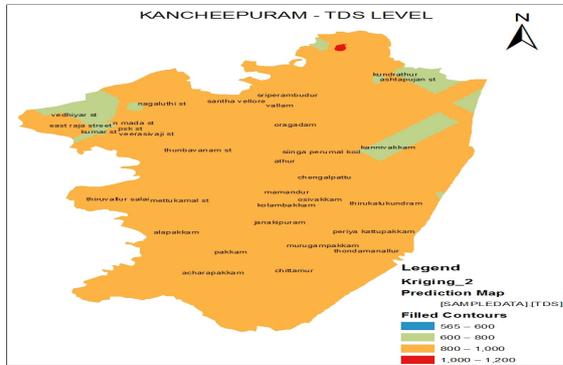


Fig. 6 Spatial distribution of TDS

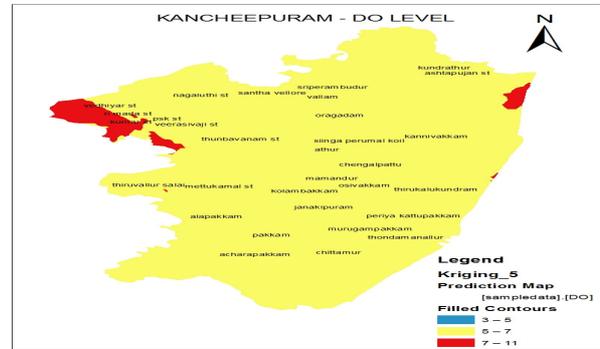


Fig. 7 Spatial distribution of DO

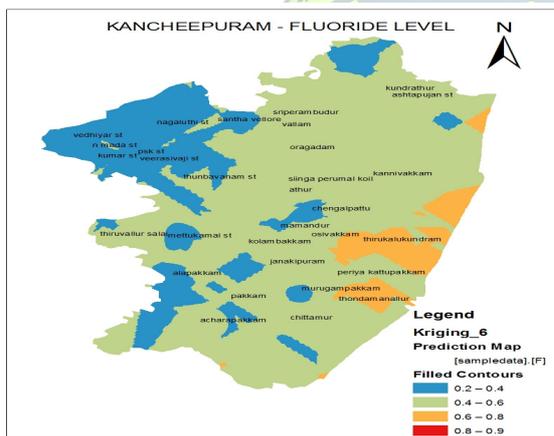


Fig. 8 Spatial distribution of Fluoride

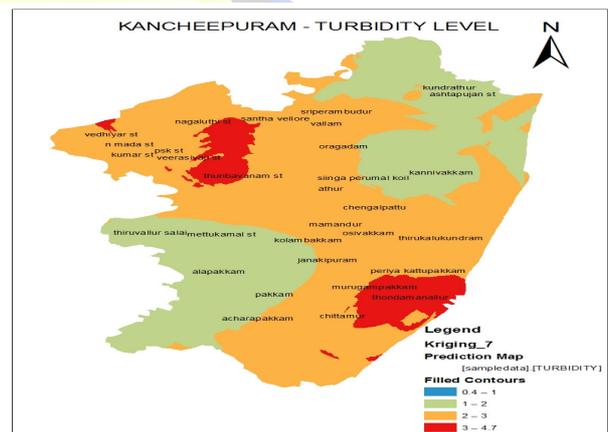


Fig. 9 Spatial Distribution of Turbidity

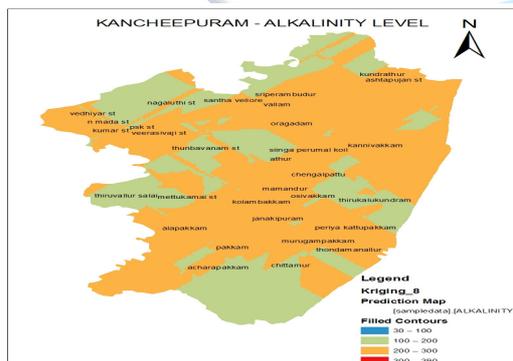


Fig. 10 Spatial distribution of Alkalinity



TABLE 2 VARIOUS PHYSICO-CHEMICAL PARAMETERS OF SAMPLES.

Sample No.	pH	EC mS/cm	Chloride mg/l	Total hardness mg/l	TDS mg/l	DO mg/l	Fluoride mg/l	Turbidity NTU	Alkalinity mg/l
1	8.1	1671	942.2	510	1120	3	0.6	0.8	130
2	7.9	1488	819.2	451.5	997	5.5	0.3	2.3	210
3	7.5	1144	499.8	878.5	767	10	0.4	2.2	200
4	7.4	1397	674.8	490	936	11	0.3	1.6	30
5	7.7	1684	624.8	330	1130	9	0.3	2.8	230
6	7.8	1050	534.8	425	704	4.5	0.3	4.4	200
7	7.6	1250	487.3	495	838	7	0.2	3.2	220
8	7.9	1034	389.9	200	693	9	0.5	3.6	190
9	7.25	1382	497.3	410	926	6	0.2	2.4	190
10	7.3	1258	584.4	285	843	8	0.7	1.3	290
11	6.8	1253	789.7	650	840	9	0.2	4.3	200
12	6.2	1597	427.3	405	1070	8	0.3	1.6	390
13	6.1	1205	502.3	280	808	6	0.4	4.6	270
14	6.23	916	352.4	160	614	7.5	0.4	2.9	210
15	6.0	1420	607.3	365	952	6.5	0.3	3.1	230
16	6.7	1479	324.9	565	991	6	0.3	0.6	230
17	6.21	843	277.4	420	565	9.5	0.4	0.4	170
18	7.3	1791	547.3	315	1200	7	0.2	0.9	250
19	7.2	1138	449.8	635	763	9	0.4	0.5	250
20	6.9	1247	439.8	490	854	8	0.9	1.9	320
21	6.9	1630	547.3	635	839	9	0.5	0.5	250
22	7.3	1138	687.1	365	829	6	0.5	0.6	210
23	6.5	1620	665.6	456	932	4.5	0.2	3.5	136
24	7.2	1850	658.5	258	988	5	0.4	2	190
25	7.9	1806	583.4	365	955	6.5	0.5	4.6	240
26	6.7	1802	457.3	368	987	8	0.2	0.5	170
27	7.8	1792	853.2	398	1001	4	0.3	4.7	230
28	7.6	1890	635.8	347	744	7.5	0.5	2.3	210
29	7.7	1930	876.9	258	758	6	0.7	4	200
30	8.1	1960	687.1	456	801	4	0.6	.05	170
31	7.9	1950	965	423	931	8.5	0.7	3.2	150
32	8.3	1178	768.1	536	987	6	0.2	4.3	140
33	6.5	1125	655.2	587	834	5	0.5	2.6	240
34	8.3	1148	578.5	642	830	4.5	0.6	4.1	230
35	7.9	1253	789.1	258	998	5.5	0.4	2.2	180
36	6.7	1630	698.8	354	893	8	0.2	0.6	150
37	6.3	1169	574.4	463	954	7	0.6	0.9	180
38	6.8	1456	649.5	214	897	6.5	0.7	0.5	150
39	6.9	1369	498.7	763	865	7.5	0.5	3.5	210
40	7.3	1658	984.5	247	857	5	0.4	4.3	220
BIS/IS (10500-2012)	6.5 - 8.5	2500	250-1000	200-600	500- 2000	10-3	1-1.5	1-5	200-600



CONCLUSION

In this current study produce the spatial variability maps of nine physic-chemical parameters. The physic-chemical parameters results were clearly compared to BIS standard. In this study area contains potable groundwater.

REFERENCES

- [1] Bureau of Indian Standards (BIS) (1998) Drinking water specifications (revised 2003), IS:10500
- [2] Partha Pratim Adhikary, Ch. Jyotiprava Dash, H. Chandrasekharan, T. B. S. Rajput, K. Dubey, "Evaluation of groundwater quality for irrigation and drinking using GIS and geostatistics in a peri-urban area of Delhi, India" *Arabian Journal of Geosciences* (2012) 5:1423–1434, DOI 10.1007/s12517-011-0330-7
- [3] Ravikumar P, Mohammad Aneesul Mehmood, Somashekar R K, "Water quality index to determine the surface water quality of Sankey tank and Mallathahalli lake, Bangalore urban district, Karnataka, India" *Applied Water Science* (2013) 3:247–261 DOI 10.1007/s13201-013-0077-2
- [4] Saravanakumar K and Ranjith Kumar R. "Analysis of water quality parameters of groundwater near Ambattur industrial area, Tamil Nadu, India." *Indian Journal of Science and Technology* 2011; 4(5) 1732-1736
- [5] Srinivasamoorthy K, Nanthakumar C, Vasanthavigar M, Vijayaraghavan K, Rajivgandhi R, Chidambaram S, Anandhan P, Manivannan R, Vasudevan S. "Groundwater quality assessment from a hard rock terrain, Salem district of Tamilnadu, India" *Arabian Journal of Geosciences* (2011) 4:91–102, DOI 10.1007/s12517-009-0076-7
- [6] WHO, "International Standards of Drinking Water," World Health Organization, Geneva, 2004, pp. 55-79.
- [7] Yogendra K, Puttaiah E T. "Determination of Water Quality Index and Suitability of an Urban Waterbody in Shimoga Town, Karnataka." Sengupta M and Dalwani (Editors) 2008: *Proceedings of Taal 2007: The 12th World Lake Conference*: 342-346.
- [8] Selvam S, Manimaran G, Sivasubramanian "hydrochemical characteristic and GIS –based assessment of groundwater quality in the coastal aquifer of Tuticorin Coporation, Tamilnadu,India" *Applied water science* (2013) 3:145-159
- [9] Srinivas Y, Hudson Oliver D, stanley Raj, Chandrasekar N "Evaluvation of groundwater quality in around Nagercoil, Tamilnadu, India: an integrated geochemical and GIS approach" *Applied water science* (2013) 3:631-651
- [10] Gnanachandrasamy G, Ramkumar T, Venkatramanan S, Vasudevan S, Chung S Y, Bagyaraj M, "Accessing groundwater quality in lower part of Nagapattinam district, southern India: Using Hydrogeochemistry and GIS interpoltion techniques" *Applied water science* (2014) DOI 10.1007/s13201-014-0172-z
- [11] Magesh S N, Chandrasekar N, Evaluation of spatial variation in groundwater quality by WQI and GIS techniques: a case study of Virudunagar District, Tamilnadu, India" *Arabian Journal of Geoscience* (2011) 6:1883-1898. S. M. Metev and V. P. Veiko, *Laser Assisted Microtechnology*, 2nd ed., R. M. Osgood, Jr., Ed. Berlin, Germany: Springer-Verlag, 1998.