ISSN: 0974-2115
www.jchps.com Journal of Chemical and Pharmaceutical Sciences

Study of Ground Water Quality in Chengalpattu

S. Rajesh*
Civil Engineering Department, Bharath University, Chennai, Tamilnadu, India.
***Corresponding author: E-Mail: rajeshskr06@gmail.com**

ABSTRACT

Water be the essential constituent for communal and profitable infrastructure and is vital for burly society and sustainable maturity. Owed to swift increase in mass of population, rapid urbanization, industrialization, demand of water is increasing now days. A upshot of surface water and ground water level is declining; pollution and augmented of demand have made superior class water scarcer and more pricey. Groundwater being most favorite substitute is facing threats due to harmful human activities in India, which has lead to descent in ground water quality. Chance of ground water corruption to the combination up of toxic chemicals, fertilizers, waste disposed and industrial at site. Hence monitor of ground water quality has become obligatory. So that map info software is useful, not only to facilitates data capture and processing, also serves as powerful computational tool to facilitates multi-map integrations. In this project ground water quality psychoanalysis be carried out at Chengalpattu area in kanchipuram district, well water samples have been collected all around the study area and strategically analyzed results are presented in a map info software to create water eminence mapping and shows spatial variations. GIS, a tool which is used for storing, analyzing and displaying spatial data is also useful for investigating groundwater quality information.

KEY WORDS: Ground Water, GIS, Facilitates.

1. INTRODUCTION

Groundwater is precious innate resource that is crucial for human health, socio-economic progress, and functioning of ecosystems. In study area, stern water paucity is becoming common in several parts of the remote area. Water scarcity owing to fast growth of inhabitants and anthropogenic actions, the eminence of groundwater is deteriorating present days. Possibility of groundwater infectivity on existing drought-prone conditions, the crudely treated, spontaneous release of effluents of industry, municipal and domestic into the nearby streams and ponds. Temporary changing basis of water and creation of the recharged water, hydrological and human factors, may cause sporadic changes in groundwater quality. Ascertaining the quality is crucial before used for various purposes such as drinking, recreational and industrial. Therefore monitor of groundwater quality has become indispensable. Current study attempts to create map of spatial discrepancy of groundwater quality parameter using map info software, it an effective tool used for groundwater quality mapping and essential for monitoring the ecological vary detection

Objective:

- To study the available ground water resources and to find out the physiochemical parameters
- To compare the obtained results with BIS and WHO water quality standards.
- To evaluate the ground water resources using GIS analysis.

Sampling Locations: Ground water sampling location were select by a Survey method. The water samples are collected, from each of well points during Post monsoon season period. Water samples are collected in a 1 litre fake containers and preceding to collection as a part of the quality control measures, all the bottles were wash with non-ionic detergent and rinse with de-ionized water prior to the usage. Apiece bottle was label according to the sample spot point, whilst all the samples were preserved at 4°C and transported to the laboratory. The sampling results be studied and results were obtained.

Table.1. Parameters values for Well 1 to 3

Parameters	Protocol	Well-1	Well-2	Well-3
PH Value	IS 3025 Part 11 (2009)	6.70	7.56	6.87
Total Hardness as $CaCO_3$	IS 3025 Part 21 (2009)	286 mg/l	320 mg/l	688 mg/l
Iron as Fe	IS 3025 Part 53 (2009)	0.06 mg/l	1.75 mg/l	0.32 mg/l
Total dissolved solids	IS 3025 Part 16 (2009)	694 mg/l	870 mg/l	966 mg/l
Total plate count	IS 1622-1981(Reaff) (2009)	310 cfu/ml	323 cfu/ml	766 cfu/ml
E.coli	IS 1622-1981(Reaff) (2009)	Absent /100ml	ABSENT /100ml	ABSENT /100ml
Total coli form	IS 1622-1981(Reaff) (2009)	Present: 70MPN/100ml	Present: 110MPN/100ml	Present: 245MPN/100ml

Table.2. Parameters values for Well 4 to 6

Parameters	Protocol	Well-4	Well-5	Well-6
PH Value	IS 3025 Part 11 (2009)	6.43	6.68	6.66
Total Hardness as $Caco_3$	IS 3025 Part 21 (2009)	344 mg/l	416 mg/l	448 mg/l
Iron as Fe	IS 3025 Part 53 (2009)	0.07 mg/l	0.29 mg/l	0.13 mg/l
Total dissolved solids	IS 3025 Part 16 (2009)	768 mg/l	854 mg/l	846 mg/l
Total plate count	IS 1622-1981(Reaff) (2009)	400 cfu/ml	450 cfu/ml	800 cfu/ml
E.coli	IS 1622-1981(Reaff) (2009)	ABSENT /100ml	ABSENT /100ml	ABSENT /100ml
Total coli form	IS 1622-1981(Reaff) (2009)	Present: 220MPN/100 ml	Present: 170MPN/100 ml	Present: 350MPN/100 ml

Table.3. Parameters values for Well 7 to 8

Parameters	Protocol	Well-7	Well-8
PH Value	IS 3025 Part 11 (2009)	6.66	7.06
Total Hardness as $Caco_3$	IS 3025 Part 21 (2009)	448 mg/l	360 mg/l
Iron as Fe	IS 3025 Part 53 (2009)	0.13 mg/l	0.13 mg/l
Total dissolved solids	IS 3025 Part 16 (2009)	846 mg/l	1044 mg/l
Total plate count	IS 1622-1981(Reaff) (2009)	800 cfu/ml	600 cfu/ml
E.coli	IS 1622-1981(Reaff) (2009)	ABSENT /100ml	ABSENT /100ml
Total coli form	IS 1622-1981(Reaff) (2009)	Present: 350MPN/100ml	Present: 280MPN/100ml

Table.4. Pumping Test Analysis

WELL	LAT	LONG	DUR	SWL	DWL	RWL	Q	Q	T	Qrec
SP 1	13.068°	80.145°	30	1.00	1.04	1.03	2.00	6.90	354	2.0
SP 2	13.031°	80.169°	30	1.22	2.02	1.32	0.57	0.093	11	0.6
SP 3	13.072°	80.342°	30	0.80	1.54	0.93	0.62	0.082	19	0.65
SP 4	13.122°	80.231°	30	0.90	1.68	0.95	0.135	0.005	0.39	0.1
SP 5	13.087°	80.156°	30	1.15	2.12	1.23	1.45	1.58	142	1.5
SP 6	13.054°	80.243°	30	0.93	1.76	1.08	0.32	0.053	7.9	0.3
SP 7	13.117°	80.298°	30	0.78	1.45	0.87	1.58	0.497	12.5	1.6

Note:
SWL: Static Water Level,
DWL: Dynamic Water Level
RWL: Residual Water Level,
Q: Pumping Rate (L/s)
q: Specific Capacity (l/s/m),
T: Transmissivity (m^2/d)
Qrec: Recommended yield of well in 'm', bgl (below ground level).

The spatial variation maps for groundwater quality:

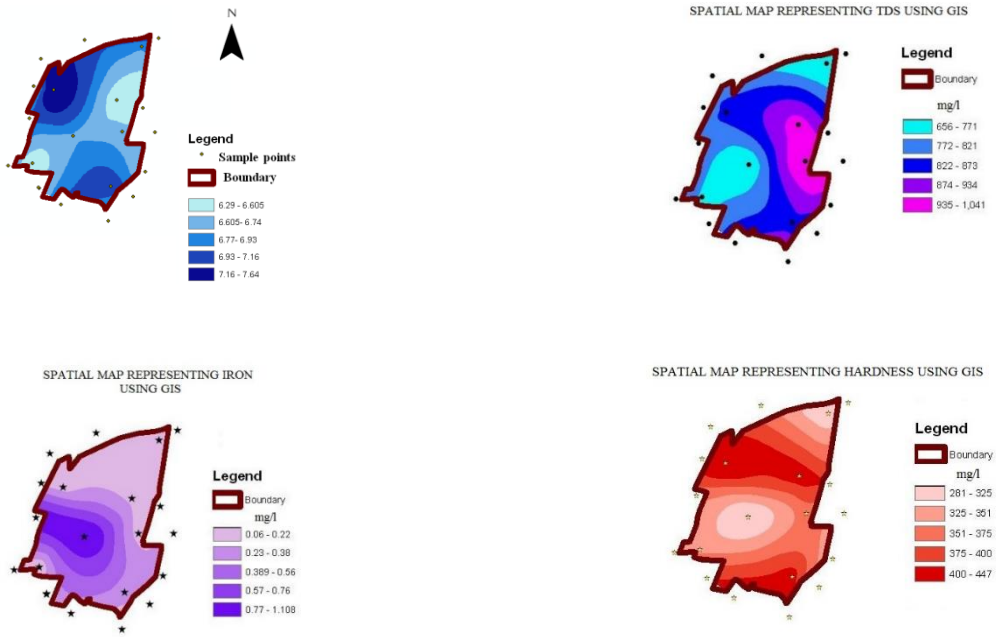

Figure. The spatial variation maps for groundwater quality

Pumping Test Drawdown Data:

Table.5. Pumping Test Drawdown Data

Time	Depth of water (from the casing in ft)	Comments
5/12/2014 10.20	7.5	Pumping hasn't started
10.21	7.5	
10.22	7.5	
10.23	7.5	
10.24	7.5	
10.25	7.5	
10.26	7.5	Pumping started @ 150 lpm
10.27	7.5	
10.28	8.1	
10.29	8.1	
10.30	8.9	
10.31	8.9	
10.32	9.8	
10.33	9.8	
10.34	10.7	
10.35	10.7	
10.36	11.6	
10.37	11.6	
10.38	12.5	
10.39	12.5	
10.40	13.4	
10.41	13.4	
10.42	14.3	
10.43	14.3	
10.44	15.5	
10.45	15.5	
10.46	16.9	
10.47	16.9	
10.48	17.5	
10.49	17.5	

10.50	18.6	
10.51	18.6	
10.52	19.7	
10.53	19.7	
10.56	19.8	Pump has been turned off

2. RESULTS AND CONCLUSION

In present study, the values the pH was in the range 6.0-7.99. The least value was recorded to be 6.0 in the month of January sample, while maximum was recorded to be 7.99 in February sample. Most of the biological processes and biochemical reactions are pH dependant PH was found to be slightly alkaline in nature at all the sites. The lower value of pH during rainy season compared to summer may be due to dilution of alkaline substance.

Total dissolved salt was in the range of 694- 1044mg/L in rainy season and 722-1100mg/L summer. TDS is the term used to describe the inorganic salts and small amount of organic matter present in solution of water. TDS values of water samples are within the highest desirable or maximum permissible limit set by W.H.O within desirable limit in all the season.

The turbidity was within permissible limit. The variation in drift of turbidity and total solids is roughly is analogous in similar seasons and the customary these parameters is higher in summer compare to rainy and winter season. It is evident that the expulsion variations are commensurate with weather conditions and seasons variations.

Total hardness is the indicator of hydrogeology and aesthetic quality of water. The hardness was ranged from 480mg/L (maximum in summer) to 280mg/L (minimum in winter). These findings suggest that the water body is moderately hard and high medium productive during present stage. Water total hardness is imainly by the calcium and magnesium ions, which apart from sulphate, chloride and nitrates are found in combination with carbonates Fluoride concentration, which are within the permissible limit of W.H.O.

Chloride is the indicator of contamination with animal and human waste. It is a common constituent of all natural water and is generally not classified as harmful constituent. The chloride contents varied from 490mg/L (in summer) to 105mg/litre (in rainy season in sample S6), which indicates pollution status of water body. Concentration of sulphate ion was minimum in rainy and winter season and maximum in summer. Sulphate concentration is within the desirable limit of WHO in all the season while in certain samples higher than the maximum permissible limit in the seasons which is negligible.

GIS software tools can able to provide correct podium for convergent scrutiny of large volume of multi-disciplinary data and verdict making for ground water studies can be effectively done. The present study provides a principle for solving water quality crisis in Chengalpattu.

REFERENCES

Anbazhagan R, Prabhakar S, Vanangamudi S, Thamotharan C, Electromagnetic engine, Middle - East Journal of Scientific Research, 20 (3), 385-387, 2014.

Anbazhagan R, Satheesh B, Gopalakrishnan K, Mathematical modeling and simulation of modern cars in the role of stability analysis, Indian Journal of Science and Technology, 6 (5), 2013, 4633-4641.

Arora AN, Use of Remote Sensing in Ground water Modelling, 2002

Arun K, Saraf P, Kundu B, Sarma, Integrated Remote Sensing and GIS in Ground water Recharge Investigation and Selection of Artificial Recharge Sites in A Hard Rock terrain, 1999.

Brindha G, Krishnakumar T, Vijayalatha S, Emerging trends in tele-medicine in rural healthcare, International Journal of Pharmacy and Technology, 7 (2), 2014, 8986-8991.

Brintha Rajakumari S, Nalini C, An efficient cost model for data storage with horizontal layout in the cloud, Indian Journal of Science and Technology, 7, 2014, 45-46.

Choubey V.K, Assessment of waterlogged area in IGNP Command State, Hydrology Journal, 19 (2), 1996, 81-93.

Gopalakrishnan K, Prem Jeya Kumar M, Sundeep Aanand J, Udayakumar R, Analysis of static and dynamic load on hydrostatic bearing with variable viscosity and pressure, Indian Journal of Science and Technology, 6 (6) , 2013, 4783-4788.

Jeyanthi Rebecca L, Susithra G, Sharmila S, Das M.P, Isolation and screening of chitinase producing Serratia marcescens from soil, Journal of Chemical and Pharmaceutical Research, 5 (2), 2013, 192-195.

Kerana Hanirex D, Kaliyamurthie KP, An adaptive transaction reduction approach for mining frequent itemsets: A comparative study on dengue virus type1, International Journal of Pharma and Bio Sciences, 6 (2), 2015, 336-340.

Kharad S.M, Srinivas Rao G.S, GIS based Groundwater Assessment Model, L & T Information Technology Limited, 1999.

Mohammed Ismal S, Pattabi S, Mapping of spatial variability of groundwater in Erode District using GIS, Proceeding of National Conference on Geoinformatics, 2000, 158-166.

Raja Mohan S, GIS application in ground water quality assessment in Madurai Corporation, Proceedings of National Conference on Geoinformatics, 2000, 127 – 135.

Ramalingam M, Santhakumar A.R, Case study on Artificial Recharge using Remote sensing and GIS, 2000.

Sachithanantham P, Sa Nkaran S, Elavenil S, Experimental study on the effect of rise on shallow funicular concrete shells over square ground plan, International Journal of Applied Engineering Research, 10 (20), 2015, 41340-41345.

Sharma K.D, Remote Sensing and Watershed Modelling, Towards a Hydrological Interface Model. Indo-US Symposium Workshop on Remote Sensing and its Applications, Mumbai, 1996.

Sharmila S, Jeyanthi Rebecca L, Das M.P, Production of Biodiesel from Chaetomorpha antennina and Gracilaria corticata, Journal of Chemical and Pharmaceutical Research, 4 (11), 2012, 4870-4874.

Sharmila S, Jeyanthi Rebecca L, Naveen Chandran P, Kowsalya E, Dutta H, Ray S, Kripanand N.R, Extraction of biofuel from seaweed and analyse its engine performance, International Journal of Pharmacy and Technology, 7 (2), 2015, 8870-8875.

Thamotharan C, Prabhakar S, Vanangamudi S, Anbazhagan R, Coomarasamy C, Hydraulic rear drum brake system in two wheeler, Middle - East Journal of Scientific Research, 20 (12), 2014, 1826-1833.

Vanangamudi S, Prabhakar S, Thamotharan C, Anbazhagan R, Collision control system in cars, Middle - East Journal of Scientific Research, 20 (12), 2014, 1799-1809, 2014.

Vanangamudi S, Prabhakar S, Thamotharan C, Anbazhagan R, Drive shaft mechanism in motor cycle, Middle - East Journal of Scientific Research, 20 (12), 2014, 1810-1815.

Vanangamudi S, Prabhakar S, Thamotharan C, Anbazhagan R, Dual fuel hybrid bike, Middle - East Journal of Scientific Research, 20 (12), 2014, 1819-1822.

Vanangamudi S, Prabhakar S, Thamotharan C, Anbazhagan R, Turbo charger in two wheeler engine, Middle - East Journal of Scientific Research, 20 (12), 2014, 1841-1847.