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Studies on Water Quality Index of Ground Water of Shahapur Taluka Yadgir District

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ABSTRACT: The present work is carried out to explore the physico-chemical characteristics and water quality of ground water of shahapur taluka yadgir district karnataka. Water samples from borewells at various locations were collected using standard procedural methods and tested for pH, TH, Ca, F, mg, cl and ground water quality index. Is computed for the ground water of shahapur taluka which needs some degree treatment before consumption and it also needs to be protected from perils of contamination.

KEYWORDS: Yadgir, Shahapur, Karnataka, TH, Ca.

I. INTRODUCTION

In general the term ground water or surface water refers to the water that occurs below the surface of the earth. The main source of ground water is infiltration. The infiltrated water after meeting the soil moisture deficiency percolates deeply and becomes ground water. The ground water is free from pollution and is very useful for domestic use in small towns and isolated forms. Water is the most precious gift of nature, the most crucial for sustaining life and is required in almost all the activities of man - for drinking, municipal use, for irrigation, to meet the growing food needs for industries, power generation, navigation and recreation. Moreover, the rainfall is mostly confined to the monsoon season and is unevenly distributed both in space and time even during this season. As a result, the country is affected by frequent droughts. Nearly one third of the country is drought prone. In the very near future, water will be a scarce resource and therefore, needs to be harnessed in the most scientific and efficient manner. The surface water is subjected to various threats like discharge of effluents from different industries in the vicinity, encroachment of surface water sources like pond, river, stream etc. Groundwater is the major source of drinking water in both urban and rural India. The demand for water has increased over the years and this has led to water scarcity in many parts of the world.

II. RELATED WORK

- 1) Dr.Yerramsetty et al, (2011) studied the physico-chemical characteristics of Groundwater in the Industrial Zone of Visakhapatnam, Andhra Pradesh. From the analysis, it is observed that the port area is found to have high concentrations of hardness, sulphates and calcium. The groundwater in Duvvada, a region surrounded by special economic zone and steel plant is found have more fluoride concentrations. Since, the study is conducted only for one year period^[6].
- 2) Mohammad Mehdi Heydari et.al, (2013) carried out Correlation Study and Regression Analysis of Drinking Water Quality in Kashan City, Iran. Their study revealed that highly positive correlation Was observed between TDS and EC ($R=0.995$) and between Ca^{2+} and TH ($R=0.948$). The results showed that regression relations have the same correlation coefficients, as: (I) pH and TH, EC and TH ($R=0.520$), (II) NO_3^- and pH, TH and pH ($R=0.520$), (III) Ca^{2+} and SO_4^{2-} , TH and SO_4^{2-} , Cl^- and SO_4^{2-} ($R=0.630$). Also results show that the systematic calculations of correlation coefficient between water parameters and regression analysis provide useful mean for rapid monitoring of water quality^[7].
- 3) MH Sayadiet.al, (2014) carried out Multivariate statistical analysis of surface water chemistry study of Gharasoo River, Iran. With reference to multivariate statistical analyses it was concluded that the agricultural, domestic and hydro-geochemical sources are releasing the pollutants into the Gharasoo River water^[8].
- 4) J.Davithuraj and S. Manjuynatha (2014) studied the Assessment of Groundwater Quality for Drinking and Irrigation Purpose of Upper Bennihalla Basin, Karnataka, India. The study revealed that hydrological parameters and quality assessment data of groundwater of upper Bennihalla Basin were compared with WHO and ISI

standards, which shows that groundwater of study area is suitable for drinking purpose and public health. The value of sodium adsorption ratio is within permissible limit, indicating that groundwater is suitable for irrigation^[9].

- 5) Akhtar Malik Muhammad, Tang Zhonghua,(2014) carried out a Study to Investigate and Compare Groundwater Quality in Adjacent Areas of Landfill Sites in Lahore City. The study revealed that 1) Groundwater is contaminated but near landfill sites concentration of pollutants is high. 2) pH, turbidity, conductivity, TDS and Hardness values are within WHO guideline. 3) Without treatment, groundwater use will be dangerous for health^[10]

OBJECTIVES OF THE STUDY

1. To find out the physico-chemical characteristics of ground water and Quality Index of Yadgir district.
2. To compare the physico-chemical characteristics of ground water samples with BIS standards.
3. To find the water quality index (WQI).

III. METHODOLOGY

Analytical Methods:

The below table shows the methods used in the study of each parameter.

Table 1 Methods/Instruments Adopted

Parameter	Method/Instrument adopted
pH	pH meter pH 700
Total Hardness	EDTA Titrimetric method
Sulphate	Turbidimetric method
Dissolved Oxygen	Winkler's method
Chloride	Argentometric method
Alkalinity	Titrimetric method
Fluoride	SPANDS method

IV. EXPERIMENTAL RESULTS

PHYSICO-CHEMICAL CHARACTERISTICS OF GROUND WATER OF SHAHAPUR

Parameters village	pH	TH in mg/L	Ca in mg/L	Mg in mg/L	Cl in mg/L	TDS in mg/L	F in mg/L	NO3 in mg/L	T Alk in mg/L	SO4 in mg/L
Shahapur town	7.41	677.67	611.49	66.18	609.50	1249.86	1.36	48.77	567.65	226.71
Doranali	7.24	679.61	586.55	93.06	1078.84	1410.30	1.32	45.43	660.25	301.34
Shirwal	7.42	720.62	659.97	60.65	1203.89	1472.70	1.51	50.25	521.72	242.89
Gogi	7.41	730.91	634.12	96.79	1052.31	1287.15	1.52	52.56	611.80	190.24
Hoskrerra	7.29	710.09	639.24	70.85	723.66	1536.12	1.76	47.77	570.03	243.54
Yekkacnhi	7.42	716.89	638.10	78.79	816.70	1455.38	1.47	49.47	623.05	186.63
Tannur	7.23	741.97	639.14	102.83	1064.57	1609.20	1.46	48.67	584.05	305.07

Hanchanal	7.48	695.31	634.16	61.15	1281.42	1312.33	1.47	55.16	570.85	185.03
Birnal	7.39	690.92	595.90	95.02	703.74	1552.96	1.06	57.05	626.42	217.52
Malhalli	7.31	731.10	670.38	60.72	1037.05	1455.63	1.29	47.05	629.11	252.23
Naikal	7.23	717.74	629.44	88.30	916.15	1331.69	1.49	47.63	593.13	213.16
Rastapur	7.31	716.26	645.88	70.38	903.91	1556.14	1.74	54.21	577.34	282.90
MEAN	7.34	710.75	632.03	78.73	949.31	1435.79	1.45	50.33	594.61	237.27
MAX	7.48	741.97	670.38	102.83	1281.42	1609.20	1.76	57.05	660.25	305.07
MIN	7.23	677.67	586.55	60.65	609.50	1249.86	1.06	45.43	521.72	185.03
SD	0.17	20.68	24.11	15.72	206.91	118.27	0.19	3.61	37.22	42.28

Correlation Coefficient of Various Parameters of shahapur

Parameters	pH	TH	Ca	Mg	Cl	TDS	F	NO3	T Alk	SO4
pH	-									
TH	-0.247	-								
Ca	0.083	0.764	-							
Mg	-0.452	0.144	-0.529	-						
Cl	0.078	0.335	0.350	-0.096	-					
TDS	-0.398	0.361	0.361	0.182	-0.079	-				
F	-0.128	0.350	0.470	-0.261	0.083	0.097	-			
NO3	0.585	-0.096	-0.079	-0.005	0.023	0.084	-0.121	-		
T Alk	-0.300	-0.157	-0.469	0.512	-0.123	-0.005	-0.513	-0.173	-	
SO4	-0.721	0.088	0.191	0.095	0.095	0.570	0.087	-0.405	0.077	-

Comparing with BIS standards.

Parameters	Standards	Recommended Agency	Observed Values	Remarks
pH	6.5-8.5	BIS	7.34	Compyling
TH	300-600	BIS	710.75	Slightly Higher
Ca	75-200	BIS	632.03	Compyling
Mg	30-100	BIS	78.73	Compyling
Cl	250-1000	BIS	949.31	Compyling
TDS	500-2000	BIS	1435.79	Compyling
F	1-1.5	BIS	1.45	Compyling
NO3	45-100	BIS	50.33	Compyling
T Alk	200-600	BIS	594.61	Compyling
SO4	200-400	BIS	237.27	Compyling

WATER QUALITY INDEX (WQI)

Table No 4.5 : Water Quality Index of shahapur Taluka

Parameters	IS	Ci	Si	wi	Wi=(wi/Σwi)	Qi=(Ci/Si)*100	SI=Wi*Qi
pH	6.5-8.5	7.34	8.5	4	0.125	86.38	10.80
TH	300-600	710.75	600	3	0.094	118.46	11.11
Ca	75-200	632.03	200	2	0.063	316.01	19.75
Mg	30-100	78.73	100	2	0.063	78.73	4.92
Cl	250-1000	949.31	1000	3	0.094	94.93	8.90
TDS	500-2000	1435.79	2000	4	0.125	71.79	8.97
F	1-1.5	1.45	1.5	4	0.125	96.67	12.08
NO ₃	45-100	50.33	100	5	0.156	50.33	7.86
T Alk	200-600	594.61	600	1	0.031	99.10	3.10
SO ₄	200-400	237.27	400	4	0.125	59.32	7.41
Total				32			94.91

Water quality index**WQI = ΣSI = 94.91**

The water quality index of the samples is found out to be 94.91 which lies in “B” grade. Hence water quality fall under good quality

V. CONCLUSION

After the careful study of analysis and discussion the following are the results that have been found.

- The ground water is crystall clear, odorless, and paratable and few samples points are of salty tastes
- Few of borewells yeild saline water with high mineral or dissolved solids.
- Water is moderately hard in almost all the sampling points.
- The concentration of fluoride in the few villages is beyond the permissible limits. Hence treating water becomes mandatory.
- From water quality index the water of shahapur taluka is considered as good quality

REFERENCES

1. Parihar S.S, Kumar Ajit, “Physicochemical and microbiological water in and around Gwalior city, MP, India” Research journal of recent sciences vol. 1(6) issue June (2012), pp 62-65.
2. Dr.Shashikanth R. Mise,Muhammadsaifaadil R. Attar, “Water Quality Index ofBijapur city, Karnataka, India”, International Journal of Advanced engineering Research and Technology(IJAERT), Vol.2 Issue 9, Dec 2014, pp 341-343.
3. F.J. Thakor et al., “Water Quality index ofPariyej Lake Dist. Kheda–Gujarat, India”,Current World Environment, Vol. 6(2), 2011, pp 225-23.
4. S.Devi et al.,“Physico-chemical Analysis of Groundwater samples near Industrial Area, Cuddalore District, Tamilnadu, India”,International Journal of ChemTech Research, Vol.4, No.1, Jan-Mar 2011, pp 29-34.
5. Shivasharanappa et al., “Study On The Physico-Chemical Characteristics of Ground Water of Bidar City and its Industrial Area,Karnataka,India”, International Journal of applied Biology and Pharmaceutical Technology (IJABPT), Vol.3, Issue-1, Jan-Mar 2012, pp 359-367.
6. Dr.Yerramsetty, Dr. G.V.R. Srinivasa Rao.“A Study on Physico-Chemical Characteristics of Groundwater in the Industrial Zone of Visakhapatnam, Andhra Pradesh, India”, American Journal of Engineering Research (AJAR), Vol.02, Issue-10, 2013, pp 112-116.
7. Mohammad Mehdi Heydari et al., “Correlation Study and regression analysis of Drinking water Quality in Kashn City, Iran”,Middle-East Journal of Scientific Research, Vol. 13(9), 2013, pp 1238-1244.



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