Analysis of Surface and Groundwater Quality in Anaji Village, Davangere, Karnataka

Kiran Kumar M S[1], Madhura R[2], Manu Prasad C B[3], Praveen D R[4], MD Sameer Khan A[5]
[1] Department of Civil Engineering, Jain institute of technology, Davanagere, India
[2]Kuvempu University, Shankaraghatta, Shimoga, India
[3, 4, 5] Department of Civil Engineering, Jain institute of technology, Davangere, India

***Abstract*—: Rural India mainly relies on surface and groundwater for drinking and agriculture. Unsustainable groundwater abstraction has led to the specter of exhausting the water scarcity problem. The quality of the available water is not only affected by dangerous pathogens and anthropogenic substances, but also by geogenic substances. Affect the water supply of many regions. The present study deals with the analysis of surface and subsurface water quality in Anaji village, District Davangere, Karnataka State. Fluctuations in the physico-chemical parameters were observed in the water samples. The analyzed parameters of the selected water samples were compared with the IS 10500:2012 standards. Some of the water quality parameters were above the allowable limit, others were not. This study helps different regions to understand the potential threats to their groundwater resources. The present investigation found that the water quality was fine well in the basin of the village of Anaji and its surroundings.**

Keywords—Surface Water,Ground Water, Physico-Chemical Parameters,Anaji Village, Davangere.

I. INTRODUCTION

The term "water first-class" consists of the water column and the Physical channel required to preserve aquatic existence. Water is an important herbal useful resource for maintaining the existence and environment. In the previous couple of decades, there was top notch boom in usage of floor water for drinking, irrigation, and enterprise and lots industrial purpose. The aim of the federal Clean Water Act, "To guard and preserve the chemical, bodily and organic integrity of the nation's waters," establishes the significance of assessing each water first-class and the habitat required for preserving different aquatic organisms. The first-class of floor water might also additionally depend upon geology of precise location and additionally range with intensity of water desk and seasonal adjustments and is ruled via way of means of the quantity and composition of the dissolved salts relying upon supply of the salt and soil-floor environment. Water, the treasured present of nature to human being, goes to be polluted day-via way of means of-day with growing urbanization.

It is assumed that bore nicely water (groundwater) is tons purer than floor water and much less at risk of infection however because of exceedingly intervention of anthropocentric sports (agricultural explanation, deforestation, urbanization, industrialization, over usage of agrochemicals etc) floor water great exceedingly numerous with heavy steel infection. The have an impact on of strong waste dumping site, aquifer fabric mineralogy collectively with semiarid climate, different anthropogenic sports and expanded human interventions has adversely affected the groundwater great. Water pollutants have reached to the alarming stage. The cause of the have a look at is to examine the great of groundwater & floor water accumulated from unique reasserts round Anaji Village, Davangere District Karnataka State. It is consequently vital that water great evaluation may be achieved to discover whether or not the to be had water from the termed dependable reassets is secure for ingesting and different uses.

II. METHODOLOGY

A. *Study Area*

Davangere is a district head quarters positioned 260km from the capital Bangalore Karnataka India, at 13°.5' and 14°50'N and 75°30' and 76°30'E geographically. Davangere district gets common annual rainfall of 644 mm (25.four inch)." In our case we pick out Anaji village for study purpose. Anaji is a Village in Davanagere Taluk in Davangere District of Karnataka State, India. It belongs to Bangalore Division. It is positioned 21 KM toward East from District head quarters Davanagere. Sixteen KM from Davanagere, 274 KM from State capital Bangalore. The overall geographical location of village is 1877.fifty two hectares. Anaji has a complete populace of 3,258 peoples and wide variety of homes is 693.Central government Jal Jeevan Mission is carried out in this village.

The foremost career of the human beings is agriculture that's supported with the aid of using bore properly water and floor water. Meteorologically the district is dry agro weather and stories a semiarid weather, characterized with the aid of using tropical monsoon, tropical climate with warm summer time season and slight winter. There is one essential floor water reasserts within side the observe region and last foremost supply of ingesting water is with the aid of using bore well water.

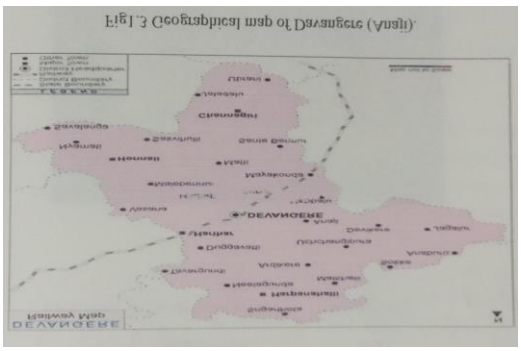

Fig 1.Anaji Village Map

B. *Methodology (Laboratory Analysis)*

i. *Water samplings*

Ground water samples (bore wells) had been gathered from **5** different bore wells & **3** Surface samples gathered. The samples were collected in sterilized bottles using the standard procedure for grab samples in accordance with standard methods. Samples had been gathered in pre-wiped clean and rinsed bottles of one liter potential with vital pre warning and transferred to the laboratory for evaluation of physico-chemical parameters. Analysis of Samples

The water samples were analyzed using standard analysis methods in the environmental technology laboratory at our College lab. Certain chemical solutions used for the analysis of water samples were made with distilled water and the chemicals were sourced from SD fine. The samples were analyzed using standard methods. for thirteen physico-chemical parameters namely; pH (Hydrogen Ion Concentration), Turbidity, EC (Electrical Conductivity), TDS (Total Dissolved Solids), TS (TotalSolids), DO (Dissolved Oxygen), BOD (Biochemical Oxygen Demand) and COD (Demand Oxygen Chemistry), TH (Total Hardness), Total Alkalinity (TA) ions of Ca2+ (calcium), NO3 (nitrate) and Cl (chloride) and phosphate (PO4)

Table 1. Parameters and Methods used in the analysis

Sl. No	Parameters	Method of Estimation
1	pH	pH Meter
2	Alkalinity	Conductivity
3	Acidity	NaoH Titration
4	Total Hardness	EDTA Titration
5	Electric Conductivity	Conductometer
6	BOD	Sodium thiosulphate titration
7	DO	Sodium thiosulphate titration

Table 2. Sources of Surface water Collected

Sl. No	Source	Source Code
1	Anaji lake	**(S_1)**
2	Rajgere lake	**(S_2)**

Table 3. Sources of Sub-Surface water Collected

Sl. No	Source	Source Code
1	Over head tank	**(SS_1)**
2	Rajgere bore well	**(SS _2)**
3	Mini tank supply	**(SS _3)**
4	Salt water supply	**(SS _4)**
5	Direct bore well	**(SS_5)**

III. RESULT AND DISCUSSION

Physico-chemical properties of surface and groundwater quality were analyzed in Anaji Village, Davangere District, Karnataka State, India. Table 4 contains the BIS drinking water standards. Table 5 gives the physicochemical properties of the surface water of Anaji Village. Groundwater properties of Anaji Village, Davangere District and Karnataka State.

Table 4. Drinking water Standards of BIS

Parameters	Desirable limit	Method of test
pH	6.5 – 8.5	IS 3025 part(11)
Alkalinity	2000 mg/l	IS 3025 Part(23)
Acidity	200mg/l	IS 3025 Part(22)
Total hardness($caco_3$)	200-600mg/l	IS 3025 Part(23)
Electric conductivity	300	IS 3025 Part(22)
BOD	<250mg/l	IS 3025 Part(44)
DO	4-8mg/l	IS 3025 part(38)
Nitrates	45mg/l	IS3025 Part(34)

Table 5: Physico-chemical characteristics of surface water

Parameter	(S_1)	(S_2)
pH	8.1	7.8
Alkalinity mg/L	115	53
Acidity	22.5	12.5
Total Hardness($caco_3$) mg/L	223	123
Electrical Conductivity, µs/cm	1055	1043
DO, mg/L	2.9	3.6
BOD	0	0.25
Nitrates	6.2	5.88

Table 6: Physico-chemical properties of groundwater

Parameter	(SS _1)	(SS _2)	(SS _3)	(SS _4)	(SS _5)
Ph	7.25	6.80	7.15	7.26	6.9
Alkalinity mg/L	178	190	158	192	180
Total Hardness	32.5	90	40	95	78
Acidity	232	265	293	265	245
Conductivity µs/cm	1240	1136	1198	1351	1150
DO, mg/L	5.9	5.1	7	8	7.3
Nitrates	7.1	8.9	9.2	9.15	8.6

pH

The sample collected from Anaji Village was analyzed. Analysis of surface and groundwater samples involves determining the concentration of the analyzed parameters. The desirable pH range for drinking water is between 6.5 and 8. The pH of the water sample in the study area was between 6.5 to 8. On average, the pH of all samples was within the desirable limit prescribed by WHO and IS. Therefore, the surrounding water does not affect the pH, there is no need to focus above the pH. Fig.2 shows variation of pH for different sources.

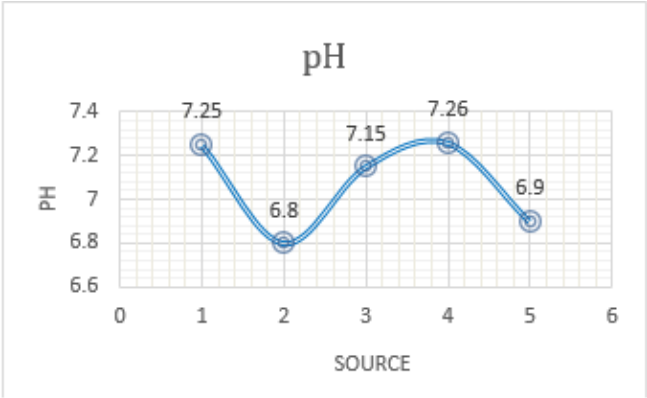

Fig 2. Variation of pH (Subsurface water)

Total Alkalinity

Total surface and subsurface alkalinity values were comparatively moderate. Water for household use with an alkalinity of less than 200 mg/l is safe. The value observed in the present study ranges from 0 to 200 mg/l. no effect on alkalinity. Fig.3 shows variation of Total Alkalinity for different sources.

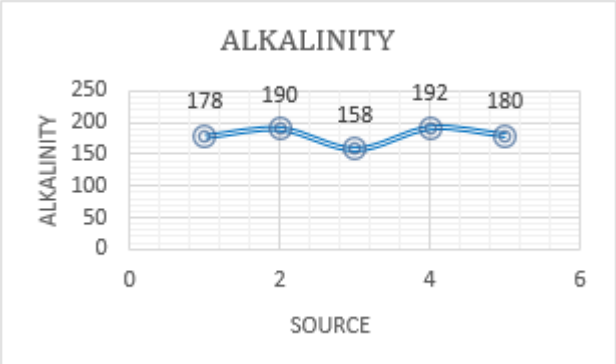

Fig 3. Variation of Alkalinity (Subsurface water)

Acidity

The maximum desirable limit for acidity is 200 mg/l. The surface and subsurface value observed in the current study area is in the range of 0 to 10 mg/l, so the samples do not exceed the desirable limit, so there is no need to focus on acidity. Fig.4 shows variation of Acidity for different sources.

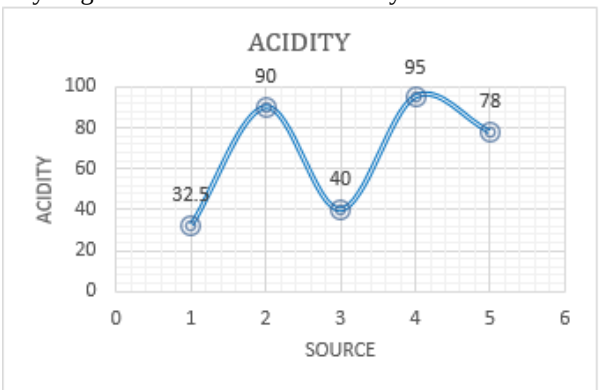

Fig 4. Variation of Acidity (Subsurface water)

Total Hardness

The total hardness found in surface and groundwater samples ranges from 0-300 mg/l, showing that the water is potable. Hardness has no known adverse health effects. However, the maximum value prescribed for drinking water is 300 mg/l. l as established. Based on this, the results show that all samples were moderately soft. Therefore, the water in the area has no influence on the total hardness. Fig.5 shows variation of Total Hardness for different sources.

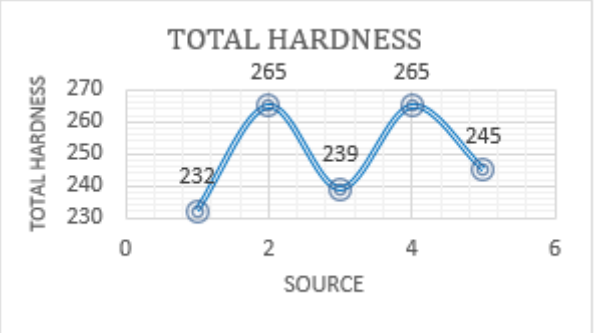

Fig 5. Variation of Total Hardness (Subsurface water)

DO

DO values were comparatively moderate. The DO found in the sample water is between 4 and 8 mg/l. However, the maximum desirable prescribed level was 4 to 8 mg. Therefore the water is safe and there is no need to focus on the DO. Fig.6 shows variation of DO for different sources.

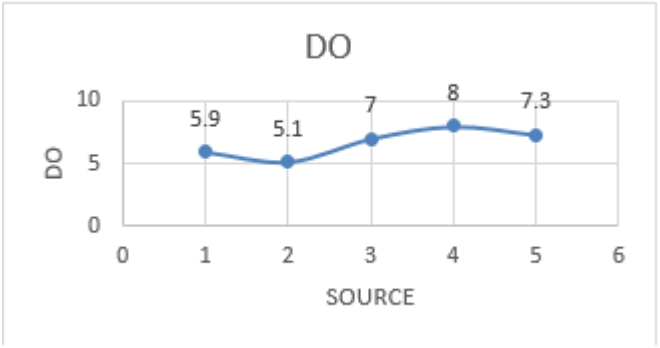

Fig 6. Variation of DO (Subsurface water)

Conductivity

The conductivity values for both surface & Ground water were found within the limit given by BIS. Fig.7 shows variation of Conductivity for different sources.

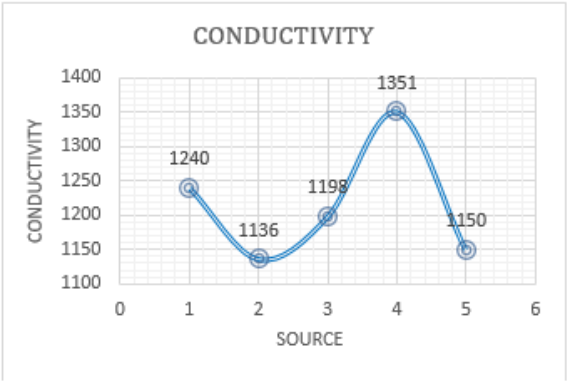

Fig 7. Variation of Conductivity (Subsurface water)

IV.CONCLUSIONS

Water samples from the various lakes and various bore wells drilled in the city of Anaji were collected at various locations, tested and analyzed for various parameters. The parameters considered are pH, acidity, total hardness, total alkalinity, electrical conductivity, DO and BOD.

- The water qualities in the collected samples are within the desirable limit.
- The pH values of the collected samples are between the desired values.

- So it's suitable for drinking, so the samples have alkalinity and acidity there. Value below the desired value, total hardness of the sample below the desired value.
- The DO and BOD are below the desired value, the total hardness and nitrate value of the surface and bore well sample are between the desired values.
- Therefore, the water from Anaji Village is suitable for drinking and household use without treatment. As a result, no water treatment is required in Anaji Village

REFERENCES

[1] B.M.Manohara, S.Thirumala, B.R. Kiran) "Assessment of ground water quality of Jagalur Taluk of Davangere Distric, Karnataka, India." Kumara Naika,et.al (2020) "An investigation of fluoride contamination in ground water ofYadgiri Dist, Kamataka."

[2] B. Rajappa, S. Manjappa E. T. Puttaiah, D. P. Nagarajappa Physico-chemical analysis of underground water of Harihara Taluk of Davanagere District, Karnataka, India. Pelagia Research Library, ISSN: 0976-8610, CODEN (USA): AASRFC.

[3] C. R. RAMAKRISHNAIAH , C. SADASHIVAIAH# and G. RANGANNA "Assessment of Water Quality Index for the Groundwater in Tumkur Taluk, Karnataka State, India" CODEN ECJHAO, E-Journal of Chemistry, 2009, 6(2), 523-530, ISSN: 0973-4945.

[4] H.A.Sayeshwara, Mahesh Anand Gouder, R. Manjunath "Water quality evaluation and phytoplankton diversity of hosahalipond, Shivamogga, India." ISSN No:0972-768X, Volume 3, Issue: Jan 2010.

[5] H.R.Barathi, S.Manjappa, T. Suresh, B. Suresh "Evaluation of water quality index of water bodies channrayanapatna tą, Kamataka region India" ISSN No:2091-2609. Voulme 4(4) Issue:Mar 2016.

[6] Kiran Kumar H S, Bharatharaj Etgi Y B, Varun B K, Punith CG "Water Quality Analysis of Avaragere Lake- A Case Study." ISSN:2395.

[7] Nagarajappa D P., Rajappa B., Manjappa s., and Puttaiah E T., (2011), "Physico chemical analysis of underground water of Harihara taluk of Davanagere district, Karnataka, India", Advances in applied science research, 2(5): 143-150

[8] Raghunandan Koppad, Archana Umesh Hiremat, R.Shreedhar "A case study of water quality index of the Bellary nala,Belagaum, Karnataka,India." ISSN No: 2224-5790. Volume 8, Issue 2016.

[9] Shivaprasad H , Ravichandra K , Prasanna Kumar G. R, Kedarraya Mallanna, "An Assessment of Groundwater Quality Index in Bommasandra, Bengaluru City, Karnataka State, India", IJERT, ICESMART-2015,Conference Proceedings, ISSN: 2278-0181.

[10] Bureau of Indian Standards, 1993, (IS 10500:1991), Edition 2.