IJCRT.ORG ISSN : 2320-2882

INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

STUDY OF GROUNDWATER PARAMETERS IN SHAHADA CITY

Pavan P. Vispute[1], Hemant A.Kuwar[2], V.A.kuwar[3]

[1]Master Student, S.S.V.P.S's. B.S.D. College of Engineering Dhule, M.S., India

[2]Assistant Professor, Dept. Of Civil Engg, S.S.V.P.S's. B.S.D. College of Engineering Dhule, M.S., India

[3]Assistant Professor, Dept. Of Civil Engg., Late Sapkal. College of Engineering Nashik, M.S., India

Abstract- The groundwater is the second largest fresh water resource available on the Planet Earth. It is a form of very important component of Hydrological Cycle. The quality of water bodies depends upon its Physio-Chemical and Microbial characteristics. The study was carried out to assess the groundwater quality of Shahada city. The groundwater samples were collected from twenty (20) different locations of Shahada city. The physiochemical characters such as pH, Hardness, Total Dissolved Solids (TDS), Dissolved Oxygen (DO), Calcium, Alkanity, Chlorides, Magnesium, Iron, Fluorides, Color, Turbidity and Temperature were analyzed to study the present status of groundwater quality in the city. The results were compared with Bureau of Indian Standards (BIS). After studying the above mentioned parameters it has been found that the groundwater samples are fit for potable purpose.

The analysis also reveals that the groundwater of certain wards needs some degree of treatment before using for drinking purpose. The biological characteristics of groundwater such as Most Probable Number Test (MPN) was carried out for all 20 samples collected from well and bore well reveals that the it is within the accepted limits of Bureau of Indian Standards (BIS).

Keywords- Water quality parameter

I. INTRODUCTION

The tern" Quality'' as applied to water embrace the combined physical, chemical and biological characteristics of the most abundant compound on the surface of the earth. Water is vital to the existence of all life as we know it and is essential, either directly or indirectly to almost all activities of man. Water quality is dominant factor in determining the adequacy of any supply to satisfy the requirements and its usefulness. About 97% of the water on the Earth is found in the ocean, more than 2% remains frozen in the, polar region and glaciers. The rest of less than 1% is found in the stream, rivers, and lakes and groundwater **1.2 SOURCES OF GROUNDWATER**

1.2.1 Meteoric Water

The water derived from precipitation (rainfall and snowfall) although a great part of the rain water reaches the sea through surface flow or runoff, a considerable part of water reaching the surface in the form of precipitation infiltrates or percolates downwards below the surface and forms groundwater. Most of the water obtained from underground water sources belongs to this category. The infiltration of the rain water and melt water starts immediately after the water reaches the ground and it may also takes place from surface water bodies such water as rivers, lakes, sea in the form of an almost continuous process.

1.2.2. Connote Water

The water entrapped in the rocks. During the formation due to sedimentation in an aqueous environment. Many important sedimentary rocks like Limestone, Sand stones and gravels are deposited and consolidated under water initially present in the pores between gains, Yet some water might still be retained in the inter granular spaces of such rocks. It is however of not much importance in yielding supplies for human consumption.

1.2.3. Juvenile Water

Also called as magmatic water of only theoretical importance. It is the cracks or crevices or pores of the rocks due to condensation of stalemating from hot molten masses or magma that are believed to exist at places below the surface water or the or water present in the zone of saturation, these water supply.

The hydrological cycle is chain of events describing the history of water, the hydrological cycle reaches into the atmosphere and traverses the domains of hydro metrology, metrology. and campanology. In the hydrosphere it crosses or embodies the domains of patamology, lemony, cytology, glaciology and oceanology.In the lithosphere the hydrological cycle relates to agronomy, hydrogeology, geohydrology and geomorphology. As the water affect plant as well as animals the Hydrological cycle extends itself into the pant ecology silviculture, biohydrology and hydrobiology.

1.2 Objective of the Research –

1 To know present groundwater quality.

2. To generate the parameters of chemical constituents of groundwater in different part of shahada city.

3. To assess the quality of groundwater and its suitability for potable purpose.

4 To identify the water quality in Biological parameters.

II LITERATURE REVIEW

Ritesh jain and et al, conducted the quality of groundwater. In order to evaluate the problems of pollution hazards of groundwater and to ascertain its suitability for drinking and agricultural purpose in Bathinda district of Punjab, the data relating to ground water chemical quality are analyzed from 49 places covering the whole district. The available data was analyzed and compare with various standards laid down by various agencies. The analysis shown that in general, quality of the ground water is suitable for irrigation purpose. Excessive quantity of nitrate was also found at many places. Geochemical analysis showed that about 65% water sample of primary saline secondary alkaline groundwater .

Vijaya Lalitha , K.SaiTejaswini The physical and chemical parameters of groundwater in all areas were studied. Water quality evaluated using Weighted Arithmetic Index Method. 10 samples from different area were collected and it is found that water quality in about 60% area is suitable for drinking purpose with primary treatment. Groundwater quality in the rest area is poor.

Ravindra Gavali the WQI for 12v samples is 55.07%. The values for all WQI found lower. The study reveals that groundwater needs some degree of treatment before consuming it. It is also recommended that the groundwater needs periodic checks regarding its quality.

V.K.Garg, B.P.Sharma, Rakesh K. Hooda the study of physic-chemical quality of the groundwater in some localities of Hisar (Haryana)city has been taken up to evaluate its suitability for domestic purpose. Altogether, 31 water sample ware covered from 11 localities. The study showed a positive and significant correlation of electrical conductivity with total dissolved solids, sodium, chloride and sulphate

S.N.Kalu et al, conducted a detailed investigation into the groundwater quality inthe surrounding areas of two sewage treatetment plants. Water sample were collected fromdifferent groundwater sources.Viz.hand pump and bore well located in region and analyzed forthis physio-chemical and bacteriological parameters. Most of sample ware found to exceed thestandard limit for drinking water parameters with respect to total hardness, TDS, Sulphates,, Fluorides, Calcium, and Magnesium.

Dr. Usha Nateshan, assessed the use of Geographic information system in ground waterof pernnampet blocked. The parameters considered for assessing growing water potential wererainfall, soil, geomorphology, land use, slope, drainage density and water level. To identifygroundwater potential zones, thematic map for each parameter was generated and overplayed

III METHODOLOGY

The study was focused on groundwater quality related issues of Shahada city. The viable literature was reviewed and methodology followed by various researchers was studied. Shahada is on average 455 feet above sea level. As the Satpura Mountain Range just 30 km north of Shahada, the bedrock is on an average 5 metres below the ground level. Due to natural or human-made caves, the ground at Savalde village, 5 km away from Shahada, caved in during heavy rain during August 2006 and caused an earthquake of magnitude 2.8 on Richter Scale on 10 November 2006. As seismograph stations are installed away from traffic to avoid false-positive results from ground vibrations, Shahada's seismograph station of the Sardar Sarovar Project is installed in the same village.

Shahada is located at Shahada Taluka It is bounded between Longitude 21.5456° N Latitude74.4683° E.

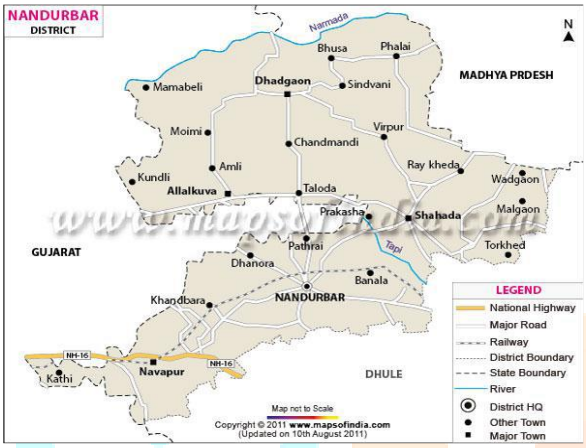

Figure no. 3.1 Location of Shahada city

Figure no. 3.2 Map On Shahada city

3.2 PHYSICAL CHARACTERITIC OF GROUNDWATER

Physical analysis of water is carried out in order to determine the physical characteristics of water. This includes tests for determining turbidity, color, taste or odor, temperature.

3.4 ANALYSIS OF CHMICAL CHARACTERITIC OF GROUNDWATER

1). PH 2). Total dissolved solid 3). Total hardness 4). Calcium hardness 5) Magnesium hardness

6). Iron 7). Fluoride 8) Chloride 9). Alkalinity 10). Dissolved oxygen

3.5 Sampling Technique

1. The water should be collected in bottles, especially of white glass, having well fitted stoppers. Bottle having holding capacity of about 2 liters of water are necessary for the chemical analysis.
2. Bottle should be thoroughly cleaned, filled thrice with water and emptied before collecting the sample. However, it will not be necessary to carry out such process, if the stated bottles are directly obtained from the laboratories.
3. When the sample of the water is to be collected from a pipe the water tap should be turned on and the water should be allowed to go waste for at least.2minutes, so as to pass out the impurities of the pipes.
4. The bottle should be held as far away from its neck as possible. In no case the water entering the bottle should not come in contact with the hand.
5. After collecting the sample, the stopper of the bottle should be well secured and the bottles containing samples of water should be labeled stating the source, date and time of collection.

IV RESULTS AND DISCUSSIONS

In this chapter for the purpose of revealing the water quality of 20 bore wells covering the study area have been established quantitatively by determining the physical chemical characteristics. They have been listed systematically and represented in table no.

Table Number 4.1 Chemical Characteristic of ground water readings

pH =Hydrogen Ion Concentration TH=Total Hardness Ca=Calcium Mg= Magnesium Cl= Chloride TDS=Total Dissolved Solids
Fe=Iron F=Fluoride DO=Dissolved Oxygen Avg.= Average Max.= Maximum Min.= Minimum

Ward no.	P^H	TH mg/lit	Ca mg/lit	Mg mg/lit	CL mg/lit	TDS mg/lit	Fe mg/lit	F mg/lit	Alkalinity mg/lit	DO mg/lit
1	7.1	99.3	65.1	15.3	125.1	375.3	0.201	0.221	49.0	4.7
2	7.0	103.3	92.4	21.6	132.2	402.1	0.205	0.179	50.1	5.2
3	7.2	106.1	39.3	12.3	130.8	154.1	0.4	0.112	116.0	5.6
4	7.6	105.6	71.1	23.3	168.5	482.4	0.026	0.309	89.0	5.4
5	7.30	85.3	64.6	19.3	152.3	510.2	0.160	0.300	60.0	5.3
6	7.60	88.8	82.3	14.3	159.7	330.6	0.330	0.290	82.1	5.8
7	8.2	308.2	130.4	47.3	63.9	785.1	2.1	1.6	92.4	4.8
8	7.0	106.5	60.2	20.4	119.2	164.1	0.244	0.281	78.1	5.1
9	7.5	200.2	52.1	15.6	158.5	148.5	0.201	0.363	81.9	5.3
10	8.9	210.1	57.4	34.5	102.3	501.2	2.4	0.8	60.4	5.0
11	8.05	292.4	75.2	14.1	170.5	367.3	0.120	0.318	59.0	5.8
12	7.7	215.3	41.1	21.2	143.6	405.1	0.245	0.432	80.1	5.2
13	7.2	97.2	75.9	14.2	162.3	462.5	0.321	0.366	90.0	5.4
14	9.0	318.6	99.2	34.6	92.3	1183.5	0.222	0.9	80.0	4.6
15	8.6	306.2	101.2	23.1	136.2	490.0	0.5	1.2	100.1	5.0
16	6.8	182.0	94.3	39.4	121.7	223.1	0.8	1.0	93.4	6.2
17	6.2	225.0	87.3	29.7	217.0	201.6	0.21	0.71	162.1	5.1
18	6.3	144.8	112.2	48.4	198.4	194.3	0.15	0.9	201.0	5.0
19	9.2	330.0	104.6	20.1	129.6	1310.4	0.7	0.5	85.3	5.4
20	7.6	165.4	103.3	19.2	159.6	156.3	0.09	1.1	110.7	4.8
Total	**152.05**	**3690.3**	**1437.9**	**487.9**	**2843.7**	**8847.7**	**9.625**	**11.881**	**1820.7**	**104.7**
Avg.	**7.6025**	**184.515**	**71.895**	**24.395**	**142.185**	**442.385**	**0.4812**	**0.59405**	**91.035**	**5.235**
Max.	**9.2**	**330**	**102.2**	**48.4**	**217**	**1310.4**	**2.1**	**1.6**	**201**	**6.2**
Min.	**6.2**	**85.3**	**39.3**	**12.3**	**63.9**	**148.5**	**0.026**	**0.112**	**49**	**4.6**

Table Number 4.2 Physical Characteristic of ground water readings

Ward No.	Temp. oC	Turbidity (NTU)
1	29	2
2	22	3
3	20	1
4	21	2
5	21	1
6	22	3
7	25	2
8	23	2
9	22	3
10	20	2
11	20	1
12	21	3
13	22	2
14	25	3
15	20	2
16	19	1
17	22	2
18	20	3
19	21	2
20	20	1
Total	**416**	**44**
Avg.	**20.8**	**2.2**
Max.	**29**	**4**
Min.	**19**	**1**

4.2 Biological Characteristic of Groundwater

4.2.1. Most Probable Number (MPN)

For many years the coli form group of bacteria, as defined below, has been used to indicate the pollution of water with wastes and thus the suitability of particular water supply for domestic and dietetic uses. The coli form group includes all of the aerobic and facultative anaerobic, Gram- negative, non-spore forming, and rod shaped bacteria, which form lactose with gas formation within 48 h at 35$_0$C. The coli form group as define above is equivalent to the B-coil group. With developments in bacteriological techniques and the culture media, multiple tube fermentation test is accepted as a major standard method. The significance of the test and the interpretations of the results are well authenticated and have been used as a basis of standards of bacteriological qualities of water supplies.

It has become the custom to report the results of the coli form test by the multiple tube fermentation procedure as a most probable number [MPN] index of the number of coli form bacteria which, most probably than any other number, would give the results shown by laboratory examinations. It is however a valuable tool for appreciating the sanitary quality of water and the effectiveness of water treatment process. Bacteriological results available must be consider in light of information available concerning the sanitary conditions surrounding the source of any particular sample. Hence precise valuation of the quality of water supply also needs sanitary survey data in addition to laboratory examination

4.19 Observation Table on MPN Test

Ward number	Number of Tubes after 24 Hours			24 hours MPN index per 100 ml of sample presumptive test
	10 ml	1 ml	0.01 ml	
Ward No.1	0	0	0	3
Ward No.2	0	0	0	3
Ward No.3	0	0	0	3
Ward No.4	0	0	0	3
Ward No.5	0	0	0	3
Ward No.6	0	0	0	3
Ward No.7	0	0	0	3
Ward No.8	0	0	0	3
Ward No.9	0	0	0	3
Ward No.10	0	0	0	3
Ward No.11	0	0	0	3
Ward No.12	0	0	0	3
Ward No.13	0	0	0	3
Ward No.14	0	0	0	3
Ward No.15	0	0	0	3
Ward No.16	0	0	0	3
Ward No.17	0	0	0	3
Ward No.18	0	0	0	3
Ward No.19	0	0	0	3
Ward No.20	0	0	0	3

CONCLUSION

After the careful study of experiments following conclusions have been drawn for the Shahada city.

- The groundwater is crystal clear, odorless and potable.
- The groundwater quality is all the areas soft except some sampling points.
- The temperature and turbidity of groundwater is within the permissible limits of BIS.
- As there is no considerable increase in chloride and Iron, it shows that possibility of contamination of groundwater due to polluted surface water is negligible.
- In some wards of city chemical and physical parameter exceeds the permissible limits.
- The groundwater in those wards needs certain degree of treatment before supply for potable purpose.
- The concentration of fluoride in entire Shahada city is well within the permissible limit.
- Most Probable Number (MPN) index for all 20 bore well samples, As per BIS recommendations MPN index are within the limits. So biologically groundwater water is safe for drinking.

REFERENCES

1. Arivoli Appavu, Sathiamoorthi Thangavelu Boomi Pandi "Study Of water Quality Parameters of Cauvery river Water in Erode Region". International Journal of Global Biosciences. Volume 05 No. 2016 .PP 4556-4567.

2. C.K.Jain, K.K.S. Bhatia and S.R. Kumar "Groundwater contamination in Greather Guwahati Asam" Indian Journal of Environmental Health volume 20, No, September 2000, pp 641-648.

3M.Feroze Ahmed "Aresonic Contamination groundwater in Bangladesh" Journal of the Institution of Public Health Engineers India Volume.2003,Octomber-December No 4 pp 10-49

4 .R.C.Dixit, S.R.Verma,V.Nitnaware and N.P.Thackur "Heavy metals contamination in surface and groundwater supply of an urban city" Indian Journal of Environmental health Volume 45, No. 2 April-2003.

5. Ritesh, Jain, Jaspal singh, Dr. S.K. Singh, "Groundwater Quality Analysis in Bathinda District". A case Study, Journal of the Institution of public health Engineers India Volume 2001, November 1, pp. 38.

6.R.V. singh, Vinod kumar, Meenakashi, S.L. Mathur and Ram Gopal "Groundwater quality of Rajgarh tehsil of churu distric in Rajasthan" Journal of Indian Water Work Association,Volume 26, January-March 1994,No.1,pp. 13-24.

8. R.S. Gavali, K.B. Sindkhede "Water Quality Index for Ground water in the discharge zone of Shelagi Nala,South Solapur Area Maharashtra,India". International Journal of Engineering science and Technology Volume 09 No.04 April 2017.

9. S.N.Kalu, P.Nema, S.K.Gayal and C.G.Mehta, "A Study of Groundwater quality in surrounding area of a sewage treatement plant ". Journal of the Institution of public Health Engineering India, Volume 2003,July-September No.3,pp.9-15.

10. V.K.Garg, B.P.Sharma, Rakesh K. Hooda, "Groundwater Contamination in Urban Area"Journal of the Institution of Public Health Engineers India Volume.2003, April-June No 2, pp 22-28.

11. .vijaya lalita, k. sai Tjaswini "A Study of Assessment of Groundwater Quality and its Suitability for drinking in Vuyyuru,Krishna (Distric) Andhra Pradesh". International Journal of Engineering Development and Research. Volume 5 Issue 2,2017

12. Bureau of Indian Standard Method (IS 10500:1991).