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Ground Water Quality Study of KhadkiNala Basin, MangalwedhaTaluka, Solapur District , Maharastra , India

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ABSTRACT

The term ground water quality covers a widespread meaning and is referred by an individual depending on suitability of ground water for intended use. Water gets polluted due to contamination by foreign matter such a chemicals, industrial or other waste or sewage. Disposal of sewage water in to fresh water aquifer is the main cause of ground water pollution. Hence determination of groundwater quality is important to observe the suitability of water for particular use. From last few years there have been many changes occur in KhadkiNala basin region. There has been increase in urbanization, industrialization and agricultural activity. Considering above present study was undertaken to assess the quality of ground water for its suitability for irrigation, industrial and human consumption. The study revealed that ground water of KhadkiNala basin is safe for human consumption. The physico-chemical properties of ground water show that it is mostly suitable for irrigation and industrial use. The Geology of study area is containing massive basalt and fractured units of upper lava flow.

***Key words**: - Ground water Quality, KhadkiNala Basin*

1. Introduction

Ground water is the cheapest source of drinking water and knowledge about its quality is essential for efficient utilization. Under natural condition composition of groundwater depends upon rain water, Soil and aquifer material. About 97.2% of water on earth is salty and only 2.8% is present as fresh water from which about 20% constitute ground water. Ground water serves as a major dissolves chemical ions, as it moves through rocksand subsurface soil. This leads to more mineralization in groundwater than surface water. Quality of ground water depends upon dissolved organic and inorganic constitute in source of drinking, irrigation and industry. Ground water is generally considered much cleaner than surface water (Patil&Patil 2011). However several factors such as discharge of industrial, agricultural and domestic wastes, land use practice, geological formation, and rainfall pattern and infiltration rate affect the groundwater quality.Groundwater is an excellent solvent that water. Therefore geochemical analysis is essential. For this purpose analysis of ground water quality in khadkiNala basin from Mangalwedhataluka, Solapur district, Maharastra, India has been carried out. The

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study area is situated about 10 km south of Mangalwedha city. The study area lies between Latitude 17^0 28' to 17^0 53' and Longitude 75^0 29' to 75^0 48'. The maximum elevation is 532 m and minimum elevation is 470 m. The sampling of ground water from 72 locations has been taken from open dug wells. The samples then brought to laboratory and subjected to analysis. All the samples test for 9 parameter. Location map given in Fig 1.

2. Geology Of study area:

The KhadkiNala basin fall under Deccan trap super group which is most extensive geological formation of peninsular India. The KhadkiNala basin area occupied by basaltic lava flow of the Deccan trap of Upper Cretaceous to lower Eocene. Around the basin the red bole is act as marker bed between upper and lower lava flow which is not exposed in region. The massive and fractured units of upper lava flow occupy most of the area.

3. Result and Discussion:

Physical Characteristic: - The physical Characteristic of water sample (Colour, odour, Total dissolved solid) collected from different location were found to be with the permissible limit fixed for human consumption (World Health Organization 2003).The water samples were colourless and odourless. Total Dissolved solid concentration varied from 300 mg/l to 4600 mg/l of open dug well located in study area. The distribution of Total Dissolved Solid in the ground water in KhadkiNala basin represented with help of contour map in fig 2. Total Dissolved Solid content increases from North East to south direction. Distribution of chemical characteristic was given in Table no 1.

2) Chemical Characteristic:

1) Chloride: Chloride concentration is range between 520 mg/l to 30mg/l. Chloride concentration is highest in North east while it is lowest in south east. The distribution of chloride concentration in khadkiNala basin in fig 3.

2) Hardness: Total hardness concentration is range between 520 mg/l to 115 mg/l. Total hardness concentration is maximum at center of the study area while it is minimum at north. The distribution of Total hardness concentration in khadkiNala basin in fig 4.

3) Mg: Mg concentration is range between 127.6 ppm to 2.4 ppm. Mg concentration is maximum at north east while it is minimum at center. . The distribution of Mg concentration in khadkiNala basin in fig 5.

4) Bicarbonate (Hco_3): Bicarbonate concentration range between 7 ppm to 2 ppm. Bicarbonate concentration increases from east to south west. The distribution of Bicarbonate concentration in khadkiNala basin in fig 6.

5) Calcium: Calcium concentration range between 23 ppm to 6 ppm. Calcium concentration is highest at center while it is lowest at its periphery. The distribution of Calcium concentration in khadkiNala basin in fig 7.

Vol. 2, Special Issue 1, March, 2016 | ISSN (Online): 2454-8499 | Impact Factor: 1.3599(GIF), 0.679(IIFS)

Table .1 The Physico-Chemical characteristic of all samples collected from different places at KhadkiNala Basin, MangalwedhaTaluka, Solapur District, Maharasrtra, India

Sample No	Colour	Odour	Total Dissolved solid in mg/l	Chloride in mg/l	PH	Total Hardness in mg/l	Ca in ppm	Hco3 in ppm	Mg in ppm
1	Colourless	Odourless	1700	440	7	228	15	5	100.8
2	Colourless	Odourless	1900	520	7	216	18	4	86.4
3	Colourless	Odourless	940	200	7	200	8	5	100.8
4	Colourless	Odourless	4600	390	7	180	18	6	64.8
5	Colourless	Odourless	800	250	7	156	7	3	76.8
6	Colourless	Odourless	600	140	7	232	23	2	84
7	Colourless	Odourless	2200	470	7	225	18	6	64.8
8	Colourless	Odourless	1200	410	7	200	14	6	62.4
9	Colourless	Odourless	800	190	7	165	9	4	57.6
10	Colourless	Odourless	600	170	7	260	7	3	45.6
11	Colourless	Odourless	630	60	7	450	9	3	86.4
12	Colourless	Odourless	840	180	7	190	5	4	33.6
13	Colourless	Odourless	1000	170	7	280	6	5	52.8
14	Colourless	Odourless	930	70	7	230	7	4	38.4
15	Colourless	Odourless	800	60	7	125	6	3	45.6
16	Colourless	Odourless	560	100	7	115	4	5	45.6
17	Colourless	Odourless	600	90	7	160	6	4	62.4
18	Colourless	Odourless	800	90	7	140	7	4	50.4
19	Colourless	Odourless	500	70	7	175	7	5	67.2
20	Colourless	Odourless	800	130	7	140	9	6	45.6
21	Colourless	Odourless	1000	90	7	125	11	4	36
22	Colourless	Odourless	900	80	7	120	23	3	2.4
23	Colourless	Odourless	900	520	7	295	6	5	127.6
24	Colourless	Odourless	750	510	7	235	7	4	96
25	Colourless	Odourless	900	480	7	265	9	3	105
26	Colourless	Odourless	1000	420	7	300	8	5	124
27	Colourless	Odourless	500	390	7	240	11	5	88
28	Colourless	Odourless	1100	350	7	225	10	3	84
29	Colourless	Odourless	1400	340	7	380	8	4	72
30	Colourless	Odourless	600	260	7	310	11	5	48
31	Colourless	Odourless	1000	250	7	145	7	4	52.8
32	Colourless	Odourless	300	220	7	110	9	6	31.2
33	Colourless	Odourless	600	230	7	155	8	7	55.2
34	Colourless	Odourless	800	280	7	170	9	6	60
35	Colourless	Odourless	200	250	7	205	11	4	74.4
36	Colourless	Odourless	500	350	7	235	14	5	144
37	Colourless	Odourless	600	380	7	260	12	4	96

Vol. 2, Special Issue 1, March, 2016 | ISSN (Online): 2454-8499 | Impact Factor: 1.3599(GIF), 0.679(IIFS)

38	Colourless	Odourless	400	400	7	250	12	4	91.2
39	Colourless	Odourless	1000	390	7	235	10	3	88.8
40	Colourless	Odourless	950	310	7	215	15	5	67.2
41	Colourless	Odourless	1000	220	7	225	12	6	76.8
42	Colourless	Odourless	910	120	7	210	8	5	81.6
43	Colourless	Odourless	1100	170	7	225	6	7	93.6
44	Colourless	Odourless	1100	250	7	160	6	6	64.8
45	Colourless	Odourless	1000	330	7	170	7	4	64.8
46	Colourless	Odourless	900	290	7	160	19	5	31.2
47	Colourless	Odourless	800	200	7	230	17	5	69.8
48	Colourless	Odourless	800	250	7	470	15	4	74.4
49	Colourless	Odourless	900	190	7	500	11	6	93.6
50	Colourless	Odourless	700	180	7	520	12	4	96
51	Colourless	Odourless	900	110	7	480	13	5	84
52	Colourless	Odourless	600	80	7	440	10	3	81.6
53	Colourless	Odourless	800	50	7	480	8	4	96
54	Colourless	Odourless	1000	190	7	450	12	5	79.2
55	Colourless	Odourless	110	170	7	370	7	6	72
56	Colourless	Odourless	1000	150	7	350	8	7	64.8
57	Colourless	Odourless	900	220	7	420	6	8	86.4
58	Colourless	Odourless	900	120	7	370	9	7	67.2
59	Colourless	Odourless	1000	90	7	350	7	7	67.2
60	Colourless	Odourless	1100	70	7	380	8	6	72
61	Colourless	Odourless	1200	120	7	360	12	4	57.6
62	Colourless	Odourless	700	80	7	280	4	5	57.6
63	Colourless	Odourless	800	40	7	250	6	6	45.6
64	Colourless	Odourless	650	140	7	260	7	6	45.6
65	Colourless	Odourless	600	120	7	340	12	5	52.8
66	Colourless	Odourless	600	100	7	310	10	4	50.4
67	Colourless	Odourless	500	80	7	300	8	4	52.8
68	Colourless	Odourless	700	90	7	290	7	3	52.8
69	Colourless	Odourless	700	30	7	250	7	3	45.6
70	Colourless	Odourless	600	50	7	210	5	2	38.4
71	Colourless	Odourless	400	60	7	180	6	2	28.8
72	Colourless	Odourless	500	50	7	170	5	3	30.6

Vol. 2, Special Issue 1, March, 2016 | ISSN (Online): 2454-8499 | Impact Factor: 1.3599(GIF), 0.679(IIFS)

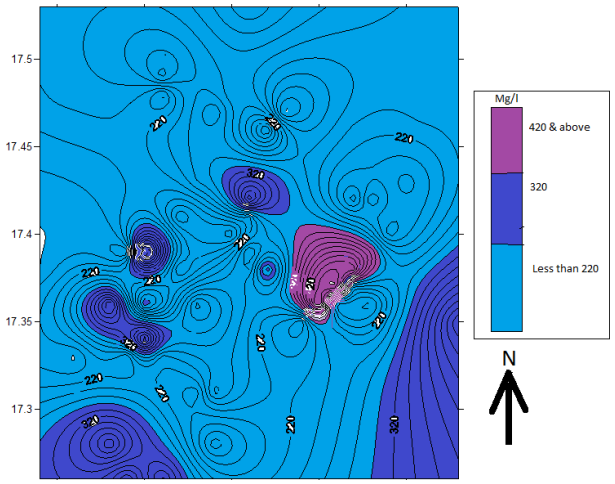

Fig. 3 .Contour Map Showing Distribution Chloride concentrations, in KhadkiNala Basin

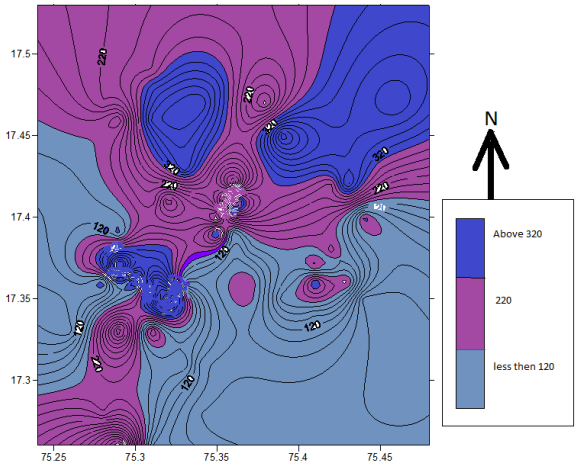

Fig. 4 .Contour Map Showing Distribution of Total Hardness concentrations, in KhadkiNala basin

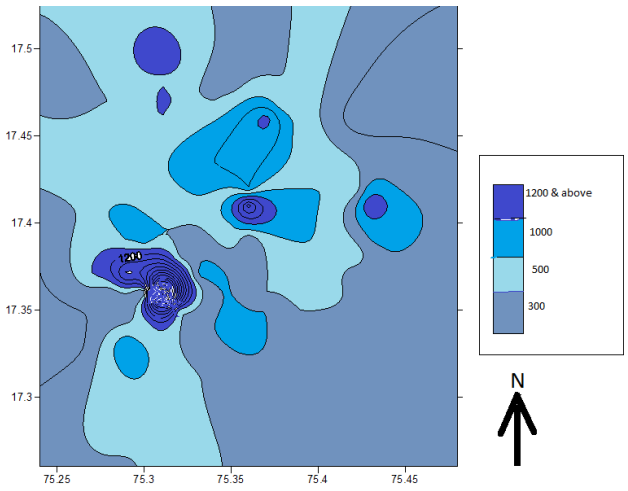

Fig .2 .Contour Map Showing Distribution of Total Dissolved Solid, in KhadkiNala basin

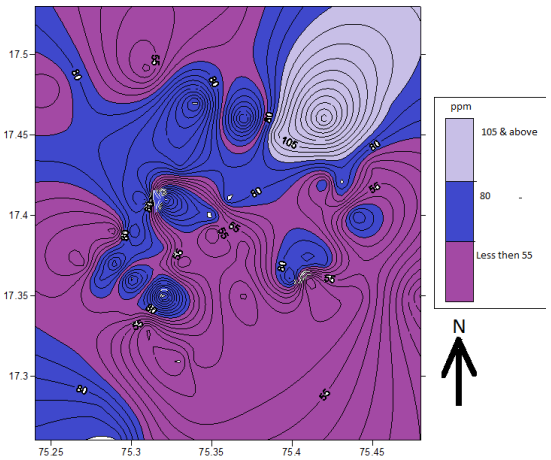

Fig.5 .Contour Map Showing Distribution of Mg concentrations, in KhadkiNala basin

Vol. 2, Special Issue 1, March, 2016 | ISSN (Online): 2454-8499 | Impact Factor: 1.3599(GIF), 0.679(IIFS)

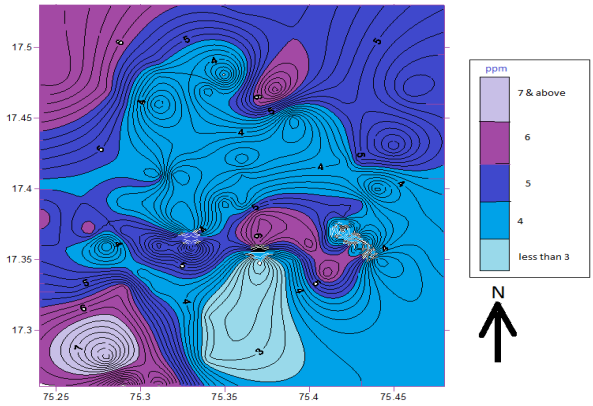

Fig. 6 .Contour Map Showing Distribution of Bicarbonate (Hco3) , in KhadkiNala basin

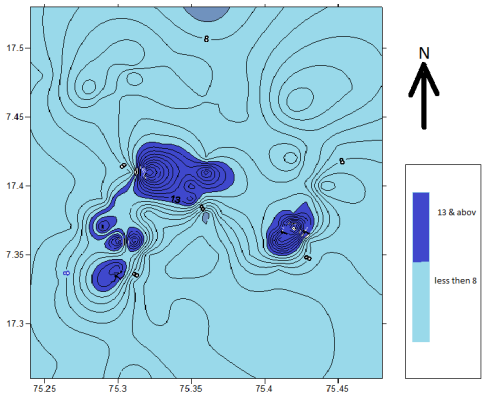

Fig.7 .Contour Map Showing Distribution of Calcium concentration, in KhadkiNala basin

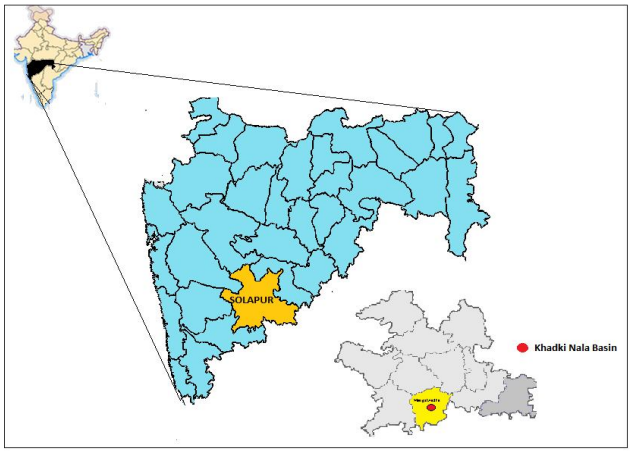

Fig : 1. Location map of KhadkiNala Basin, MangalwedhaTaluka, Solapur District, Maharastra India

4. Conclusion

The present study will certainly help not only toimprove the groundwater resource assessment managementbut also useful to achieve social, economic and environmentalbenefits to support governance and policy.The major conclusions derived from this study are as follows. Ground water quality of KhadkiNala basin is suitable for drinking purpose. Physico-chemical properties of ground water shows that it is mostly suitable for irrigation and industrial use

5. References

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