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An Assessment of Ground water of Aravalli districtindifferent season by Physico-Chemical Parameters

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Abstract

Aravalli district is situated at North part of Gujarat State. There are six talukas in this district. Mostly population of this district is dependent on ground water for drinking and irrigation purpose. Therefore quality of ground water is one of the most important matter for healthy population. Water quality can be effected by seasonal change. So in this study we analyzed Physico-Chemical Parameters in different seasons form villages of Aravalli district. The result were compared with the values which is given by Indian Standard and WHO. Physico-Chemical parameters like TDS, Chloride, Sulphate, pH, Fluoride, Nitrate, Calcium, Magnesium, etc analyzed in present study.

Key word: Ground Water, Assessment, Physico-Chemical Parameters, Aravalli District, Comparison, Indian Standard, WHO, Season.

Introduction

Water is nature's most wonderful compound. Groundwater is a main resource for drinking and irrigation purpose so majority peoples are dependent on the Ground Water. Rapid growth of industrialization, urbanization, too much use of fertilizers and pesticides in agriculture etc can effected on Ground water quality. Ground water Quality becomes Hazardous nowadays.Ground Water Quality has become an important issue. Season changes may occurs changes in some parameters.The quality and quantity of groundwater for human use and for irrigation are determined by its Physical, Chemical and Bacteriological properties. On account of water quality issues, we decided to analysis different Physico-Chemical parameters like pH, TDS, Fluoride, Chloride, Carbonet-Bicarbonet, etc in rural area of Aravalli district in different seasons. We are doing this assessment in Winter, Summer and Monsoon seasons.

Materials and Methods

The area of this study is Aravalli district, which is located at north part of Gujarat state of India. Water samples were collected from different 15 villages of Aravalli district in plastic bottles. All the Chemicals used of AR grade. Double distilled water used for the preparation of solutions. Various water quality parameters like pH, TDS, Fluoride, Chloride, Carbonet-Bicarbonet etc. were analysed by standard analytical methods which is given in APHA. All instrument were calibrated before using. [1]

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Results And Discussion

Analysis of groundwater for study area Aravalli district is carried out during the study period of three seasons (2018). During the period of this study 45 samples are collected and analysed to know the seasonal variation of Physico-Chemical parameters of groundwater. Results of this study have been listed in following tables.

pH

pH is measure of the acidic basic and natural neutral of water. Pure water is said to be neutral, with a pH of 7.[3]Water with pH under 7 is considered acidic while water with pH higher than 7 is considered basic or alkaline.[5]Permissible limit of pH according to WHO is 7.0 to 8.0 and according to Indian Standard is 6.5 to 8.5. The pH values of this present study were within 6.7 to 8.2 in winter season, 7.1 t6o 8.2 in summer season and 7.1 to 8.3 in monsoon season.All sample values of pH are within the permissible limit given by WHO and Indian Standard.[2,6]

TDS

A large number of solids are found dissolved in natural water the common ones are carbonates, bicarbonates, chloride, sulphate, phosphate is called Total Dissolved Solid (TDS).[4]Permissible limit of TDS according to WHO is 1000 mg/l and according to Indian Standard is 500 mg/l. The TDS values of this present study were within 184 to 1741 in winter season, 279 to 1055 in summer season and 218 to 738 in monsoon season. In four villages TDS level is higher (in winter season) and in one village TDS level is higher(in summer season) than permissible limit given by WHO. In monsoon season all samples value of TDS level is within permissible limit.[2,6]

Chloride

According to WHO and Indian Standard permissible limit of Chloride value is 250mg/l. The Chloride values of this present study were within 53 to 1057 in winter season, 56 to 432 in summer season and 71 to 308 in monsoon season. Chloride value is higher in 8 villages (in winter season) and in 2 villages (in summer season) and in 3 villages (in monsoon season) than permissible limit given by WHO and Indian Standard.[2,6]

Sulphate

Permissible limit of Sulphate according to WHO is 250 mg/l and according to Indian Standard is 200 mg/l. The Sulphate values of this present study were within 21 to 340 in winter season,23 to 150 in summer season and 25 to 101 in monsoon season. Sulphate value is higher in 3 villages (in winter season) than permissible limit given by WHO and Indian Standard in winter season. In summer and monsoon season all samples value of Sulphate is within permissible limit given by WHO and Indian Standard.[2,6]

Calcium

According to WHO and Indian Standard permissible limit of Calcium is 75 mg/l. The Calcium values of this present study were within 39 to 249 in winter season, 45 to 128 in summer season and 26 to 121 in monsoon season. Calcium value is higher in 13 villages (in winter season) and in 8

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villages (in summer and monsoon season) than permissible limit given by WHO and Indian Standard.[2,6]

Magnesium

According to WHO and Indian Standard permissible limit of Magnesium is 30 mg/l. The Magnesium values of this present study were within 12 to 89 in winter season, 16 to 43 in summer season and 9 to 46 in monsoon season. Magnesium value is higher in 9 villages (in winter season) and in 5 villages (in summer season) and in 8 villages (in monsoon season) than permissible limit given by WHO and Indian Standard.[2,6]

Flouride

According to WHO and Indian Standard permissible limit of Flouride is 1 mg/l. The Flouride values of this present study were within 0.059 to 0.85 in winter season, 0.055 to 0.3 in summer season and 0.09 to 0.26 in monsoon season. All sample values of Flouride are within the permissible limit given by WHO and Indian Standard.[2,6]

Nitrate

Permissible limit of Nitrate according to WHO is 50 mg/l and according to Indian Standard is 45 mg/l. The Nitrate values of this present study were within 4 to 32 in winter season, 4 to 16 in summer season and 1.2 to 12 in monsoon season. All sample values of Nitrate are within the permissible limit given by WHO and Indian Standard.[2,6]

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Aravalli District (Villages Samples)									
Winter 2018									
Sr. No	Sample Name	pH	TDS	Chloride	Sulphate	Calcium	Magnesium	Flouride	Nitrate
1	Navi Borol	8.1	765	340	148	63	28	0.11	10.3
2	Bhaijipura	7.43	955	660	182	98	32	0.85	21
3	Pentarpura	7.12	1286	683	209	249	78	0.7	19
4	Choila	7.4	501	83	29	95	40	0.25	7
5	Tenpur	7.16	329	59	21	78	26	0.15	4
6	Amarapurkampa	7.08	938	310	118	158	49	0.45	15
7	Heerapur	7.41	1486	900	267	129	50	0.65	29
8	Baderakampa	6.8	1741	1057	340	188	59	0.8	32
9	Dhansura	7.23	628	228	79	119	42	0.2	10
10	Dhamaniya	8.2	1184	521	139	158	89	0.29	17
11	Govindpur	7.11	551	203	62	78	24	0.25	8
12	Sompur	7.18	184	53	21	39	12	0.1	5
13	Trikampura	6.77	408	118	54	110	29	0.2	9
14	Satarda	7.7	332	647	259	96	36	0.33	18
15	Ubharan	7.9	353	198	58	79	28	0.059	5.1

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Aravalli District (Villages Samples)									
Summer 2018									
Sr.No.	Sample Name	pH	TDS	Chloride	Sulphate	Calcium	Magnesium	Flouride	Nitrate
1	Navi Borol	7.85	349	80	31	54	18	0.095	6.1
2	Bhaijipura	7.53	510	150	60	83	27	0.165	9
3	Pentarpura	7.68	279	71	29	65	22	0.08	5.4
4	Choila	7.59	509	83	40	108	35	0.1	6.5
5	Tenpur	7.7	313	56	23	62	21	0.06	4
6	Amarapurkampa	7.61	808	200	70	115	40	0.2	10.9
7	Heerapur	7.73	648	216	68	94	32	0.115	8
8	Baderakampa	7.64	328	101	42	45	16	0.075	4.6
9	Dhansura	7.58	548	147	53	85	27	0.105	7
10	Dhamaniya	8.22	990	326	110	128	43	0.23	14
11	Govindpur	7.35	679	229	80	78	26	0.12	8.5
12	Sompur	7.14	351	76	32	68	23	0.06	5
13	Trikampura	7.29	479	118	46	97	31	0.085	6.75
14	Satarda	7.61	1055	432	150	56	19	0.3	16
15	Ubharan	7.4	359	81	37	64	21	0.055	4.8

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Aravalli District (Villages Samples)									
Monsoon 2018									
Sr.No.	Sample Name	pH	TDS	Chloride	Sulphate	Calcium	Magnesium	Flouride	Nitrate
1	Navi Borol	7.91	555	185	76	69	26	0.205	9.47
2	Bhaijipura	7.67	521	189	87	112	46	0.19	12
3	Pentarpura	7.85	303	290	101	72	27	0.235	10.5
4	Choila	7.8	514	142	65	117	43	0.15	7.6
5	Tenpur	7.9	491	71	42	79	39	0.11	3.08
6	Amarapurkampa	8.05	738	191	82	95	37	0.25	1.2
7	Heerapur	8.31	295	79	35	26	9	0.12	5.7
8	Baderakampa	8.03	278	102	29	48	19	0.11	4.75
9	Dhansura	7.96	559	200	73	121	43	0.205	10
10	Dhamaniya	7.9	527	230	80	110	40	0.23	10.7
11	Govindpura	7.57	597	308	98	92	41	0.19.	11
12	Sompur	7.18	449	120	53	71	25	0.175	8
13	Trikampura	7.73	565	186	64	89	34	0.24	10.15
14	Satarda	7.48	737	305	96	65	25	0.26	12
15	Ubharan	7.3	218	77	25	45	17	0.09	4

Conclusion

After the study of analysis and discussion we find that most of the bore well yield potable water. In this study results showed that some of water quality parameters slightly lower in summer season. In this study we find that all samples value of pH , Flouride and Nitrate in all season are within permissible limit given by WHO and Indian Standard.[2,6] Value of TDS in some villages are higher in winter and summer season and within permissible limit in monsoon season. In some villages Value of Chloride, Calciumand Magnesium are higher in all season than permissible limit. Value of Sulphate in some villages are higher in winter season and within permissible limit in summer and monsoon season. The analysis results reveals that the groundwater of some selected areas needs some treatment. Hence the groundwater of study area is as considered as fit for domestic and drinking purpose.

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