ASSESSMENT OF GROUND WATER QUALITY SAROORNAGAR MANDAL, RR District, TELANGANA STATE

Samba Shiva Rao[1], Dr. A. Manjunath[2], K. Ramesh[3], Y. Hima Bindu[3*], M.Sarada Devi [4]
M.V.S.R. Engineering College, Hyderabad
C.B.I.T Engineering College, Hyderabad

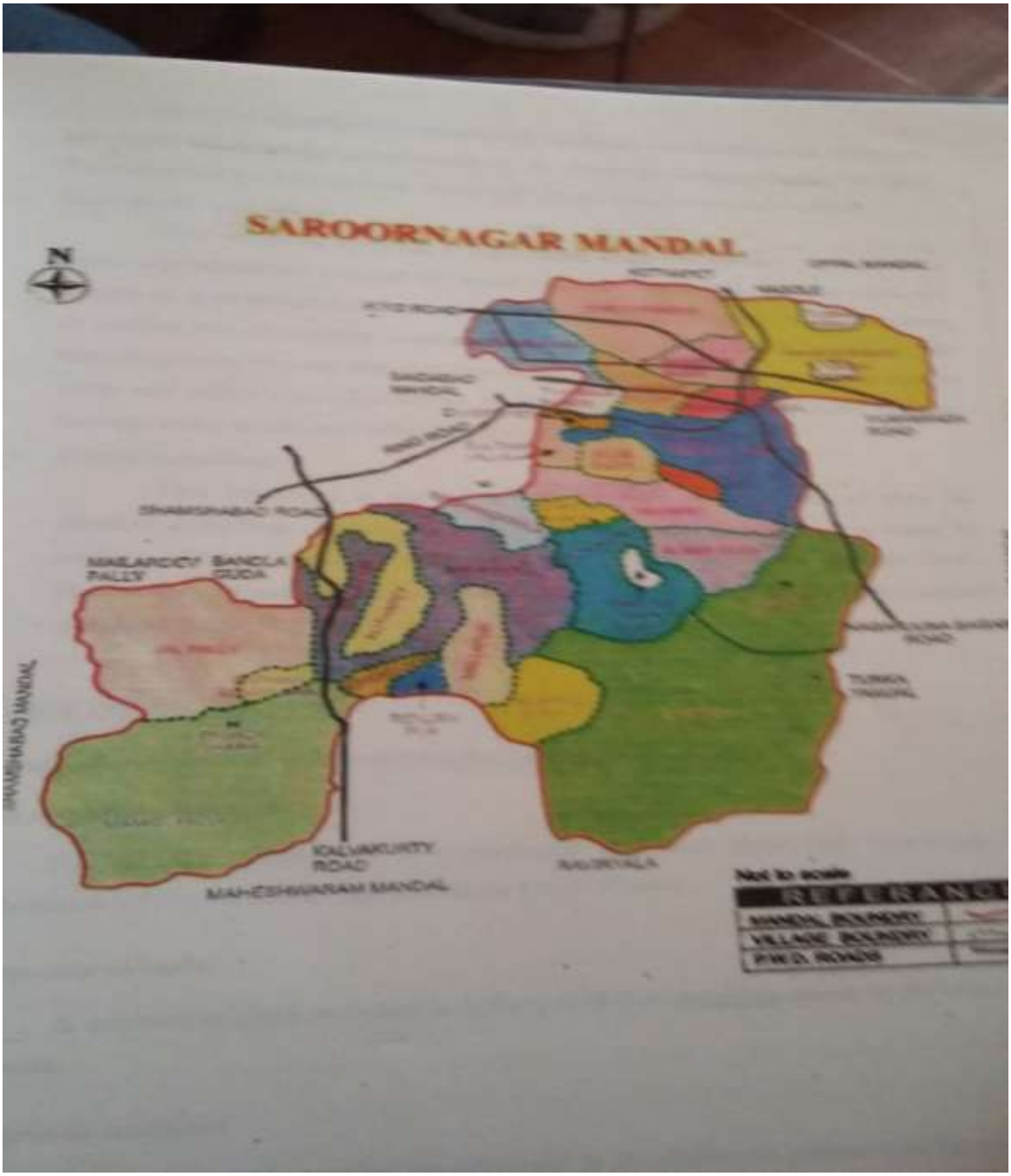
ABSTRACT: The Indian sub-continent has vast water resources of perennial rivers and abundant ground water. The population is predominantly rural oriented, dependent on agriculture. In the absence of adequate surface water sources, people depend on ground water, a valuable resource and providing to be an important asset in many areas. Ground water is exploited for agriculture, domestic and other uses like industries etc. over exploitation of water resources, unplanned industrialization, urbanization and discharges of untreated waste contaminate both surface water as well as ground water sources and also unscientific use of fertilizers and pesticides aggravate the problem of contamination of water sources.

A Ground Water Quality study has been carried out assess the portability of ground water in various localities in Sarrornagar Mandal Ranga Reddy district. A total of 28 samples from different bore wells were collected and analyzed for 10 parameters to determine the water quality of that area. The water quality of samples collected in the study area has been compared with drinking water quality standards as per BIS 10500(1991) and CPHEEO manual on water sample and Treatment (Third Edition, May, 1999) Ministry of Urban Development, GOI, New Delhi.

KEY WORDS: Water analysis, Physical, Chemical parameters.

1. INTRODUCTION:

Ground water is precious and most widely distributed resource of the earth and unlikely any other mineral resources it gets its annul replenishment from the meteoric precipitation. The world's total water resources are estimated as 1.37 x 10 8 million ha-m. Of these global water resources, about 97.2% is salt water, mainly in oceans and 2.8% is available as fresh water at any time on the planet earth. Out of this 2.8%, about 2.2% is available as surface water and 0.6% as ground water. Even out of this, 2.2% of surface water, 2.15% is fresh water and glaciers and ice peaks are only order of 0.01% (1.36 x 10 6 million ha-m) is available in lakes and reservoirs 0.001%in streams, the remaining 0.01% being in the form of water vapour in atmosphere and 0.02% as soil moisture in the top 0.6m out of 0.06% of stored ground water only about 0.3% (41.11 x 10 4 million ha-m) can be economically extracted with the present drilling technology and remaining being unavailable as it is situated below a depth of 800m.



Map of Saroornanager Mandal

Methods & Experimental Procedure

2. METHODOLOGY

Sample collection

List of Experiment

pH, HARDNESS TEST, ALKALINITY, Electrical Conductivity

CHLORIDES, POTTASIUM Sodium. Mg, ca

2. Sample Collection:

The first step of the project is sampling. The sample collected should be small in volume, enough to accurately represent the whole water body. The water sample tends to modify itself in the new environment.

Basically we have 3 different types of samplings. They are:

2.1 **Random sampling:** In random sampling, the sample sites are selected randomly within the areas related to the more homogeneous components.

2.2 **Systematic sampling:** This sampling method is considered most satisfactory as it gives more representative sample for water quality assessment. Sample sites are chosen to appropriate locations as to cover the whole water body.

2.3 **Rapid sampling:** This sampling is carried out when there is constraint of time for detailed sampling. Rapid assessment of the water quality can be done by mixing equal volumes of water from the different locations of water body.

Out of the 3 types we chose random sampling so that it represents the whole area. We have collected samples from places about 1000M and more distance from each other.

DETAILS OF SAMPLES COLLECTED

S. NO	VILLAGE NAME	OPERATING CONDITION	DEPTH OF BORE WELL(Ft)	SIZE OF CASING cm
1	Karmanghat	Hand pump	140	**15.4**
2	Bairamalguda	Electrically operated	280	**15.4**
3	Gaddiannaram	Electrically operated	250	**15.4**
4	Lingojiguda	Hand pump	**140**	**15.4**
5	Saroornagar	Electrically operated	**200**	**15.4**
6	Bhahadurguda	Electrically operated	**250**	**15.4**
7	Mansoorabad	Hand pump	**90**	**15.4**
8	Thummalkunta	Hand pump	**120**	**12.5**
9	Champapet	Hand pump	**140**	**15.4**
10	Sultanvala	Hand pump	**145**	**15.4**
11	Balapur	Hand pump	**205**	**15.4**
12	Kothapet	Hand pump	**110**	**15.4**
13	Venkatapur	Hand pump	**120**	**12**
14	Mallapur	Hand pump	**90**	**12.5**
15	Renukapur	Electrically operated	**110**	**12**
16	Mamidipally	Electrically operated	**210**	**15.4**
17	Jalpallu	Electrically operated	**240**	**15.4**
18	Bapaih Kumandan	Electrically operated	**290**	**15.4**
19	Roshan dowla	Electrically operated	**280**	**15.4**
20	Chintalkunta	Hand pump	**150**	**15.4**
21	Meerpet	Hand pump	**130**	**15.4**
22	Jillelguda	Electrically operated	**260**	**15.4**
23	Metibowli	Electrically operated	**210**	**15.4**
24	Badagmpet	Electrically operated	**240**	**15.4**
25	Gurramguda	Electrically operated	**210**	**15.4**
26	Almasguda	Electrically operated	**200**	**15.4**
27	Kurmalguda	Hand pump	**140**	**15.4**
28	Nadergul	Electrically operated	**220**	**15.4**

The following parameter are studied

pH:

pH can be measured in many methods such as electrometric method, pH-metry method (glass reference electrode) are used. The method we used is electrometric method.

HARDNESS TEST:

Hardness in water is determined using complex metric titrimetry. The tartan used is EDTA as complexing agent for Ca, Mg ions and EBT is used as indicator. The volume of EDTA consumed for the wine red color to change to blue is noted and hardness is calculated.

ALKALINITY:

The alkalinity of water is a measure of its capacity to neutralize acids. The alkalinity of natural waters is due to the salts of carbonates, bicarbonates, borates, silicates and phosphates along with the hydroxyl ions in Free State. Alkalinity of sample is estimated by titrating with standard sulphuric acid. Titration to pH 3-8 or decolonization of phenolphthalein indicator will indicate complete neutralization of pH and ½ of CO_3 while pH or sharp change from yellow to pink of methyl orange indicator will indicate total alkalinity (complete neutralization of OH^-, CO_3, HCO_3).

Electrical Conductivity:

It is measured by using Elico- Conduct meter.

CHLORIDES:

Chloride ion is determined by Mohrs method titration with standard silver nitrate solution by which silver chloride is precipitate at first. The end of titration is indicated by formation of red-silver-chromate from excess AgNO3 and potassium chromate is used as an indicator in neutral to slightly alkaline solution.

POTTASIUM:

Trace amount of potassium is determined by direct reading of flame photometer at a specific wavelength of 766.5m by spraying the sample into the flame.

Sodium :

Trace amounts of sodium is determined by flame emission photometry at the wavelength of 589 nm.

Experimental results of the samples

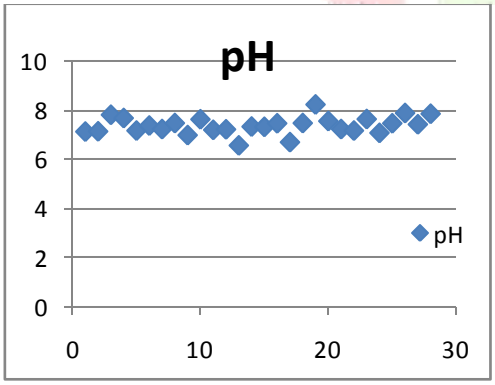
Mg, Ca, and alkalinity expressed as $CaCO_3$ equivalent hardness.

SL. NO	pH	TDS Mg/l	*EC µS/cm*	Na mg/l	K mg/l	Acidity	Cl^- ion	Ca ion	Mg ion	Total Hardness
1	7.11	1014	1625	176	99	40	179	315	25	340
2	7.12	1310	2285	719	114	24	383	270	240	510
3	7.78	401	697	221	117	16	84.3	75	95	170
4	7.65	277.7	479	218	104	12	70	65	135	200
5	7.15	726.7	1258	239	114	40	121.1	240	90	330
6	7.35	378.5	645	619	115	32	69.48	140	0	140
7	7.21	11.36	1917	113	101	36	302.7	245	345	590
8	7.45	626.6	1085	303	55	16	114.1	165	715	880

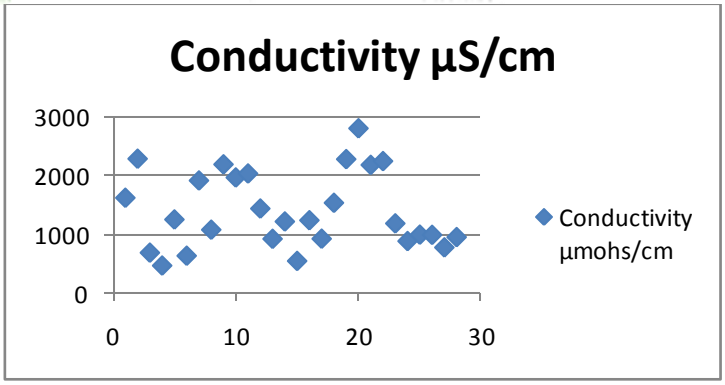
9	6.97	1265	2190	107	111	20	382.1	505	60	565
10	7.60	1134	1968	66	113	44	302.7	685	515	1200
11	7.18	1317	2035	434	107	60	302.7	280	210	490
12	7.20	580	1443	266	113	40	218.3	195	0	195
13	6.56	450	931	224	114	52	377.1	95	215	310
14	7.31	1050	1224	82	114	40	2	190	0	190
15	7.30	3292	557	707	119	36	164	95	45	140
16	7.44	705	1245	1450	113	2	70	225	70	295
17	6.69	543	933	1282	115	20	114.1	75	170	245
18	7.45	674	1540	1162	101	76	521.1	115	165	280
19	8.19	1500	2278	632	116	44	585.6	185	340	525
20	7.53	1645	2799	953	65	68	367.2	295	185	480
21	7.21	1278	2181	1770	101	48	377.1	230	0	230
22	7.15	1317	2245	101	90	52	372.2	245	35	280
23	7.61	705	1192	734	109	16	143.9	220	0	220
24	7.06	526	893	169.4	115	80	14.8	140	0	140
25	7.44	590	1001	80	35	16	198.5	205	155	360
26	7.85	575	998	295	113	48	69.5	150	0	150
27	7.40	458	786	278	117	44	69.48	95	75	170
28	7.82	558	960	417	109	52	253.1	130	235	365

Graph1

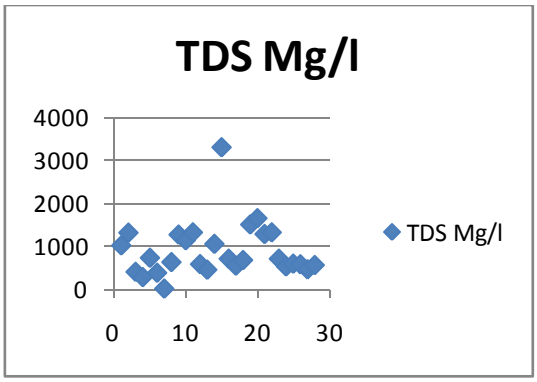
Graph-2

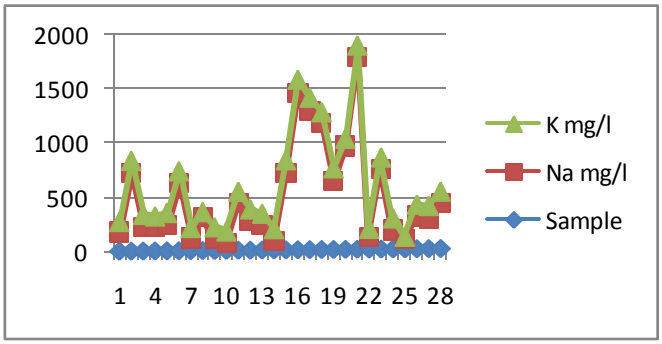


Graph-3

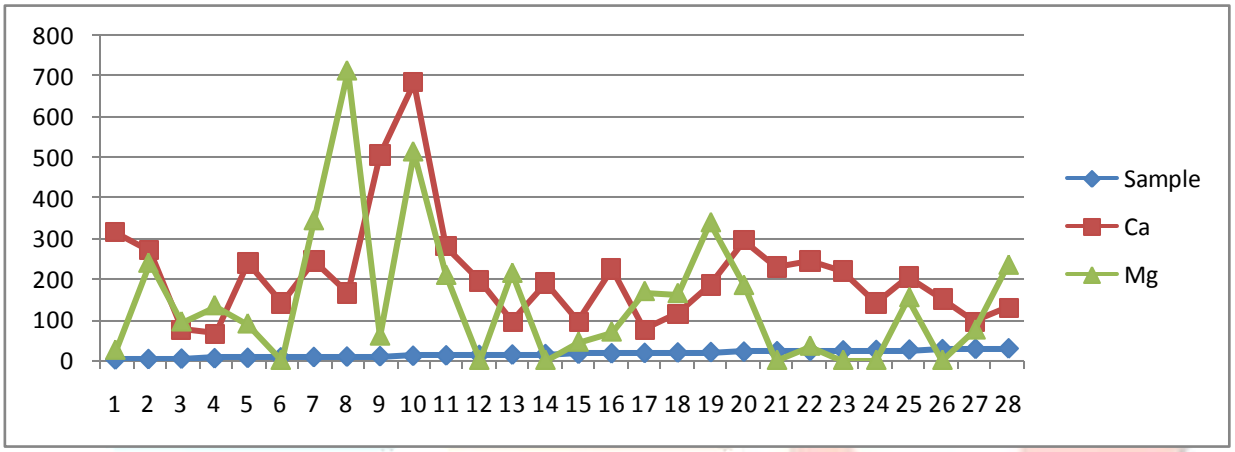


Graph-4





Graph-5



Results and Discussions:

1. pH (6.5 to 8.5) has no direct adverse effect on health, however a lower value below 4 will produce sour taste and higher value above 8.5 a bitter taste.

2. Higher values of pH hasten the scale formation in water heating apparatus and also reduce the germicidal potential of chlorine.

3. High pH induces the formation of trihalomethanes which are causing cancer in human beings.

Electrical conductivity:

The electrical conductivity gives quantitative picture of water. The values of electrical conductivity range from 479 ***μS /cm to 2200 μS /cm*** for ground water sample. For Such anonymous values arise from various anthropogenic activities and geochemical processes prevailing in the region.

Total dissolved solids:

The weight of the residue consisting of pollutants left behind after the water sample is evaporated is a measure of TDS and gives the general nature of ground water quality and extent of contamination. The

permissible limit is 500-1000ppm .The TDS value varies The high concentration may be due to leaching of solid waste from ground surface.

Alkalinity:

In the area the value of alkalinity varies from12 to 80mg/l for ground water The source of alkalinity in water is from sewage and various human activities. The alkalinity is in the permissible limit.

Total Hardness:

The total hardness is an important property indicating the quality of groundwater. The desirable limit for TH is up to 300mg/l and up to 600mg/l is The permissible limit , the sample values are various 120 to 1200 mg/liter. which leads to corrosion of steel ,vessels and plant growth, Ca &Mg affect on the Renal system(Asim Kurjak Text book on prenatal medicine infor health care).

POTTASIUM : The potassium are in ther permissible rage only which may useful for mobility on ion in the body.

Concussions

This study is the first report on groundwater quality for drinking and irrigation purposes in Saroornager mandal mandal, Ranga district, Telangana Sate India. The investigation indicates that abundance of major cations in the groundwater those are Na, K, Ca, Mg, and other anion Cl.

Based on TDS, and other parameter of the water samples are within the highest desirable limits of BIS (2012) standards. Most o f the constituents in groundwater were higher than the acceptable permissible limit by BIS or WHO. Most of the groundwater samples are not suitablefor irrigation purposes. In the study area Na^{+} concentration was dominant among cations andHCO_3^{-}among anions. It causes increase of salinity and hardness in the groundwater. US Laboratory Salinity diagrams reveal that most of the groundwater samples are not suitable for irrigation purposes under normal condition. The salinity hazard for groundwater is classified as medium, high and some show very high salinity.Therefore, salinity is the principal concern ini rrigated agriculture in the study area. High salinity may relate to low precipitation, high evaporation rate and overexploitation in the study area. Foragricultural development special management. of salinity control and certain kind of plants withgood salt-tolerance should be consider.

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