

PHYSICO-CHEMICAL ANALYSIS OF DRINKING WATER QUALITY IN NAWABPET MANDAL MAHABOONNAGER DISTRICT, TELANGANA STATE

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Abstract: The suitability of water quality for drinking purpose in the area was assessed by measuring physicochemical parameters, including major cation and anion compositions, p^H , Total dissolved solid, Electrical conductivity, and other parameter such as Fluoride 0.28 to 2.4ppm, the Nitrate concentration ranged between 5 to 504ppm, the Chloride content in samples range from 53 to 567ppm, in groundwater, which is above the WHO standards. The values obtained for different parameters, are compared with the standard values given by WHO / TSE (Treated sewage effluent) and suitable suggestion were made. In Nawabpet Mandal, Mahaboobnager District Telangana state. Water quality investigation was carried out to identify ground water geochemistry and its suitability for drinking purpose

Keywords : geochemistry, physico-chemical analysis, anions, cations and drinking water quality.

I. INTRODUCTION.

In Telangana state, Nalgonda and Mahaboobnager District are badly affected by water drinking quality in this collection. Nawabpet Mandal of Mahaboobnager is chosen as a study of an area where groundwater occurs in all the geological formations in the Mandal. The major rock types in the district are peninsular gneissic crystalline, limestone's, conglomerates, sandstones, shale's, basalts and alluvium. The occurrence and behavior of groundwater is an outcome of combined interplay of hydrological, geological, structural, climatological factors, which together form a dynamic integrated system. All these factors are inter-dependent and inter-related, each adding its contribution in functioning of the dynamic system. The yield of wells depends on recharge conditions, draft etc. In drought condition, the yield of wells will drastically dwindle in phreatic aquifers. The general hydrogeological conditions in the Mandal presented. The nature and occurrence of the groundwater in different water-bearing formations are discussed below. In the archaean formations the archaean crystalline rocks are represented by pink and grey granites. The archaean crystalline rocks are represented by pink and grey granites and gneisses. The occurrence of groundwater is controlled by the depth and degree of weathering and fracturing. The thickness of weathering of these rocks ranges from 10 to 30 m. Groundwater occurs under water table conditions in weathered mantle and semi-confined to confined conditions in the fractured and jointed rocks. The depth of dug wells in weathered zone, archaean rocks varies from 6 to 20 m with 2 to 3m column of water retained during summer months. The yields of the wells range between 250 and 350 cu.m/day. Storage coefficient varies from 0.002 to 0.020 and specific capacity.





II. METHODOLOGY LIST OF EXPERIMENTS

The selected groundwater samples are used for agricultural and domestic purposes. Polyethylene bottles cleaned with HNO₃ were used for sample collection. All bottles were rinsed with deionized water. The samples were collected after 10 min of pumping and stored in polyethylene bottles.

S.NO	PARAMETER	METHODS USED
1	pH	electrometric method
2	Electrical Conductivity	conductometry
3	Total Dissolved Solids	Titration
4	Total Hardness as CaCO ₃	Titration
5	Calcium Hardness as CaCO ₃ -mg/l	EDTA Method
6	Magnesium Hardness as CaCO ₃ -mg/l	EDTA Method
7	Nitrate	
8	Na ⁺	Flame Photometry
9	K ⁺	Flame Photometry
10	Fluoride	Ion selective electrode
11	sulphate	ultraviolet absorption
12	Chloride	Argentometric titration

III. Results and Discussions.

Sl.no	Characteristics	Groundwater pre monsoon	Groundwater post monsoon
1	pH	6.98	7.19
2	Electrical Conductivity-/cm	964	1269
3	Total Dissolved Solids-mg/l	653	935
4	Total Hardness as CaCO ₃ -mg/l	388	486
5	Calcium Hardness as CaCO ₃ -mg/l	195	225
6	Magnesium Hardness as CaCO ₃ -mg/l	213	229
7	Na ⁺	83	119
8	K ⁺	4	4
9	chloride	142	185
10	sulphate	114	114
11	Nitrate	45	95
12	Fluoride	1.25	3.25

Sl.No	Characteristics	WHO 2004 Guidelines value	TSE(1997) Guidelines value
1	pH	6.5-8.5	6.5-9.2
2	Electrical Conductivity	---	---
3	Total Dissolved Solids	1000	1500
4	Total Hardness as CaCO_3	200	500
5	Calcium Hardness as CaCO_3 -mg/l	200	200
6	Magnesium Hardness as CaCO_3 -mg/l	150	150
7	Na^+	200	175
8	K^+	20	12
9	chloride	250	400
10	sulphate	250	250
11	Nitrate	45	50
12	Fluoride		

SAMPLE-1&2

Location: Chowdoor

pre monsoon Date: 03-04-16 Tested on: 04-04-16

, post monsoon Date; 12-10-2016, Tested on: 14-10-16.

SAMPLE-3&4

Location: Darpalle

pre monsoon Date: 10 -04-16, Tested on: 12-04-16

, post monsoon Date; 09-10-2016, Tested on: 10-10-2016

Sl.No	Characteristics	Ground Groundwater pre monsoon	Groundwater post monsoon
1	pH	7	7.41
2	Electrical Conductivity	785	958
3	Total Dissolved Solids	685	963
4	Total Hardness as CaCO_3	492	888
5	Calcium Hardness as CaCO_3 -mg/l	164	196
6	Magnesium Hardness as CaCO_3 -mg/l	148	203
7	Na^+	121	144
8	K^+	4	5
9	chloride	145	190
10	suiphate	82	102
11	Nitrate	40	97
12	Fluoride	4.2	7.02

SAMPLE-5,6

Location: Darpalle

pre monsoon Date: : 4-4-2016 Tested on: 6-04-2016

, post monsoon Date: 10-10-2016 Tested on: 12-10-2016

Sl.no	Characteristics	Ground water pre monsoon	Groundwater post monsoon
1	pH	6.69	7.19
2	Electrical Conductivity	1165	1263
3	Total Dissolved Solids	768	814
4	Total Hardness as CaCO_3	442	493
5	Calcium Hardness as CaCO_3 -mg/l	172	296
6	Magnesium Hardness as CaCO_3 -mg/l	226	294
7	Na^+	97	89
8	K^+	4	6
9	chloride	190	194
10	suiphate	102	112
11	Nitrate	17	12
12	Fluoride	3.2	4.9

SAMPLE-7,8 LOCATION: AMMAPUR

PRE MONSOON DATE: : 09-04-2016 TESTED ON: 10-04-2016
 post monsoon Date: 09-11-2016 Tested on: 11-11-2016

Sl.no	Characteristics	Groundwater Pre monsoon	Ground water post monsoon
1	pH	6.89	7.14
2	Electrical Conductivity	978	1142
3	Total Dissolved Solids	691	966
4	Total Hardness as CaCO_3	501	412
5	Calcium Hardness as CaCO_3 -mg/l	245	183
6	Magnesium Hardness as CaCO_3 -mg/l	233	201
7	Na^+	98	221
8	K^+	4	120
9	chloride	216	355
10	sulphate	78	298
11	Nitrate	40	145
12	Fluoride	2.4	4.2

SAMPLE-9,10 Location : Karoor

pre monsoon Date: : : 09-02-2016, Tested on: 10-02-2016,
 post monsoon: Date: 12-11-2016, Tested on: 14-11-2016

Sl.no	Characteristics	Groundwater pre monsoon	Groundwater Post monsoon
1	pH	6.66	7.12
2	Electrical Conductivity	995	1089
3	Total Dissolved Solids	698	785
4	Total Hardness as CaCO_3	513	401
5	Calcium Hardness as CaCO_3 -mg/l	221	198
6	Magnesium Hardness as CaCO_3 -mg/l	201	183
7	Na^+	173	114
8	K^+	4	4
9	chloride	212	221
10	suiphate	92	112
11	Nitrate	90	126
12	Fluoride	11	14

SAMPLE-11,12 Location: Khanapur

pre monsoon Date: : : 10-04-2016 Tested on: 11-04-2016,
 post monsoon : Date 14-11-2016, Tested on: 17-11-2016

Sl.no	Characteristics	Ground water Pre monsoon	Ground water post monsoon
1	pH	7.1	7.26
2	Electrical Conductivity	879	1309
3	Total Dissolved Solids	614	850
4	Total Hardness as CaCO_3	480	598
5	Calcium Hardness as CaCO_3 -mg/l	213	248
6	Magnesium Hardness as CaCO_3 -mg/l	211	193
7	Na^+	142	191
8	K^+	5	4
9	chloride	178	190
10	suiphate	88	140
11	Nitrate	8	5
12	Fluoride	2.12	3.24

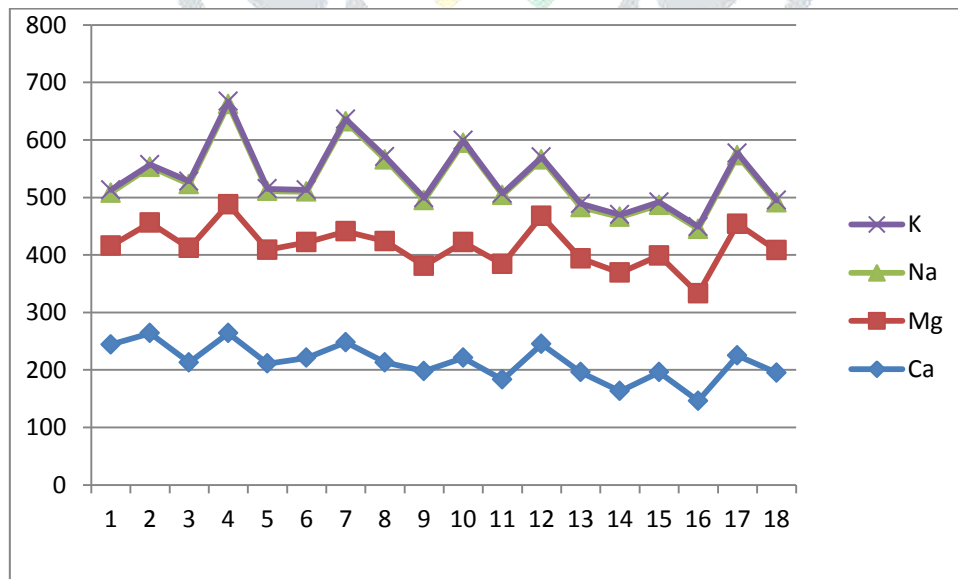
SAMPLE-13,14 Location :kollor
 pre monsoon Date: : : 16-04-2016, Tested on: 17-4-2016
 ,post monsoon 14-11-2016, Tested on: 17-11-2016,

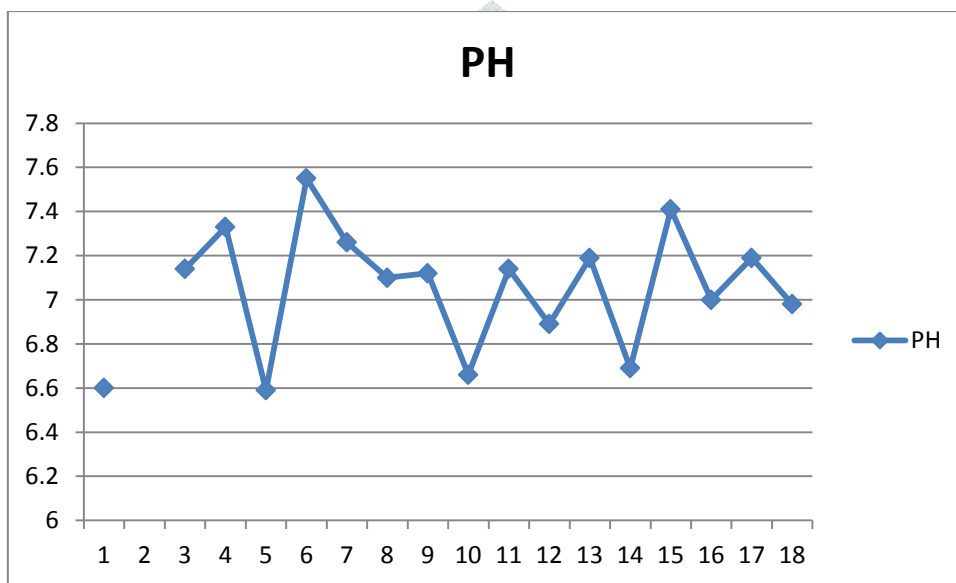
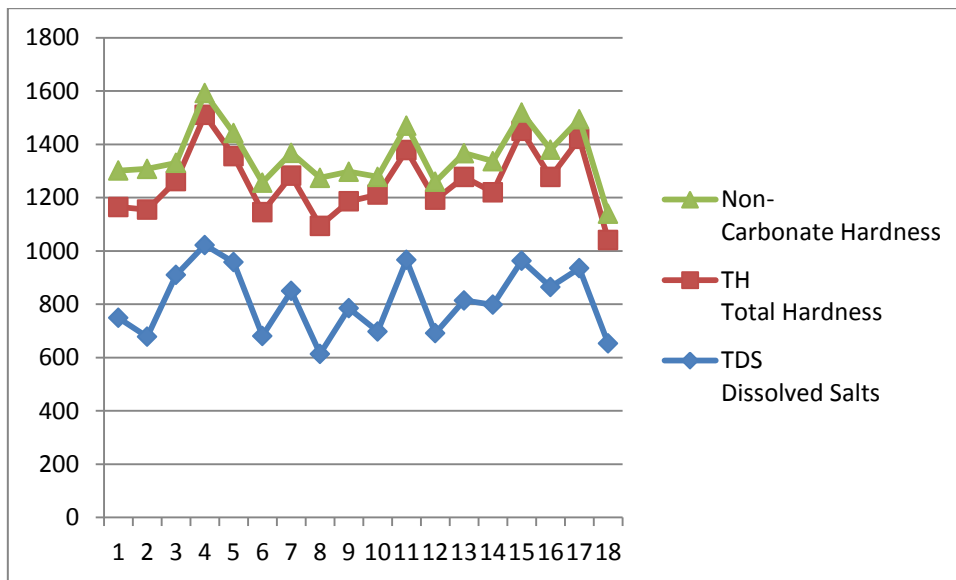
Sl.no	Characteristics	Ground water pre monsoon	Ground water post monsoon
1	pH	7.55	6.59
2	Electrical Conductivity	887	1087
3	Total Dissolved Solids	681	958
4	Total Hardness as caco3	465	398
5	Calcium Hardness as caco3-mg/l	226	311
6	Magnesium Hardness as caco3-mg/l	201	198
7	Na+	88	102
8	K+	3	4
9	chloride	190	221
10	sulphate	125	305
11	Nitrate	79	125
12	Fluoride	7.1	9.4

SAMPLE-15,16
 Location: Kondapur
 pre monsoon Date: : : 16-04-2016, Tested on: 17-04-2016
 post monsoon Date: Date: 09-05--2016, Tested on: 10-12-2016

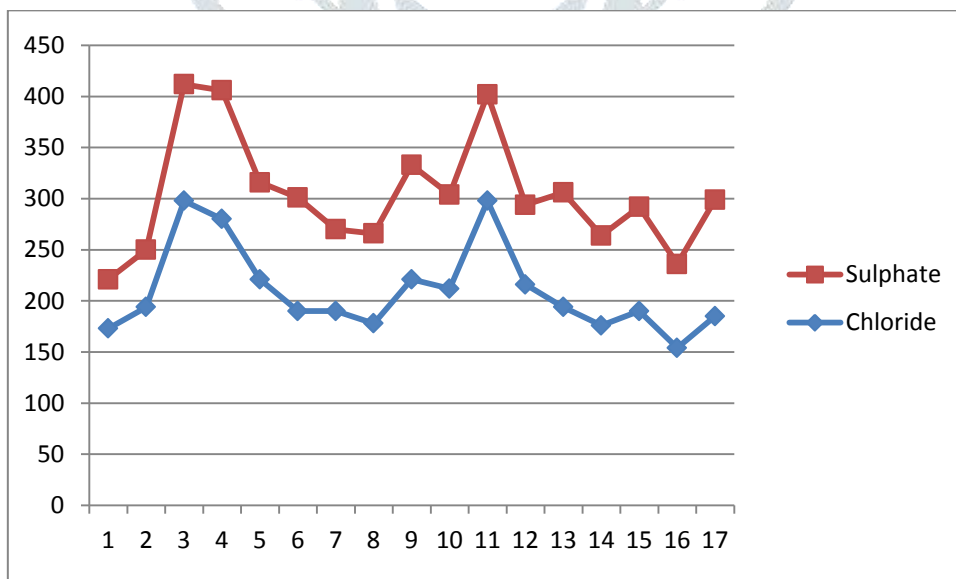
Sl.no	Characteristics	Ground water pre monsoon	Ground water post monsoon
1	pH	7.14	7.12
2	Electrical Conductivity	1411	1082
3	Total Dissolved Solids	910	785
4	Total Hardness as caco3	352	401
5	Calcium Hardness as caco3-mg/l	213	198
6	Magnesium Hardness as caco3-mg/l	199	183
7	Na+	5	114
8	K+	111	4
9	chloride	298	221
10	suiphate	114	109
11	Nitrate	120	290

1.cations in pre and post monsoon graph





Sulphate , Chloride graph



Conclusion:

From the Ground Water Survey the following conclusions are drawn. The pH values of some villages o Nawab pet mandal These panchayats shows acidic range to basic range waters hence use of these waters must be taken with care i.e, they cannot use this water for drinking purpose. High concentrations of chlorides above the permissible limits of 250 mg/L in water very salty and domestic use of these waters is unpleasant .The extreme high Total Alkalinity in the panchayats is almost very high and more than the permissible limits. Tthese leads scale formation in the cooking vessels and white precipitate formation in the buckets. The total hardness above the permissible limits given by WHO i.e., 500mg/L. Phosphates concentration was more than the permissible limits given by BIS . the presence of Fluorides

permissible limits given by WHO more than in all these 8 panchayats. The nitrates are also within permissible limits. Water is the mirror of life and water is essential for drinking purpose. Water and life are inseparable. So protected water supply is very essential for population. In panchayats, municipal water supply i.e., potable water must be supplied to the population to protect their health. There is municipal water supply in Nawabpet mandal, it is not sufficient to the inhabitants. Hence use of bore well waters for washing, cooking, bathing etc is inevitable. From the survey it is clear that even the municipal water is having high chloride, alkalinity, total hardness, total dissolved salts and phosphates.

Remedial Measures.

1. Purification of water used for drinking.
2. Supply of potable water to panchayats.
3. To educate the people to boil water, filter and then use them so that the chlorides, alkalinity and hardness may be removed to some extent.
4. To educate to use toilets in every home.
5. Slogan – Potable water protects the health of consumers.
6. To conduct environment awareness camps at schools.
7. To educate to keep clean environment.
8. To encourage to use natural fertilizers.

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