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GROUNDWATER AVAILABILITY AND QUALITY IN RURAL AND URBAN AREAS OF NARASARAOPETA MANDAL OF GUNTUR DISTRICT

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ABSTRACT

Groundwater frameworks are dynamic and that isn't accessible and not appropriate for savoring reason all locales of the world, so it is exceptionally valuable, the current investigation centers around the relative investigation of ground water quality, the ground water tests are gathered from various areas in provincial and urban territories of Narasaraopet mandal, Guntur region, and Andhra Pradesh, India. The water tests were broke down to decide the convergence of physiochemical parameters to survey groundwater quality, the examples were gathered and investigated The examination of various parameters, for example, pH, Electrical conductivity, TDS, Sulfate, Sodium, Magnesium, Nitrate, Chloride, Fluorides, Total Alkalinity, Total hardness, and Iron were done according to standard techniques in the research center . Results indicated that Electrical conductivity, absolute disintegrated solids (TDS) sodium (Na+), magnesium (Mg2+), Fluoride (F-) fixations are exceptionally high and chloride (Cl−).The investigation uncovers that the groundwater needs treatment before utilization for drinking and local reason.

1. INTRODUCTION

Water is the mixture of life in every single living plant and creatures. It establishes over 75% of their body weight. Subsurface water is one of the most important normal assets of the planet Earth with numerous utilizations and a significant wellspring of new water on the earth. Groundwater is a financial asset and over 85% of the open water supplies are gotten from wells. The groundwater has assumed a key job in expanding nourishment creation and accomplishing nourishment security in India.

In the creating nations, water has been known to be fundamental asset forever quality. Accessibility of water has become an enormous issue and has become an extraordinary worry to numerous families and networks. Surface water bodies are not exactly sheltered, they are inclined to tainting because of regular adjustment and anthropogenic intercession in spite of the fact that in the long haul, and groundwater assets are solid, safe, and available to individuals. Water assets in Andhra Pradesh advance the way of life and upgrade financial development. Like most places on the planet, Andhra Pradesh is likewise encountering populace development and interest for nourishment and water is expanding as well. Moreover, there is environmental change which impacts on the restricted water assets in semi-bone-dry locales. A few creators have revealed huge crumbling in microbiological nature of water between the source and the purpose of utilization in homes and that drinking water ought to be analyzed on physicochemical and microbiological quality. As per writing, it has reported that there were assessed 4 billion instances of loose bowels and 2.2 million instances of death every year recorded because of drinking dangerous water. Therefore, water borne sicknesses, for example, typhoid, cholera, loose bowels and looseness of the bowels are conceivable because of this sullying. The chance of drinking dangerous water is all around archived in numerous nations at all degrees of financial improvement. The most dependable wellspring of drinking water has been accounted for to be filtered water which is acceptable in bacteriological quality yet is costly. Groundwater has become the significant wellspring of drinking water for individuals who don't approach treated water. The need to get to the nature of water from a portion of these elective sources has become critical in light of the fact that they effects affect the wellbeing of people. In Narasaraopeta, there is no occasional research on the quality (physicochemical) of boreholes and hand-burrowed wells which are a significant wellspring of drinking water. Consequently, there is a need to lead the examination to give wellbeing data about the condition

of these significant wellsprings of water in the network. Hence, the point is to think about the nature of ground water in Narasaraopeta people group by deciding their physicochemical parameters.

2. AREA

The examination region lies in north eastern piece of Guntur region of Andhra Pradesh State. It lies between East scope and north longitudes: 16.2359° N, 80.0496° E individually. The absolute land degree of the investigation zone is 7.65 sq. km. The number of inhabitants in the examination zone is 2, 12,000 as indicated by 2011 registration. The normal yearly precipitation is 761mm. The examination region is available by both street and rail from Guntur and Narasaraopeta. The principle wellspring of water for savoring the examination region originates from Krishna River and Nagarjuna Sagar right waterway.

Table No 2.1 Details of sample location Samples are collected from these areas

S. NO	URBAN	RURAL
1	Nrt railway station	Kesanupalli
2	Kodela park	Ellamandha
3	Lalitha nagar	Jonnalagadda
4	Kadiyala hsptl	Mulakaluru
5	Yogaiah nagar	Ravipadu
6	Prakash nagar	Palapadu
7	Kamakshi nagar	Uppalapadu
8	60ft.road	Pedda Reddypalem
9	Sr. nagar	Issapalem
10	Srkt nagar	Kakani

Fig 2.1 Location map of Narasaraopet Mandal of Guntur District

Fig 2.2 Samples location map

3 GEOLOGICAL PARAMETERS OF GROUND WATER

3.1 Atmosphere and Rainfall

3.1.1 Atmosphere:

Tropical atmosphere conditions with outrageous sweltering summer and cold winter win in the Guntur District. April to June is the most blazing time frame with high temperature in May. The atmosphere of the region is moderate and portrayed by tropical stormy atmosphere with forceful summer. The period from December to center of February is commonly dry and cool winter season. The late spring time frame is from March to May. This is trailed by south-west storm from June to September, the post rainstorm from October to December. The relative dampness running between 80% to 30% and the breeze speed is between 4.5 to 16.3 km/hr.

The day temperature will be higher by 3°c to 4°c in summer and the night temperatures lower by 3°c to 4°c in winter. Rentachintala is the most sizzling spot, recording a greatest temperature of around 49°c and the least temperature of 10°c. The yearly normal least and most extreme temperatures of the region run from 17.3°c to 27.8°c and 30.6°c to 48.5°c, separately.

3.1.2 Precipitation

The normal yearly precipitation of the region is 864 mm, which ranges from nil precipitation in January to 160 mm in August. August is the wettest month of the year. The mean occasional precipitation circulation is 547 mm in southwest storm (June-September), 235 mm in upper east rainstorm (Oct-Dec), 8 mm precipitation in Winter (Jan-Feb) and 74 mm in summer (March – May). The season-wise rate conveyance of precipitation is 63% in southwest rainstorm, 27% in upper east storm, 1% in winter and 9% in summer. The precipitation for the most part diminishes from east toward the west. The downpour is experienced for the most part by both south-west storm and the withdrawing rainstorm. October is the rainiest month of the year. By and large, there are 47 stormy days in a year. The most noteworthy precipitation recorded was 386 mm at Sattenapalli on nineteenth of November, 1879.

3.1.3 Topography of Guntur District

The Guntur region is underlain by different geographical developments of various age bunches going from Archaean to Recent. The Archaean storm cellar complex involving the stone gneisses, Schists, Khondalites, Charnockites and fundamental dykes of dolerites structure the overwhelming stone sorts in the focal part. The granitoids and granitic gneisses are barged in by number of Gabbros, Norite and Dolerite dykes. The edge of the Archaeans in the focal part is spoken to by Cuddapah bowl, specifically Nallamalai gathering of Upper Cuddapahs. In a successive request, the more youthful Kurnools happening in the Cuddapahs and those in the western pieces of the region are pushed over by the Cuddapahs and these thusly by the Archaean rock gneisses. The Upper Gondwana gathering of sandstones and shales out yield are seen at places among Guntur and Tenali. The most youthful stone kinds of the area seem, by all accounts, to be of Mio-Pliocene age followed by the alluvial stores of Recent to Sub-Recent age.

Fundamental Charnokites are uncovered in the applied territory as rocks. They are comprised of Hypersthene, Quartz, Biotite and Gray Feldspar and other mafic minerals. These stones have a place with Granulite facies of transformative nature and they are required to have been shaped due to palingnetic combination of and changeability. These stones speak to the Pre-cambrian storm cellar of Easternghat region. The khondalites of this region are Melanocratic (dim shading), crystalline. Size of the grains ranges from exceptionally medium to coarse grained Anhedral to subhedral porphyritic surface is the trademark highlight**.**

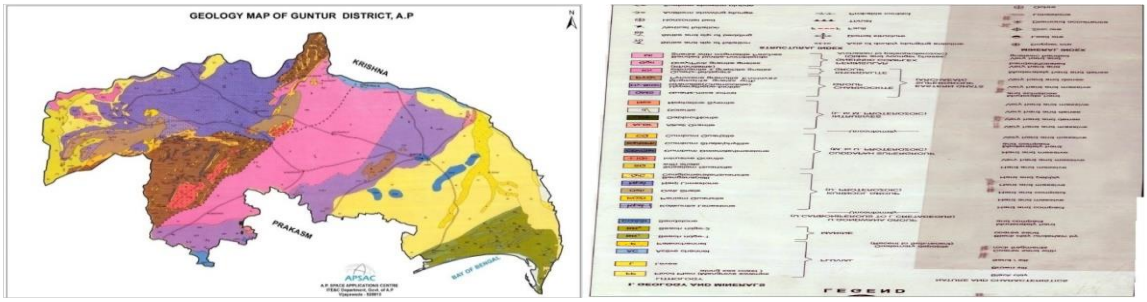

Fig 3.1 Geology map of Guntur

3.1.4 GROUND WATER AVAILABILITY

TABLE 3.1.4.1 Depth to water levels monitored in NSRC observation wells in guntur district of narasaraopeta

S. No	Location	Mandal	Geology	Total depth (bgl.) in m.	MSL (bgl)	May-18	Jul-18	Sep-18	Nov-18	Jan-19	Mar-19	May-19
1	2	3	4	5	6	7	8	9	10	11	12	13
72	Kakani	Narasaraopet	Gr.gneisses	6.85	63.47	5.28	5.20	4.09	4.06	3.16	4.60	6.92
73	Uppalapadu	Narasaraopet	Gr.gneisses	5.60	62.96	3.70	4.26	4.60	5.08	5.40	5.11	5.49
74	Ravipadu	Narasaraopet	Gr.gneisses	5.75	84.28	3.73	4.03	2.93	2.83	2.81	3.25	3.96
75	Lingamguntla	Narasaraopet	Gr.gneisses	6.15	70.10	2.97	3.95	3.41	2.80	2.97	3.53	4.78
76	Guravayapalem	Narasaraopet	Gr.gneisses	6.00	58.63	3.91	3.11	3.11	2.67	2.50	3.30	4.60
77	Kotappakonda	Narasaraopet	Gr.gneisses	5.60	69.97	3.8	4.23	4.48	3.85	5.35	5.5	5.55
78	Vissapalem	Narasaraopet	Gr.gneisses	6.50	68.25	WC	W.C	WC	WC	W.C	WC	WC
79	Kesanapalli	Narasaraopet	Gr.gneisses	7.60	50.08	WC	W.C	WC	WC	W.C	WC	WC
80	Kattubadivaripalem	Narasaraopet	Gr.gneisses	8.15	63.82	WC	W.C	WC	WC	W.C	WC	WC
81	Jonnalagadda	Narasaraopet	Gr.gneisses	6.90	60.84	6.80	7.08	7.70	6.90	6.90	6.71	6.90
82	Narasaraopet	Narasaraopet	Gr.gneisses	7.64	66.81	2.36	2.55	2.68	3.33	3.05	3.44	3.59

4 METHODOLOGIES

Twenty groundwater tests each were gathered from bore wells during December, 2019. Each example was gathered in corrosive washed polyethylene 1000 ml bottle. Prior to assortment of water in a specific jug, the container was washed altogether with the individual examples of the groundwater. Test area was composed on the jug and appropriate additives were included for capacity till fruition of quantitative concoction examination. The jug was filled to the edge with water taking consideration that no air bubble was caught inside the water test. So as to forestall dissipation, the jugs were fixed with twofold plastic tops and safety measure was likewise taken to keep away from test tumult during move to the research facility. Following assortment, tests were moved to the lab. pH and electrical conductivity (EC) were estimated in situ utilizing

convenient instruments. Water investigations were completed by utilizing standard systems (APHA 2003). Chloride (Cl-) were examined by titration strategy. Sulfate (SO42-) nitrate (NO3-) were controlled by utilizing Digital Spectrophotometer model GS5 700A. Complete Dissolved Solids (TDS) is determined by increasing a proportion somewhere in the range of 0.9 and 1.6. The PH and electrical conductivity (EC) were estimated in situ utilizing compact instruments. Water examinations were completed by utilizing standard methodology (APHA 2003). Bicarbonate (HCO3-), calcium (Ca2+), magnesium (Mg2+), and chloride (Cl-) were broke down by titration technique. Sulfate (SO42-) nitrate (NO3-) were controlled by utilizing Digital Spectrophotometer model GS5 700A. Absolute broke up solids is determined by duplicating a proportion between 0.9 with 1.7. The nitrates, sulfates and fluoride are controlled by utilizing spectrophotometer. In science spectro photometry is the quantitative estimation of the reflection properties of a material as a component of frequency. It is more explicit than the general term electromagnetic spectroscopy in that spectro scopometery manages the noticeable light. The investigation of various parameters, for example, pH, turbidity, complete alkalinity, all out hardness, chloride, sulfate, nitrate, TDS are done according to standard methads. The current investigation expected to figure water quality so as to evaluate the appropriateness of water for drinking purposes.

5 RESULTS AND DISCUSSION

The ground water quality in a region can be surveyed by evaluating the 998hysic-substance parameters like pH, EC, TDS, turbidity, Ca, Mg, Na, K, HCO-, NO3, SO4, Cl-, F-. The concise conversations with scopes of the previously mentioned parameters are as per the following.

Table 5.1 Physicochemical parameters of drinking water at urban areas

Samples	pH	EC	TDS	SO4	Na	Mg	Cl	NO3	F	TA	TH	Fe
S1	8.3	6	518	32	260	189	90	20	1.7	284	200	0
S2	8.2	4	986	56	124	280	180	12	3.3	264	360	0
S3	6.1	3	2912	180	101	139	900	15	3.2	320	1124	1
S4	9.3	5	720	44	120	170	120	0	2.1	300	280	0
S5	9	6	307	16	105	153	80	24	1	348	124	0
S6	8.5	8	570	28	98	200	120	10	1.6	300	216	0
S7	8.2	6	755	42	218	142	150	15	2.6	244	296	0
S8	7.9	5	986	56	124	183	160	22	1.7	253	216	0
S9	8.5	8	570	34	136	120	180	12	2.1	264	200	1
S10	7.9	7	370	56	220	142	200	20	3.3	346	334	0
NEC	5	6	655	28	126	184	354	25	2.6	264	124	0

Table No 5.2 Physicochemical parameters of drinking water at rural areas

Samples	pH	EC	TDS	SO4	Na	Mg	Cl	NO3	F	TA	TH	Fe
S1	8.6	6	550	30	246	169	95	21	1.7	281	200	0
S2	7.4	4	936	56	142	268	170	11	3.2	254	340	0
S3	6.9	3	2412	170	105	132	910	13	3.2	315	1014	1
S4	7.2	5	670	41	129	137	110	0	2.0	301	223	0
S5	8.2	6	267	13	145	163	82	23	1	328	114	0
S6	6.7	8	470	28	92	204	126	11	1.2	285	261	0
S7	6	6	735	38	228	143	156	14	2.1	224	256	0
S8	7.3	5	936	49	114	162	168	20	1.0	223	200	0
S9	8	8	530	43	126	127	178	12	2.1	246	200	1
S10	7.6	7	320	65	210	134	201	20	3.1	321	324	0

Table No 5.3 Drinking Water standards recommending Agencies and unit weights.(All values except pH and Electrical Conductivity are in mg/L)

S/NO	Parameters	Standards	Recommended agencies
1	Ph	6.5-8.5	WHO/BIS/USPH
2	EC	300	WHO/USPH
3	TDS	500	WHO/BSI/USPH
4	Sulphates	200	WHO/BSI/USPH
5	Na	50-60	WHO
6	Magnesium	30	WHO/BSI/USPH
7	Nitrates	45	WHO/BSI
8	Chloride	250	WHO/BSI/USPH
9	Flouride	1-1.5 ppm	WHO/BIS
10	Total Alkalinity	--	---
11	Total Hardness	300	WHO/BIS/USPH
12	Iron	0.1	WHO/BIS

6 REASONABLENESS OF WATER QUALITY FOR DRINKING

The part depicts about the groundwater for drinking reason by ascertaining the drinking appropriateness parameters like pH, turbidity, all out alkalinity, all out hardness, chloride, sulfate, nitrate, TDS is likewise determined by contrasting the watched qualities and the standers parameters.

The groundwater of the investigation zone is broadly utilized for drinking because of the absence of surface water sources. The appropriateness of groundwater for drinking relies upon the mineral constituents present in the water. Drinking water of good quality is fundamental to keep up the wellbeing at a more elevated level. Water utilized for drinking consistently contains quantifiable amounts of broke down substances which are by and large called as salts. The salts ought to contain limited quantities of disintegrated solids beginning from disintegration of rocks. EC and Na assume an imperative job in appropriateness of water for drinking. Higher salt substance in drinking water causes an expansion in soil arrangement osmotic weight (Throne and Peterson 1954), which makes hard for the human wellbeing. The osmotic weight is corresponding to the salt substance or saltiness danger.

6.1 CONCLUSION

The nature of groundwater test gathered from twenty distinct areas of Narasaraopet Mandal, Guntur (DT). Based on these diagnostic discoveries, the accompanying ends can be drawn. The pH of the whole water test is well inside reasonable cutoff points. The TDS and Total hardness estimations of all the water tests are not inside passable cutoff points. All out alkalinity esteems for all the examples are inside reasonable breaking point. Sodium and Magnesium content for all examples has high an incentive above passable cutoff points. Chlorides content in test 3 high range however staying all examples are admissible cutoff points

Results indicated higher estimations of the majority of the watched parameters at the urban site comparative with tests gathered in the provincial area. This indicated the groundwater characteristics of country wells are less sullied contrasted with the urban groundwater. The impact of occasional variety was likewise watched

7 REFERENCES

[1].Hussein B. Ghalib (2017). Groundwater science assessment for drinking and Irrigation utilities in east Abdomen area, Central Iraq, India.

[2] A. Antony Ravindran and Mohd. Abdul Kadar Prabhu. H (2012). Groundwater investigation study utilizing Wenner-Schlumberger cathode exhibit through W-4 2D Resistivity Imaging frameworks at Mahapallipuram, Chennai, Tamilnadu, India.

[3] A.A. Sarker and A.A.Hassan (2016) Water Quality Assessment of a Ground Water bowl in Bangladesh for Irrigation use. Pakistan Journal of Biological Sciences 9:1677-1684, 2006.

[4] A. Jeyaseelan, T. Narmatha1, S.P. Mohan1, S. Mahalingam2 and Natchimuthu3 (2013) Assessment of Groundwater Quality and its Suitability for savoring use Nishbanathi and Kalingalar sub-bowls of Vaippar waterway bowl, TN, India. J. Acad. Indus. Res. Vol. 1(11) April 2013.

[5] A.K. Tripathi, U.K.Mishra, Ajay Mishra, Saras Tiwari and Pural Dubey (2012) investigations of Hydro land in Groundwater Quality around Chakghat region, Rewa District, Madhya Pradesh, India. Worldwide Journal of Modern Engineering Research (IJMER) Vol.2, Issue.6, Ov-Dec. 2012pp-4051-4059

[6] A.K. Sinhala, Vinay Kumar1 and P.K. Singh2 (2018) GIS approach based Groundwater Quality Assessment in a Hard Rock Hilly Terrain of Western India. Diary landing page: http://www.ijcmas.com

[7] MG District Survey Report, Guntur District,8p.

[8] Geological Survey of India (GSI) (2000) District Resource Map, Guntur District, Andhra Pradesh