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THE ROLE OF GO&NGO'S ON EFFECT OF FLUORIDE WATER IN HUMAN BEING IN NALGONDA DISTRICT TELANGANA

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ABSTRACT

A review was done to evaluate the physico-compound qualities of ground water with extraordinary accentuation on fluoride in pieces of Nalgonda locale, Telangana State. The water tests were gathered from the cylinder wells situated in 82 chose towns in three mandals during pre and post-storm seasons. The ground water tests in the review region deciphered as unbiased to marginally antacid in response, non-saline in nature. The mean upsides of fluoride present in the ground water tests of Ramannapet, Narkatpalli and Aatmakoor mandals were 2.08, 2.88 and 2.45 mg L-1 , individually in pre-storm and 1.71, 2.28 and 1.72 mg L-1 , separately in post rainstorm season. According to drinking water principles, 83% (68 examples) and 58.5% (48 examples) of the groundwater tests in pre and post rainstorm seasons, separately and have F content more noteworthy than that of reasonable constraint of 1.50 mg L-1 . The chloride (Cl-), sulfate (SO4 - 2) and borate (B) groupings of all the water tests in both pre and post rainstorm seasons were underneath as far as possible for water system just as drinking purposes. No water test tried in the current examination had more than positive restrictions of sodium (Na), calcium (Ca), magnesium (Mg), carbonate (CO3 - 2), bicarbonate (HCO3 -), sodium adsorption proportion (SAR) and leftover sodium carbonate (RSC) subsequently, all the water from the concentrated on sources can be securely utilized for drinking and water system purposes. According to the edge furthest reaches of Cu, Mn, Fe, Zn Cd, Cr, Ni, Pb and Co for drinking and water system water proposals, every one of the examples examined during both the seasons fell inside as far as possible.

Keywords:*Water, Fluoride,drinking*

Introduction

Groundwater is the significant hotspot for drinking in many areas of the planet, as it is accessible efficiently close to entryway step and liberated from pathogenic microscopic organisms. Great nature of drinking water is fundamental for human life. The objective of Government is to furnish each individual with satisfactory safe water for drinking, cooking and other homegrown employments. The spatio-transient varieties in precipitation, local dispersion in topographical arrangements and geomorphic piece of different units have prompted lopsided event and dissemination of groundwater assets. There are not many synthetic defilements of drinking water that can prompt extreme medical issues. Particularly fluoride is a main issue; the suggested grouping of fluoride in drinking water is 1.5 mg/l (WHO; 1984). Seawater regularly contains around 1 mg/l of F − where waterways and lakes by and large show under 0.5 mg/l. Low or high centralizations of fluoride is conceivable in groundwater, contingent upon the presence of nature of the stones and fluoride-bearing minerals. The high fluoride containing water happens in huge and broad geological belts related with dregs of marine beginning in hilly regions,

volcanic rocks, granitic and gneissic rocks. In India, high groundwater fluoride content related with volcanic and transformative shakes, for example, stones and gneisses have been accounted for. Endemic fluorosis is as yet a difficult and widely concentrated on public medical issue.

The most truly impacted regions in India are Telangana, Andhra Pradesh, Punjab, Haryana, Rajasthan, Gujarat, Tamil Nadu, Orissa, Punjab and Uttar Pradesh and so forth The high convergence of fluoride in drinking water was accounted for in 19 states and domains which incorporate 177 locale. The most noteworthy focus saw to date in India is 48 mg/l in Rewari District of Haryana. Groundwater is the essential wellspring of consumable water supply in provincial India. It is beyond the realm of possibilities to expect to assess the quantity of individuals in danger with high fluoride in drinking water. This is a direct result of the trouble of testing groundwater from India's a huge number of hand siphons. In these states, 10 to 25% of the provincial populace has been assessed to be in danger, and roughly 60-70 million individuals are impacted by fluoride sullied groundwater. Around 60% of land goes under water system of groundwater; this is likewise other primary explanation of creating high fluoride food. The precipitation is the wellspring of re-energize of groundwater, geomorphology assumes an indispensable part in controlling dissemination of precipitation, spillover, and penetration adding to re-energize. Fluorosis is an endemic illness. An endemic illness found in a specific geographic district or in a particular race of individuals. The fluoride in consumable water not surpasses to1 mg/L. High F^- fixation in drinking water is principle concern, in light of its adverse consequence on human wellbeing. The fluoride emerges into the water from the topographical outside. The really potential wellbeing chances from fluoride are viewed as fluorosis or bone sickness. In view of body tissues impacted by fluoride, fluorosis is classified into Dental, Skeletal and Non-Skeletal fluorosis. Independent old enough and orientation, anyone can become casualties of Fluorosis. Fluoride content territory in drinking water and how it impacts on human wellbeing is recorded in Table 1.

Table 1 Fluorosis Hazards chart.

S no.	F^- in drinking water (mg/L)	Effects on human health
1	0.6	Dental caries
2	0.6–1.2	Development of normal bones & teeth
3	1.2-2.0	Mottled enamel
4	2.0–4.0	Dental fluorosis
5	4.0–8.0	Skeletal fluorosis
6	8.0–10.0	Mild crippling Skeletal
7	Above 10.0	Cripping Skeletal Fluorosis

In the current review, groundwater quality assessment was completed in the towns of Ramannapeta Mandal, Telangana State, India. To assess the spatial appropriation of fluoride focus, 72 water tests were gathered from 36 spots when rainstorm season. The Spatial circulations of fluoride maps were ready with

the assistance of the Remote Sensing Imaginary (RSI) and Geography Information System (GIS) methods. The relations between fluoride dispersion and physiology, hydrogeology were corresponded. The review region is situated in northern piece of the locale of Nalgonda, Telangana State, India. It lies in the middle 78. 59°-79.15° of East-longitudes and 17.14°-17. 22° of North-scope with a normal rise of 322 meters. It falls in the SOI Toposheets No. 56 O/3. The area of the review region is displayed in Fig. 1. According to 2011 enumeration, the number of inhabitants in the space is 51,534 while the metropolitan populace is 10,202. The region encounters semi-parched environment, the normal temperature shifts from 17°C in winter (December-January) to 45°C in summer (March-May). The normal yearly precipitation is 649 mm both by upper east and southwest storms. 80% individuals from the review region use bore and burrowed wells water for drinking, cooking and other homegrown employments. The profundity of the drag wells changed somewhere in the range of 90 and 300 feet. The region around228 sq.km was covered and 36 water tests were gathered in cleaned and sanitized glass bottles. Every one of the gathered examples were examined inside week in the research center.

Objective

1. Study on physico-chemical characteristics of ground water with special emphasis on fluoride in parts of Nalgonda district, Telangana State.
2. Study on Good quality of drinking water is essential for human life

Materials and Methods

82 (82) water tests from bore wells situated in various towns in Ramannapet, Narkatpally and Atmakoor mandals of Nalgonda area, Telangana State, India were gathered during the premonsoon (May) and post rainstorm (September) periods of 2013. Stoppered polythene containers of one liter limit were utilized for gathering water tests. Each container was washed with weaken HCl and afterward flushed completely with refined water. Before inspecting, the container was flushed completely with the water drawn from the source. During assortment of water tests, water was siphoned out from bore wells and open wells for about 30 minutes. The examples were braced with 1 ml toluene to capture any organic movement and put away at 40C. The physical and synthetic boundaries were examined for significant particle science utilizing the standard strategies (Richards, 1954) like hydrogen particle fixation (pH) and electrical conductivity (EC) were estimated, utilizing pH and EC meters. Carbonate (CO3 2−) and bicarbonate (HCO3 −) were assessed by titrating with sulphuric corrosive. Calcium (Ca2+) and magnesium (Mg2+) were investigated titrimetrically, utilizing standard EDTA. Sodium (Na+) and potassium (K+) were estimated by fire photometer. Chloride (Cl-) was assessed by standard AgNO3 titration. Sulfate (SO4−2) was resolved gravimetrically by hastening BaSO4 from BaCl2 utilizing a spectrophotometer. To decide the reasonableness for water system use, boundaries like SAR and RSC were determined and plotted on USSL Diagram (Richards 1954; Hem 1985). Fluoride (F not entirely set in stone by utilizing an ideal cradle (TISAB) system with Fluoride Ion Selective Electrode.

Results

The outcomes acquired on various quality boundaries of groundwater tests in the review region were introduced in tables 1 and 2.

PH: The pH of water tests gathered from bore wells was somewhat basic. The pH upsides of ground water in Ramannapet, Narkatpalli and Aatmakoor mandals during pre-storm season differed from 7.04 to 8.72, 7.24 to 8.74 and 7.24 to 8.56 and the mean upsides of 7.91, 7.95 and 7.91, individually. In post storm it differs from 7.02 to 8.66, 7.22 to 8.68 and 7.13 to 8.33 and the mean upsides of 7.80, 7.76 and 7.70, separately.

The typical or appropriate pH in water system water is going from 6.5 to 8.7, as per FAO (1994). The water tests included a pH inside the suggested degree of water system water as recommended by FAO (1994), ISI (1983) and ICMR (1975). Likewise, the pH of waters for water system design is inside as far as possible for example somewhere in the range of 6.0 and 9.0 as recommended by Desai et al., (1990). Comparable outcomes announced by Brindha et al., (2010a) in groundwater tests of Nalgonda locale of Telangana and Gautam et al., (2010) in Nagaur area of Rajasthan.

EC (dS m-1): In Ramannapet, Narkatpalli and Aatmakoor mandals the electrical conductivity fluctuated from 0.24 to 0.92, 0.25 to 0.89 and 0.27 to 0.83 dS m-1 , individually in pre-rainstorm and 0.20 to 0.79, 0.24 to 0.85 and 0.25 to 0.82 dS m-1 , separately in post storm season. The outcomes uncovered that EC upsides of a large portion of the waters were deciphered as marginally saline to tolerably saline in nature. The ordinary, modestly and not appropriate scope of electrical conductivity in water system water is from 0.25, 0.25-0.75 and > 0.75 dS m-1 , individually (FAO, 1994). The best furthest reaches of EC in drinking water is 1.5 dS m-1 as endorsed by WHO, 2004. The outcomes uncovered that EC upsides of a large portion of the waters were deciphered as non-saline in nature. Comparative outcomes detailed by Ramanaiah et al., (2006) in ground water tests of Prakasham region.

Chlorides: The normal substance of Cl in water system water tests of Ramannapet, Narkatpalli and Aatmakoor mandals was 3.34, 3.60 and 3.33 me L-1 , separately in premonsoon and 2.4, 3.0 and 2.9 me L-1 , individually in post rainstorm season. The typical and moderate scope of chlorides focus in water system water is from < 4 and 4 to 10 me L-1 , individually. Out of 82 towns of three mandals, water tests of 18 towns in pre rainstorm and 4 towns in post storm go under decently appropriate for water system. The chloride groupings of all the water tests are underneath as far as possible (10 me L-1) for water system just as drinking purposes, as endorsed by ISI, 1982. These outcomes are in concurrence with the discoveries of Jinwal and Dixit (2008).

Carbonates and bicarbonates: The carbonates present in Ramannapet, Narkatpalli, and Aatmakoor manuals of inundated water tests fluctuated from 0 to 0.8, 0.9 and 0.6 me L - 1 with, individually in premonsoon and 0 to 0.7, 0.8, and 0.5 me L-1, separately in the post-storm season. While the bicarbonate content of these manuals went from 6.1 to 9.6, 6.4 to 8.6 and 6.2 to 8.6 me L-1, separately in pre-storm and 4.6 to 8.5, 4.8 to 8.6 and 4.5 to 8.3 me L-1, individually in the post-rainstorm season. Expanded movement of HCO3 - and CO3 2-particles combined with a sodium fixation expanded solvency and arrival of fluoride from the fluoride-bearing guardian materials (Hebbara et al., 2010).

Calcium and magnesium: The calcium content in water tests in pre-rainstorm season fluctuated from 5.4 to 8.5, 5.2 to 8.2 and 5.1 to 8.4 meq L-1 with the mean upsides of 6.9, 6.8 and 6.8 me L-1 in individual manuals of Ramannapet, Narkatpalli, and Aatmakoor. In post-rainstorm season, the Ca content in water

tests fluctuated from 4.2 to 8.1, 5.2 to 7.7 and 4.8 to 8.1 me L-1 with the mean upsides of 6.1, 6.2 and 6.2 me L-1 in individual manuals of Ramannapet, Narkatpalli, and Aatmakoor. The beneficial convergence of calcium in drinking water according to WHO (1971) and ICMR (1975) norms is 3.75 me L-1 and the most extreme allowable focus according to the above guidelines is 10 me L-1 . Since the greatest grouping of calcium in ground waters tried is 8.5 and 8.1 me L-1 during pre and post storm season, separately, the water can be utilized for drinking reason gave different constituents are not in unsafe reach. Comparative perceptions were made by Naidu (1994).

The magnesium content shifted from 2.5 to 5.6, 2.7 to 4.4 and 2.4 to 4.5 me L-1 in premonsoon and 2.4 to 5.3, 2.6 to 4.3 and 2.2 to 4.4 me L-1 in post-rainstorm season in various towns of Ramannapet, Narkatpalli and Aatmakoor mandal, individually. The alluring and most extreme admissible centralizations of magnesium in drinking water according to WHO (1971) principles are 2.5 and 12.5 me L-1 , individually. Likewise, according to ICMR (1975) norms, the most noteworthy and greatest passable convergences of magnesium in drinking water are 4.2 and 8.4 me L-1 , individually. No water test was tried in the current examination had more than 8.4 me L-1 of Mg for each liter, thus, every one of the waters can be securely utilized for drinking reason gave different constituents don't surpass the unsafe levels. Concerning water system water, recommended limits were not referenced by any specialist as far calcium and magnesium is thought of. For the most part in the event that the magnesium content of waters is high, the SAR and RSC will be low. Comparable perceptions were made by Naidu (1994).

Sodium: The mean Na content in water tests of Ramannapet, Narkatpalli and Aatmakoor mandals was 2.7, 2.7 and 2.7 me L - 1 , separately in pre-rainstorm and 4.0, 3.7 and 3.6 me L-1 , individually in post storm. The greatest reasonable constraint of Na is 200 mg L-1 (8.7 me L-1) in drinking and water system water and it uncovers that every one of the examples fall inside helpful restriction of WHO (1997) and ISI (1982).

Sulphates and Borates: In Ramannapet, Narkatpalli, Aatmakoor mandals, the sulfate substance differed from 0.2 to 0.8, 0.3 to 0.9 and 0.2 to 0.9 ppm, separately in pre-rainstorm and 0.12 to 0.98, 0.13 to 0.78 and 0.18 to 0.89 ppm, individually in post storm season. In Ramannapet, Narkatpalli, Aatmakoor mandals, the mean borate substance was 0.4, 0.5 and 0.4 ppm, separately in pre-rainstorm and 0.4, 0.4 and 0.4 mg L-1 , individually in post storm season.

RSC: The RSC esteems in the water system water tests of Ramannapet, Narkatpalli and Aatmakoor mandals shifted from - 6.0 to 0.4, - 5.1 to 0.0 and - 5.6 to 0.9 me L-1with normal upsides of - 2.2, - 2.8 and - 2.4 me L-1 , individually in pre-storm season. In post rainstorm season it was gone from - 6.7 to 0.4, - 6.4 to - 0.6 and - 7.4 to 0.4 me L-1with normal upsides of - 2.5, - 3.0 and - 3.0 me L-1 , separately. The typical and moderate scope of RSC esteems in water system water is named < 1.25 and 1.25 to 2.5 me L-1 , individually as recommended by USSL (1954). The outcomes uncovered that all the water tests were in safe (< 1.25 me L-1) and can be utilized for water system. These outcomes are in similarity with the discoveries of Suresh et al., (2014).

SAR: The SAR upsides of water system water in Ramannapet, Narkatpalli and Aatmakoor mandals differed from 1.3 to 2.2, 1.2 to 2.3 and 1.1 to 2.1, individually in pre-rainstorm and 0.8 to 1.8, 0.8 to 2.0

and 0.8 to 2.3, repectively in post storm season. The low, moderate, high and exceptionally high scope of SAR esteems in water system water is delegated < 10, 10 to 18, 18 to 26 and > 26, separately as endorsed by USSL (1954). The SAR upsides of water system water tests gathered from various drag wells from the review region was in ordinary reach which can be securely utilized for water system. Out of the 82 water tests gathered 3, 63 and 16 examples were arranged under C1S1, C2S1 and C3S1 quality class, individually. These outcomes are in similarity with the discoveries of Suresh et al., (2014).

Fluoride: The F present in the water system water tests of Ramannapet, Narkatpalli and Aatmakoor mandals showed wide variety yet their mean qualities were 2.08, 2.88 and 2.45 mg L-1 F, separately in premonsoon season and 1.71, 2.28 and 1.72 mg L - 1 F, individually in post storm season. According to drinking water norms, 83% (68 examples) of the groundwater tests during pre-storm season and 58.5% (48 examples) of the ground water tests during post rainstorm and have F content more prominent than that of most extreme reasonable restriction of 1.50 mg L-1 F. Accordingly drinking water is adequate to deliver extreme type of dental fluorosis and gentle type of skeletal fluorosis drank for a significant stretch.

Safe limit of 10 mg fluoride L-1 irrigation water has been proposed for all type of crop plants by Leone et al., (1948). All the samples were to be well within permissible limits. According to FAO (1994), the normal and moderately suitable range of fluorides concentration in irrigation water is from < 19 ppm (1.0 me L-1) and 19 to 171 ppm (1.0-15 me L-1) F, respectively. The present investigation showed that none of the water samples have found to cross this limits and hence suitable for irrigation purpose.

Micronutrients: The micronutrients like Cu, Mn, Fe and Zn content during pre-rainstorm season changed from follows to 0.35, 0.56, 0.56 and 0.89, separately in water tests Ramannapet mandal, follows to 0.41, 0.35, 0.56 and 0.91 mg L-1 , individually in water tests of Narkatpalli mandal and follows to 0.35, 0.55, 0.77 and 0.56 mg L-1 , separately in water tests of Aatmakoor mandal. In post storm season, the accessible micronutrients like Cu, Mn, Fe and Zn content was in the scope of follows to 0.20, 0.09, 0.58 and 0.09 mg L-1 , separately in water tests of Ramannapet mandal, follows to 0.50, 0.86, 0.56 and 0.13 mg L-1 , individually in water tests of Narkatpalli mandal and follows to 0.24, 0.86, 0.91 and 0.89 mg L-1 , separately in water tests of Aatmakoor Mandal. According to drinking water principles of WHO (1996), every one of the examples broke down fell inside the reasonable furthest reaches of 0.3, 0.1 and 3.0 mg L - 1 for Fe, Mn and Zn, separately in ground water. As for water system water, suggested most extreme centralizations of Fe, Mn, Zn and Cu are 5.0, 0.2, 2.0 and 0.2 mg L-1 , individually given by National Academy of Sciences (1972). No water test tried in the current examination had beyond what reasonable cutoff points, consequently, every one of the waters can be securely utilized for water system purposes. Follow metals are generally disseminated in the climate with sources fundamentally from enduring of minerals and soils. Comparative perceptions were likewise announced by Ackah et al., (2011).

Heavy metals: The weighty metals like Cd, Cr, Ni, Pb and Co substance during pre-rainstorm season fluctuated from follows to 0.24, 0.75, 0.45, 0.56 and 0.58 mg L-1 , individually in water tests of Ramannapet mandal, follows to 0.51, 0.51, 0.34, 0.36 and 0.41 mg L-1 , separately in water tests of Narkatpalli mandal and follows to 0.31, 0.34, 0.86, 0.56 and 0.56 mg L-1 , separately in water tests of

Aatmakoor mandal. In post storm season, the weighty metals like Cd, Cr, Ni, Pb and Co substance differed from follows to 0.56, 0.23, 0.56, 0.41 and 0.56 mg L-1, individually in water tests of Ramannapet mandal, follows to 0.09, 0.28, 0.89, 0.18 and 0.45 mg L-1 , separately in water tests of Narkatpalli mandal and follows to 0.89, 0.25, 0.86, 0.58 and 0.56 mg L-1 , individually in water tests of Aatmakoor mandal.

According to as far as possible for drinking water proposals by WHO (1996) every one of the examples dissected fell inside the reasonable furthest reaches of 0 to 0.01, 0.002 to 0.01 and >0.02 mg L-1 for Pb, Cd and Ni individually in ground water. The suggested greatest centralizations of Cd, Ni, Pb and Co are 0.01, 0.2, 5.0 and 0.05 mg L-1 , individually for water system purposes given by National Academy of Sciences (1972). Every one of the examples examined fell inside as far as possible for water system.

Table.1Descriptivestatisticsofirrigationwaterqualityparameters collectedfromdifferentmandalsof Nalgondadistrict (Pre-monsoon, 2013)

Parameters	Ramannapet		Narkatpalli		Aatmakoor	
	Range	Mean	Range	Mean	Range	Mean
pH	7.04-8.72	7.91	7.24-8.74	7.95	7.24-8.56	7.91
EC(dSm^{-1})	0.24-0.92	0.51	0.25-0.89	0.52	0.27-0.83	0.54
F($mg\ L^{-1}$)	0.99-3.94	2.08	1.16-5.34	2.88	1.12-4.67	2.45
Cl(meL^{-1})	1.7-5.3	3.34	1.8-4.9	3.60	1.9-5.1	3.33
CO_3^{-2}($me\ L^{-1}$)	0.0-0.8	0.2	0.0-0.9	0.13	0.0-0.6	0.17
HCO_3^{-}($me\ L^{-1}$)	6.1-9.6	8.0	6.4-8.6	7.48	6.2-8.6	7.58
SO_4^{2-}(meL)	0.20-0.80	0.50	0.30-0.90	0.58	0.20-0.90	0.57
B(mgL^{-1})	0.12-0.98	0.38	0.13-0.78	0.45	0.18-0.89	0.42
Ca(meL^{-1})	5.4-8.5	6.9	5.2-8.2	6.8	5.1-8.4	6.8
Mg(meL^{-1})	2.5-5.6	3.6	2.7-4.4	3.7	2.4-4.5	3.4
Na(meL^{-1})	3.0-5.0	4.0	2.8-5.1	3.7	2.2-5.1	3.6
RSC(meL^{-1})	-6.0-0.4	-2.2	-5.1-0.0	-2.8	-5.6-0.9	-2.4
SAR	1.3-2.2	1.7	1.2-2.3	1.60	1.1-2.1	1.6
Cu(mgL^{-1})	0-0.35	0.09	0-0.41	0.11	0-0.35	0.09
Mn(mgL^{-1})	0-0.56	0.15	0-0.35	0.14	0-0.55	0.17
Fe(mgL^{-1})	0-0.56	0.18	0-0.56	0.17	0-0.77	0.26
Zn(mgL^{-1})	0-0.89	0.15	0-0.91	0.13	0-0.56	0.09
Cd(mgL^{-1})	0-0.24	0.05	0-0.51	0.10	0-0.31	0.07
Cr(mgL^{-1})	0-0.75	0.12	0-0.51	0.10	0-0.34	0.09
Ni(mgL^{-1})	0-0.45	0.08	0-0.34	0.11	0-0.86	0.18
Pb(mgL^{-1})	0-0.56	0.10	0-0.36	0.10	0-0.56	0.14
Co(mgL^{-1})	0-0.58	0.12	0-0.41	0.11	0-0.56	0.15

Table.2Descriptivestatisticsofirrigationwaterqualityparameterscollectedfromdifferentmandalsof Nalgondadistrict (Post monsoon,2013)

Parameters	Ramannapet		Narkatpalli		Aatmakoor	
	Range	Mean	Range	Mean	Range	Mean
pH	7.02-8.66	7.80	7.22-8.68	7.76	7.13-8.33	7.70
EC(dSm^{-1})	0.20-0.79	0.42	0.24-0.85	0.49	0.25-0.82	0.51
F($mg\ L^{-1}$)	0.53-3.86	1.71	0.56-5.25	2.28	0.73-3.25	1.72
Cl(meL^{-1})	1.2-4.1	2.4	1.2-4.6	3.0	1.1-4.7	2.9
CO_3^{-2}($me\ L^{-1}$)	0-0.7	0.2	0-0.8	0.1	0-0.5	0.1
HCO_3^-($me\ L^{-1}$)	4.6-8.5	6.9	4.8-8.6	6.6	4.5-8.3	6.3
SO_4^{2-}(meL)	0.2-0.6	0.3	0.2-0.7	0.4	0.2-0.6	0.4
B(mgL^{-1})	0.07-0.94	0.40	0.02-0.76	0.40	0.08-0.84	0.4
Ca(meL^{-1})	4.2-8.1	6.1	5.2-7.7	6.2	4.8-8.1	6.2
Mg(meL^{-1})	2.4-5.3	3.4	2.6-4.3	3.5	2.2-4.4	3.2
Na(meL^{-1})	1.9-3.6	2.7	1.7-4.1	2.7	1.9-4.8	2.7
RSC(meL^{-1})	-6.7-0.4	-2.5	-6.4--0.6	-3.0	-7.4-0.4	-3.0
SAR	0.8-1.8	1.2	0.8-2.0	1.2	0.8-2.3	1.3
Cu(mgL^{-1})	0-0.20	0.04	0-0.50	0.08	0-0.24	0.05
Mn(mgL^{-1})	0-0.09	0.03	0-0.86	0.12	0-0.86	0.16
Fe(mgL^{-1})	0-0.58	0.08	0-0.56	0.13	0-0.91	0.16
Zn(mgL^{-1})	0-0.09	0.02	0-0.13	0.02	0-0.89	0.15
Cd(mgL^{-1})	0-0.56	0.07	0-0.09	0.03	0-0.89	0.09
Cr(mgL^{-1})	0-0.23	0.04	0-0.28	0.05	0-0.25	0.05
Ni(mgL^{-1})	0-0.56	0.11	0-0.89	0.13	0-0.86	0.13
Pb(mgL^{-1})	0-0.41	0.07	0-0.18	0.03	0-0.58	0.16
Co(mgL^{-1})	0-0.56	0.13	0-0.45	0.07	0-0.56	0.09

Table.3Correlationcoefficients(r)betweenfluorideconcentrationandotherchemicalproperties of ground water

S. No	CorrelationAmong	rvaluein					
		Ramannapet		Narkatpalli		Aatmakoor	
		Pre-monsoon	*Post monsoon*	*Pre-monsoon*	*Post monsoon*	*Pre-monsoon*	*Post monsoon*
1	FluoridevspH	0.561**	0.564**	0.704**	0.741**	0.525**	0.791**
2	FluoridevsEC	-0.120	-0.146	-0.182	-0.199	-0.013	-0.491
3	FluoridevsChloride	0.226	0.412	0.245	0.724	0.353	0.392
4	FluoridevsSulphate	0.071	0.052	0.288	0.062	0.251	0.019
5	FluoridevsCarbonate	0.120	0.434	0.037	0.143	0.232	0.243
6	FluoridevsBi-carbonate	0.198	0.435	0.532	0.457	0.260	0.621
7	Fluoridevs Calcium	-0.380	-0.360	-0.263	-0.563	-0.413	-0.597
8	FluoridevsMagnesium	-0.139	-0.268	-0.343	-0.546	-0.017	-0.033
9	Fluoridevs Sodium	0.437	0.790	0.543	0.693	0.541	0.763
10	FluoridevsSAR	0.535	0.806	0.576	0.756	0.561	0.804
11	Fluoridevs RSC	0.424	0.599	0.519	0.703	0.175	0.745
		*5%(0.3730)		*5%(0.3889)			
		**1 %(0.4774)		**1 %(0.4994)			

Correlation of fluoride concentration with other physicochemical parameters

The altogether sure connection of fluoride with pH demonstrates that basic groundwater is probably going to have a higher measure of fluoride, recommending that the pH of the groundwater is more significant in deciding the grouping of fluoride. This is a direct result of the likeness between the ionic span of fluoride and hydroxyl particle consequently supplanting each other at higher pH. A positive connection (r= 0.893) has additionally been seen among fluoride and pH revealed by Teotia et al., (1981), Trivedi (1988) and Gupta and Deshpande (1998). The connection among fluoride and electrical conductivity was negative yet no huge relationship was noticed. The connection among fluoride and

chloride, fluoride and sulfate was positive and critical. These outcomes are congruity with the perceptions of Chakrabarty and Sarma (2011) (Table 3). A fundamentally solid negative relationship has been seen among fluoride and calcium in the ground waters (r upsides of - 0.380 in pre-rainstorm and - 0.360 in post storm period of Ramannapet mandal) is credited to high solvency of fluoride from these cation bearing rocks. On the off chance that calcium is available in higher focus it is best in decreasing the fluoride fixation. This is additionally interesting towards the chance of ionexchange process (Chakrabarty and Sarma, 2011). Generally speaking, high pH, high carbonate in addition to bicarbonate, and low calcium in addition to magnesium in groundwater prompts draining of fluoride which results expansion in the grouping of groundwater fluoride. Such a perception was additionally made by Rao et al., (1993).

Seasonal variation of fluoride in ground water

When contrasted with two seasons, the convergence of fluoride in groundwater during post storm was lower than the premonsoon. Occasional circulation is found fundamentally and the variety of fluoride is subject to many elements. During the post rainstorm season, weakening might be credited to renewal of the groundwater by precipitation demonstrated a clean re-energize without contamination from outer sources. During pre-storm season, high fluoride focus due to over-abuse of groundwater assets for farming and drinking water purposes, occasional dispersion of fluoride is subject to an assortment of variables, for example, measure of solvent and insoluble fluoride in source shakes, the term of contact of water with rocks and soil temperature, precipitation and oxidation-reduction process.

CONCLUSION

High grouping of fluoride in groundwater of up to 3.94 ppm was estimated. Around 60% of wells had fluoride focus over the allowable furthest reaches of 1.5 ppm set by Indian drinking water principles. The utilization of groundwater for drinking reason from these wells must be limited. Appropriate measures, for example, defluorinating the ground water before use and re-energizing the ground water by rainwater reaping for water system reason should be drilled to work on the groundwater quality around here.

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