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HYDRO ANALYSIS: GROUND WATER OF PORT CITY IN EAST GODAVARI DISTRICT, ANDHRA PRADESH, INDIA

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ABSTRACT
The research article describes the hydro analysis study of port city (i.e. Kakinada).Eastgodavari district is the top place of population wise and one of the largest geographical areas in the state of Andhra Pradesh. Present study is Kakinada and also called by people as port city .it has 3 rd largest deep water port in India. In 2016, our honorable union minister Mr. vankaiah Naidu (presently positioned as vice president of India) announced the Kakinada as smart city of top 20 in first spell of India. In the city gradually developing of educational institutions, industrial sector, shipping exports and shopping, changing patterns of agriculture and aquaculture activities. Last one decade increase of influx of migration from rural to urban. Due to increase of land scarcity and population explosion, also increase of migration for the purpose of educational and employment. Due to change the global warming, environmental degradation and population pressure effect on the city, so the present study was understood hydro analysis and management of ground water recourses. Hydro chemical parameters of ground water compared with WHO and ISI standards.
KEYWORDS: *changing patterns of agriculture, aquaculture, and migration.*

INTRODUCTION

Water has been aptly described as “Blue Gold” by our ancestors. In tune with their conventional values of life and simple methods of living, the ancient people used water resources for their entire domestic, transport and agricultural needs with utmost care. They considered water recourses conservation as a basic law of self preservation. But modern man who cultivated new styles of living based on high energy consumption has misused these precious recourses of the streams without considering their impact on the subsequent uses of water by the people down stream. Day by day sanitation and ecologically unsound practices of development in the field of irrigation, forestry and industrialization. Moreover the total supply of water is not only limited in a given state but also both geographically and through the seasons and the years.

The rapid pace of industrialization has resulted in environmental pollution becoming a growing concern for the welfare of the mankind. Quality of drinking water is essential for life. Ground water is of the most important of spatially importance for the human utility as well as for the support of habitat and maintenance of industrial uses and agricultural utilization. Water quality change by the flow of river streams and rain flow, while its quality assessment is essential for sustainable safe use of the natural recourses for drinking, agricultural usage and industrial utilization. The quality of ground water depends on rock stratigraphy of the area presence and erodes of minerals.

City is undergoing as smart city in new Andhra Pradesh. And the last one decade most facing problem is decline of ground water levels and change of quality of G-water. We are seen lot of previous research articles on this topic raises the problem and increase of construction activities, industrial development and population growth. Most of peoples sought for quality of clean water and safe water to domestic and other uses.

GEOLOGY OF THE EAST GODAVARI DISTRICT

East Godavari lies North-East coast of Andhra Pradesh in India and bounded on the North side by Visakhapatnam District and the state of Orissa, on the East and south side by the Bay of Bengal and on the west side by west Godavari district. Geographically east Godavari has 10,807 sq km East Godavari is the rice Granary of Andhra Pradesh, it bekons tourists to have a glimpse of its rich cultural heritage. Main River of the district are Godavari, Pampa, Thandava and Yeleru rivers. In east Godavari District there are 5 revenue divisions and they consist of 60 revenue mandals. The average rain fall 157.6 mm.

METHODOLOGY

Generally understood the variation of groundwater quality changes, I taken the pilot survey before sample collection and was carried different parts in the research areas; these samples are collected from the ground well and randomly select the sample in different area in the city. And analyzed for chemical analysis, compare with WHO and ISI standards.

RESULTS

1. In the present study a detailed study was carried out identifying the ground water quality, and to test the quality of parameters controlling the hydro chemical evolution of aquifer system was studied.
2. The data obtained by chemical analysis were evaluated in terms of its suitability for drinking and general domestic use.
3. A comparison of ground water quality of the area has been made with WHO international standards and ISI standards and its presented in the table the p^H value of the groundwater very between 6.3 and 8.6 indicating slightly alkaline to alkaline nature.
4. The EC in ground water varied from 495 to 1182 µs/cm where as permission limits. <1500 µs/cm for domestic use indicating that the all values are within permission limits.
5. The total TDS are the concentrations of all dissolved minerals in water indicate the general nature of salinity of water.
6. The total dissolved solid in all the study area varies from 310 to 725 mg/L is also evident from the classification of water type on the basis of their TDS values.
7. Due of Hardness affected by divalent metallic ions dissolved in water, the concentration of TH varies from 190 to 569 mg/L.
8. The concentration of potassium is bicarbonates alkalinity fallows ranges 55 to 150 mg/L, 8 to 72 mg/l, 16 to 200 mg/L, 102 to 422 mg/L.
9. Finally fluoride varies from 0.3 -22 mg/L , only one exceed the maximum limit, and nitrates samples of the research area from 10-100 mg/L the three samples are effected not use for drinking all other are use for drinking and domestic use.

CONCLUSION

The analysis of the water quality parameters of G-water from different stations in Kakinada city, show that the PH,EC,TH,TDS, Na^+, K^+, Ca^{++},F^-,Mg^{++},Co_3^-, ,No_3 ,HCo_3^- values are well within permissible limits. Bur the high value of nitrate in two samples are (12 and 13) might be excessive use of nitrate fertilizers in agricultural. These two samples are unsuitable for drinking purposes. The high fluoride concentration in two ground water samples (14and17) just above the maximum permissible levels is found. Otherwise all the samples are suitable for drinking and domestic purposes uses. East Godavari district is population wise to place in the state of Andhra Pradesh, day by day proportionally increase of infant death, and diseases through the improper maintenance of municipal solid waste by the effect of inadequate municipal workers (scavengers),personally everyone have lack of awareness about plastic / solid debris and waste of coconut shell (in this develop/ grow the mosquitoes),empty water tins, un capped water storage tanks, open drainage, not interest of surround environment, off greenery problems are cause of illness of health and wealth of the population, in my view Govt. create awareness about the environment in school children's, mahila sadhikara mitras, anganwade workers, teachers, local health workers not only seasonal wise the program ongoing throughout the year.onewho are participate actively in this programs to encourage with money rewards and financial assistance to the family. It is not only eradicate by Govt. local NGOs, unemployment youth actively participate automatically gone the problem and give good environment for future generation. Finally say when trees on, pollution off.

Basic standards of WHO and ISI standards:

Si no	Water quality parameters	WHO Max Highest Desirable	WHO Max Accept limits	ISI Max Highest Desirable	ISI Max accept limits	Concentration in study area
1	P^H	8.5	7.0	8.5	6.5	6.3 – 8.6
2	EC	2000	400	2000	500	495 – 1182
3	TH	500	100	600	300	190 -586
4	TDS	1500	500	1500	500	310 -726
5	Na^{++}	200	-	200	-	8 -125
6	K^+	12	10	-	-	1- 22
7	Ca^{++}	200	75	200	75	55 – 150
8	Mg^{++}	150	50	100	30	8 -72
9	Co_3	-	-	-	-	2 -12
10	HCo_3	-	-	-	-	102 -422
11	Cl^-	600	200	1000	250	16 – 200
12	No_3^-	-	45	100	45	10 – 100
13	F^-	1.5	0.6	1.5	0.6	0.3 – 2.2

Analysis of total samples:

Parameters Si .no	P^H	EC	TH	TDS	Na^{++}	K^+	Ca^{++}	Mg^{++}	Co_3^-	HCo_3	Cl^-	No_3^-	F^-
1	7.9	1168	554	710	34	3.2	125	67	5	419	98	20	0.3
2	6.9	610	371	726	74	2	65	19	8	368	19	25	0.7
3	8	610	410	723	8	1	84	15	2	265	25	15	0.49
4	7.5	847	362	503	41	4.8	150	35	10	312	37	35	0.72
5	6.3	713	298	695	22	2	90	19	5	172	32	45	0.87
6	8.2	810	320	332	35	2.4	148	21	3	400	22	22	
7	6.4	750	278	537	41	2	83	10	4	224	21	35	0.91
8	6.8	495	225	400	16	22	57	8	8	103	18	10	0.76
9	7.2	732	328	310	20	3.8	112	22	3	246	79	65	0.86
10	7.8	1062	286	498	69	3	125	39	5	422	32	17	0.49
11	7.1	750	505	619	30	1.9	79	34	6	322	123	19	0.5
12	7.7	696	395	410	100	12	80	56	4	289	68	100	0.46
13	8.2	885	300	600	40	7	74	21	3	174	16	60	0.36
14	7.9	916	530	406	110	4	55	63	3	420	156	29	2
15	7.6	709	190	502	20	4	69	22	6	342	159	26	12
16	7.9	782	376	622	17	1	138	33	7	250	30	24	0.32
17	7.8	1182	312	565	125	8	61	72	6	361	88	14	2.2
18	7.1	790	448	465	32	4	82	32	2	333	50	20	2
19	8.6	782	586	510	24	4	98	19	12	102	200	28	0.4
Max	8.6	1182	586	726	125	22	150	72	12	422	200	100	2.2
Min	6.3	495	190	310	8	1	55	8	2	102	16	10	0.3
Total	142.9	15289	7074	10133	858	92.1	1775	607	102	5524	1273	609	12.73
Mean	7.52	804.68	372.32	533.32	45.16	4.85	93.42	31.95	5.37	290.74	67.00	32.05	0.67

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