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Case Study of Ground Water Quality in Patancheru Industrial Area

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Abstract **- Pollution in ground water resources has created a lot of problem in mankind living in rural village due to increase in the industrialization over decades. This has leads to analysis of water to overcome problem. In this connection a case study on ground water quality has been carried by considering different parameters by collecting samples from patancheru industrial area in Pashamylram village in Medak district. All the parameters required in testing the ground water are considered in rainy season and winter seasons.**

Keywords **- Electrical Conductivity (EC), Fluorides, Chemical Oxygen Demand (COD), Chloride, Water Quality Index, Turbidity.**

I. Introduction

Due to uneven distribution of water surfaces resources in many places of country dependence in ground water leads to reduce the rain fall in rural and urban areas an average of 100 cm. Ground water is one of the important tools for the nourishment of life on earth [10]. Among the various resource of water, ground water is supposed to be the safest water for drinking and household purposes. The superiority of ground water is influenced by the environment of the sub surfaces on top of the environment where revitalize takes place. Water worn for agricultural, Industries, and human needs put in constantly contaminants to the ground water. It is report that two third of all ill health in India are linked to water borne diseases. Industrialization and unparalleled population increase include resulted in the making of large volume of wastes that are in adequately disposed and managed. The impact of haphazard waste disposal on the environment has raise concern in current times. Improper discarding of chemicals from Industries, mining, and agricultural behavior have negative implication on marine life and water quality.

As the judgment of climatic condition is based on the availability of the water beneath to the earth. The ground water is being commonly used for all purposes of industrial as well as domestic purpose. As mentioned by World Health Organization (WHO) approximately 80 percentage of dieses are caused due to contamination of water at ground level due to high percentage of the chemical presents in water.

Water quality index (WQI) test must be carried out determine the percentage of contamination in water[9].

Most commonly presented chemicals in water includes bicarbonates, sodium, sulphate ions and calcium. One of the important chemical is chloride ion which is derived from evapotranspiration concentrating salt, Sea water are some the examples. The nitrate is one of the important chemical in water but high percentage of nitrates results in pollutant to water. Relative suitability contain in water are classified as sodium contents and specific conductance etc.

Water Quality index is the important testing tool to predict the level of contamination and water quality information and their relative values of water located at different places in Hyderabad as well as many places all over the world by considering the different parameters like EC, turbidity, COD, fluorides and chlorides etc.

II. Literature Survey

Shweta Tyagi, Bhavtosh Sharma, Prashant Singh, Rajendra Dobhal [1] assessed the quality of water at Uttarakhand in India by collecting samples of both pure and pollutant water from the ground to predict the issues present in the water by performing water quality index test. Efforts have been made to estimate the criteria of water quality for the suitability of drinking water. This paper also highlights the new developments which are globally accepted water quality index (WQI) by using simplified formatted to presnt the clear picture of water quality. The most generally used water quality changeable are likely to be pH, alkalinity, specific conductance etc. are widely used in many countries across the world.

Dr. N.C. Gupta, Ms. Shikha Bisht and Mr. B.A. Patra [3] in their research work collected samples of water from 32 different places in old town of Delhi for conducting Physico-Chemical analysis on drinking water as drinking water is creating problem in city. During the test physical and chemical parameters are considered to solve the issue.

Manjesh Kumar and Ramesh Kumar[2] in their work performed an experimental study on Physico-Chemical Properties of Ground Water of U.P., in India.

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The study deals about the evaluation of contamination of water located near the granite mines of Jhansi by collecting water from six different sites. The physic-chemical parameters such as T.D.S., alkalinity, pH, D.O., Ca (calcium) E.C., turbidity, and Mg (magnesium) hardnessNO3 (nitrate), F (fluoride), total hardness, Fe+3 (iron) and Cl- (chloride) have been tested. They found the values are not in boundaries of W.H.O. standards when compared.

RAMKRISHNA Ch.[4] studied the status of water quality index of ground water at Visakhapattanam in India. As the city has population of about 1.33 millions according to 2001 census. Appropriate with the extension of industrialization and allied activities the city has grown up from 30Km2 to 80 Km from 1960to till date. Because of pollutants in water major part of city is transporting water from Godavari Apart from the municipal supply the population is mostly depends upon the ground water reservoirs.

Amaliya N.K. and Sugirtha P. Kumar[5] carried out ground water quality status by using water quality index method at different places of kanyakumari district, Kanyakumari (INDIA), for measuring the water quality Index. To calculate the Quality Index the following eighteen parameters are considered. 8.45 to 162.3 quality index values has been ranged in the kanyakumar district.

Rajankar P. N. et. al (2013)[6] estimated the quality of hose well water of Wardha in India by uing W.Q.I. at some places of Wardha district. The parameters used are Temp., D.O., B.O.D. turbidity, pH, in the commercial and residential agricultural area. Physico-chemical parameters such as calcium hardness (as CaCO3), Na+ (sodium) and K+ (potassium) Total hardness, EC, chlorides, sulphates, etc. Finally this parameters are compared with Bureau of Indian Standard (BIS).

K. Elangovan (2010) [7] carried out individuality of ground well water for Erode district in India to predict ground water quality of 60 locations over different climatic conditions. Ground water samples were collected and tested for 11 physico-chemical parameters by using WHO standards on water quality index

Sriniwas Kushtagi and Padaki Sriniwas(2011) [8] performed Water Quality index (WQI) test on ground water of Gulbarga in Karnataka state to assess the quality of water used in rural and urban areas. Ten villages are chosen for the study by collecting the three samples from different location of each district. The technical methods used for analyzing are TH, Ca, TDS, CL, pH, Mg, Fe, F, SO4, NO3. BIS-10500-1991 standards were used for measuring the water quality index.

III. Methodology For Analysis Of Water

The ground water sample are collected from Pashamylram village for analyzing the following parameters to predict the health issued caused to people living near the industrial area.

1. EC,
2. Turbidity
3. Hardness of water
4. Sulphate
5. Chloride
6. Fluorides
7. Nitrates
8. COD

IV. Assessment Of Quality Of Water

Total Hardness [10] Total hardness, an important property indicating the quality of groundwater is mainly caused by calcium and magnesium cat ions and is defined as the sum of their concentrations expressed in mg/l. Basically, it is the soap consuming property of water (5).In all the bore well samples total hardness has exceeded the standard value in the rainy season (desirable limit 300 mg/l). **Total Alkalinity** In all the samples total alkalinity in all the samples is well within the standard limit, (desirable limit 200 mg/l). **Total Dissolved Solids** all the bore well samples have shown the trend of exceeding the standard limit (desirable limit 500mg/l). **Chlorides** The WHO limit for chloride in groundwater is < 250mg/l. In the entire bore well water sample it is above the standards (desirable limit 250mg/l). **Fluorides** all the samples are well within the standards (desirable limit 1.0 mg/l) According to UNESCO specifications water containing more than 1.5 mg/l of fluoride can cause mottled tooth enamel in children. Excess fluoride may also lead to flourosis that can result in skeletal damage. **Sulphates** In S4.S5 samples are within the standards and remaining samples (S1, S2, S3, S6 and S7) are above the standards. (250mg/l). Concentrations exceeding 500 – 600 mg/l impart a bitter taste and may cause laxative effects in some individuals. **Nitrate** Nitrate in natural water is due to organic sources or from industrial and agricultural chemicals. The entire bore well water samples are well within the standards (desirable limit 45 mg/l). **Electrical Conductivity (EC)** depends upon temperature, ionic concentration and types of ions present in the water. Thus the EC gives a qualitative picture of the quality of groundwater. The electrical conductivity exceeded the upper limit in all the samples.

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V. Results And Discussions

The following are the results as shown in table 1 & 2 obtained from the samples collected from the village located in Medak district.

Table 1:
Analysis of ground water in Pashamylram village in Rainy Season

Samples	Initial DO	Turbidity	EC	Hardness	Nitrate	Sulphate	Chloride	Fluoride	COD
P1	0	2.4	3130	332	4.6	289	700	1.4	2.0
P2	1.0	0.9	3530	1340	5.2	294	964	0.3	2.8
P3	2.0	0.5	1870	212	0.8	139	152	1.0	3.2
P4	0.5	0.6	3100	948	5.6	209	650	0.4	4.1
P5	1.6	0.8	3250	1048	6.2	287	824	0.8	4.8
P6	4.0	0.5	1950	588	0.8	187	350	0.2	5.7
P7	4.0	0.8	2500	348	3.1	174	400	0.2	6.6
P8	4.2	7.2	1710	708	0.8	129	270	1.4	7.4

Table 2:
Analysis of ground water in Pashamylram village in Winter Season

Samples	Initial DO	Turbidity	EC	Hardness	Nitrate	Sulphate	Chloride	Fluoride	COD
P1	1.8	2.6	3020	362	4.8	310	715	1.6	2.2
P2	3.6	1.6	3610	1364	5.6	315	1020	0.9	3.0
P3	2.8	1.4	1950	234	1.0	163	165	1.3	3.4
P4	2.1	2.6	3225	1024	5.9	228	710	0.8	4.4
P5	2.3	3.5	3350	1072	6.5	313	854	1.2	5.0
P6	5.6	2.5	1060	610	1.0	207	378	0.6	5.9
P7	6.0	1.6	2650	373	3.4	201	430	0.6	6.8
P8	4.9	9.2	1820	728	1.2	148	315	2.1	7.6

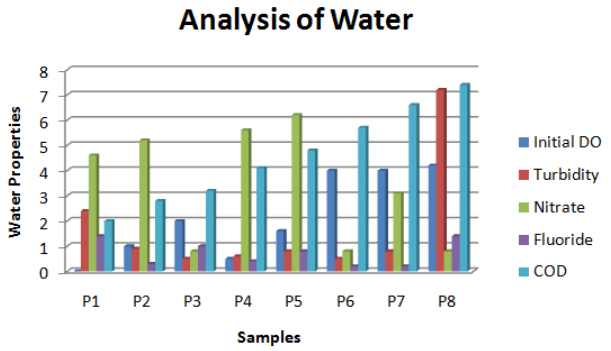

Fig.1: Analysis of ground water for the above said parameters in rainy season

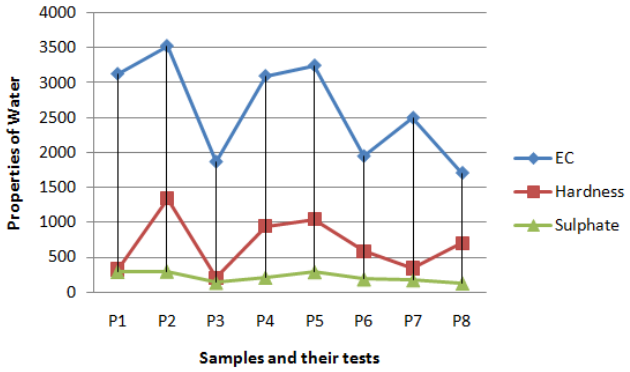

Fig.2: EC, Hardness and sulphates of ground water in rainy season

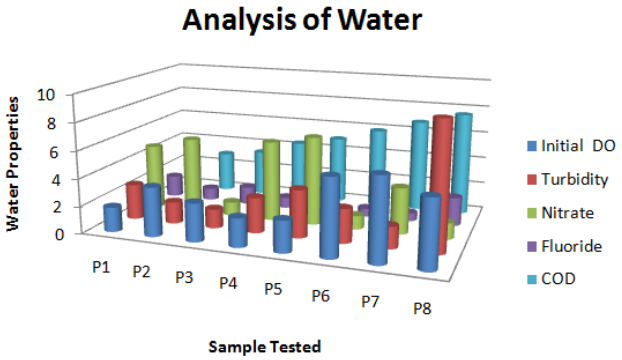

Fig.3: Analysis of ground water for the above said parameters in winter season

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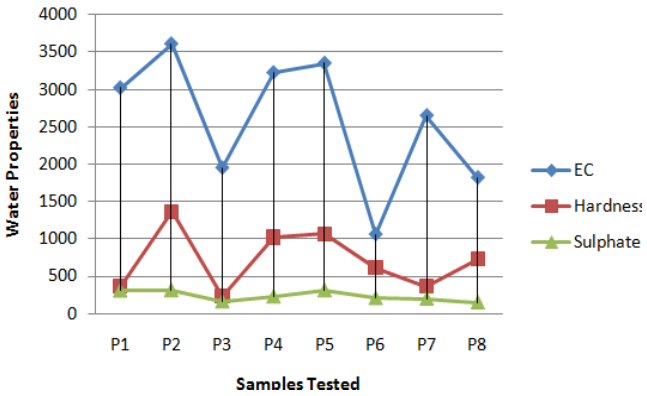

Fig.4: EC, Hardness and sulphates of ground water in summer season

VI. CONCLUSION

The following conclusions are obtained after analyzing the ground water, they are as follows:

1. EC value in rainy season at sample 2 is more (3530 micro mohs /Cm) compare to the EC value in other samples and less when compared the same value in winter season (3610 micro mohs /Cm)
2. Turbidity in rainy season at sample 2 is more both in rainy and winter season (2294.5 mg/l in rainy and 2346.5 mg/l in winter)
3. In term of sulphates, fluorides and chlorides the value are more fluctuating.
4. COD value at sample 1 is exact the border level in rainy season and more in winter season.
5. Overall the water contamination in rainy season less the contamination carried in winter season.

Any how these results show us that people living near to the industrial are facing a lot of problem. Therefore a new innovative idea has to be implemented to change the life style the people living in rural area.

REFERENCES

[1] Shweta Tagy and et al, Water Quality Assessment in terms of Water Quality Index, American Journal of Water Resources, 1(3), 34-38 (2013)

[2] Manjesh Kumar and Ramesh Kumar, Assessment of Physico-Chemical properties of Ground Water in granite mining area in Goramachia, Jhansi (India), 2(1), 19-24, (2013)

[3] Gupta N. and et.al., Physico-Chemical Analysis of Drinking Water Quality from 32 locations in Delhi, Journal of Indian Water Works Association, (2010)

[4] Ramakrishna C. and et.al., Studies on Ground Water Quality in slums of Visakhapatnam, Asian Journal of chemistry, 21(6), 4246-4250 (2009)

[5] Amaaliya N.K. and Sugirtha P. Kumar, Carried out ground water quality status by water quality index method at Kanyakumari (INDIA) (2013)

[6] Rajankar P. and et al., Assessment of Ground Water Quality using water quality index(WQI) in Wardha Maharashtra, Journal of Environmental Science and Sustainability, NEERI, 1(2), 49-54 (2013)

[7] K. Elangovan, Carried out characteristics of tube well water for district Erode (India), Int. Journal of Environmental science, 1(2), (2010)

[8] Srinivas Kushtagi and Padki Srinivas, Studies on water quality index of ground water of Aland taluka, Gulbarga(INDIA), International journal of applied biology and pharmaceutical technology, 2(4), (2011)

[9] Devendra Dohare1, Shriram Deshpande2 and Atul Kotiya3, Analysis of Ground Water Quality Parameters: A Review, *Research Journal of Engineering Sciences*, ISSN 2278 – 9472, Vol. 3(5), 26-31, May (2014)

[10] Baby Abrarunnisa Begum, N. Devanna, Md. Sibgatullah, Asma, Assessment of ground water quality in BAchigudam Village near Patencheru in Medak District in month of September, International Journal of Recent Trends in Science and Technology, ISSN: 22772812, E-ISSN: 2249-8109, Volume 11, Issue 2, 2014, PP: 138-140.