Evaluation of Ground Water Analysis : A Review

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Abstract- *Water is the most essential, abundant and useful natural resources on the earth because no life is possible without water. It is important for the survival of all living beings and it also plays an important role in our life. Rapid industrialization has affected the quality of groundwater due to over exploitation of resources and improper disposal of waste particles and indiscriminate use of chemical fertilizers. Pesticides in agriculture are causing heavy pollution in aquatic environment leading to deterioration of water quality and depletion of aquatic life. Due to such use of contaminated water, human population suffers from water borne diseases. It is therefore essential to test the water quality at regular interval of time. Parameters tested includes pH, electrical conductivity, TDS, total hardness, bicarbonate, carbonate, chloride, sulphate, phosphate, nitrate, fluoride, calcium, magnesium, sodium, potassium, iron and manganese. A Water Quality Index (WQI) is a means by which water quality data is summarized for reporting to the public in a reliable manner. Its purpose is to provide a simple and concise method for expressing the water quality for different usage.*

Keywords- Ground water, Pesticides, Physico-chemical, Water quality index.

I. INTRODUCTION

Water occupies about 70% of the body weight of almost all the life forms. Life is not unimaginable on our planet without this precious resource. About 97.2% of water on earth is saline and only 2.8% exists as fresh water. Out of the available fresh water, about 20% constitutes groundwater. Certain properties that are not possessed by surface water are fulfilled by the groundwater. Hence, it is highly valued resource.

The rapid urbanization has further affected the groundwater quality due to misuse and overexploitation of resources and improper disposal of waste particles. Since time immemorial, human civilizations have settled and centered near spring and streams. A large number of civilizations flourished post developing reliable supply of water collapsed when the supply was disrupted, deteriorated or exhausted.

This natural resource has been used for different purposes, namely for domestic, irrigation and industrial purposes and most importantly for drinking purpose. The utility of water for aforementioned purposes mainly depends on its acceptability and usability which is closely related to its intrinsic quality. Hence, it is vital to have extensive information on quality of the available water resources in the region, while planning developmental projects or for human settlements. A large population of humans and also plants and other animals are dependent on ground water sources. Thus, the value of groundwater lies not only on the factor of occurrence and availability but also in its consistent good quality, for its acceptability as an ideal supply of drinking water. Thus, assessment of water quality is very important for attaining the information and knowledge to understand its acceptability for widespread purposes

II. REVIEW OF PAST WORK

Various technical research papers were reffered on evaluation of ground water quality for bore wells and lakes of different cities, which is summarized below:

1. **P. J. Puri, M.K.N. Yenkie, et al (2011)** have studied water quality index (WQI).The water quality index has been calculated for different surface water resources particularly lakes, in Nagpur city, Maharashtra (India), from January to December 2008; comprising of three seasons, summer, winter and monsoon season. The sampling points were selected on the basis of their significance. Water quality index were calculated using water quality index calculator specified by National Sanitation Foundation (NSF) information system. The WQI calculated for different lakes studied showed fair water quality rating in rainy season which later changed to medium in winter and poor in summer season. Gorewada Lake showed medium water quality rating in all season except rainy season. Futala, Ambazari and Gandhisagar Lake has been declined in aesthetic quality over past decade following invasion of aquatic weeds such as hydrilla and water primrose, so the reasons to bring in water quality change and measures to be taken up in terms of surface water (lakes) quality management is required.

2. **B. N. Tandel, Dr. J.Macwan, C. K. Soni** carried out work on Assessment of water quality index of small lake in South Gujrat, India. The work deals with the monitoring of variation of seasonal water quality index of some intentionally selected surface water bodies. The index improves the knowledge of general water quality issues, communicates water quality status and illustrates the need for and the effectiveness of protective practices. It was found that in all cases the change in WQI value was following a similar trend throughout the study period. The lake water was found of good quality (67.7 to 78.5) during both the seasons. However, it was found that water quality of lake deteriorates slightly from winter to summer season as there was increase in microbial activity aswell as increase in pollutants concentration due to water evaporation.

3. **J Sirajudeen, Arul Manikandan and V Manivel (2013)** carried out the work on ground water for evaluating the W.Q.I. The samples were collected from Ampikapuram area near Uyyakondan channel Tiruchirappalli district. For evaluation of water quality index (WQI) following parameters were examined: pH, E.C., T.D.S., Total hardness, D.O., C.O.D., B.O.D., Cl^-, NO_3 and Mg .The WQI for these samples ranges between 244 to 383.8.The analysis reveals that the groundwater of the area needs some degree of treatment before consumption, and it also needs to be protected from the perils of contamination.

4. **Amaliya N.K. and Sugirtha P. Kumar (2013)** carried out ground water quality status by water quality index method at Kanyakumari (INDIA), that the Quality Index assessment method is used to monitor the pollution status of water samples by integrating the water quality variables. The aim of this work is to monitor the pollution level of ground water samples from different places of Kanyakumari district. For calculating the Water Quality Index the following 18 parameters such as EC, TDS, DO, TH, pH, alkalinity, calcium, sodium, magnesium, sulphate, phosphate, potassium, chloride, fluoride, manganese and nitrate have been considered. The different ground water samples were collected from Kanyakumari district.The Water Quality Index ranges from 8.45 to 162.3. The water quality was found to be good for consumption and other purposes except Kalkulam bore well water sample.

5. **C.R. Ramakrishnaiah, et al., (2009)** studied, 'Assessment of Water Quality Index for the Groundwater in Tumkur Taluk, Karnataka State (India).' The groundwater was examined for 17 parameters such as pH, electrical conductivity, TDS, total hardness, bicarbonate, carbonate, chloride, sulphate, phosphate, nitrate, fluoride, calcium, magnesium, sodium, potassium, iron and manganese .Total 269 samples were collected and WQI of the samples ranges from 89.21 to 660.56. Many water samples showed poor quality.Thus the analysis shows that the groundwater of that area needs some treatment before utility.

6. **P. Shroff, et al., (2013) studied**, 'Assessment of Water Quality Index for Groundwater of Valsad District of South Gujarat (India).' They studied WQI created by CCME (Canadian Council of Minister of the Environment). 17 physico-chemical parameters were examined for calculating the WQI. The WQI of Valsad district was 59.6 .TheWQI of few location showed fair category while some showed excellent category while rest of them falls under good category. The analysis shows that the groundwater of Valsad districts needs some treatment before utility.

7. **Sajitha V., et al.,(2016)** studied, ' Study of Physico chemical parameters and pond water quality assessment by using water quality index at Athiyannoor panchayath, Kerala, India.' In this study the quality of pond water was checked by physico chemical parameters and WQI. Then the results were compared with water quality standards of WHO and BIS. It was found that, WQI of collected samples comes under excellent category. Therefore water is appropriate for domestic activities.

8. **Namita, et al., (2017)** studied, 'Evaluation of Water quality index for drinking purpose in and around of Tekanpur area M.P. (India).' They carried out an experimental work on physicochemical parameters of groundwater samples.The different samples were taken from the region of Tekanpur, Gwalior (M.P.). The water sample was collected from five selected locations. After analysis the results were compared with WHO and ISI standards. The majority of the samples satisfy the guidelines of the parameters. WQI ranged from 58.66 to 93.75 of the samples. It was suggested that it requires pretreatment before consumption.

9. **Manjesh Kumar and Ramesh Kumar (2013)** carried out an experimental work on "Physico-Chemical Properties of Ground Water of U.P., (India). The study deals with evaluation of granite mines sited in Jhansi (Goramachia) for their status about physio-chemical contamination of ground water. Six different sites were selected for sample testing collected from different mines and urban area. Three samples have been taken from

different distances on the site.The site was 10Km above from Jhansi city.The physico-chemical parameters such as pH, D.O., E.C., T.D.S., alkalinity, turbidity, Calcium, Magnesium, hardness, total hardness, Nitrate, Fluoride, Iron and Chloride were tested. The results revealed that the parameters were not in limit when compared with W.H.O. standards.

10. **K. Yogendra, et al.(2008)** studied on, 'Determination of Water Quality Index and Suitability of an Urban Water body in Shimoga town, Karnataka.' In this study they determined WQI of an urban water body on the basis of different physico-chemical parameters.The analysis showed that water bodies have low DO, high COD and high nitrate concentration. And also the water is unsuitable for domestic purpose.

III. CONCLUSION

From the above literature study, the seasonal values of WQI indicate that during summer season, lake water is likely to get more affected during winter.This may be because the microbial activity get reduced due to low temperature, thus keeping DO level at a very suitable range during entire winter season.There must be awareness among those who lives near the substation of waste collection. The individual, the community and Municipal Corporation will assist to reduce bore well water pollution by simple housework and management practices.

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