Eco-Sustainability Assessment of Ground Water in And Around Deogiri College Campus of Aurangabad City, Maharashtra, India

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Abstract- *The identification and management of groundwater quality is of supreme importance for maintaining the freshwater resources. It is essential for sustainable development. The highest value of pH was observed in the month of March and lowest value was from October month and the average value was 7.42. The highest value of DO was observed in the month of February and lowest value was from May month and the average value was 10.8 mg/litre. The highest value of BOD was observed in the month of September i.e. 21.2 and lowest value was from April month and the average value was 12.1 mg/litre. The highest value of COD was observed in the month of September i.e.10.2 and lowest value was from November month and the average value was 6.9 mg/litre. The highest value of TDS was observed in the month of December i.e.356 and lowest value was from November month and the average value was 254 mg/litre. The highest value of Turbidity was observed in the month of January i.e. 6.8 and lowest value was from September month and the average value was 1.9 NTU. The present research aims to identify the proper areas of water pumping for drinking and agricultural harvest in the study area. Urbanization, industrialization and other manmade activities affect the quality of groundwater.*

Keywords- quality, groundwater, analysis, values, average

I. INTRODUCTION

Water has many applications and since every organism need it, a study of water from different aspects becomes essential (Potadar *et al.,* 2021; Padalkar and Kumar, 2018).The groundwater quality is the significance of every one of those procedures and responses which follow upon water from the minute it is primary gathered until the time it is stored in a well that is regularly controlled by some of physicochemical attributes. Groundwater plays a vital role in public water supplies around the globe. Globally, more than two billion people depend upon the groundwater for their daily water supply and more than half of the world's population depends upon the groundwater for drinking water purpose (Anthony; 2006).While the amount of groundwater utilization has been rapidly and continuously increasing, achieving sustainable improvement of groundwater resources is one of the important objectives for the future of nations. (Nuong, *et.al,* 2016, Mende *et.al, 2007).* Groundwater is the universal largest distributed house of fresh water which is central to sustaining ecological systems and human adaptation to climate change. Sustainability management of groundwater resources is particularly significant, with 50% of the global drinking water and 43% of irrigation sourced from the aquifers. Due to the rigorous groundwater exploitation, saltwater intrusion and the land subsidence may become serious concerns in some of the areas among the other environmental threats and geological hazards. Water is the largest common liquid of the Earth, very important to all life forms. It is the best dispersion medium for all biochemical reactions of the living process on the earth. Water is an essential nutrient and is a crucial component of every cell, tissue, and organ. Water has ability to dissolve organic as well as inorganic compounds in it; hence water is called as universal solvent (Potadar *et al*., 2021; Jadhav and Jadhav, 2017). Due to severe destruction of water quality, available water resources are increasingly becoming not suitable or even harmful for human consumption (Saraswat *et al*. 2016; Vorosmarty et al. 2000). Groundwater pollution is found in a range of aquifers of unconsolidated sedimented regions to bedrocks (Kumar *et al*. 2010; Smedley and Kinniburgh 2002). Groundwater contamination by trace elements has turned recently out as a main concern for policy planners in the countries like India and in the sub continental zones (Mahanta *et al*. 2015; Meliker *et al.* 2008).

II. METHODOLOGY

Aurangabad is situated primarily in the Godavari river basin. Aurangabad district is on 19 to 20 degrees north longitude with 74 to 76 degrees to the east latitude (Chaudhari *et al.,* 2021; Potadar *et al.,* 2021; Potadar and Patil, 2016).

The collection and analysis of the ground water samples were carried out at regular interval for a period of

nine months.A systematic sampling was carried out in and around Deogiri college campus for the study purpose.

Fig.1: Study area showing sampling location

The ground water quality samples were collected and analyzed in the laboratory. Physico-chemical parameters of the collected samples were analysed. Physical parameters include pH and total dissolved solids (TDS). pH was measured by a digital pH meter. TDS was measured with the help of a Portable Water Analyzer Kit, dissolved oxygen (DO), biochemical oxygen demand (BOD) and chemical oxygen demand (COD)were estimated by following APHA standard methods (APHA, 1985)

III. RESULTS AND DISCUSSION

The collected samples from the present study area were analyzed for their physico- chemical properties for determining their designated proper use of the ground water. The results analysed have been tabulated in Table. The observed values have been tabulated in the table no.1 and graphically represented in fig. no. 2 to 7.The observed values for various parameters like pH, DO, BOD, COD, TDS and Turbidity significantly varies from month to month. The highest value of pH was observed in the month of March and lowest value was from October month and the average value was 7.42. The highest value of DO was observed in the month of February and lowest value was from May month and the average value was 10.8 mg/litre. The highest value of BOD was observed in the month of September i.e. 21.2 and lowest value was from April month and the average value was 12.1 mg/litre. The highest value of COD was observed in the month of September i.e.10.2 and lowest value was from November month and the average value was 6.9 mg/litre.

Table No. 1: Estimated physico-chemical values of ground water from study area

Sr.No.	Month/ Parameters	September	October	November	December	January	February	March	April	May	Average	Max.	Min.
1	pH	7.3	6.2	7.5	7.7	6.9	8.1	8.3	7.6	7.2	7.42	8.3	6.2
2	DO	10.9	10.2	11.01	11.25	12.5	11.2	9.9	10.8	9.6	10.8	12.5	9.6
3	BOD	21.2	16.5	17.4	16.5	17.4	16.2	17.3	12.1	12.4	16.3	21.2	12.1
4	COD	10.2	9.5	6.9	8.8	10.2	7.8	8.1	9.5	9.8	8.98	10.2	6.9
5	TDS	255	265	254	356	259	289	305	315	279	286.3	356	254
6	Turbidity	1.9	2.5	2.7	2.01	6.8	4.5	5.8	6.2	5.8	4.25	6.8	1.9

The highest value of TDS was observed in the month of December i.e.356 and lowest value was from November month and the average value was 254 mg/litre. The highest value of Turbidity was observed in the month of January i.e 6.8 and lowest value was from September month and the average value was 1.9 NTU. Saxena and Sharma (2017) measured physical and chemical parameters to know the water quality and found results within the standard limits (Saxena and Sharma, 2017). However, water from all the natural sources which contain impurities in the gaseous, liquid and solid phases (Jogdand *et al.,* 2021). Generally, groundwater quality varies from region to region, sometimes based on seasonal changes the types of soils, rocks and surfaces through which it generally moves (Trivede *et al.,* 2010; Thivya *et al.,* 2014). As groundwater flows through the sediments, metals like iron and manganese are dissolved and may later be found in the high amounts in the water (Moyo, N.A.G.2013).

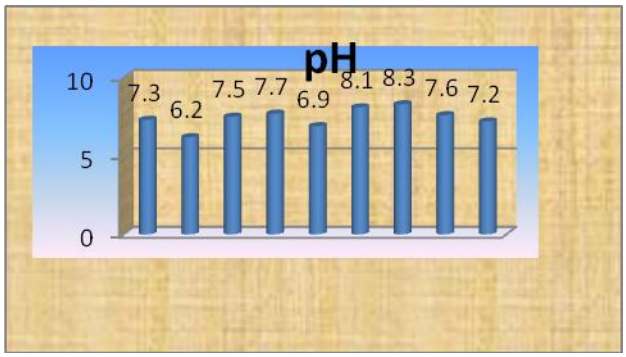

Fig.2: Values indicating monthly variation in pH

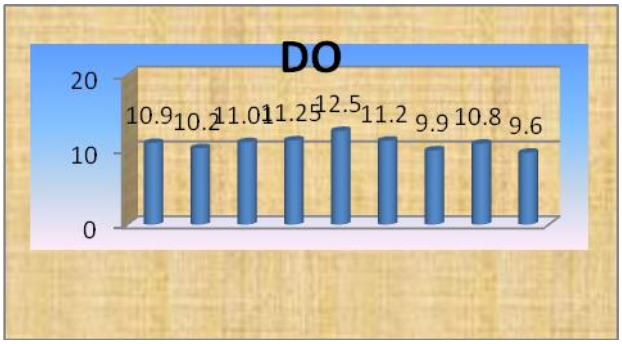

Fig.3: Values indicating monthly variation in DO

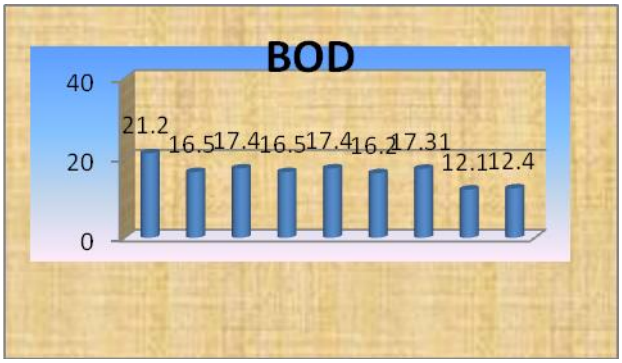

Fig.4: Values indicating monthly variation in BOD

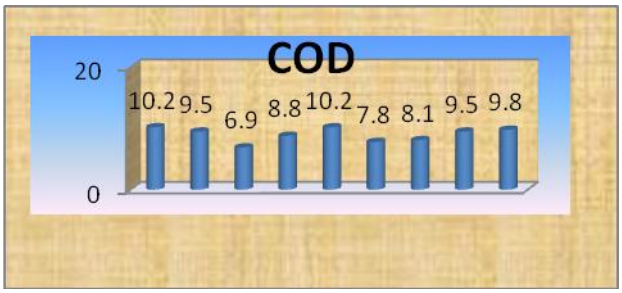

Fig.5: Values indicating monthly variation in COD

Fig.6: Values indicating monthly variation in TDS

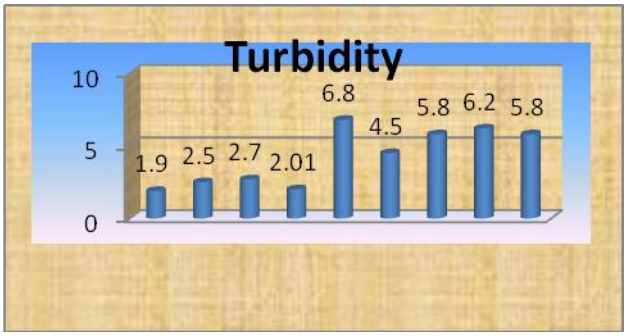

Fig.7: Values indicating monthly variation in Turbidity

IV. CONCLUSION

A scientific study was carried out to estimate the physicochemical parameters of ground water samples in and around Deogiri college of Aurangabad city. The prime objective of present research study was to know the water quality of the study area. The estimation of Physical and chemical parameters of groundwater like pH, TDS, DO, COD, BOD and Turbidity were determined by adopting standard methods. The evaluation of physiochemical parameters were carried by selecting systematically. The parameters were analysed over a period of nine months from September 2020 to May 2021 and six physiochemical parameters were taken for water analysis. The highest value of pH was observed in the month of March and lowest value was from October month and the average value was 7.42. The highest value of DO was observed in the month of February and lowest value was from May month and the average value was 10.8 mg/litre. The highest value of BOD was observed in the month of September i.e. 21.2 and lowest value was from April month and the average value was 12.1 mg/litre. The highest value of COD was observed in the month of September i.e.10.2 and lowest value was from November month and the average value was 6.9 mg/litre. The highest value of TDS was observed in the month of December i.e.356 and lowest value was from November month and the average value was 254 mg/liter. The highest value of Turbidity was observed in the month of January i.e. 6.8 and lowest value was from September month and the average value was 1.9 NTU.The samples were carefully collected, stores and analyzed and compared with standardized databases. The results indicated that the samples were suitable for human consumption purposes. Based on the present study it is suggested that there should be ecologically sound plan of ground water use for drinking purpose so as to avoid the harmful effects on the individuals resides in the railway station area. The study further suggests that the groundwater of the area is good.

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