

Impact of Stagnant Water of Wainganga River on the Quality of Groundwater of nearby locality in Bhandara district

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Abstract:

Groundwater refers to all water occupying the pores and fissures within geological formations, which originated from atmospheric precipitation either directly by rainfall infiltration or indirectly from rivers, lakes or canals. The chemical, physical and biological condition of groundwater determines its usefulness for various purposes. The groundwater is extensively used and the exploitation of it disturbs the state of equilibrium of aquifer and disturbs the hydrological cycle, some wastewater find their way in to a river causes depletion of oxygen of water which leads to deterioration of water quality. In the present study it is identified that major pollution of groundwater because of stagnant water of Wainganga River which is highly polluted. The higher concentration of TDS, chlorides, nitrates, total hardness were found and depletion of oxygen shows pollution of groundwater of the locality near Wainganga River District Bhandara.

Key words: Groundwater, stagnant, exploitation, pollution.

Introduction:

Groundwater is very valuable natural resource and an extensively used in many parts of the world and this has resulted in the excessive exploitation of some water bodies. Nowadays groundwater pollution has become a very serious problem throughout the world. Over exploitation of groundwater disturbs the state of equilibrium of aquifer. The urban groundwater has emerged as one of the world's most challenging issues due to large users and contamination with chemicals of anthropogenic origins. All of these could disturb the hydrological cycle in the region, triggering several negative environmental impacts like land and subsidence, desertification and intrusion of salt water in the coastal areas. Of all the human activities that influence the quality of groundwater, agriculture is probably the most important, as a different source of pollution from fertilizers, pesticides and animal wastes, industrial wastes reach the groundwater from impoundments of lagoons, spills, pipelines breaks the land disposal sites. Septic tanks and pools ground and are the most frequently reported sources of groundwater contamination Khan and Jhariya (2016).

Various activities of man generate a huge quantity of waste water and in various characteristics if this waste water is not disposed in a safe manner, it pollutes the water bodies and threatens human life. The effluents coming from industries find their way in to the river course, they cause depletion of oxygen content of water which leads to deterioration in the water quality aquatic flora and fauna cannot survive in such polluted water.

It lowers the pH value of the stream and also causes higher values of TDS, hardness, chlorides, nitrates etc.

In the present study it is identified that, major source of ground water pollution in the study area. The Wainganga river water content number of chemical pollutants such as carbonate, bicarbonate, nitrite, phosphate, oil etc., therefore taking in to account above prospective, the present investigation was undertaken on the groundwater quality of Bhandara district near Wainganga River.

Material and methods:

The groundwater sample were collected from nearby locations of Wainganga river, of Bhandara district, water sample was collected in the post monsoon period from January 2019 to June 2019 in a clean 5 lit. Can. The collected sample were brought to the laboratory and stored at 40C. The physical parameters i.e. pH, temperature, were measured at the spot other effluents such as Total dissolved solids, DO, CO₂, Hardness, Alkalinity, Chloride, Nitrate were analyzed by the standard methods for the examination of water and wastewater APHA, AWWA (2005)

Observation:

Table: - 1- The average values of parameters of groundwater near Wainganga River from Bhandara district during January 2019 to June 2019

S. No	Parameters	Groundwater (mg/lit.)	
		Bore water SI	Bore water SII
1.	pH	7.8	8.5
2.	Temperature	31 ⁰ C	32 ⁰ C
3.	Total dissolved solids	1200	1250
4.	DO	5.1	5.7
5.	CO ₂	6.5	6.2
6.	Hardness	450	460
7.	Alkalinity	160	185
8.	Chlorides	45	80
9.	Nitrate	70	81

Results and Discussion:

In present investigation varying trends reveal during pre monsoon season water was clear, the average pH was 7.8 at site I and 8.5 at site II similar observation done by Ramakrishnaiah *et. al.*, (2009) at Tumkur Taluka, Karnataka. The average temperature recorded 31⁰C at site I and 32⁰C at sit II. In the present investigation the average value of TDS recorded 1200 at site I and 1250 at site II. Dissolved Oxygen ranged 5.1 at site I and 5.7 at site II. Continuous introduction of effluents in water may support in reduction of dissolve oxygen takes place.

In the present study the average value of CO₂ recorded 6.5 at site I and 6.2 at site II. Hardness in groundwater is mainly due to the presence of divalent cation of calcium and magnesium, in general, hard water originates in areas where the top soil is thick and limestone formations are present Arumugam (2010), in present study the average value of hardness was 450 at site I and 460 at site II. Alkalinity is due to bicarbonate, carbonate and hydroxides ions, in the present investigation the average value of alkalinity was 160 at site I and 185 at site II similar observations done by Rubia Khan and Dalchand Jhariya (2016) in Raipur. Excess quantity of chloride imparts salty taste to water; allergic people are subjected to harmful effects Anitha *et.al.* (2011), in present study the average Chloride value was 45 at site I and 80 at site II.

Higher Nitrate concentration causes many serious diseases in human beings such as gastric cancer, thyroid, diabetes etc... the average value of nitrates was recorded 70 at site I and 81 at site II similar observation done by Kumar *et. al.* (2014) it is found in associated with fertilizers, human and animal waste and sludge discharge, higher concentration of Nitrogen may cause Eutrophication.

Conclusion:

In present study total nine parameters were studied to check groundwater quality for drinking and other purposes. From the above study it is found that the both industry effluents and domestic waste water which is in stagnant form in Wainganga River have adverse effect on groundwater of some parts of Bhandara district near Wainganga river is unsuitable as the value of nitrate, hardness, TDS beyond permissible limits as shown by BIS (2009). Once the groundwater is polluted it is difficult to restore its initial quality. Hence proper management of wastewater is a need of today's world which can help and protect groundwater from contamination.

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