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Deterioration of Groundwater Quality from Unplanned Industrialization: A Case Study

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ABSTRACT
Water is a vital resource that helps society and the economy grow and thrive. Only 1% of the world's fresh water supply (out of a total of 2.5%) is suitable for human use. In many parts of the globe, particularly in rural regions, people rely on groundwater as their primary supply of potable water. One million people rely heavily on underground water supplies.

Nearly 90% of India's rural population relies on groundwater for drinking, household, and agricultural needs, making it one of Asia's most important natural resources. Many places have experienced groundwater contamination problems. Heavy metals, nitrate, and organic compounds like pesticides are the primary contaminants of groundwater. The purpose of this research was to assess the effect of unregulated industrial development and improper waste disposal on the physicochemical properties of ground water in the Samba district of Jammu's Samba division.

***Keywords**: pH, TSS, TDS*

1. INTRODUCTION:

In regions where surface water supplies are inadequate, the rate of groundwater usage is rising.

In contrast to surface water, groundwater is often seen as more sanitary and so more relied upon by the public. Despite being an essential part of the ecosystem and a renewable resource, groundwater is very susceptible to contamination from both man-made and natural sources.with human activities (Prasanth et al. 2012). (Prasanth et al. 2012). Numerous studies have shown that drinking contaminated groundwater poses substantial health risks to people. Groundwater quality is thought to be determined in large part by the local geology and how it reacts to the varying climatic conditions. The degradation of water quality is also significantly contributed to by human activities.

Anthropogenic activity includes, discharge of untreated sewage, effluents, and indiscriminate use of agrochemicals has left the \sgroundwater unsuitable for drinking/agriculture or both. The need for high-quality water has risen in recent years to keep up with the rising demand from the agricultural, industrial, and home sectors.

A significant cause of groundwater pollution is the rapid speed of industrialization and urbanisation that is now a need for a country like India. The absorption capacity of the environment has been exceeded due to the excessive discharge of pollutants. Pollutants from manufacturing are introduced into groundwater resources because these firms do not treat their waste to acceptable limits before discharging it. The discharge of untreated effluent and residential sewage into the groundwater of rural Maharashtra and the area around sugar mills has caused severe pollution (Pawar et al. 1998). In the Kodaganar river basin in Tamil Nadu, the tanneries' untreated effluents have had a major impact on the health of the aquifers below (Mondal, et. al 2005). Pollution of groundwater poses risks to human health, economic growth, and social prosperity in addition to lowering water quality.

Prior to the establishment of factories on the bank of the river Basanter, the ground water quality in a number of villages in the Samba area was high and was effectively utilised for a variety of household uses. Normally, ground water is safe for human consumption, but a study in Samba revealed that the

water there looks to be cloudy. The purpose of this research was to evaluate physico-chemical characteristics to see whether groundwater was suitable for agricultural, municipal, industrial, and household water usage.

2. LITERATURE SURVEY

India has completed a number of initiatives to improve the quality of its groundwater for human and agricultural usage.

Many people, especially in rural areas, get their water supply directly from the ground. The physical, chemical, and biological properties of around 40 shallow wells at the Mae-Hia waste disposal site were analysed by Karnchanawong et al. (1993). as contrast to potable water,

Total and faecal coliforms were discovered to be at very high concentrations in the well water, while nitrate and manganese concentrations were found to be moderately elevated, making the water unfit for human consumption. It was also shown that the well water in the area just surrounding the dumping site had significantly higher concentrations of conductivity, total solids, colour, chloride, chemical oxygen demand, sodium, copper, and lead.

Abed et al. conducted a seasonal study of the groundwater in Paithan, Aurangabad district, Maharashtra, to determine its characteristics. Conductivity, temperature, total dissolved solids, chloride, dissolved oxygen, hardness, phosphate, and pH were some of the other variables measured. (2011) When compared to the ranges suggested by various regulatory agencies, most measures were determined to be perfectly acceptable.

Jasrotia et al. (2007) studied hydrochemistry and groundwater quality throughout the Devak-Rui watersheds to provide the groundwork for planning the sustainable use of groundwater in the growing Jammu metropolitan region and the neighbouring rural areas.

Patel et al. (1994) tested groundwater samples from rural parts of the Rourkela Industrial Complex for 21 physico-chemical parameters, and they concluded that the water was suitable for human use.

Sohani et al. (2001) analysed 16 samples of groundwater drawn from bore wells in different colonies in Nandurbar Town, Maharashtra, for 15 physico-chemical parameters, and found that some of the samples had Iron concentrations that were too high for human consumption, falling instead within the range of 0.0 to 5.80 mg/l established by the Bureau of Indian Standard for drinking water..

3. STUDY AREA

The northern Indian state of Jammu and Kashmir is home to both the summer and winter capitals, Srinagar and Jammu. For instance, the Samba District is located at (32.46, -32.75) degrees north latitude, (74.90, -75.26) degrees east longitude. There are 22 more districts in the state, so this is only one of them.

Located in the southwest of Jammu and Kashmir, Samba is one of the region's districts. Samba is located on the banks of the Basantar River, 40 kilometres from the city of Jammu, and is perched on a chain of Shivalik hills next to National Highway 1A (NH 1A) connecting Jammu and Pathankote. Located in southern Jammu and Kashmir, between the districts of Udhampur and Kathua, and between the tehsils of Jammu and Bishnah to the west, and the International Border between India and Pakistan to the south, lies the district of Samba. The Samba Industrial area is situated on the banks of the River Basantar at a coordinate position of 32.55°–32.58° north latitude, 75.09°–75.12° east longitude. The ground water quality in the villages of Doghur, Supwal, Daboh, Samlah, Katli, Madhera, and Chak Manga within the Samba district was assessed.

4. MATERIALS AND METHODS

Scientists in the present study sampled water from two hundred (200) dug wells and two hundred (200) tube wells in the study area's urban, rural, and industrial regions before and after the monsoons to learn more about the water's chemical makeup.

5. Hydrochemistry of groundwater

Water is an essential commodity at the local, national, and international levels. India is responsible for more than 16 percent of the world's people yet uses just 2.2 percent of the world's land. Development projects in India and elsewhere in the globe rely heavily on groundwater. There has been a dramatic growth in the worldwide demand for fresh water in recent years, and much of India suffers from a severe water deficit every summer. If countries like India's economy are going to continue to flourish, then it's imperative that they prioritise the optimal development and effective use of their water resources. However, in recent years, undesired consequences have followed the improper planning and management and use of groundwater for numerous purposes: Agricultural waterlogging and salinity, as well as industrial and municipal waste contamination, are two potential outcomes of

agricultural usage. The engineering, agricultural, hydrological, and environmental industries are just some of the many that have found success with the use of geographic information systems (GIS) for data storage, analysis, and presentation (Goodchild, 1993). Many academics in India and elsewhere have recently used

6. Conclusion:

Untreated chemical waste discharged from nearby sources contaminates groundwater via its hydraulic connection. Dumbed-down pipes are a key contributor to the groundwater pollution crisis in Samba, which is caused by the surface discharge of untreated industrial effluents into a river. Groundwater may not be drinkable for decades or even millennia after it has been contaminated. Therefore, if not properly treated, industrial effluents may pollute groundwater sources and severely reduce their usefulness.

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