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Assessment of Groundwater Quality of Kanher Stream: Case study from Vanpuri in Purandar Tehsil Dist. Pune

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Abstract: *Ground water quality of ten wells along the Kanher stream in Purandar Tehsil were assessed by using water quality index. The water quality index was calculated by using concerned physical and chemical parameters such asodor, pH, turbidity, temperature, electrical conductivity, totalalkalinity, total hardness, Dissolved Oxygen (DO), Biological Oxygen Demand (BOD) with respect to residential and agricultural use and compared with Bureau of Indian Standards(BIS) to know groundwater quality and seasonal variation. The water quality index of all samples were compared with national sanitation foundation with quality index criteria all (10 samples) groundwater samples were of good quality. The groundwater sample showed the quality changed from good to medium which indicated the seasonal variation due to monsoonal recharge in this region.*

Key Words: groundwater, water quality index, seasonal variation, groundwater, physiochemical parameters, biological parameters.

1. INTRODUCTION

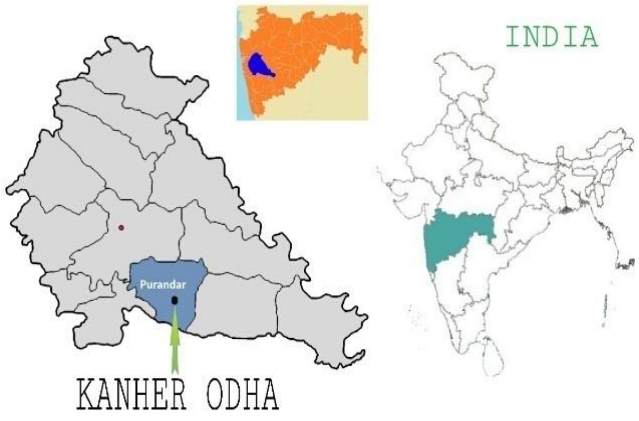
Natural resources are the important wealth of our nation, water is one of them. “No life without water” is a common saying depending upon the fact that water is one of the naturally occurring essential requirement of all life support activities. Water is the most important in shaping the land and regulating the climate. It is one of the most important compounds that profoundly influences living.

Maharashtra is facing increasing environmental problems. The vast population and ever increasing industrial and agricultural activities in state, makes water resources more vulnerable to water quality deterioration. Generally,groundwater resources are considered safe from anthropogenic contamination as the resources are trapped in aquifers and not exposed to human activities.

Mostly groundwater in this area is used for potable and agricultural purposes without any treatment. It is observed that groundwater resources are getting contaminated due to anthropogenic activities, therefore its quality is deteriorating day by day, from source to destination of river. Any change in the in the natural quality may disturb the equilibrium system and would become unfit for desired users.

2. STUDY AREA:

In the present context we opted for Kanher stream from Vanupri in Purandar tehsil. The fan shaped catchment area of Kanher Odha which we opted for our case study was peculiarly chosen as this region was once extremely flourished. But from since last decades the ground water level is constantly depleting and it has also lead to draught like condition in this region. Now days the watershed in rural area of the rural area are also become vulnerable to the contamination of an surface and ground water. This is mainly due to the excessive of pesticides industrial growth above the city area and dumping of human waste. The present Kanher steam is the best example of the same. It has been observed that the groundwater level in this area is constantly depleting despite of average rainfall in this region.



3. ENVIRONMENT

The environment of this area is semi-arid and extremely dry in summer. It has also led to draught like conditions during summers from past few years. There is extreme fall in the ground water level in this area.

4. GEOMORPHOLOGY

The geomorphology of this region is almost the same in all the wells. The uppermost layer consists of black cotton soil. We can see compact weathered basalt in the upper portion of the well. As we move further a band of volcanic bracia will be seen. Moving further deep inside the well natural aquifers are observed flowing through highly jointed compact basalt. Highly jointed compact basalt can be seen even the deepest of the wells in this region.

5. HYDROLOGICAL STUDY

For water analysis 10 wells accordingly samples were collected along the stream were selected, and tests were conducted to study the quality of water and to know if any anthropogenic factor is affecting the ground water. The wells thus selected were from either sides of the stream.The main aim of investigation is to understand whether the water is potable or polluted due to different dissolved minerals and chemicals which will effect on health of residents who are residing in watershed area.

6. MATERIAL AND METHOD

A. Study Area

Kanher Odha is situated in Saswad Tehsil, Pune District in the central part of the state Maharashtra in India. It has a geographical area of 8.950km2, it is bounded by N18^{0}23'03.5'' and E074^{0}04'16.6'' 802, the average annual rainfall varies from 544.30mm to 609.40mm.

B. Sampling

The sampling locations consist of 10 wells along the Kanher stream. Samples were collected during post monsoon season and information was gathered by interacting with the owners. Samples were collected in 1L plastic bottles for analysis such that the sample collected serves as representative sample. The samples thus collected were transported to the laboratory with due care and were analyzed as per standard procedure.

C. Analysis of groundwater

As stated above after knowing the importance of study of behavior of groundwater which was collected from wells from upstream to downstream the groundwater was analyzed for physiochemical and biological parameters.

D. Physiochemical Analysis

The temperature of the samples were noted at their sampling point itself.

A) Physiochemical Parameters:

1) pH
   pH was found to be alkaline in nature in most of the samples
2) Turbidity
   The Bureau of Indian Standard (BIS) (1991) guideline value for turbidity in drinking water is 5 NTU.
3) Temperature
   The temperature of the collected samples were in range (24.4-31.1) °C.

The other physiochemical parameters re stated in the table below.

7. RESULTS AND DISCUSSIONS

Physiochemical Parameters			
Sr. No.	Tests	Readings	Permissible value
1.	Temperature	23	
2.	Odour	Odourless	Odourless
3.	Ph	7.3	6.5-8.2
4.	Turbidity (NTU)	2.1	5
5.	Total Alkalinity	410 mg/lit	600mg/lit
6.	Total Hardness	230mg/lit	>300mg/lit

The pH values of the samples are within the permissible limits. But on the other hand, the Hardness is more. The turbidity results shown in this test were up to the mark but the turbidity goes on increasing as we go in the downstream of the stream. Low pH increases corrosion of concrete. Hard water contains high amount of minerals leading to many negative impacts on human health. This water cannot be used directly in industries.

8. CONCLUSION

From the above samples, we can conclude that the water in the Kanher Odha is high in alkalinity and hardness. There will be number of waterborne diseases arising in the area. Which will include diseases and infections of Cardiovascular tract, digestive issues including constipation, Alzheimer disease, kidney stone, etc. Therefore people should at least boil the well such water before potable use. Considering the industrial use in the nearby areas the water should undergo softening treatment before use else it can lead to corrosion of tools and machinery used in industries.

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