

Total Dissolved Solids (TDS) in Groundwater of Neemkathana Block Sikar, (Rajasthan) India

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Abstract: This paper observes comparative analyses and describes the groundwater TDS level of Neemkathana Block. Seven villages (Ganeshwar, Khadra, Mandoli, Sirohi, Chala, Heeranagar, and Bhudoli) have been selected for analysis and monitoring. The BIS (IS10500:2012) standard method for sampling and testing was selected. Sirohi village groundwater highly deteriorated. As anthropogenic and geogenic activities are continuously affecting to quality of groundwater in the selected block.

Keywords: Groundwater, physio-chemical parameters, TDS, BIS, permissible limit, WHO

1. Introduction

High levels of TDS are caused by the presence of potassium, chloride, sodium, and toxic ions in larger amounts. It is also undesirable to drink because it may taste salty, metallic, or bitter. Low levels of TDS (below 100 ppm) may have a flat or diluted taste so indigestible

Comparative study of water quality standards

Quality of drinking water is a big task and it is responsible for human health because our body consists of water of 60%. World Health Organization (WHO) 1993, recommended a guideline for drinking purposes. The guideline becomes a basis for the different countries to adopt their water quality standards for different uses. Water quality standards are shown in given Table 2

Table 1: TDS level-Water Class (Bruvold, W.H. & Ongerth, H. J)

Excellent	Less than 300 mg/L
Good	Between 300 and 600 mg/L
Fair	Between 600 and 900 mg/L
Poor	Between 900 and 1200 mg/L
Unacceptable	Greater than 1200 mg/L

Table 2: Comparisons of water quality standards

Parameters	BIS (IS 10500: 2012)		US-EPA (2002.)		UNITED KINGDOM		EU (1998)	WHO (1993)
	Acceptable Limit	Permissible Limit	"Maximum Contaminant Levels" (MCLs)	"Secondary Maximum Contaminant Levels" (SMCLs).	Regulatory	Non-regulatory		
Ph	6.5-8.5	No relaxation		6.5-8.5	6.5-9.5		no std	No guideline(1)
TDS (mg/l)	500	2000		500		conductivity 2500 μ S/cm at 20°C	no std	250 microS/cm
Hardness (as CaCO ₃) (mg/l)	200	600	no std	no std	no std	no std	no std	No guideline
Alkalinity (as CaCO ₃) (mg/l)	200	600	no std	no std	no std	no std	no std	No guideline
Nitrate (mg/l)	45	No relaxation	10		50		50	see nitrogen
Sulphate (mg/l)	200	400		250	250		250	500
Fluoride (mg/l)	1	1.5	4	2	1.5		1.5	1.5
Chloride (mg/l)	250	1000		250	250		250	250
Turbidity (NTU)	1	5	no std	no std	4		no std	No guideline

2. Study Area

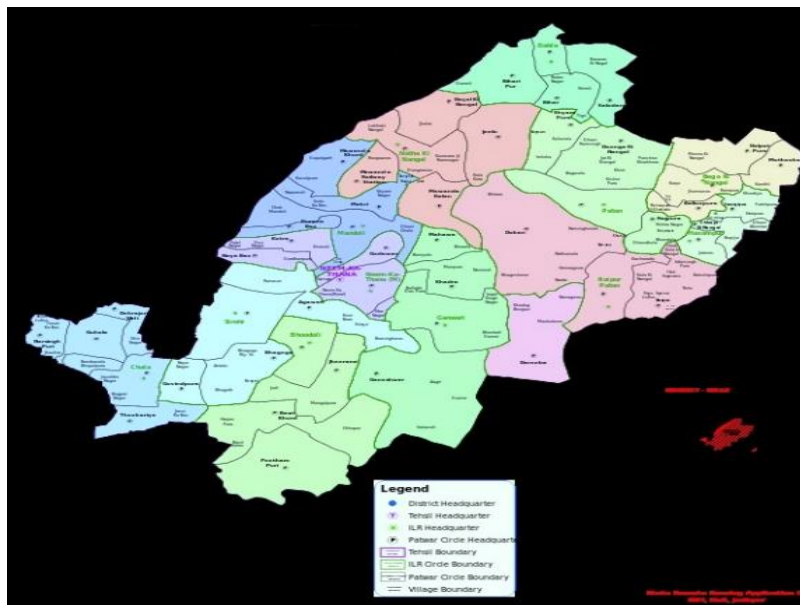


Figure 1: Neemkathana block (source: election commission)

Geographic Location

The latitude of Neemkathana, Rajasthan, India is 27.738001, and the longitude is 75.782997. Neemkathana, Rajasthan, India, GPS coordinates of 27° 44' 16.8036" N and 75° 46' 58.7892" E. The mean annual rainfall is the highest (536.6 mm), hydrological formation of block is older alluvium and quartzite, population estimated to be 511,886 in 2022, Total Number of Villages in this Tehsil list are 192.

3. Result and Data Analysis

Assessment of TDS in groundwater of Neemkathana block

Groundwater samples analysed for TDS (mg/L). Test results for the assessment period for the selected block are-

Table 3: TDS in groundwater of Neemkathana block

Months	TDS in groundwater of Neemkathana block							Mini	Max
	Ganeshwar	Khadra	Mandoli	Sirohi	Chala	Heeranagar	Bhudoli		
Aug-20	1030	760	1015	2430	805	865	805	760	2430
Sep-20	695	765	840	2090	715	640	695	640	2090
Oct-20	905	815	880	2020	665	710	220	220	2020
Nov-20	885	805	855	1910	650	680	745	650	1910
Dec-20	945	835	855	1940	775	680	775	680	1940
Jan-21	910	780	740	1740	920	800	730	730	1740
Feb-21	670	690	730	1860	840	500	540	500	1860
Mar-21	855	722	730	1840	980	600	690	600	1840
Apr-21	920	735	770	1810	1285	680	680	680	1810
May-21	790	740	755	1930	845	570	640	570	1930
Jun-21	925	750	785	1870	1045	670	675	670	1870
Jul-21	910	730	770	1845	995	635	695	635	1845

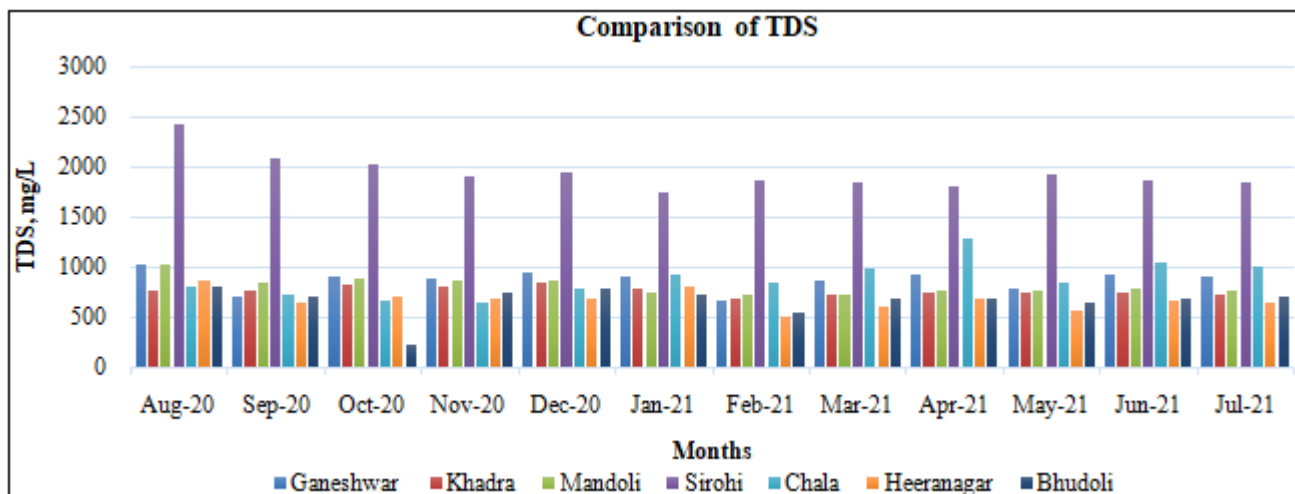


Figure 2: TDS in groundwater in Neemkathana block

Table 3 and figure 2 show that for the assessment period from Aug-20 to Jul-21 TDS in the groundwater of the Neemkathana block shows variation. Acceptable limit is 500mg/L, while permissible limit is 2000 mg/L. TDS is above the BIS (IS10500:2012) acceptable limit of 500 mg/L in Groundwater for all the selected villages of the block. All the selected sources in the block having TDS more than acceptance limit, while for Sirohi village the limit of TDS exceeds the permissible limit 2000 mg/L for few months, Chala and Ganeshwar village of the block also have comparatively more, while Heeranagar having less.

4. Conclusion

Assessment results for the TDS parameters are at an alarming level for the Sirohi village of the selected block, while the other six also have more than the acceptable limit. Neemkathana block is a part of Aravalli hills and above 500 open-cast mines and stone crushers are operated and several have been closed, also so many sand mining mines also operated in the block so a depletion of water level is occurring, with the depletion of water table a continuous degradation of water quality occurring in the block so I like to suggest the monitoring and regulatory body to monitor the water quality and take necessary action.

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