

Water Resource Management based on GIS- A Case Study of Municipality of Sanganer, Jaipur

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Abstract-Tap water is an important source for drinking water and its quality is a critical issue around the India. Tap water quality is affected by different natural as well as anthropogenic processes. As no significant work appears to have been done in hydro geochemistry of tap water in different villages of Sanganer Tehsil, Jaipur, Rajasthan, therefore it is necessary to undertake a systematic study of the area. Dominated by carbonate-bicarbonate and chloride type ones. However, general hydro chemical parameters indicated that most of the samples were within the maximum permissible limits for drinking water. Parameters under study have been found to be highly positive associate PH, TDS, conductivity, turbidity, TH, TS.

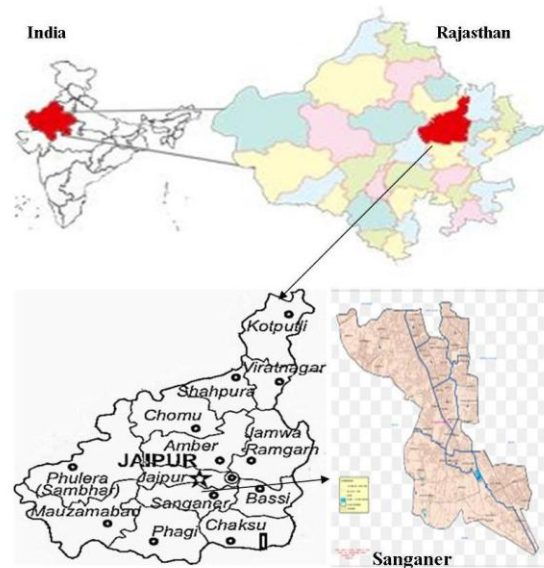
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I. INTRODUCTION

Water has been regarded as huge resource in the form of tap water and surface water. Tap water makes up about 21% of the world's fresh water supply, which is about 0.60% of the entire world's water, including oceans and permanent snow. Deterioration of tap water quality due to different geogenic and anthropogenic activities are of grand concern [1]. Tap water quality in an area is dependent on different physical, chemical and biological factors. Rajasthan state is determined as arid and semi-arid area[2]. Due to scarcity of surface water, majority of the people in Rajasthan, have to confide in upon tap water resources. In many areas, tap water is the available source for drinking water[3]. In this context, rapid increase in human population coupled with increasing urbanization and industrialization has led to a imbalance between water availability and higher water demand[4]. At the same time, good quality of water in adequate quantity should be available to sustain a vigorous life [4]. According to quantitative study is not sufficient for the management of tap water. Qualitative study of the tap water is equally important component of tap water management [6]. As such, the objective of this study is to explore the hydro geochemistry of the groundwater in different villages of Sanganer Tehsil, Jaipur (Rajasthan) and also to find suitability of tap water for drinking purpose.

II. STUDY AREA

Sanganer Tehsil is connected with main Jaipur city. It varies between 26°49' to 26°51' N latitude and 75°46' to 75°51' E longitude. It coverlet an area of 635.5 sq. km. The climate of the area under study is hot semiarid with extremes of temperature (15-42°C) having average rainfall around 650 mm (26 inch.). The location of the sanganer area is shown in the Map-1 given below



Map 1: Study Area Map

III. METHODOLOGY

Total nine samples were collected from different wells, tube-wells or hand-pumps from wards of Sanganer, tehsil. All samples were labeled properly and according to the precondition for the sample analyses. Temperature, pH, conductivity, total dissolved solids while all other parameters were analyzed using distilled water.

Table 1: Analysis of Water Sample of different Places

Latitude	Longitude	ph	TH(mg/l)	TDS(mg/l)	TS (mg/l)	Turbidity(NTU)	Conductivity+	Alkali water (mg/l)
26.820476	75.813558	7.65	560	830	6100	2.5	1.15	16
26.819925	75.814798	7.89	575	770	6230	3	1.13	16.5
26.819925	75.815404	7.76	580	790	6025	2.7	1.17	17
26.817941	75.81721	7.67	590	810	6150	3	1.14	17.1
26.820523	75.81721	7.87	573	825	6152	2.3	1.16	17.3
26.816826	75.817822	7.82	540	795	6115	2.8	1.19	17.1
26.81747	75.817591	7.95	579	811	6135	3	1.16	17.5

IV. RESULTS & DISCUSSION

The values of pH ranged from 7 to 8.9. Minimum pH (7.95) was observed in budhsingh pura (ward no.46). While Maximum pH (7.96) was observed in ward 46. All the water samples were found to be within extreme but were alkaline in nature.

Electrical Conductivity (EC) Minimum (510 $\mu\text{mhos/cm}$) and maximum (4835 $\mu\text{mhos/cm}$) EC was found in sanganer (Sample No.-7). By analyzing the results, all water samples showed Electrical Conductivity higher than permissible limit. TDS (Total Dissolved Solids) Electrical Conductivity signifies the amount of TDS in water. Knowing of the present study were in agreement with the results of the survey conducted. The total dissolved solids in drinking water confess saline behavior of water, which indicates the organic pollution level of water. Minimum (296 mg/l) and maximum (1948 ± 25 mg/l) concentration of TDS was observed from sanganer (Sample No.-9). TDS was found to be within limit in 72.50% wards, lower in 22.50% wards, whereas 5.00% wards showed TDS higher than acceptable limit. It showed highly positive correlation with EC.

Total Hardness (TH) Minimum (73 mg/l) and maximum (1355 mg/l) total hardness was observed in sanganer (Sample No.-9). W.H.O. has validated safe permissible limit for hardness to be 100-500 mg/l. In tap water, hardness is mainly due to carbonates, bicarbonates, sulphates. Total hardness was higher in 7.50% wards; below than permissible limit in 7.50% wards whereas 85.00% samples showed TH within optimum limit.

V. CONCLUSIONS

The study focused on analyzing and evaluating tap water quality in areas with poor quality of drinking water & unfavorable effects on tap water in affected areas of

Rajasthan with particular reference to Sanganer Tehsil of Jaipur District. The salinity hazard is alarming in the study area as 72.5% samples fall in this range indicative of being unfit from the point of view of drinking water as well as irrigation. However, most of the general hydrochemistry parameters of studied samples were within the maximum admissible limit for drinking water.

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