



# Conductivity Variation in Tube Wells and Hand Pump Water Samples

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## ABSTRACT

Physico-chemical parameters of ground water were determined. The results broadly indicate that the quality of water varied considerably from one location to other. Systematic study has been carried out to assess the water quality of River Krishna adjoining areas in Shamli District. Water samples from sampling stations were collected and analysed. Each parameter was compared with the standard desirable limit of that parameter in river water as prescribed by different agencies. The Physico-chemical parameters of ground water of different villages during the pre-monsoon and post monsoon seasons were comparatively analysed. Study has been carried out to assess ground water quality in different villages of Shamli district of Uttar Pradesh. The ground water samples were collected from hand pumps and tube wells. The study area experiences a seasonal climate and broadly divided into three seasons as winter (November to February), summer (March to June) and rainy (July to October). The analytical data of various physicochemical parameters indicates that some parameters are found to be in excess than the prescribed limit. Values of water samples show the contamination of ground water.

**Keywords:** Contamination, Groundwater, Hardness, Hand pumps, Physico-chemical parameters, Tube wells, Water quality

## I INTRODUCTION

Water is essential to man for maintain personal body hygiene. Ground water pollution is an environmental problem that has attracted international attention (Mishra *et al.*, 2009 and Pushpendra *et al.*, 2014)). The difference between atoms is expressed by atomic numbers (Pathak *et al.*, 2014 and Pushpendra *et al.*, 2018). Diverse uses of the rivers are seriously impaired due to pollution. The chief source of pollution is identified as sewage constituting 84 to 92 percent of the waste water. Industrial waste water comprised 8 to 16 percent. Most of the development activity is still dependent upon rivers. It becomes very important to systematically study the status of the pollution of the rivers in the relation to adjoining areas i. e. villages, towns etc (Gautam *et al.*, 2010 and Pathak *et al.*, 2013). Man requires a minimum body intake of water which varies from 2.8 to 5.0 liters per day. If there is no intake of water in to the body then death can occurs within couple of days (Pushpendra *et al.*, 2017 and Mani *et al.*, 2010).

Ground water is the main source of life for many peoples in the world depending upon the climate and temperature (Gautam *et al.*, 2010 and Pathak *et al.*, 2013). The surface water pollution issue has been enlisted as one of the most serious problem in developing countries. Most of the rivers in urban area of the developing world are the end point of

the effluent discharged from the industry (Rana *et al.*, 2014 and Pushpendra *et al.*, 2018). Now a day's men is feeling one off the most severe ecological crises of environmental as well as water pollution is a phenomenon characterized by determination of quality of water as a result of various human activity. Water pollution is related to water borne diseases like typhoid, hepatitis, jaundice, cholera, diarrhea and dysentery. Rapid population, growth land development along river basin urbanization and industrialization are major cause for this (Pushpendra *et al.*, 2011).

These are also responsible for giving rise to water pollution and environmental deterioration. Increased human activities, contamination of surface and ground water by sewage disposal municipal and drainage system are also leading the problem. The Physico-chemical indices are based on the values of various Physico-chemical parameters. In water sample, biological indices are derived from the biological information and are calculated using the species composition of the sample. River water has been used as drinking water and irrigation water of agriculture and for fish culture throughout the history of the mankind (Rana *et al.*, 2014 and Pushpendra *et al.*, 2018). In this study the goal is to access the quality of ground water at different places of different villages. The domestic sewage discharged gives rise to numerous water-borne diseases like typhoid, cholera, dysentery, poliomyelitis, thereby affecting the human health and deterioration of the water quality.

## **II MATERIAL AND METHODS**

The water supply of the Krishna is partly dependent on the rains brought by the monsoon winds from July to October. For this study, the water samples were collected. Sampling station were studied and described properly before the starting of this work. The present study is devoted for valuation off different water quality parameters of groundwater compared on their geography and particular location. On the basis of the preliminary study, sampling locations were selected in the study area. Water sample were collected into plastic bottles of 500ml. All samples were analyzed for Physico-chemical parameters as per procedure prescribed in standard methods and manuals of instruments. Krishna, the mighty Indian River originates from the Saharanpur, remains the source of water of millions of Indians. From its source to its entry in to the Hindon, it travels a distance of around 225 Kms. Shamli is a city in Northern India on the bank of the Krishna River north of Delhi. It is an agriculture pilgrimage centre. Shamli lies along the Krishna River at the boundary between the Indo-Gangetic plain.

## **III EXPERIMENTAL**

The Physico-chemical analysis of water samples were carried out in laboratories of D.J. College Baraut, Baghpat, UP and Delhi Jal Board. The water samples were collected from 16 different spots during different seasons during this period. The samples were taken in BOD bottles and plastic jerry canes and brought to the laboratory with necessary precautions. All samples were labeled properly. All the sampling locations were near about the Krishna River. The river is following from Saharanpur via Shamli district. The concept behind this was that adjoining area of river may be contaminated due to percolation of river pollutants in ground water. The qualitative analysis of water samples, were done to fulfill the objective of the study. The water has been collected during daytime. Sampling is done at each station in plastic sampling bottles of 500ml capacity. Sampling has

been done from the hand pumps and tube wells separately. Sampling stations were situated in the north and south of Shamli. The stream of the Krishna is separated from the other rivers before merging it in to Hindon. Before every sampling site, industries also situated and the effluent also enters into the stream.

#### **IV RESULT AND DISCUSSION**

Conductivity, permissible limit is from 0-1000  $\mu\text{S}/\text{cm}$  for drinking water. The results broadly indicate that the quality of water varied considerably from one location to other (Table-1). In the groundwater sample Conductivity varies from 270 to 1138  $\mu\text{S}/\text{cm}$ . During the pre monsoon season highest value was observed 1138 while the lowest was 270  $\mu\text{S}/\text{cm}$ . In case of post monsoon period highest value was recorded 1334 while the lowest was 421  $\mu\text{S}/\text{cm}$ . There was a quite difference in average values, maximum values and minimum values. These were 577, 1138, 270 and 804, 1334, 421  $\mu\text{S}/\text{cm}$  during premonsoon and post monsoon respectively.

#### **V CONCLUSION**

Effective monitoring and control of ground water pollution requires the expertise from various disciplines. In India it is reported that about 70% of the available water is polluted. After the analysis of water samples of Hand pump and Tube wells from different locations results were compared. Suitable suggestions were made to improve the quality of water. Inside the body of a human being, there is a skeleton, which makes your body solid and makes sure you can stand up without falling apart. Water is also a kind of skeleton. It consists of tiny particles, the atoms, just like every other substance on earth. The flooding of rivers at the time of excessive rains increases ground water percolation. It may create dilution of pollutants in ground water chambers. Even the polluters like industry also suffer due to increased pollution of the rivers. Ground water pollution has several dimensions.

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Table 1: Variation in Conductivity at Various Sampling Sites (Villages/ Towns) of Shamli District in Hand pumps and Tube wells during Pre-monsoon as well as Post-Monsoon

S N	Villages	Source	Conductivity		
			Pre monsoon	Post Monsoon	Difference
1	Lilon	Handpump	429	893	-464
		Tubewell	666	778	-112
2	Kabaraut	Handpump	353	975	-622
		Tubewell	478	1120	-642
3	Khandrawali	Handpump	270	591	-321
		Tubewell	288	513	-225
4	Hasanpur	Handpump	429	499	-70
		Tubewell	795	850	-55
5	Lisadh	Handpump	468	494	-26
		Tubewell	819	955	-136
6	Kiwana	Handpump	1138	1334	-196
		Tubewell	1121	1308	-187
7	Kandhala	Handpump	492	529	-37
		Tubewell	329	421	-92
		Avg	577	804	-228
		Max	1138	1334	-26
		Min	270	421	-642