

Quality Assessment of Ground Water of Kashmir

Sajad Shakeel Dar* Simarjot Kaur**

* Student at Department of Civil Engineering RIMT University, Punjab

** Assistant Professor, Department of Civil Engineering RIMT University, Punjab

ABSTRACT:

The present paper deals with the ground water quality of Kashmir (J and K) India for human consumption and other purposes. A total of six sampling sites in the study area were selected for water quality assessment. The sampling sites are named as Pampore, Ganderbal, Batamaloo, Budgam, Sopore and Sumbal. For assessing water quality in the study area, 9 parameters - pH, electrical conductivity, total dissolved solids (TDS), total suspended solids, chloride content, sulphate content, and turbidity, were considered. The calculated values of sodium adsorption ratio (SAR) integrated with the electrical conductivity indicated that the ground water in the study area can be utilised for irrigation purpose without any threat of imposition of any hazard to crop soils. The analytical data from the study area also confirms that the ground water present in the study area is suitable for domestic purposes excluding a few locations.

Keywords: Kashmir, Ground water, Conductivity, chemical affinity, alkalinity

INTRODUCTION

Groundwater has become the major source of water for agriculture and human consumption in many countries where river and drainage systems are insufficient to meet the requirements. Therefore, poor groundwater quality is a matter of worry. The valley of Kashmir is a home to abundant fresh water resources like glaciers,

lakes, springs, rivers, streams and groundwater. These water resources are used for irrigation, electricity generation and recreational purposes. There are about 144

Glaciers in the Himalayan region of Jammu and Kashmir, Kolahoi being the biggest of all, spread over 2.63 sq. km as per the recent studies. For centuries, natural springs have been providing clear mountain water to the

valley. Anantnag, Baramulla and Srinagar have a predominance of them.

The importance of ground water for the existence of human society cannot be underemphasized. Ground water is the major source of drinking water in both urban and rural areas of India and other countries. In certain advanced countries like Germany and Netherlands, nearly 70% of drinking water comes from ground water as revealed by studies..Although groundwater development in Kashmir valley is at its primary stage, but it is expected that its demand will increase in future due to urbanisation and population expansion. Ground water crisis is not the result of natural factors, but it has been caused by human activities. During the past two decades, the water level has been falling rapidly due to dry weather conditions especially during autumn, giving rise to drought like situation. This study attempts to assess the physico-chemical characteristics of ground water of Kashmir to obtain prior information about its usefulness and suitability for drinking, irrigation and other domestic purposes.

Generally, water quality parameters are indicators of drinking water use, while water quality indices such as sodium adsorption ratio (SAR), residual sodium carbonate (RSC), residual alkalinity (RA), Kelly's ratio (KR), permeability index (PI),

chloroalkaline indices, potential salinity (PS), magnesium hazard (MH) (or magnesium adsorption ratio; MAR), total dissolved solids (TDS) and total hardness (TH) based on primary water quality parameters are frequently used to determine quality of water for the purpose of irrigation. In the present study, six groundwater samples collected from bore wells were analyzed for different physicochemical parameters.

MATERIALS AND METHODS

Representative groundwater samples for the present investigation were collected from 6 sampling sites. The water samples were collected in clean 2.5 litre polythene bottles, which were first cleaned by rinsing with distilled water. Prior to sample collection, bore wells were flushed for about 10 minutes to obtain therequired samples. The physico-chemical analysis was carried out as per the standard methods (APHA, 2005). While temperature wasanalyzed on spot, other parameters-pH, electrical conductivity, total dissolved solids (TDS), total suspended solids, chloride content, sulphate content, turbidity, iron content and manganese contentwere analyzed within 24 hrs of sampling in accordance withthe standard methods.

RESULTS AND DISCUSSION

The quality of ground water is of great importance in determining the suitability of a particular ground water for a certain use. The physico-chemical parameters of ground water play a significant role in assessing

water quality. The results of physico-Chemical parameters of ground water samples are given in table 1. Satellites pictures of the sampling sites taken from Google maps 2021 are also given.

Table 1

Parameter	Concentration Values						Desirable Limit
	A	B	C	D	E	F	
pH	7.1	6.7	7.6	6.6	7.5	6.4	6.5 – 8.5
Conductivity ms/cm	0.306	0.308	0.282	0.298	0.302	0.280	0.05 – 0.5
Turbidity (NTU)	3	2.6	1.9	2.4	2.5	1.8	Not more than 5 NTU
TDS g/l	1.21	1.84	1.62	1.61	1.46	1.34	Not more than 2
Sulphate Contentmg/l	2.51	34.15	8.24	36.11	31.31	25.43	Not more than 200
Chloride Contentmg/l	93.33	182.55	155	111	182	156	Not more than 250
TSS g/l	0.23	0.3	0.25	0.1	0.2	0.28	Not more than 0.5
Manganese content	0.21	0.33	0.28	0.4	0.2	0.3	

A – Pampore, B – Ganderbal, C – Batamaloo, D – Budgam, E – Sopore, F - Sumbal

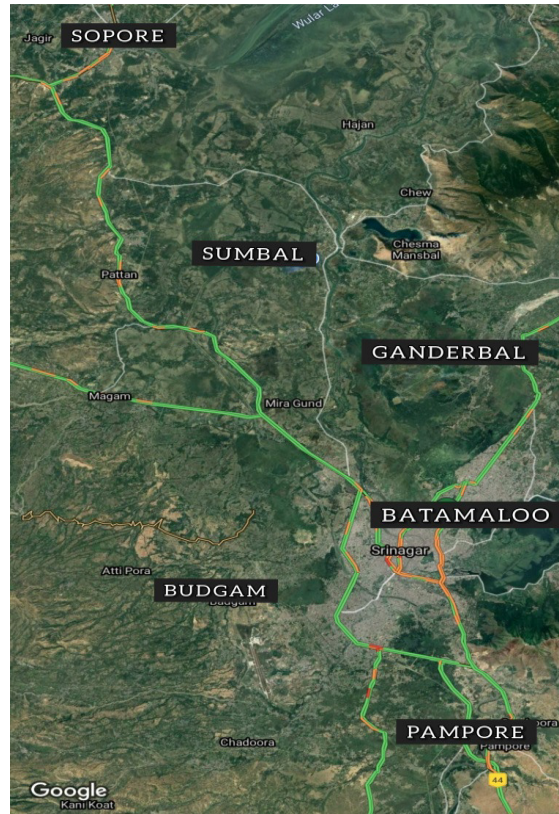
During the study period, samples from all the sites showed neutral to alkaline pH ranging 6.4 to 7.6. During investigations highest pH 7.6 was recorded at Batamaloo site and lowest value 6.4 at Sumbal site. The lowest conductivity value 0.280µS/cm was recorded at Sumbal and highest value of 0.308µS/cm was recorded at Ganderbal.

During the present study, the turbidity of ground water samples was found to be in the range of 1.8 to 3, with lowest value of 1.8 at Sumbal and highest value of 3 at Pampore site.

The concentration of the total suspended solids of the ground water samples varied

from 0.1 to 0.3g/L. The maximum value of 0.3 g/L was recorded at Ganderbal site in the and minimum value of 0.1g/L at Budgam site..Concentration of Sulphate, one of the most pronounced minerals, was observed to vary from 2.51 to 34.15g/L. The maximum concentration of 34.5g/L was recorded at Ganderbal and minimum concentration of 2.51g/L was recorded at Pampore site.The concentration of manganese was observed to vary from 0.2 to 0.4g/L. The maximum concentration of 0.4g/L was recorded at Budgam site and minimum concentration of 0.2g/L was recorded at Sopore site. In the present study, the concentration of Chloride varies from 11.1 to 182.5mg/L. The maximum concentration of 182.5 mg/L was reported from Ganderbal site and minimum concentration of 11.1 mg/L was recorded at Budgam site. (TDS) total dissolved solids content of ground water samples ranged from 1.21 to 1.84g/L. The minimum value 1.21 g/L was found at Ganderbal site and the maximum value 1.84g/L was from

Sopore site. The sodium adsorption ratio of ground water samples recorded a range of 0.59 to 11.23meq/L. The maximum concentration of sodium adsorption ratio 11.23 meq /L was recorded at Sopore site and minimum concentration of 0.59meq /L was recorded at Pampore site.



Sampling Sites(Source – Google 2021)

ACKNOWLEDGEMENT

The authors would like to thank each and every person who helped them in one or the other way during the study.

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