



A Review on Groundwater Pollution of Chandigarh and Adjoining Areas

Arshpreet Kaur, Simerjit Kaur* and Alice Sikhan

Department of Life Sciences, Rayat Bahra University, Mohali-140104, India.

Abstract: Chandigarh, also called 'The City Beautiful', is the fastest growing area where population is increasing day by day which leads to more water consumption. Water is the one of the most important natural resource used for the survival of living beings. But its quality is degrading day by day due to human activities and industrialization. Groundwater is the natural as well as fresh resource on earth. Quality of groundwater is also not much better because it contains harmful chemicals such as fertilizers, degradable waste, etc. Samples of groundwater were collected from various location of Chandigarh and adjoining area (Panchkula, Mohali, Zirakpur) to evaluate the groundwater quality of the region. Therefore, findings have shown that industrialization have a negative impact on groundwater quality as well as on human health.

Keywords: Groundwater quality, Physiochemical analysis, Water pollution, Water Quality Index, Water analysis.

1. Introduction

Ground water is an important component for the survival of life. It is polluted due to the human activities such as release of harmful chemicals directly and then; it goes deep down in soil. Through soil, it enters into groundwater and make it polluted. Municipal solid waste disposal also leads to the groundwater pollution [1]. There is a huge need of treating this polluted water in order to avoid health problems in Man and Animals as well [2]. Groundwater pollution is a very common issue. The water quality due to the introduction of pollutants is a problem of great concern around the world. This research shows that there is presence of large quantity of heavy metals in drinking water according to the range set by International Organisation like, WHO [3].

2. Objective

The main objective of study to review the groundwater quality for drinking purpose in Chandigarh, Mohali, Panchkula and Zirakpur.

2.1 Study Area

Chandigarh city is the capital of Punjab and Haryana. It is located by foothills of Shivalik range of the Himalayas in northwest India. The approximate area of

Chandigarh is 114km sq. Panchkula city is the connecting link between Chandigarh, Mohali and Zirakpur. It covers an area of 816 km sq. approximately. Zirakpur is located by foothills of Shivalik. Mohali, also called Sahibzada Ajit Singh Nagar. Chandigarh, Mohali and Panchkula collectively known as Tricity.

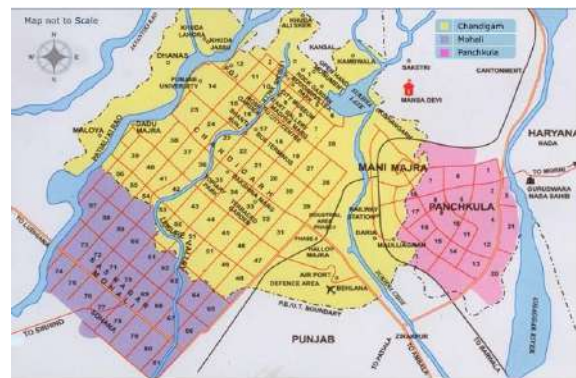


Fig. 1: Map of Chandigarh, Mohali and Panchkula (Tri-city).

3. Literature Review

Central Pollution Control Board (CPCB) studied on the water quality of Ghaggar River (ADSORBS, 2010). This study shows the presence of high value of TSS (228 mg/L), BOD (393 mg/L) and COD (921 mg/L) [4].

Study was carried out at Dhakoli village in the municipality of Zirakpur, Mohali, Punjab, India to know the effect of industrialization on groundwater quality as well as on human beings. The study was

conducted in two phases. First phase includes collecting groundwater sample from 10 different spots of particular area and second phase includes the survey conducted over 1500 peoples in a particular area. The results show that the Ph was not within permissible limits. Water samples are basic in nature. TDS also found beyond permissible limits. The water samples in this region are hard. Hence, from the above results its proved that the water is not healthy to drink in Dhakoli. Because of this polluted water, peoples living in this region mostly suffering from skin and stomach diseases [2].

Work on different sectors of Chandigarh to check the water quality. This study involves the effect of chemicals on surface water as well as groundwater around industrial area. This study gives results that in or around industrial area, water temperature is more than that of other areas. High level of total hardness is shown in surface water and in ground water [5].

Groundwater samples were taken from shallow and deeper aquifers showed that shallow aquifers were found more polluted than deeper aquifers. There is high level of EC (Electrical conductivity), TDS and TH in shallow groundwater samples. Both aquifers are alkaline in nature. More hardness and

more nitrate content were observed in Shallow aquifer [6].

Studies carried out Characterization and treatment of industrial waste water near Dera Bassi area (Pb) in Ghaggar River, region under observation includes different districts of Haryana and Punjab like Panchkula, SAS Nagar (Mohali), Patiala, Ambala and Kaithal revealed that the pollution in Ghaggar River comes from point and non- point sources. Large amount of heavy metals found in the river released by industries. And, agricultural waste also contributes in polluting River Ghaggar [7].

A study on the groundwater samples of various district of Punjab. SAS Nagar, Mohali district also involved in their study. They found good quality of groundwater in this region which is fit for drinking and cultivation purposes [8].

A study on evaluation of Groundwater artificial recharge wells in Chandigarh showed that groundwater level is less deep because of good amount of rainfall during pre- monsoon season [9]. According to the report of CGWB on Aquifer Mapping & Management Plan in Panchkula concluded that Groundwater in Panchkula region is basic in nature and fresh for drinking. Butit's also found that Iron content is more only in Patwi, comes under Panchkula [10].

According to the report of CGWB on Aquifer Mapping & Management Plan in SAS Nagar District, Punjab, concluded that the quality of groundwater is fine for drinking and agriculture purposes. It is observed that the level of groundwater is low. Groundwater is basic in nature and healthy for drinking. It was concluded that concentration of fluoride found to be more in Gholumajra. Nitrite content was more in Isarpur, Derabassi, Antala and Landran. More amount of iron found in Isarpur-1, Isarpur-2, Handesaran and Sirsini. So, day by day, in this region groundwater quality is deteriorating because of natural and human activities [11].

A study on Groundwater Quality in Haryana, India has shown that quality of groundwater in Haryana has been degrading day-by-day due to human activities and geological process occurring in earth crust. Heavy metals like iron, fluoride, arsenic and nitrate also found which are beyond permissible limits that results in polluting groundwater [12]. An investigation on water quality of lakes in Haryana, India has shown the high value of EC was recorded because of basic nature of water. So, it proved that water quality was poor in this region [13].

Twenty groundwater samples were taken from Dera Bassi, Punjab and Panchkula, Haryana. From above study, it was concluded that 10% of groundwater samples are unfit for drinking.

A study on the quality of groundwater for drinking purpose in South- Eastern part of Panchkula city, Haryana, India revealed that ammonia is found to be non- potable in Sector- 28- C and in sector- 26, Panchkula. Water samples of Sector- 28- A, 28- B, 25 and Market, Ramgarh found to be permissible. Nitrate and Groundwater quality was non- potable in Sector- 26, Panchkula [15].

Studies have shown that the Magnesium ratio shows 53.33% groundwater sample location was fit for cultivation purpose. Results of Residual sodium carbonate showed that 20% of groundwater samples good for cultivation, 36.66% were marginally fit for cultivation and 43.33% of samples are not suitable for irrigation purpose [16].

A study on the groundwater quality of Baltana area in Zirakpur, Punjab and Sector- 19, Panchkula City, Haryana, India revealed that non- potable iron and ammonia content was found in Tribune Colony, Baltana.

Non- potable nitrate content found in Saini Vihar, Baltana. Non- potable iron found in Vaishali Enclave, Baltana. Non- potable iron as well as nitrate found in Sector-19, Panchkula. Overall groundwater quality of all four locations shows that water is non-potable [17].

4. Conclusion

It has been concluded that the main cause of groundwater pollution is urbanization & industrialization. As, industries release all the harmful chemicals into water body which directly or indirectly pollute the groundwater; hence, groundwater is unhealthy for drinking purpose. It was also

observed that quality and level of groundwater is declining rapidly and there is need to protect and the quality and level of groundwater by taking protective measures. Spreading awareness among public regarding groundwater pollution and its bad effect will help to save and maintain groundwater quality and environment.

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