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A Study of Water Quality of Chambal River Basin in (Rajasthan)

Vandana Ankodia
Assistant Professor
Dept. of Chemistry,
Govt. College,
Bundi, Rajasthan

Abstract

Water samples were collected from different parts of river basin. The result obtained in the present investigation that the concentration of fluoride, Nitrate, iron was excess in sample of the water sources. The Fluoride amount was very high range, which may cause health hazards for human being. The result concluded the river Basin water had a considerable effect on water quality for fertilizer and human activity.

Keywords: River Basin, Chambal, Fluoride.

Introduction

Chambal river originates from northern slope of singar chouri peak, at an altitude of 884.4m, in the vindyan ranges. It flows in Madhya Pradesh and Rajasthan. From Kota, It makes boundary between Kota and Bundi district and then boundary between Rajasthan and M.P. Passing through Sawai Madhopur, Karauli and Dholpur. It enters U.P. and flows about 32 Kilometers before joining the Yamuna near Bhareh. In Rajasthan, Chambal basin extends over part of Chittorgarh, Bhilwara, Bundi, Sawai Madhopur, Tonk, Jhalawar, Kota, Baran and Dholpur districts on its south, east and west, the basin is bounded by Vindhyan mountain ranges and on the north-west by the Aravallis. Four main dams on Chambal river. Length of Chambal River is approximately 965 km. It flows in Rajasthan 225 km. Tributaries which meet in Rajasthan on left side are Bamni, Banas, Kural Mej etc.. Where as tributaries which meet in Rajasthan on right side are Kali sindh, Parvan, Parvati etc. Kota is only one major city on the bank of Chambal river in Rajasthan. Chambal river Basin is located in eastern Rajasthan, bounded by Banas and Mahi Basins lie to its west and Gambhir and Parbati Basins to its north. Its eastern and southern edges border Madhya Pradesh state. Total catchment area of the Basin is 31460 sq.km.

The western part of the Chambal Basin is marked by hilly terrain belonging to the Vindhyan Chain, with fairly sloping terrain along the Chambal river and its tributaries. East of Kota- Jhalawar lies an extensive alluvial plain sloping gently north words towards the Yammna river in Uttar Pradesh. The mean annual rain fall over the Chambal basin was 797 m.m. of which about 93% fall during the four monsoon months (June-September).

Aim of the Study

A river basin is the entire area drained by a river, including its tributaries. The best approach to conserving the fresh water resources is through managing river basins sustainably. Any activity that takes place in a river basin has impacts down-stream. River basin are important from hydrological and ecological point of view. They absorb and channel the run off from snowmelt and rainfall which, when wisely managed, can provide fresh drinking water as wellas access to food. Hydropower, building materials, medicines and recreational opportunities.

River basins often contain fertile soil, water resources enough to grow a great deal of food and agricultural products. But when humans, came up with the machinery to divert, contain and central rivers, there was the belief that we knew better than nature. But river basins are built by the physics of water flow, erosion, deposition of sediment, plant and wildlife, change one factor, and everything changes. We are still learning how to do this, and many river basin project made in the last century have created slow motion disasters. The need to conserve and manage fresh water ecosystem at the basin scale is increasingly being recognized by governments and other. The main aim of the present investigation is to high light the pollution load in the Chambal river basin.

Experimental

The sample was collected in various villages of Chambal basin during Jan. 2016 to 2017 in Kota, Jhalawar, Baran, Sawai Madhopur, Bundi, Tonk, Chittorgarh districts Rajasthan India. The sample which collected from different sources analyzed as per standard procedures to know the chemical status of water.

The Tabular representation of the affected habitations in each district is reproduced here.

District : Kota

Block	Type of contamination				Total affected habitation
	Salinity	Fluoride	Nitrate	Iron	
Itawa	180	-	-	-	180
Khairabad	10	24	-	-	84
Sangod	9	1	-	-	10
Ladpur	4	4	-	-	8
Sultanpur	140	1	-	-	141

District : Jhalawar

Block	Type of contamination				Total affected habitation
	Salinity	Fluoride	Nitrate	Iron	
Bakani	-	11	1	-	12
Dug	2	29	2	-	33
Jhalrapatan	18	12	1	-	31
Khanpur	1	-	-	1	2
Manoharthana	-	12	-	-	12
Pirawa	7	11	-	-	18

District: Sawai Madhopur

Block	Type of contamination					Total affected habitation
	Salinity	Fluoride	Nitrate	Iron	Flouride + salinity	
Sawai Madhopur	8	16	1	-	1	26
Khandar	2	-	-	-	-	2

District: Bundi

Block	Type of contamination					Total affected habitation
	Salinity	Fluoride	Nitrate	Iron	Flouride + salinity	
Hindoli	35	2	-	-	2	39
Nainwa	33	2	-	-	4	39
K.Patan	47	9	-	-	1	57
Talera	53	6	-	-	5	64

District: Chittorgarh

Block	Type of contamination					Total affected habitation
	Salinity	Fluoride	Nitrate	Iron	Flouride + salinity	
Pratapgarh	-	15	16	-	-	31
Arnod	-	9	5	-	-	14
Rawatbhata	3	-	13	-	-	16
Begun	2	-	-	-	-	2

District: Tonk

Block	Type of contamination					Total affected habitation
	Salinity	Fluoride	Nitrate	Iron	Flouride + salinity	
Deoli	-	156	-	-	-	156
Uniara	-	140	-	-	-	140
Tonk	-	176	-	-	-	176

Result and Discussion

Fluoride

Fluoride content in ground water is relatively less in Chambal Basin than in other part of Rajasthan. In this basin, less than 10% areas of Baran and Bundi districts, 25% area of Kota, Jhalawar and Chittorgarh district and 50% area of Bhilwara, Sawai Madhopur and Dholpur District floride concentration in ground water is in excess of the permissible limit. High values of fluoride are recorded in Tonk (10.8 ppm), Sawai Madhopur (7 ppm), Bundi (25 ppm), Kota (2-3 ppm) and Chittorgarh (2ppm)

Nitrate

Nitrate in excess of the permissible is reported in 47-5% village. About 50% of the area in district and 25% of the area in Kota and Jhalawar district falling in the basin are affected by high nitrate concentration in ground water in excess of the permissible limit. It is less than 10% in Bundi and Baran district. High value of nitrates are reported in

Chittorgarh (345 ppm), Tonk (240 ppm), Sawai Madhopur (250 ppm), Bundi (196ppm) and Jhalawar (123 ppm) district.

Iron

High value of iron in ground water is noted in Chittorgarh (19-7 ppm), Bundi (10.45 ppm) Baran (7-8ppm), Jhalawar (4ppm) and Kota (3.1 ppm) district of the besin.

Salinity

Salinity problem is noticed in 50% of the area in Bundi districts, 25% of the area in Kota and Jhalawar districts and less than 10% in Baran and Chittorgarh districts of the basin. High values of TDS exceeding the maximum permissible limit of 20000 ppm are reported in Jhalawar, Bundi and Chittorgarh district of the basin.

Conclusion

The results indicated that presence of fluoride in ground water may be attributed to in-situ occurrence of fluoride minerals derived from the basement rocks. High concentration of nitrate in ground water may be due to heavy application of fertilizers in the field which seeps down as applied irrigation water. High concentration of iron is attained by waters with law pH (acid waters). In ground water such as wells, iron is the most common dissolved chemical. Iron is an essential mineral, but when it gets into your drinking water, it needs to be removed. Iron in water has many negative effects like skin problem. They can damage healthy skin cells, which can lead to wrinkles. Water with iron has a metallic tast to it, which makes it very unpleasant to drink.

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