P: ISSN NO.: 2394-0344 RNI No.UPBIL/2016/67980 VOL-5* ISSUE-8* November- 2020
E: ISSN NO.: 2455-0817 *Remarking An Analisation*

Stage of Ground Water Distribution in the Selected Villages of Sardar Shahr Tehsil of Churu District

Paper Submission: 15/11/2020, Date of Acceptance: 26/11/2020, Date of Publication: 27/11/2020

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Abstract

Surface and Ground water are systems linked with each other. In Coastal region salinization problem is significant for ground water contamination. The transitionof ground water in to the surface waters contributes a noticeable change in theground water environment besides heavy metal cycling.The largest available source of fresh water lies underground. As a result of this, different techniques for investigation of the occurrence and movement of ground water resources have been developed. Even with the discovery of vast amount of ground water today, there is a great concern about ground water depletion and contamination. There is a need to understand, protect and manage the groundwater resources of the study area.

The present work has the objective of understanding the spatial distribution of ground water in and depth of ground water in the selected villages of the Sardar Shahar Tehsil.

Keywords: Ground Water, Sustainable Development, Global Issue, Geological Formation.

Introduction

Ground water is very precious for the growth and development of life on earth. Ground water stores under the surface in the form of aquifers by percolation through rocks. This acts as filter and improves its quality. There is continuous increase in the demand of water resources due to increasing population. This natural resource is over exploited in different areas of earth making it scarce and contaminated. There is a need to understand, protect and manage the groundwater resources of the study area.

The situation of ground water exploitation is also not satisfactory as in areas where surface irrigation is provided there is a tendency of not using ground water for agriculture which creates problem of water table rise and even water logging. On the contrary, in large areas of the State, ground water is being over exploited and the water table in some areas is going down even at the rate of 3 meter per year. Our ancestors were very careful about the harvesting of rain-water and conservative use of ground water. But with the expansion of population volume and consequently enhanced use of ground water for drinking, industrial and irrigation purposes, the balance of ground water recharge and exploitation has lost its existence. The result has been reflected in the shape of drying-up of existing resources of ground water.

Objective of the Study

Due to their significance the aim of the work is pointed out in the following way:

1. To analyses the water resources of the study area.
2. To determine the trends of water table.
3. To determine the variations in depth ground water of the study area.
4. To suggested better measures for management of ground water.

Review of Literature :

There has been lot of research done in this field at global and national levels. Many organizations are engaged in this work. The brief description is given below.

Barathi (2004) She simulated groundwater flow using Visual MODFLOW.

Mohan and Muthukumaran (2004) carried out a modeling of pollutant transport in groundwater in Palar river basin.

Mukherjee (2006) stated that industrial disposal of effluents on landand subsequent pollution of groundwater and soil of surrounding farmlands is relatively new area of research.

Hassan et al (2008) evaluated the use of the generalized likelihood uncertainty estimation (GLUE) methodology in analyzing the results of stochastic groundwater models.

Kelly (2008) A statistical study of historical water quality data was undertaken by to determine how urbanization activities have affected shallow (<60m) ground water quality.

Kraft et al (2008) identified that the leakage of pollutants from agricultural lands to aquifers has increased greatly, driven by increasing fertilizer and pesticide use.

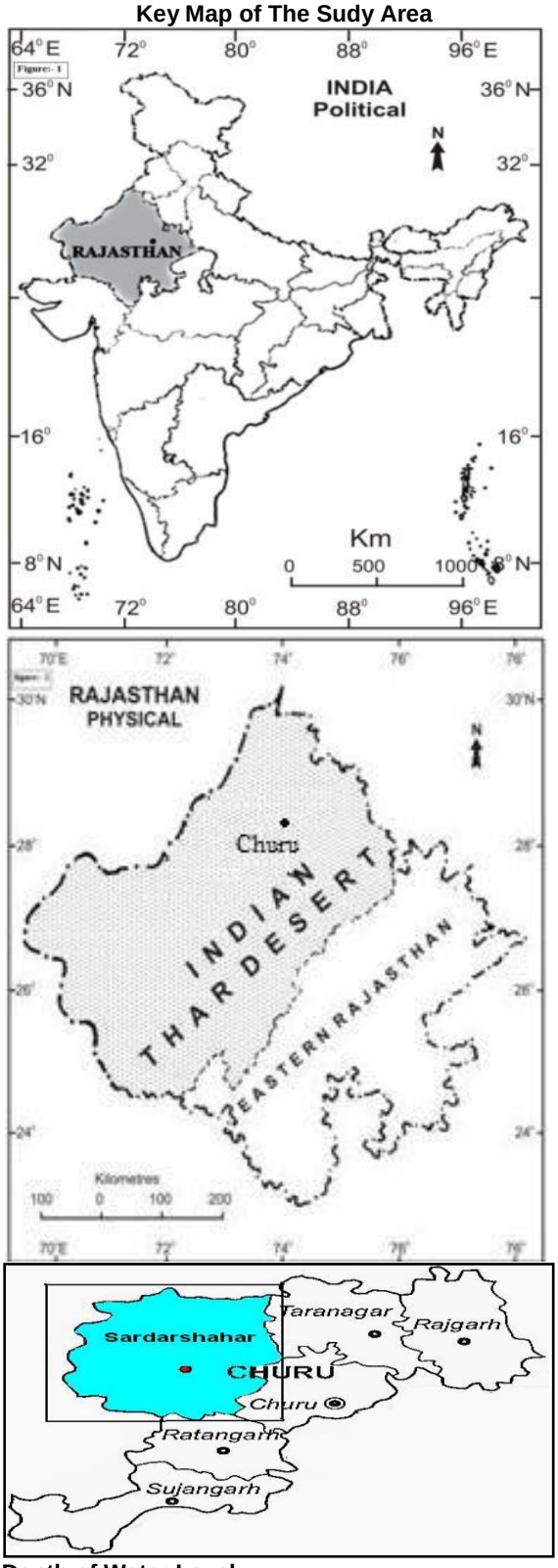
Methodology and Source of Data

The present study is based on secondary sources of data. 10 villages of the Tehsil have been taken as a study unit. Data of water level has been collected from Phed Office, Churu, District Ground water Report, Churu and Department of Ground water, Rajasthan.

Study Area

The Sardar Shahar is a tehsil of district Churu situated in the heart of the Thar Desert in northern Rajasthan. Sardar Shahar Tehsil is located between 28°.45" degrees 28° 26' 59" North of the Equator and longitude 74°.48" degrees 74° 28' 48" East of the Prime Meridian on the Map of the world. The Sardar Shahar city is the Tehsil Head quarter of the tehsil also. Sardar Shahar city named after Sardar Singh, a Maharaja of Bikaner. It is known for grand havelis (mansions) with frescoes. This city is also known for its handicraft work, silver work and wood works. It is the birthplace of Eleventh Acharya (Religious head)-Acharyashri Mahashramanji of Shri Jain Terapanthi Sect. Sardar Shahr is also known for its sweets.Sardarshahr city is situated 285 kilometers from state capital Jaipur and 56 kilometers from district headquarters Churu. It is around 130 kilometers from Bikaner. The city is connected to nearby tehsil Ratangarh through rail line. Main transport inside the city is Auto-Rickshaw. The city is also well connected with other important cities of the state, Bikaner & Sri Ganganagar using a mega highway and state highway network. The Sardar Shahar city has dry climate with a large variation in temperature. In the city minimum and maximum temperature varies from 0.5 to 48.2 degree Celsius. The normal rainfall is only 32.8 cm in the city. According to census data 2011 the city has a population of 95911.

Key Map of The Sudy Area



Depth of Water Level

Data of Depth to water level and data of pre-monsoon & post-monsoon periods and fluctuation of water-table of the year 2010 and 2019 have been computed in these tables.Data of depth of water level has been collected from PHED, office Churu. After analyzing the data we found that in 2019 the highest

depth of water was measured at Tolasar Village. The depth was 140 meter here which was highest. And in the year of 2019 depth of water level in this village was 140.50 meter.

Table no. 01: depth of water level and fluctuation in key wells - 2010

Sr.no.	Name of village	Total depth	W.l. pre monsoon	W.l. post monsoon	Fluctuation
1.	ASALSAR	43.56	43.03	43.26	-0.23
2.	ASPALSAR	55.47	45.66	45.50	0.16
3.	BARJANGSAR	59.75	47.47	46.95	0.52
4.	DHANI PANCHERA	49.34	44.12	43.57	0.55
5.	GAMTIA	95.67	77.65	77.60	0.05
6.	RANSISAR	74.69	66.38	66.42	-0.04
7.	SOMASAR	59.80	58.01	58.02	-0.01
8.	TOLASAR	140.00	54.66	54.23	0.43
9.	UDASAR BIDAWTAN	38.93	37.52	37.64	-0.12
10.	UDASAR LODERA	39.80	36.33	36.22	0.11
11.	BILLYOOWAS	52.30	46.59	46.05	0.54
12.	KANWLASAR	63.60	51.25	51.13	0.12
13.	MELUSAR	31.93	26.86	27.66	-0.80
14.	RANASAR BIKAN	39.65	39.15	39.98	-0.83

Source: Ground Water Department, Govt. of Rajasthan

Study of both tables reveals that out of these 14 locations total 08 villages has depth of water level beyond 50 meter in 2010. But in the year of 2019 this number was 10. Total 10 villages out of these 14 had the depth of water level above 50 meter. In 2010only 05 key wells/PZ has water level below 50 meters. Wells/PZ situated in Asalsar, Tolasar and Ranasar Bikan has depth of water level above 100 meters in the year of 2019.

Depth of Water Level, Sardar Shahar

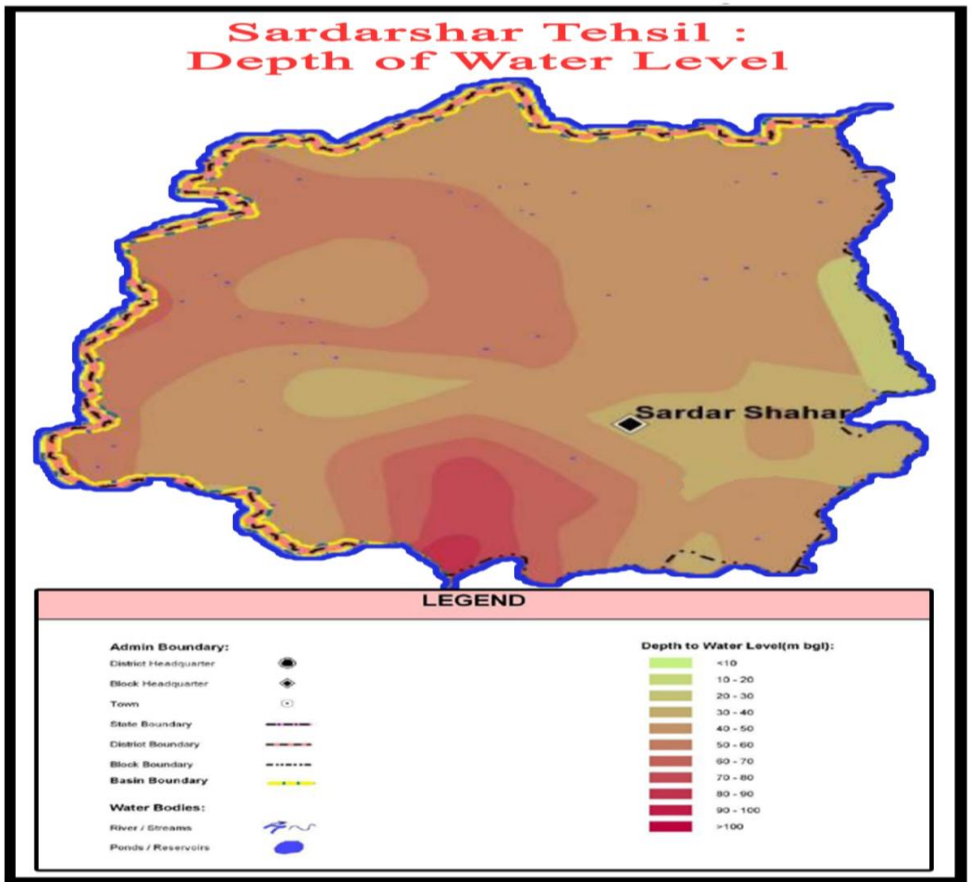


Table no. : Depth of Water Level and Fluctuation In Key Wells - 2019

Sr.no.	Name of village	Total depth	W.l. pre monsoon	W.l. post monsoon	Fluctuation
1.	ASALSAR	125.00	46.50	45.16	1.34
2.	ASPALSAR	55.47	45.30	45.18	0.12
3.	BARJANGSAR	59.75	47.30	47.68	-0.38
4.	DHANI PANCHERA	49.34	44.30	44.22	0.08
5.	GAMTIA	95.67	92.60	92.84	-0.24
6.	RANSISAR	74.69	64.15	62.18	1.97
7.	SOMASAR	59.80	57.30	57.18	0.12
8.	TOLASAR	140.50	57.40	58.13	-073
9.	UDASAR BIDAWTAN	38.93	37.85	38.26	-0.73
10.	UDASAR LODERA	39.80	37.85	37.82	0.03
11.	BILLYOOWAS	52.30	48.90	48.81	0.09
12.	KANWLASAR	63.60	54.20	54.14	0.06
13.	MELUSAR	38.00	27.05	27.17	-0.12
14.	RANASAR BIKAN	125.00	39.80	39.76	0.04

Source: Ground Water Department, Govt. of Rajasthan

Comparative study of the data of both tables reveals that water level depth of the tehsil from 2010 to 2019 has increased too much. Key well/PZ at Aslasar and Aspalsar observed the depth of water level 43.56 meter and 55.47 meter but in 2019 same locations has observed depth of water level 125 meter and 55.47 meter. It declares that depth of water level in Aslasar village has decreased very much and Asplasar has the same depth as 2010. The record decreased in water level has been observed at Ranasar Bikan village. In 2010 total depth of water level at this location was 39.65 meter but in 2019 water level decreased very much at this location. It was observed 125 meter in 2019.

Fluctuation of Water

An initial net-work of key-wells and piezometers was established at the villages and panchayat samiti level in the tehsils for periodic monitoring of water-table fluctuation behavior. However, its shape and size has been changing every year either with the construction of new piezometers or with the drying-up/silting of existing key-wells/piezometers. These hydro-stations are being monitored regularly during pre- and post-monsoon surveys every year.Data of Water fluctuations of the year 2010 and 2019 has been given in table no. 01 and table no. 02. The comparative study of both tables has revealed that water-table fluctuation shows a very wide range in its magnitude.

Conclusions

Variations in availability of water in time, quantity and quality can cause significant fluctuations in the economy of a country. Hence, the conservation, optimum utilization and management of this resource for the betterment of the economic status of the country become paramount. As the summary it is found that depth of water level in selected villages of Sardar Shahr tehsil is increasing year by year. There is a must need to make better policies to management of the water resources and sustainable development. Although in the comparison of other tehsils of churu district Sardar Shahar tehsil is in “safe zone” marked by govt. authorities. But still there is much more need to work for the development of water.

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