Research Paper Engineering

Analysis of Rain Water Harvesting System for Artificial Recharge of Groundwater for Gandhinagar District, Gujarat

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ABSTRACT

In the present world scenario, In a progressive and developing society it is natural that demands of water always remain on the rise. Rainfall is seasonal and is not evenly distributed. So, we face the fury of floods and droughts. Every increasing human population has escalated the consumption of water. This has created a tremendous pressure over water system like lakes and rivers. Underground water table is also depleting alarming due to excessive tapping in the dry seasons. We are entering an era which availability of freshwater is becoming scarce. Fresh water is a gift of nature to living beings. Rain is the main source of fresh water. Rainwater harvesting and artificial recharge structure are innovative method to solve this demand.

Gandhinagar is the capital of Gujarat state the problems of low water level and water quality standard is affected in the whole district. The piezometric well and artificial well data analysis by bar chart and using Golden Surfer Software. The study is useful to know effectiveness of artificial recharge in water level and water quality.

KEYWORDS | Artificial Recharge.

INTRODUCTION

As rain is the main source of fresh water, any agent that threatens the downpour causes water scarcity. For most of the water problems among the people, the improper handling of irregular rainfall is a major cause. It is important to discover ways and means of saving water. The quantity of water that is actually recharged into the aquifer is very small than the requirement of water. As huge quantity of rainwater finds its way ultimately to sea through rivers, the only alternative is to harvest and conserve this precious gift of nature by Rainwater Harvesting. Artificial recharge is an innovative method of increasing the amount of water, which enters the ground water reservoirs. The concept has been widely spreading in the past few years. Artificial Recharge of surplus water and artificial storage of rainwater can modify the hydrological cycle.

Though Gandhinagar is the capital of Gujarat state the problems of low water level and water quality standard is affected in the whole district. The state government had restricted to bore a tube well below certain limit in Gandhinagar district. The problem of water lvl. And water quality in Gandhinagar district is shown in fig below.





RAINWATER HARVESTING AND ARTIFICAL RECHARGE

Rainwater harvesting is the accumulating and storing, of rainwater.

Artificial recharge is one method of modifying the hydrological cycle and providing ground water in excess of that available by natural processes

ADVANTAGE OF ARTIFICIAL RECHARGE

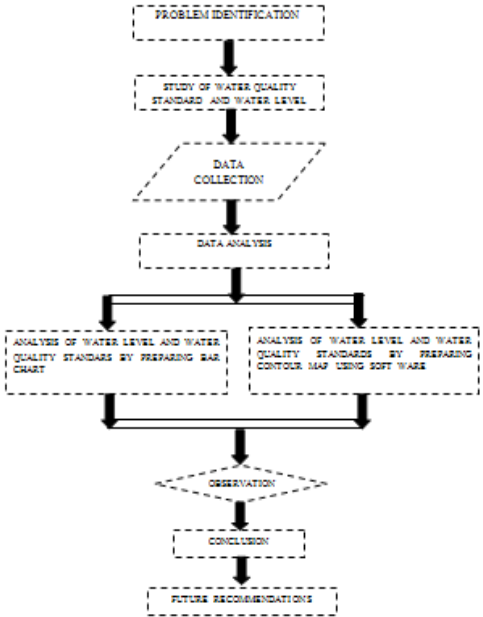
- Steam the Decline of water levels.
- Supplement existing supplies.
- Remove suspended solids by Filtration through soil.
- Store cycle water surplus for use in dry periods.
- Prevent seawater intrusion and salination of ground water.

STUDY AREA



Gandhinagar is the capital of Gujarat state. Located at Latitude (23° 13′ 0″ N) Longitude (72° 41′ 0″ E). The district has an area of 2,163, 48 km^2, and a population of 13,87,478 of which 5,99,539 were urban (2011 census).The district includes four talukas - Gandhinagar, Kalol, Dehgam and Mansa and it has 287 villages. Gandhinagar district is bounded by the districts of Sabarkantha to the northeast, Kheda to the southeast, Ahmedabad to the southwest, and Mehsana to the northwest. The city is situated on the banks of the Sabarmati River, in north-central-East Gujarat. According to the Bureau of Indian Standards it is under seismic zone-III.

METHODOLOGY



DATA COLLECTION AND ANALYSIS

- Water level and water quality data of Piezometric wells pre monsoon and post monsoon from year 2000 to 2013.
- Water level and water quality data of recharge wells pre monsoon and post monsoon.



Fig. Comparison of Water Level from Oct 2003 to Oct 2013

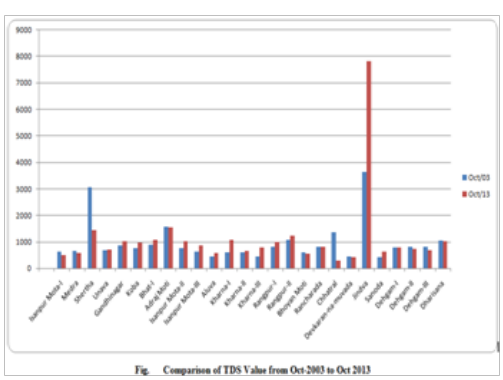


Fig. Comparison of TDS Value from Oct-2003 to Oct 2013

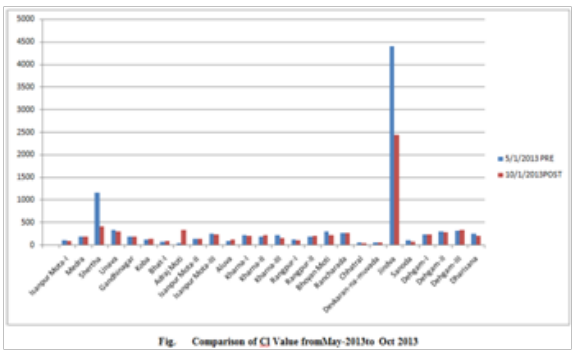


Fig. Comparison of Cl Value fromMay-2013to Oct 2013

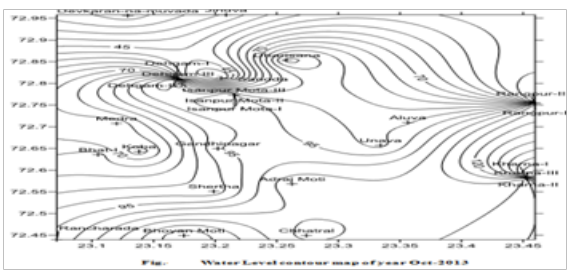


Fig. Water Level contour map of year Oct-2013

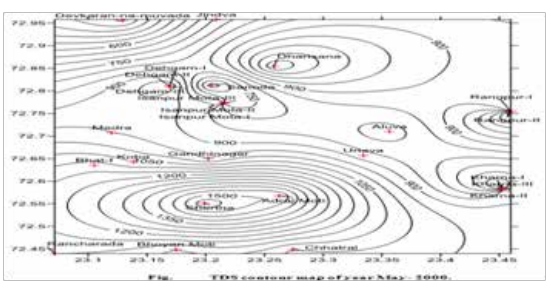


Fig. TDS contour map of year May- 1999.

CONCLUSION

1 It has been observed the study area having good aquifer to absorb ground water.
2 Because of annual recharge, water table is increased which is responsible for decreasing TDS, Cl, and F.
3 It has been observed that pre monsoon and post monsoon data of the TDS, Cl, F, value is more than the desirable value which are alarming for the health.
4 As per the piezometric well data analysis the average ground water table level had increased 9.12% , average TDS value in water had decreased 5.64% and average Cl value in water had decreased 10.92% over one decade.

REFERENCES

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