Impact Assessment Of Check Dam On Artificial Recharge Of Ground Water – A Case Study Of Chotila Taluka In Gujarat

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Abstract

Artificial recharge structures are constructed with the objective of augmenting ground water resources and to improve its quality. Impacts Assessment of check dam on ground water recharge are studied. The Check Dams chose which are constructed in Chotila Taluka in Gujarat for this study. Rainfall data collected from nearby rain gauge station and data showing water level in the well are collected from observation well for the assessment of the impacts of check dam on ground water recharge. The data collected for water level from observation well is plotted in column chart and discussed the effectiveness of check dam.

Keywords: Artificial recharge, Grond Water, Check Dam, Impact assessment, Water table.

I. INTRODUCTION

Check Dams are low cost dams (approximately below Ten Lacks rupees), which are built across streams to prevent rain water from flowing away into the sea. Check Dams serves mainly two purposes; the first is to provide direct irrigation when rain fails, and the second is to facilitate the recharging of surrounding wells through percolation of water. Additionally they also provide water for other purposes such as bathing, washing clothes, and drinking water for animals. Area selected for impact assessment is Chotila Taluka of Gujarat, situated at 22°24’ North altitude and 72°12' East longitudes. This is a drought prone area with an annual rainfall of 490 mm and 80 percent variability of rainfall. It is very essential to set up water harvesting structure, especially check dams in all possible places for saving every drop of water. It has been observed that the study area have good aquifer to hold ground water.

II. METHODOLOGY

1. Check Dam Details: There were phase wise construction of Check Dams in study area from Year 2001 to year 2006 under Government and Non-Government Organization. All these five Check Dams have their identification code with other details like latitude, longitude, and village name, name of stream and date of completion.

2. Methodology: The observation well data located within the area of Check Dam’s influence is used for the study. The behavior of water table is studied by preparing column charts for the data collected from the observation well over a period of time from 2000 to 2009 for interval of three year. The impact assessment of ground water recharge on ground water table is studied for this location after comparison of using charts.

III. STUDY AREA

Area selected for impacts assessment is Chotila Taluka of Gujarat, situated at 22°24’ North altitude and 72°12' East longitudes. This is a drought prone area with an annual rainfall of 490 mm and 80 percent variability of rainfall. It is very essential to set up water harvesting structure, especially Check Dams in all possible places for saving every drop of water. It has been observed that the study area have good aquifer to hold ground water

IV. DATA COLLECTION AND DATA ANALYSIS

1. The average rainfall in the area obtained with the help of Meteorological data of Chotila as shown in Figure 1 for the period of 9 years span (2001 to 2009).

2. Details of Check Dam constructed at study area (Source: Rajkot Irrigation Project Circle, Rajkot).

Table No. 1

Sr. No.	Code No of Check Dam	Name of Check Dam	Latitude of Check Dam in Deg/Min/Sec	Longitude of Check Dam in Deg/Min/Sec	Name of River, Steam or Vokli	Completion Date of Check Dam
1	286	CD - 1	22° 24' 30" N	71° 12' 30" E	Local vokli	17.03.01
2	287	CD - 2	22° 24' 55" N	71° 12' 30" E	Local Vokli	17.03.01
3	565	CD - 3	22° 24' 30" N	71° 12' 40" E	Bodavalu	21.07.05
4	566	CD - 4	22° 24' 50" N	71° 12' 40" E	Nanavada	18.08.05
5	579	CD - 5	22° 24' 30" N	71° 12' 00" E	Bekoshi	22.05.06

3. Preparation of table showing the pre-monsoon and post-monsoon water depth (meter) from ground level in observation well.
(Source: The Geohydrologist, Unit-1, Data Center, Ahmedabad.)

Table No. 2

Well No	Description	Year 2000		Year 2003		Year 2006		Year 2009	
		Pre	Post	Pre	Post	Pre	Post	Pre	Post
B1	WL from GL in meter	17.35	11.4	12.5	10.5	12.6	4.85	12.5	6.85

4. Preparation of Column Chart and Line chart to compare and correlate the water table fluctuation in observation well, pre-monsoon and post-monsoon to assess the impacts of Check Dam on ground water recharge both quantitative and qualitative.

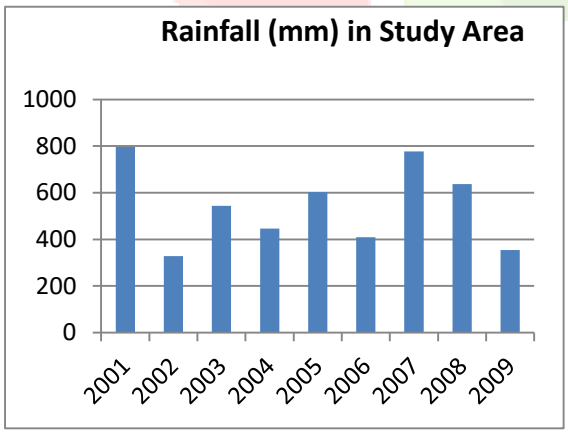

Figure 1. Yearly Average Rainfall

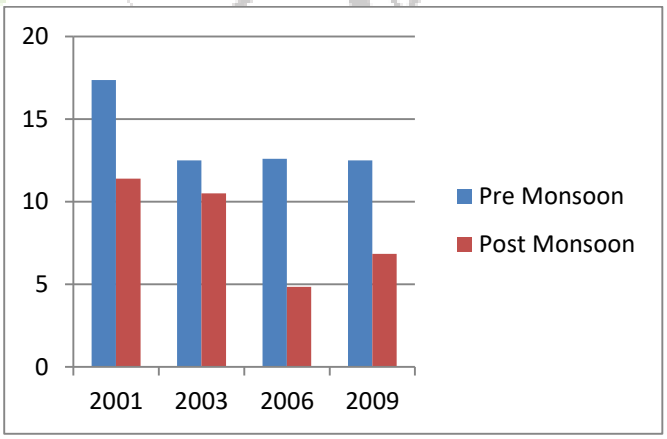

Figure 2. Comparison of pre-monsoon and post-monsoon water depth (meter) from ground level

V. RESULTS

1. A perusal of Table No.2 indicates that the depth of water table from ground level decrees by 4.85 m for pre-monsoon period and 4.55 m post-monsoon period for period of eight year (2001 to 2009) The results reveal that the increased water level is stable even in case the moderate rainfall for year 2009.

2. The overall study from figure 1 and figure 2 indicates the rise of water table after artificial recharge of ground water by constructing check Dam

VI. CONCLUSION

1. Check Dam is small water harvesting structures present a major alternative to conventional water resource development. These small rainwater harvesting structures can be well distributed in place where the rainfall is moderate. Rain water harvesting by constructing check dam can be very useful in semi-arid and dry sub-humid regions where the variability of rainfall is large. It has been observed that the study area has good aquifer to hold ground water. Check Dam is small water harvesting structures present a major alternative to conventional water resource development in the region.

VII. REFERENCES

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