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PATHRIKAR PRAMOD B.
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Research Papers

GEOLOGICAL AND HYDROLOGICAL STUDY OF PHULMBRI TALUKA AURNGABAD DISTRICT

PATHRIKAR PRAMOD B.
Research scholar Nims University
Jaipur

Abstract

The area under investigation stretch along Phulambri Taluka along with Phulmasta River which is Sub- basin of Girja River. The thickness and the extent of basaltic flow throw the focus on availability of ground water. Deccan basaltic flow the ground water occurrence depends mainly on the factors like jointing pattern and variation of thickness and lateral extent of different flows.

The main objective behind the present study is to locate favorable sites for percolation of water. Effective percolation could be achieved through water conservation by resorting to certain water conservation measures for sustainability of ground water reserve.

For the purpose in hand 10 scattered villages falling in the Phulambri Taluka along Phulmasata River bank of Girja river were Geohydrological investigated. The area under investigation is 13 kms EW and 4.5 NS spread along side of river. The msl of area caries in between 645m at maximum and 610m. at the minimum thereby exposing 99m vertical thickness for direct observation. On the basis of detailed well inventory carried out in 15 well, a Lithology showing Geohydrological variation was prepared. With the help of Lithology and surface geological survey favorable as well as unfavorable sites for water percolation were demarcated such demarcations will be guideline for taking water conservation measures for ground water sustainability.

Introduction:

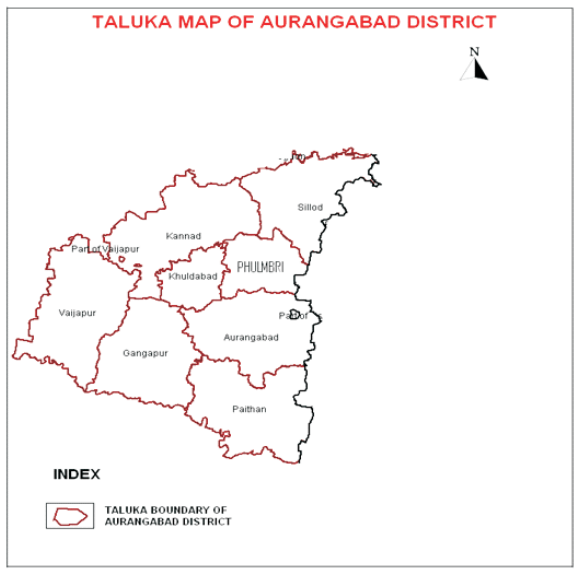
Fresh water is expected to become the most limiting resource in many parts of the India in the near future. When precipitation in the form of rain, snow, sleet, or hail reaches the ground, it can take any number of pathways. Groundwater plays an important role in supporting plant and animal life. Roughly 22% of the Earth's freshwater is groundwater. However only about one-half of that is actively exchanged through the water cycle. Water table levels fluctuate depending on how much water enters the system at recharge areas and how much is withdrawn. Recharge areas are surface areas where precipitation or surface water infiltrates the soil to enter the groundwater system. This research paper about the role of Geology and Hydrology in the recharge a groundwater in Phulambri Taluka.

METHODOLOGY:

Base line hydrogeological survey for Phulambri Taluka was conducted with a view demarcates the Aquifer boundaries, for managing the groundwater resources for the long-term sustainability of drinking water sources. Well inventory survey will be carried out for geohydrological character of the basaltic lava flows.

LOCATION:

Study area falls between the 200 10'05`N 750 20'10`E having elevation difference 35m (max 645 and min 610) The area of Phulambri Taluka shows large variation in Geohydrological characters Average annual rain fall is 750m.



Groundwater condition

The irrigation wells and drinking water purpose well can take for observation. The observation shows the well which is taken as river basin area which is give all season groundwater soundly. There is problem for area which is well cannot take or near the river basin there is no groundwater for summer season. The depth to water level maps for pre and post monsoon is prepared separately. The pre monsoon water level indicate that the Northeast part in the watershed has water level at 6 to 9 m bgl where as remaining part having 9 to 12 m bgl, most of the wells goes dry during summer. During post monsoon north east part of the watershed covers up to 3m level. Whereas remaining part represents the 3 to 6 m water level.

As we know rainfall is the only source for surface storage and groundwater recharge and generally 80% of the total rainfall is drain out of the basin in the form of runoff. Considering the geomorphologic set up specific yield of aquifer and riparian right of the downstream stakeholders, balance runoff for the further development can be utilized.

Aquifer in study area

An aquifer is a layer of porous substrate that contains and transmits groundwater. When water can flow directly between the surface and the saturated zone of an aquifer, the aquifer is unconfined. The deeper parts of unconfined aquifers are usually more saturated since gravity causes water to flow downward.

The upper level of this saturated layer of an unconfined aquifer is called the water table or phreatic surface. Below the water table, where generally all pore spaces are saturated with water is thephreatic zone.

Substrate with low porosity that permits limited transmission of groundwater is known as anaquitard. An aquiclude is a substrate with porosity that is so low it is virtually impermeable to groundwater.

WELL INVANTOR DATA OF STUDAY AREA:

TABLE NO.1

Sr.No.	Depth in mtrs	2006	2007	2008	2009	2010	5Year Avg
1	10.80	8.80	6.15	8.3	6.6	6.3	7.23
2	19.25	4.60	7.80	8	4.6	4	5.80
3	11.60	6.00	5.40	6.9	8	7.7	6.80
4	13.70	12.80	12.10	12.4	12	11.9	12.24
5	11.00	10.90	5.90	7.8	7.7	7.7	8.00
6	18.80	18.80	15.50	16.25	13.1	16	15.93
7	11.30	7.50	8.05	8	6.6	5.2	7.07
8	14.90	11.70	12.90	13.2	9	9	11.16
9	12.00	9.50	8.40	9.25	8.3	5.9	8.27
10	9.25	6.90	8.70	9.2	9.95	6.7	8.29
11	12.00	7.60	5.50	7	7.5	8	7.12
12	15.00	5.20	7.65	8.4	5.7	6.6	6.71
13	18.80	16.60	10.80	12.9	7.1	10.7	11.62
14	13.20	12.90	12.00	12.16	13.2	11.5	12.35
15	23.00	21.10	17.90	18.8	18	18.9	18.94

GEOLOGY OF THE AREA:-

The area falls in the terrain if Deccan trap basalt consisting of two major type of basaltic flows viz. compact basalt and amygdaloidal basalt, compact basalt is a thick and extensive flow. It may be aphanites or porphyritic in nature. Jointing pattern in the compact basalt plays important role in the percolation of water. But jointing pattern shows variation even within short distances. Joints may be inconsistent, broadly spaced or closely spaced. Top of the compact basalt is almost always hydrothermally altered and becomes amygdaloidal. Amygdaloidal basalt is not permeable when fresh. But it becomes permeable due to development of sheet jointing which is an intermediate stage of weathering. It also shows limited permeability at some places where it develops broadly spaced jointing pattern particularly when amygdales are scanty. Because of all these variations there are limitations in the occurrence of groundwater.

In the area following flows are demarcated in and their characters are studied from the available scattered open dug wells i.e. from well inventory data.(Table- 1)

CONCLUSION

1. A large number of irrigation wells in the trappean area can be made more productive by deepening to allow full penetration of the weathered and fracture zone and the under laying vesicular or zeolitic units,
2. Instead of dug wells, it would be more economical to put radial boreholes of 4 to 8m length from near the bottom of well below average summer static water level to allow increase the yield of dug well considerably.
3. Construction of new dug wells may be taken up according to balance groundwater available for future groundwater development watershed wise.
4. Decline of water level and reduction in yield is observation as compared to previous data.
5. The aquifer is unconfined and replenished by rain fall infiltration.
6. The groundwater quality is potable for drinking and irrigation yield.

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