



A STUDY OF FLUCTUATIONS IN THE LEVEL OF UNDERGROUND WATER IN JALNA DISTRICT, MAHARASHTRA STATE, INDIA

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Abstract- Water existing in the voids of the geographical stratus below the surface of the earth is called underground water. The use of underground water for various purpose has been enhanced in multiple and there by due to over withdrawal of underground water than the natural recharge of it levels are going down. Therefore the depleting trend of underground water levels due to overexploitation prompted to swith over to deep borewells. It is found that the periodical natural recharge is not sufficient to region the original water levels and hence attempts are to be made to study the spatio-temporal changes in the level of underground water. In pre-monsoon season(2008) average water table recorded 11.6meters in the disctrict out of fifteen sample villages, six villages are marked water table below the district average, where as nine sample villages have registered water table above the district average in the year 2008. Most of the wells in the districts are observed that there increase in water table during monsoon season. In post monsoon season the wells along river have surface level water table. The highest fluctuations from average is recorded at Badapur and Malkapur villages.

Keywords- Ground water, Fluctuation in water table, Depletion of underground water

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Introduction

Underground water is most widely distributed in the earth's crust and it is a replenishable resource of the nature. The distribution of underground water depend on the geology of the area i.e. the aquifer material, its structure, composition, porosity and permeability. The study area is having diversified geological characteristic and landforms. The slightly dissected plateaus occurring in the Godawari valley from a good potential zones. Where highly dissected plateaus occurring at the higher reaches of the major valleys, from the run off zone. The underground water potential is expected to be poor. The valley filled areas along major rivers, i.e. the Godawari, the Purna and the Duddna are covered alluvial deposits. The alluvium consists of silts and sand, therefore, acts as a good aquifer. These areas are therefore, favorable for occurrences and movement of underground water.

Objectives

The main objective of the present study is to analyze the spatio-temporal variation in the yield of underground water and seasonal fluctuation in the level of underground water.

Study Area

Jalna district is characterized by diversified land including, the Ajantha ranges, extensive plateaus, river valleys, and hills with step slopes. It is approximately situated in northern direction of Marathwada region. Total number of villages are recorded 1540 in

the district, out of which 15 villages [Fig-1] are selected for case study of fluctuation of underground water. The average annual rainfall in the district is about 700mm. The district often experiences drought, whenever rainfall recorded as low as 400mm to 450mm. It is resulted on the level of underground water, which is found declined during the period of investigation.

Database and Methodology

For examining the fluctuations of water table of wells, the data are collected from fifteen sample villages and two wells are selected from two villages of each tahsils of the district except Jaffrabad tahsil where only well is chosen from one village. It is supplemented by the information given by the Groundwater Surveys Development Agency (GSDA, 2008). Underground water is studied in relation to the level of water table in pre-monsoon and post-monsoon seasons and fluctuations of water table. The collected data is processed and presented in the form of graphs.

Result and Discussion

for the present study of the fluctuation in the level of underground water, Wells of villages are taken as samples for unit. Which are randomly selected from eight tahsils of the district. The level of underground water is studied in pre-monsoon and post-monsoons seasons, whereas the variation in the fluctuation of underground water is also considered in the same period.

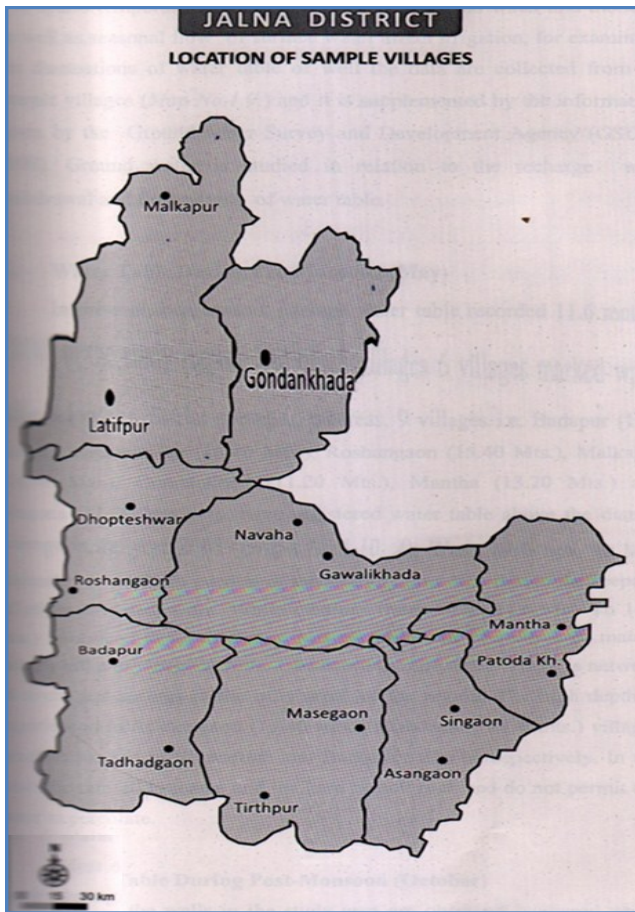


Fig. 1- Location of Sample Villages of Jalna District

Water Table During Pre-monsoon (May)

In pre-monsoon seasons, average water table was recorded 11.6meters in the study region. Out of 15 villages 5 villages marked water table below the district average, where 10 villages i.e. Badapur (12.6meters) Dhopteshwar (18.4meters) Roshangaon (15.4meters) Malkapur (14.4meters) Gondankhed (11.20meters) Mantha (13.20meters) and Singona (11.20meters) etc. have registered water table above the district average in the year 2008 [Fig-2]. Water table up to 10meters recorded in southern portion of the study region. It is due to the seepage of irrigated area. While medium water table (11.6meters to 14.6meters) is noticed in northwestern and southern part of the study area, mainly Jalna's hill and Gabuwat hill, Ghansawangi hilly area. There is network of rivers and springs in the hilly area of the district. The high depth is experienced in Roshangaon (15.40meters) Malkapur (14.40meters) villages, which is located in Bhokardan and Badnapur tahsils respectively. In the west the rainfall is scarce and the hard basalt rock bed do not permit the water to percolate.

Water Table During Post-monsoon (October)

Most of the wells in the study area are observed increased water table during post-monsoon season. In post-monsoon season, the wells along the river have surface level water table [Fig-3] depicts the level of water table during post-monsoon period in the district. The shallow water table (below 3meters) is recorded in Badapur, Lotifpur (2.30meters), Gawalipokhar (2.10meters) villages of Am-

bad, Bhokardan and Jalna tahsils respectively. About seven villages are recorded level of water table below district (6.4meters) average i.e. Badapur, Tadhadgaon, Latifpur, Malkapur, Thirthpuri, Gowalipokhar and Potodakh villages, which may be related to the prevalence of springs. The high depth of water table is found in Dhopteshwar, Roshangaon, masegaon and asangaon villages. It is only be due to low rain fall, thin soil, cover resulting in to recharge of water [Fig-3].

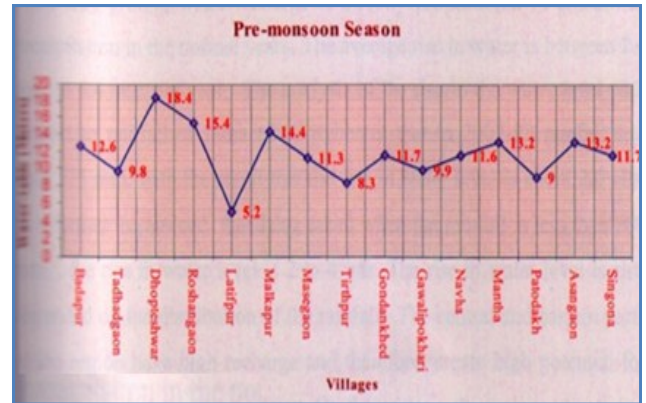


Fig. 1- Pre-monsoon fluctuation in the level of underground water (2008)

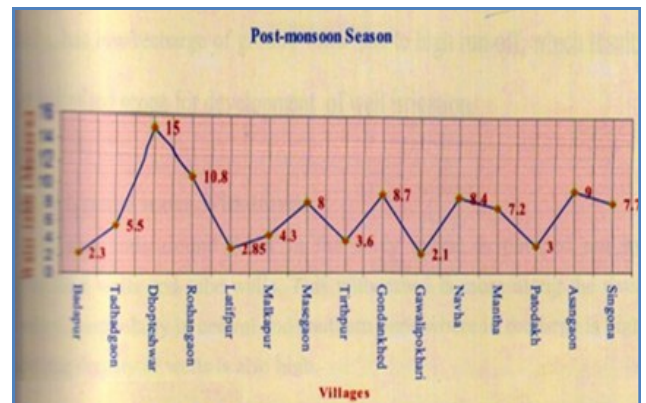


Fig. 2- Post-monsoon fluctuation in the level of underground water (2008)

Fluctuation in Water Table

The fluctuation in water table in different seasons are remarkable. The average water table during pre-monsoon period is marked 11.6meters, which ranges remarkable from below 2.4meters to above 6.4meters. The water table during this period is below average in nine villages and above average in six villages [Fig-4]. The highest fluctuations from average is recorded at Badapur and Malkapur villages (10.3meters to 10meters) respectively.

Conclusion

The foregoing analysis reveals that there is high fluctuation in the level of underground water table. The fluctuation of in the level of underground water is depend on distribution and amount of rainfall. The highest fluctuations from average is registered at Badapur and Malkapur villages (10.3 meters to 10.1meters). Both villages are located in the western part of district. Which have received rainfall below 500mm.

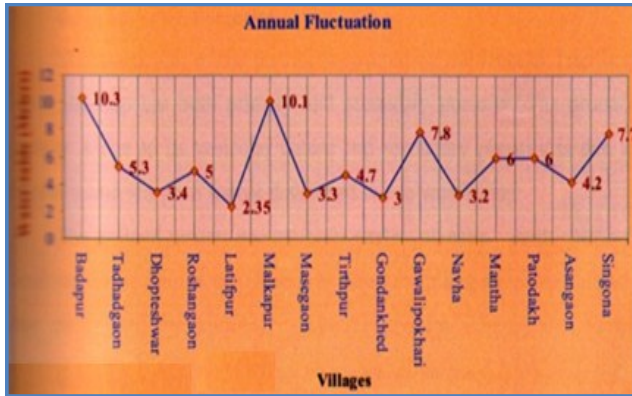


Fig. 2- Annual fluctuation in the level of underground water (2008)

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