An Analysis of Groundwater Level & Quality in Aurangabad District

Dr. Patil S. A.

Vice Principal
Asst. Professor,
Dept. of Geography,
MSS Ankushrao Tope College, Jalna (MS)

Introduction:

Ground water has been the primary source of water supply for domestic, agricultural and industrial uses in Maharashtra. It is the single largest and most readily available source contributes to almost eighty percent of the drinking water requirements in rural areas, fifty percent of urban water requirements and more than fifty percent of the irrigation requirements of the nation.

The sustainable development and management of ground water resources warrants precise assessment based on reasonably valid scientific principles as groundwater play a very important role in the state's economy and therefore needs to be monitored scientifically both in terms of quality and quantity. Naturally, ground water contains mineral ions. These ions slowly dissolve from soil particles, sediments, and rocks as the water travels along mineral surfaces in the pores or fractures of the unsaturated zone and the aquifer, they are referred to as dissolved solids. Some dissolved solids may have originated in the precipitation water or river water that recharges the aquifer. The quality of ground water depends on various chemical constituents and their concentration, which are mostly derived from the geological data of the particular region.

Study Region:

Aurangabad District is situated in the central part of the state which is an elevated land. It is incised by the Godavari river and its tributaries in the southern part. Except for a small portion in the north and north-west, which belongs to the Tapi drainage, the entire district falls in the Godavari Basin. Aurangabad district lies between 19^017' North to 20^040' North latitude and 74^039' East to 76^040' East longitudes. It is surrounded by Jalgaon district to the north, Jalna district to the east, Ahmednagar district to the south

and south-west and Nashik district to the west. It also has small boundaries with Buldhana district in the north-east and Beed district in the south.

Area of the district is 10,100 Sq.KM which is 3.28% of Maharashtra. Out of total area 1.40% is Urban Area and remaining 98.60% is Rural Area. According to the 2011 census Aurangabad district has a population of 37,01,282. This gives it a ranking of 72nd in India (out of a total of 640). Its population growth rate over the decade 2001-2011 was 27.76%. Aurangabad has a sex ratio of 923 females for every 1000 males, and a literacy rate of 79.02%. Study area comprising nine tahsils namely, Aurangabad, Khultabad, Kannad, Soygaon, Sillod, Paithan, Gangapur, Vaijapur and Phulambri. The district is divided into three divisions for the administrative purpose.

Ground Water Level and Quality:

After testing the groundwater and data obtained from the groundwater survey department, following observations have been revealed.

The ground water quality parameters and standard is given in table 1.

Table 1 - Ground Water Quality Parameters and Standard

Parameter	Actual Results	Expected values	Remarks
Color	15.3 hazen	Below 5 hazen	Not meet the standards
pH	7.49 ph	More than 6	Borderline
Total Hardness	460.22 mg/L	Below 200 mg/L	More than the standards
Alkalinity	358.56 mg/L	Upto 500 mg/L	Borderline
TDS	752 mg/L	Upto 500 mg/L	More than the standards
Chloride	139.68 mg/L	250 mg/L	Within limit
Turbidity	0.87 mg/L	1 NTU	Within limit
Nitrate	25.3 mg/L	45 mg/L	Within limit
Fluoride	0.66 mg/L	1 mg /L	Within limit
Iron	BDL	1 mg /L	Less than the standard

All the above parameter shows that, most of the parameter which are required for good drinking showed abandon values. So the water is not suitable for drinking.

Table No. 2
Comparison of Quality of Water Sample
(Year 2011 and 2019)

Year	No. of Water Sample Collected	Affected Sample	Percentage
2011	17889	5893	32.94
2012	13548	4652	34.34
2013	10526	2999	28.49
2014	19227	5223	27.16
2015	13861	3688	26.61
2016	12759	3075	24.10
2017	10273	3001	29.21
2018	10721	2969	27.69
2019	11243	2546	22.65

Source: Calculated by researcher on the statistics provided by Z.P. Aurangabad.

Table 2 reveals that, out of total 17889 water samples, 5893 (32.94%) samples were affected and at last in the year of 2019, 22.65% samples were affected. The remaining years and the affected samples are as: 2012 - 34.34%, 2013 - 28.49%, 2014 - 27.16%, 2015 - 26.61%, 2016- 24.10%, 2017- 29.21%, 2018 - 27.69% and 2019 - 22.65%. The affected water sample trend abandon. Increasing population pressure over land and natural resources, increasing industrialization are some of the reason behind the water pollution. This has resulted into the affected samples as stated above.

Conclusions:

The analysis based on statistics revealed that, the almost of the groundwater is not suitable for drinking purpose where the ground water is also below than the standard.

References:

American Public Health Association (APHA) (2012): Standard methods for the examination of water and wastewater, 22nd edn. American Public Health Association, Washington DC.

Anandha Kumar, KJ & Sinha, SK (2003): 'Groundwater simulation studies in Hirakud irrigation command area, Orissa, India', Proceedings of the International Conference on Water and Environment, Bhopal, India

Chakrabarty, S. and Sharma, H.P. (2011): A statistical approach to multivariate analysis of drinking water quality in Kamrup district, Assam, India. Archives of Applied Science Research. 3 (5).

Chandra, S. (1987): Planning for integrated water resources development project with special reference to conjunctive use of surface and groundwater resources. Central Groundwater Board, New Delhi.

Handa B.K. (1979), 'Effect of return irrigation flows from irrigated lands on the chemical composition of ground water from shallow unconfined aquifers', Prog. Water. Tech., 11: 337-349.

Karanth, K. R. (1987): Ground water assessment: development and management. Tata McGraw-Hill Education, Delhi.

Singh, Jasbir and S.S. Dhillon (1995): Agricultural Geography, Tata McGraw Hill Publishing Co.Ltd., New Delhi.

Socio-Economic Review and Statistical Abstract of Aurangabad District (1991 to 2020)

WHO (1984), Guide lines for drinking water quality, 1, Recommendations World Health Organization Geneva: 1-130.