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Original Article

Geo-chemical study of Ground water in Marathwada Region

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Abstract

Tremendous increase of population in last two decade has put extra trace in water source in any area. The ground water quality directly depends upon geology of the area. The sewage water released from city contributes to the pollutant ground water surrounding the area. Therefore, detail study of hydro geological and hydro chemical condition of the area. To understand the groundwater quality of the hour. Ground Water is the major source of drinking water in both urban and rural Marathwada region. Water utilization Projections for the year 2021 put the groundwater usage at about 50 per cent. Being an important and integral part of the hydrological cycle, its availability depends on the rainfall and recharge Conditions. Groundwater is used as an important supplementary source of water in study area have a large number of wells, which supply water for domestic as well as irrigation purposes.

In study region water table has gown down in many areas as a recent of indiscriminate and high withdrawal ground water for drinking and sanitation purposes, with lowering of water table, the cost of ground water extraction has not only increased but also affected the quality of water.

Keywords: *Groundwater, Physio-chemical analysis, Water quality*

Introduction:

Groundwater is used as an important supplementary source of water in study area have a large number of wells, which supply water for domestic as well as irrigation purposes. The rapid growth of urban development in this region and inadequacy of piped water supply has led to over abstraction of water from these wells. This has resulted in the intrusion of seawater into the underground reservoir affecting the quality of the well water. Analysis of groundwater in Nanded and Aurangabad district indicates that the water at most places is hard. When compared with the WHO and ISI guidelines for drinking water, most of the tube well water is contaminated, hence, unsuitable for drinking. The groundwater in most of the industrial and residential areas of Aurangabad is moderately polluted.

Objectives: The specific objectives of the present study are as follows:

1. To study the geographical background of Marathwada Region.
2. To analyze the district wise quality of Ground water.
3. To draw the conclusions and find out the problem related to water resource management and suggest suitable remedies to solve them.

Database and Methodology:

The study is based on extraction of data from various secondary sources which includes Ground water survey development agency (GSDA), and various publications. For the statistical analysis various techniques and methods will be applied. The physio-chemical parameters viz, TDS, hardness, Ca Mg, of water were analyzed following method of IS 500, total hardness and chloride of water were analyzed following the methods of APHA (1989) using Hanna fresh water analysis kit. For this study statistical data are taken from 2015 and 2025.

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Study area:

The location of Marathwada is 74^0 40^I to78^o16^I East longitude and 17^o35^I – 20^o41^I north latitude forms the part of the vast Deccan plateau all of India and is one of the six divisions of Maharashtra state.

Result and Discussion:

Groundwater resource estimation is mainly dependent on the quality of the data. Many a times because of the lack of good quality data the resource assessment misleads the planners, administrators and technocrats in formulating various developmental activities. The chemical quality of groundwater's from the shallow basaltic aquifers is good In most samples the pH values range from 7.5 to 8.5 indication the alkaline nature of the groundwater.. The drinking water quality was analyzed in all season. The water quality parameters such as T.D.S, Hardness, Calcium, were analyzed. The water sample collected from 08 stations in each district. One result was compared with water quality standards of WHO, ICMR indicated that it is not suitable for drinking. So, the water needs treatment before human consumption.

Water sample from different locations were also examined for the physio-chemical attributes (Table No.1). It was observed that was sample from hand pump, Dug wells and bore wells entire the study area.

Physio-chemical analysis of Ground water in Marathwada (2015-2025)

Sr. no.	Districts	Parameters							
		TDS(ppm/L)		Hardness(ppm/L)		Cl (mg/L)		Mg(mg/L)	
		2015	2025	2015	2025	2015	2025	2015	2025
1	Chh. Sambhajinagar (H)	490	530	180	293	85	75	415	272
2	Jalna (Dug well)	631	1420	410	650	65	210	120	65
3	Beed (Hand pump)	275	810	125	198	70	51	85	37
4	Dharashiv (Bore well)	300	416	90	148	85	215	105	158
5	Latur (Bore well)	**1038**	**1605**	350	740	90	265	83	159
6	Nanded (Hand pump)	705	950	460	208	60	81	65	35
7	Parbhani(Dug well)	890	1200	375	478	175	259	10	142
8	Hingoli (Bore well)	630	810	260	345	105	160	75	60

Source: Compiled by researcher

The drinking water quality was analyzed in all season. The water quality parameters such as T.D.S, Hardness, Calcium, Mg, were analyzed. The water sample collected from 08 stations in different tahsil of study area. Result was compared with water quality standards of WHO, BIS indicated that it is not suitable for drinking.

Classification of Ground water quality of selected Taluka in Marathwada

District		Sambhajinagar	Jalna	Beed	Dharashiv	Latur	Nanded	Parbhani	Hingoli	NS
Taluka		Vaijapur	Jafrabad	Gevrai	Omerga	Latut	Kandhar	Sonpeth	Hingoli	
Excellent	NS	2	1	1	3	1	1	3	2	14
	%	20	10	10	30	10	10	30	20	
Good Water	NS	3	4	2	3	2	2	3	2	21
	%	30	40	20	30	20	20	30	20	
Poor water	NS	2	1	3	2	3	3	1	3	18
	%	20	10	30	20	30	30	10	30	
Very poor	NS	2	3	3	1	2	1	2	1	15
	%	20	30	30	10	20	10	20	10	
Unsuitable	NS	1	1	1	1	2	3	1	2	12
	%	10	10	10	10	20	30	10	20	
Total		10	10	10	10	10	10	10	10	80
Percentage (%)		100	100	100	100	100	100	100	100	100

Source: Compiled by researcher

The table above classifies the water quality in selected talukas of the Marathwada region. This includes primarily Vaijapur taluka from Chhatrapati Sambhaji Nagar district, Jafrabad from Jalna district, Gevrai from Beed district, Umarga from Dharashiv district, Latur taluka from Latur district, Kandhar from Nanded district, Sonpeth from Parbhani district, and Hingoli taluka from Hingoli district. A total of 80 water samples from Marathwada were tested, of which 14 samples showed excellent water quality, 21 samples showed good water quality, and the remaining samples

were found to be unsuitable for drinking. Of the water samples taken from Kandhar, Latur, and Hingoli talukas, seven samples were found to be suitable for drinking.

So, the water needs treatment before human consumption. Higher concentration of TDS observed in Latur district in 2025 year, whereas Jalna and Latur are recorded in 2015 year. On the other hand higher concentration of hardness observed in Nanded district in 2025, but it is higher in Jalna in 2025.Higher percent of Cl (175 mg) found in Parbhani district in 2015. where as Higher percent of mg (265 mg) in Latur district in 2025. Hence there are imbalanced between water qualities.

Conclusion:

Analysis of groundwater in Nanded and Jalna district indicates that the water at most places is hard in 2015 year. When compared with the WHO and ISI guidelines for drinking water, most of the tube well water is contaminated, hence, unsuitable for drinking. The groundwater in most of the industrial and residential areas of Chh. Sambhajinag is moderately polluted. Calcium and magnesium are the major cations responsible for hardness. The high concentration of TDS, recorded in Latur and Jalna district. hardness is observed in ground water and its effects on human being.

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Conflicts of interest

The authors declare that there are no conflicts of interest regarding the publication of this paper

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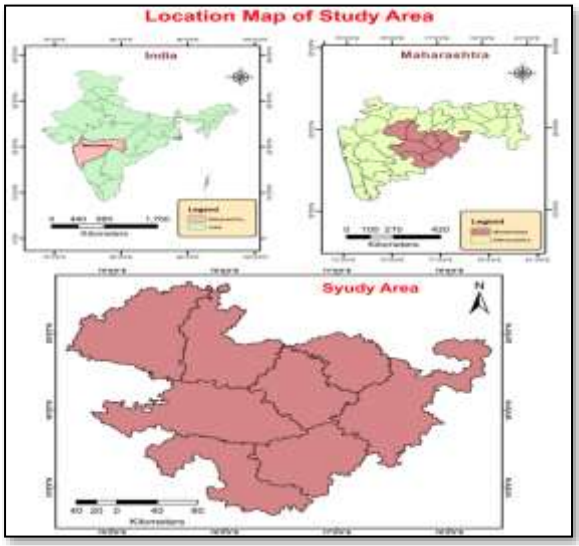

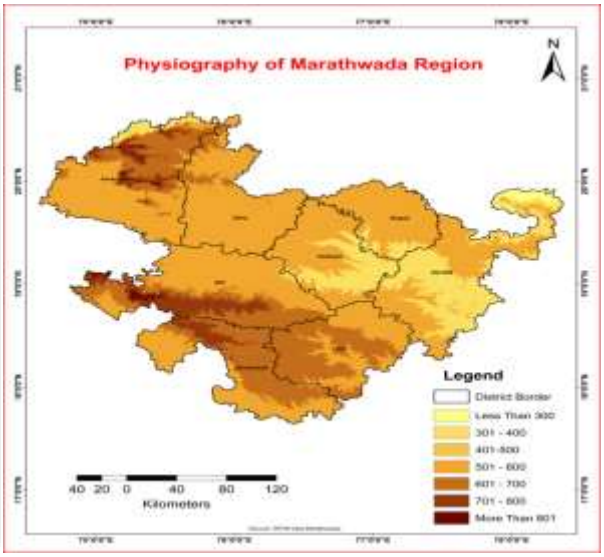

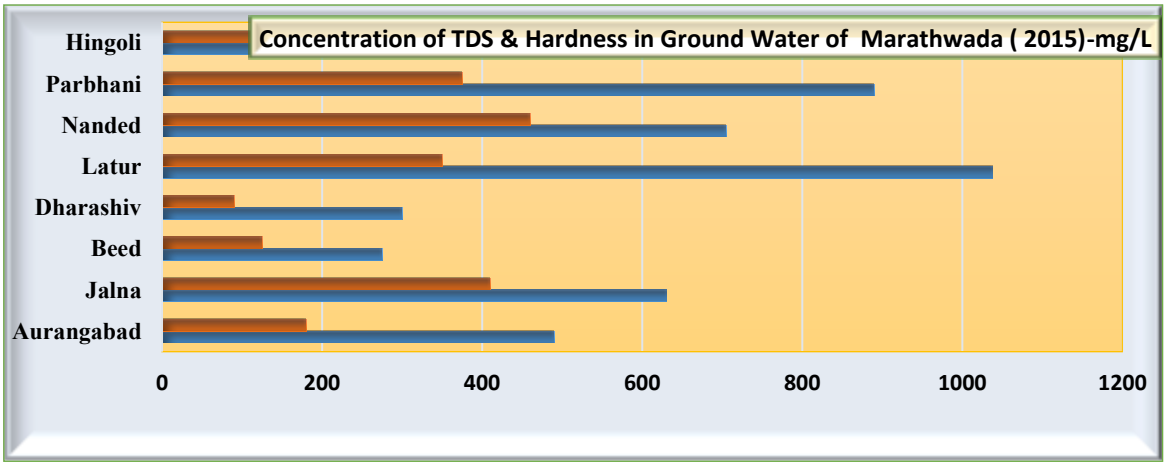

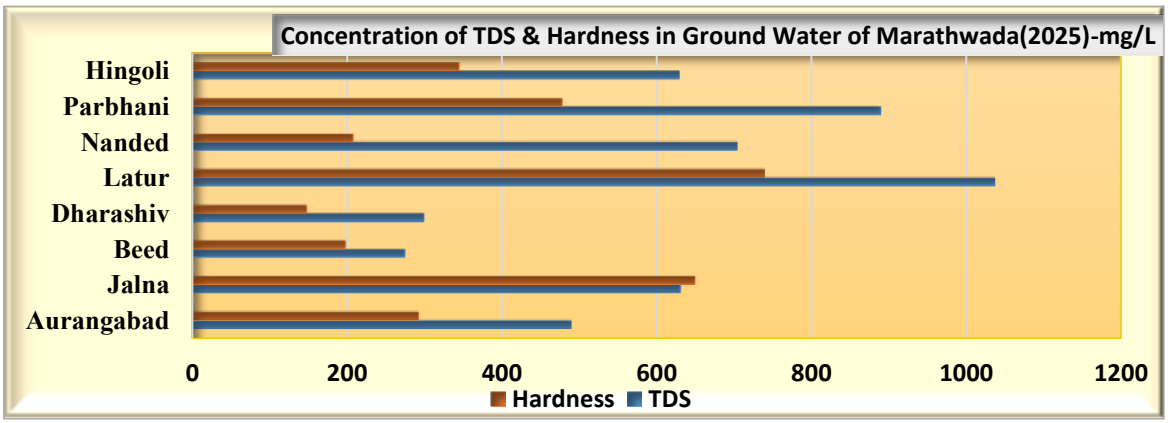

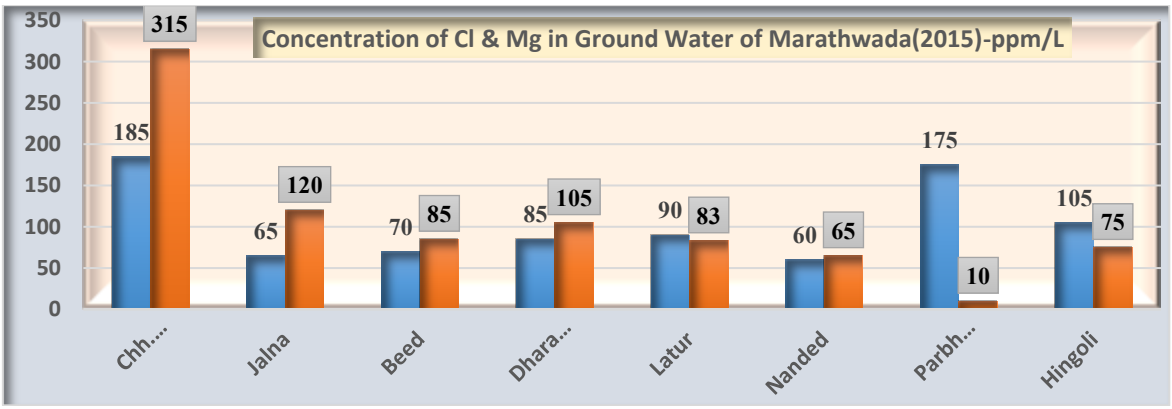

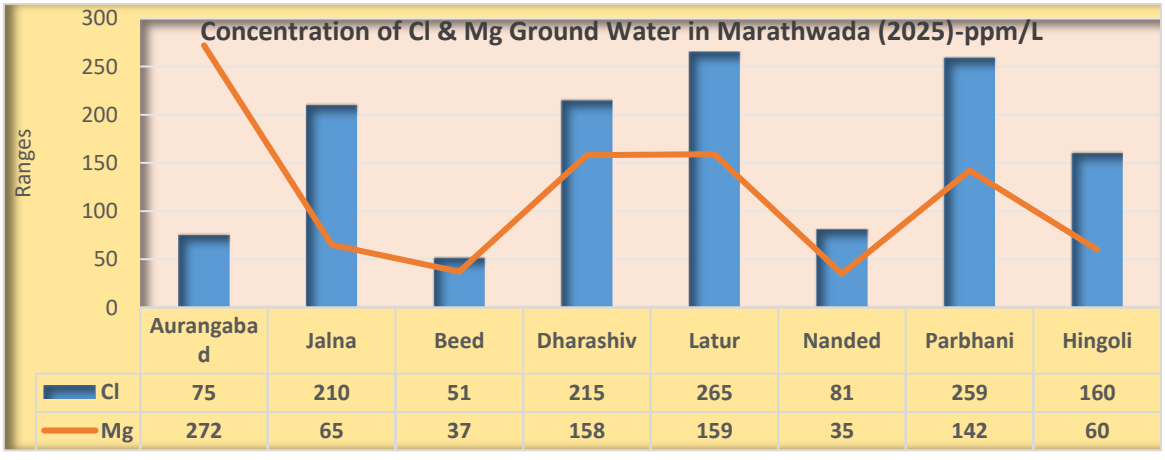

	Aurangabad	Jalna	Beed	Dharashiv	Latur	Nanded	Parbhani	Hingoli
Cl	75	210	51	215	265	81	259	160
Mg	272	65	37	158	159	35	142	60