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## INDEX

Sr. No	Title for Research Paper	Page No
1	Physio-Chemical Analysis Of Ground Water In Marathwada <b>Dr. Baliram P. Lahane</b>	1
2	New Species of the Genus Phoreiobothrium Honaliec From Charcharias Actus at Murud-Janjira M.S., East Coast of India. <b>D.H. Jadhav, M.N. Kolpuke</b>	8
3	भारतीय अर्थव्यवस्था में चर्मकार समाज का महत्व कु. चंदा अनंतराव बोरकर	11
4	जागतिकीकरण व भारतीय अर्थव्यवस्थेतील बदल डॉ. के. के. पाटील	21
5	नांदेड जिल्हयातील अनुदानित महाविद्यालयीन ग्रंथालय व्यवस्थापनात आऊटसोर्सिंगचा अभ्यास महावीर महादेवराव कटके, डॉ. बालाजी निवृत्ती ढाकणे	30
6	रा.रं.बोराडे यांच्या कथासाहित्यातील संवाद डॉ. त्र्यंबक धरणे	34
7	कुसुमाग्रज यांच्या कवितेतील समाजवास्तव डॉ. काकासाहेब रामराव सुरवसे	38
8	अरुण साधू यांच्या राजकीय कांदबऱ्यांचा चिकित्सक अभ्यास डॉ. अनिल सुग्रिव कांबळे	43
9	अनुसुचित जातीच्या समस्या डॉ. पांडुरंग किसनराव मगर	53
10	काशिराम यांचे सामाजिक कार्य भागवत वीर	57



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**PHYSIO-CHEMICAL ANALYSIS OF GROUND WATER IN MARATHWADA****Dr. Baliram P. Lahane**Joint Director, Higher Education,  
Nanded Region, Nanded, Dist. Nanded**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 Maharashtra and also an important source of water for the agricultural and the industrial sectors. Water utilization Projections for the year 2011 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 include municipal corporation statistically office, Ground water survey development agency (GSDA), town planning office, National remote sensing agency, Hyderabad and various publications. For the statistical analysis various techniques and methods will be applied. The map was generated using Auto Cad and GIS software. The physical elements like relief, slope, drainage and soil are studied for SOI topographic sheet. For this study statistical data are taken from 1990 - 1991 to 2010 - 2011.

**Study area:**

Marathwada comprises of total eight districts. They are, Jalna, Aurangabad, Beed, Osmanabad, Latur, Nanded Parbhani and Hingoli. The location of Marathwada is 74°40' E to 78°16' E East longitude and 17°35' N - 20°41' N north latitude forms the part of the vast Deccan plateau of India and is one of the six divisions of Maharashtra state. A large part of the region is occupied by rock similar to the Deccan trap formation, represented by almost horizontal lava flow of basaltic composition though to have been emplaced from fissures towards the close of the Mesozoic era on the lower tertiary era. They are referred to as Deccan trap owing to their prevalent occurrence in the Deccan and step like appearance of their exposures.



**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. Even today, the situation is no better. Systematic information on groundwater withdrawal by various sectors through different groundwater structures is unavailable. Even with sincere efforts made by the GSDA, it was not possible to obtain the required data, especially the well census data. 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 Electrical conductivity, T.D.S, Hardness, Calcium, Mg, sodium, alkalinity, Chloride and Sulphate were analyzed. The water sample collected from 12 stations. 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.

**Physio-chemical analysis of Ground water in Marathwada (1997-2017)**

Sr. no.	Districts	Parameters							
		TDS(ppm)		Hardness(ppm)		Cl (mg)		Mg(mg)	
		1997	2017	1997	2017	1997	2017	1997	2017
1	Aurangabad	490	530	180	293	85	75	415	272
2	Jalna	631	1420	410	650	65	210	120	65
3	Beed	275	810	125	198	70	51	85	37
4	Osmanabad	300	416	90	148	85	215	105	158
5	Latur	1038	1605	350	740	90	265	83	159
6	Nanded	705	950	460	208	60	81	65	35
7	Parbhani	890	1200	375	478	175	259	10	142
	Hingoli	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.



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## Classification of Ground water quality of selected Taluka in Marathwada

District	Abad.	Jalna	Beed	Os'bad	Latur	Nanded	Parbhani	Hingoli	NS	
Taluka	Vaijapur	Jafrabad	Gevraji	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

So, the water needs treatment before human consumption. Higher concentration of TDS observed in Latur district in 1997 year, whereas Jalna and Latur are recorded in 2017 year. On the other hand higher concentration of hardness observed in Nanded district in 1991, but it is higher in Jalna in 2017. Higher percent of Cl (265mg) and higher percent of mg (272 mg) in Latur and Aurangabad district respectively. With the help of GSDA, Maharashtra pollution control board has collected the samples and analyzes the quality of water from selected taluka of every district in Marathwada region. 176 samples whereas analyzing from different location. It is found that 21 samples have excellence, 113 sample good

water, 32 sample have poor water whereas 6 samples water have unsuitable for drinking purposes. Hence there are imbalanced between water qualities.

#### Conclusion:

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. Calcium and magnesium are the major cations responsible for hardness. The high concentration of TDS, hardness is observed in ground water and its

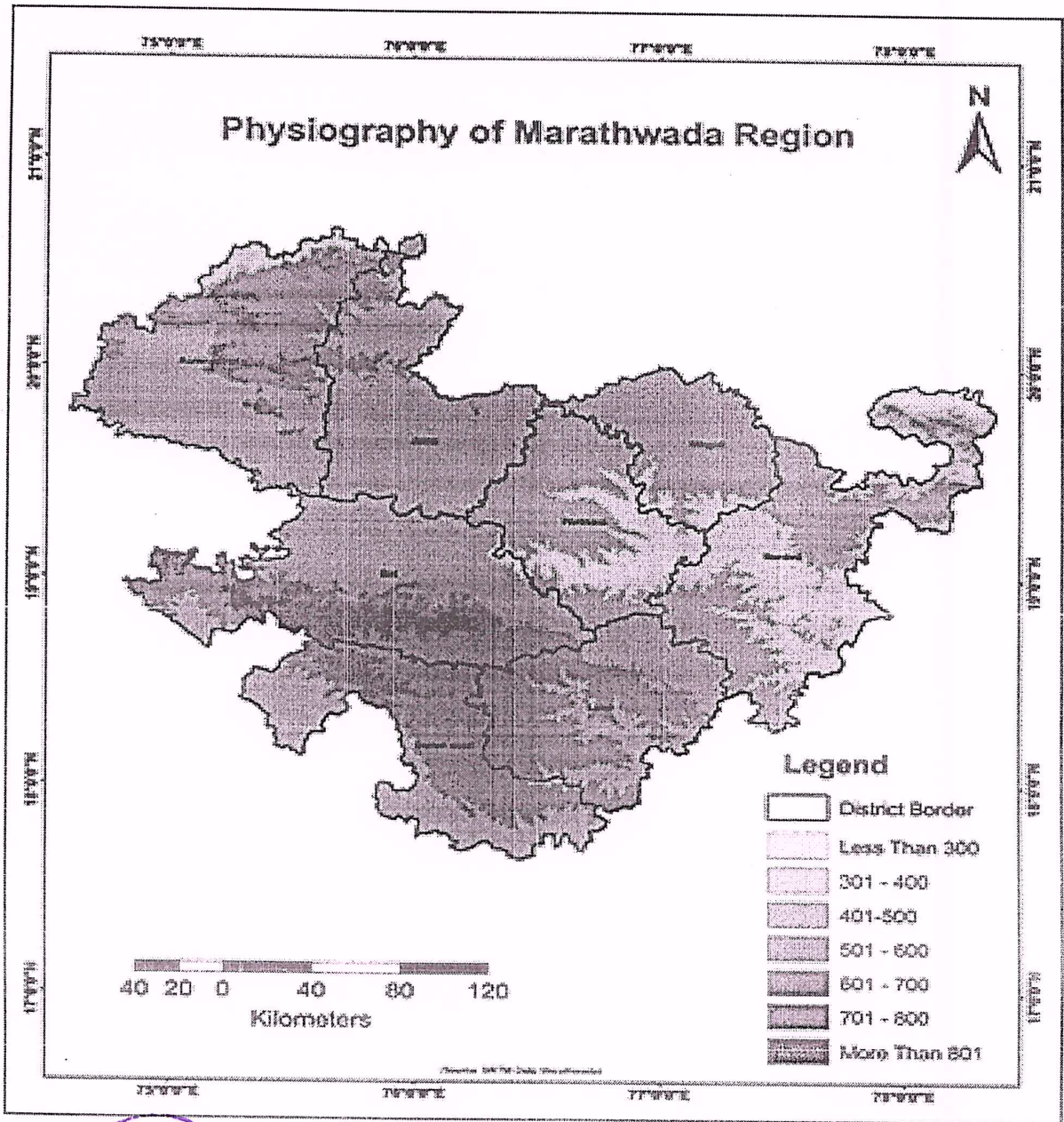


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effects on human being. In the present investigation the relationship between ground water quality and health effects has been being.

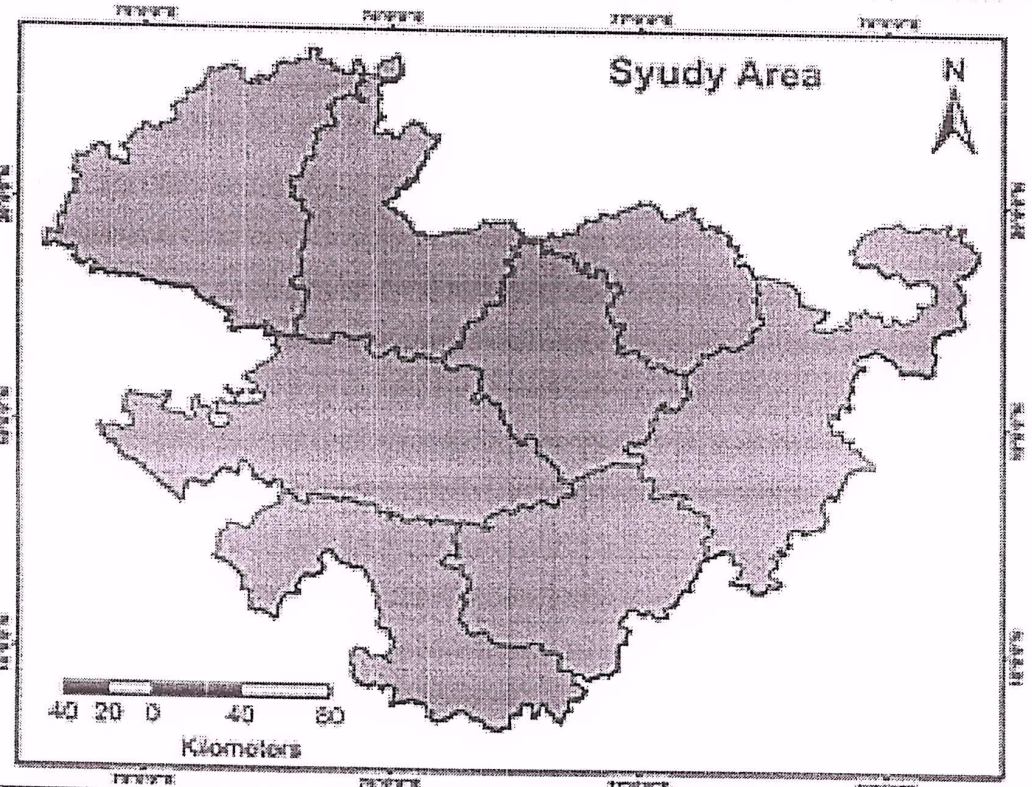
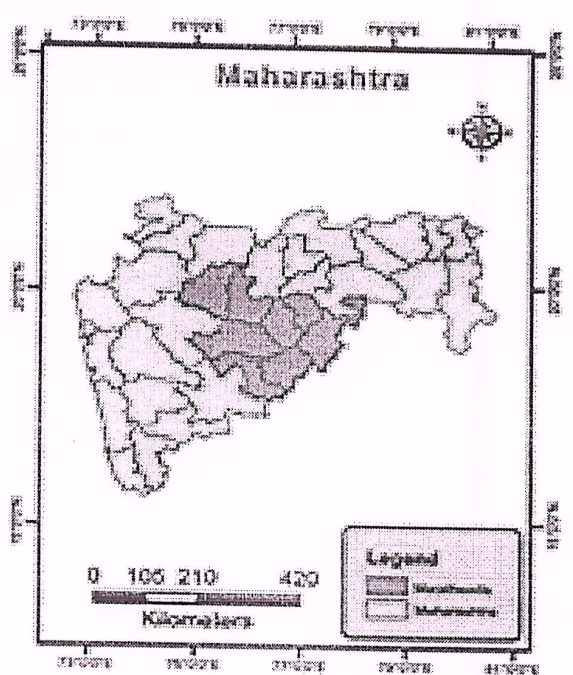
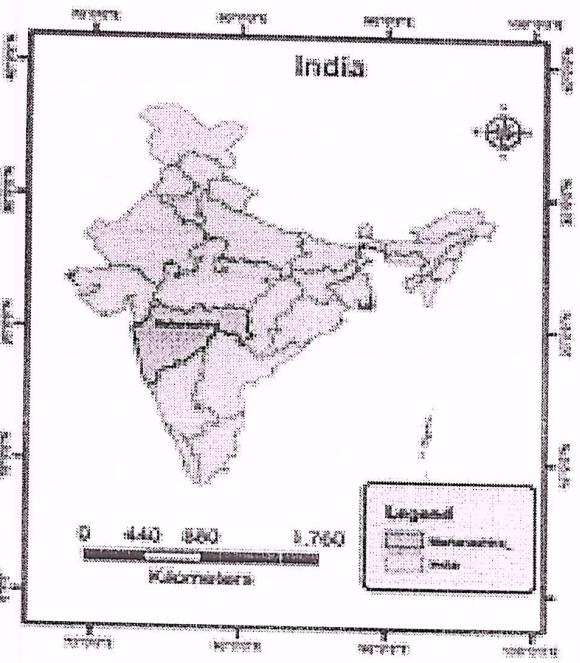
In the present investigation the relationship between ground water quality and health effects has been studied.



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### Location Map of Study Area

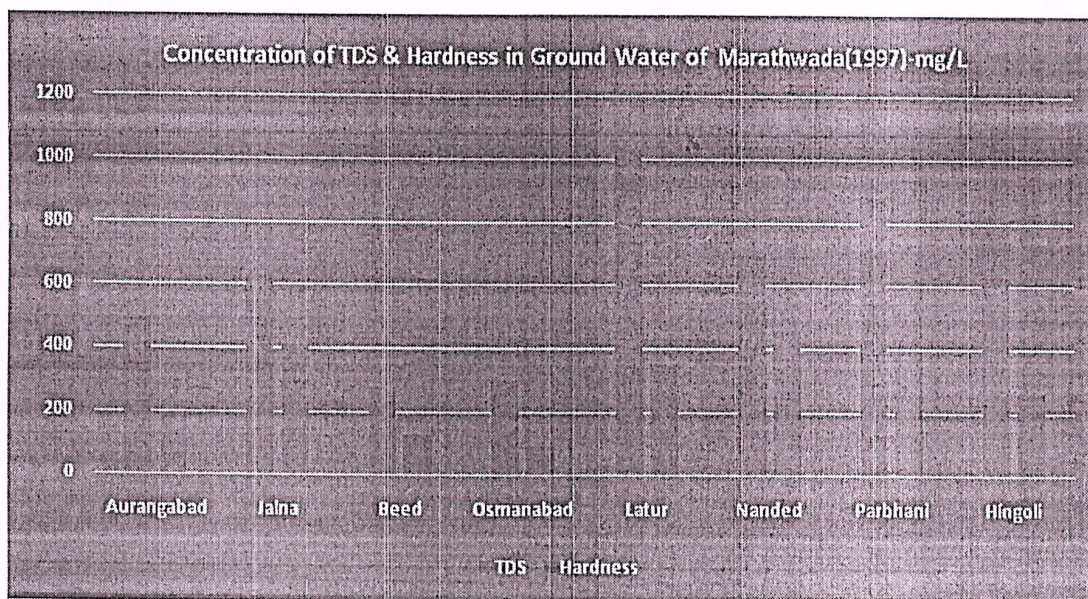


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