

Status of Ground water Quality, Hoskote Taluk, Bangalore Rural District, Karnataka, India

Dr.Maruthesha Reddy M.T¹, Dr.B.C.Prabhakar², Akshatha M.R.³

¹Professor, Department of Civil Engineering, Acharya Institute of Technology, Bangalore- 560 107
Karnataka, India

²Professor, Department of Geology, Bangalore University, Janna Bharathi Bangalore, Karnataka, India

³Assistant Professor, Rajiv Gandhi, Institute of Technology Bangalore, Karnataka

Abstract

The quality of groundwater in nature is determined by quantum and nature of recharge, chemical composition of the soil cover and its thickness, mineralogical make up of the aquifer, residence time of the water which is governed by the transmissivity of the formation. The two important characteristics of the crystalline terrain, which covers practically the entire Taluk, are the heterogeneity and preferred flow paths. They have a dominant role to play in determining the quality of the ground water with the result; large variations are noticed in short distances. Thus it is not uncommon to get varied quality of water even in a small village. This fact is to be borne in mind while locating sources of water supply for various uses.

Quality data in respect of 14 parameters of all the drinking water sources in the villages is available with PRED. Summaries of bore well sources, Gramapanchayat wise which is presented in Table 1.1. The same has been collected and analysed. The range of value in respect of 14 parameters are given in table 1.2 Table 1.3 summarizes the number of wells with a quality problem in the Taluk. As seen the most commonly observed problems relate to the total dissolved solids, Total hardness, Turbidity, Calcium, Iron and Fluoride. The strategy to be adopted in providing solutions to these villages is discussed.

As for the irrigation requirement, the two important quality parameters are Sodium adsorption ratio and total dissolved solids are indicated by the Specific conductance of the water These determine the Salinity and Sodium hazard from the irrigation water. These determined from the results available in the records of DMG. Considering the fact that large areas of the Taluk are covered by red soils and mixed soil, it is very important to study the soil water inter relationship before undertaking irrigation practice. It

can be safely concluded that in red soil areas, the quality of ground water is safe for irrigation and has low to medium salinity-low sodium hazard

Keywords: Recharge, Aquifer, quality problem, Soil cover

1. INTRODUCTION

Location: Hoskote is a taluk in Bangalore Rural District and forms the northern part of the district. It features in the survey of India Top sheet Nos. 57 G/12, 57 G/16, 57 H/9 and 57 H/1 3 and lies between 12°51' to 13°15' N.Latitude and 77° 41' to 77° 58' E Longitude, covering an area of 582 sq.km (Fig1.1). Physiographically, the area is characterized by undulating topography. The highest elevation is seen near Nandagudi, which rises above 940 in above MSL. The low lying valleys and depressions are intensely cultivated.

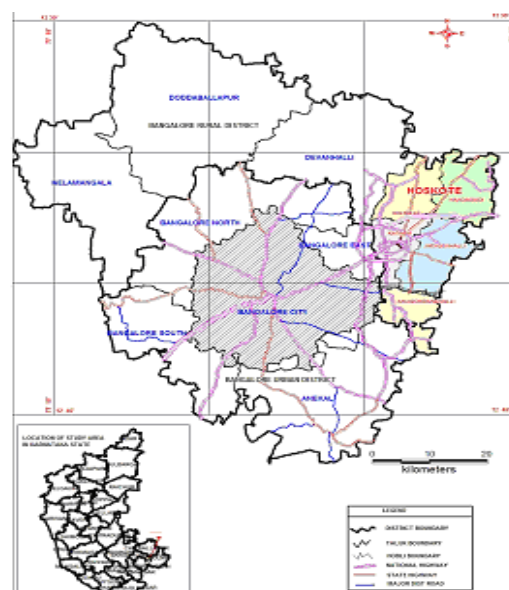


Fig.1.1 depicts the location of Hoskote Taluk in Karnataka State.

Climate: Physiographically Hoskote Taluk presents an undulating topography with gentle slope towards Southwest. The general elevation of the ground is around 870 in above MSL. The highest elevation is seen near Nandagudi which rises above 940 m N1SL. Hoskote Taluk enjoys a salubrious climate with mild summers and pleasant winters. The summer temperature touches 37°C during May and the winter temperature around 19°C during December/January. The relative humidity is around 77% during monsoon and 50% during dry month. The study area receives an average rainfall of 838mm.

Geology of the Study area:

Geologically the area is chiefly made up of peninsular Gneisses, small bodies of granite plutons and younger doleritic dykes are also observed.

The gneisses are exposed as mounds and hillocks which rise from 20 to 80m above the surrounding ground level.as in the accompanying fig.1.2

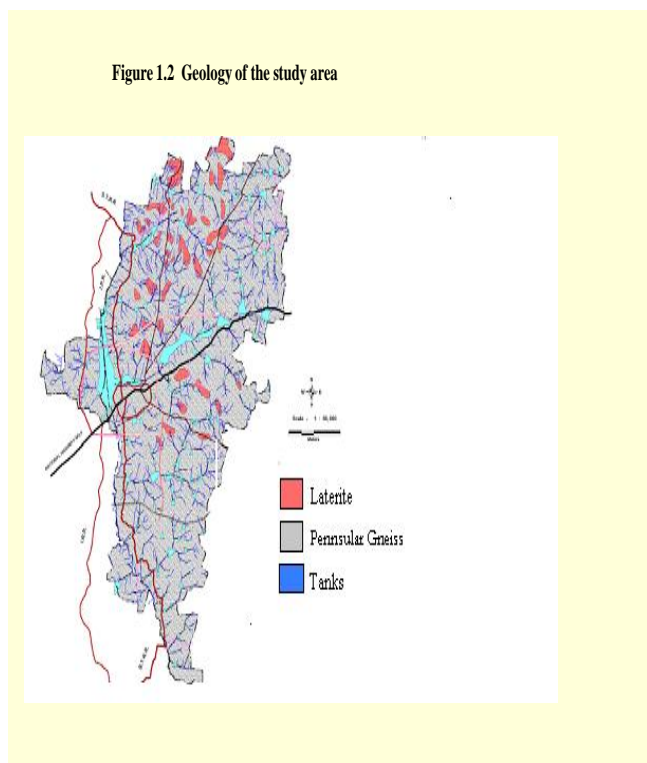


Fig 1.2 Geology of Study area

Table 1.1 Summary of Bore well sources Grampanchayatwise

Col.1	Col.2	Col.3	Col.4	Col.5
Sl.no	Grampanchayat	Number Of sources	Samples Collected	Not sampled
1	Anugondanahally	23	17	6
2	Balnarsapura	27	22	5
3	DoddaGattiganabbi	37	29	8
4	Devanagundi	44	29	15
5	Dodda araligere	47	36	11
6	Doddanallala	47	29	18
7	Doddahullur	28	21	7
8	Ganagaloor	35	29	6
9	Giddappanahalli	33	22	11
10	Hittasandra	35	31	4
11	Jadigenahalli	25	20	5
12	Kamblipura	30	24	6
13	Kalkunte Agrahara	22	17	5
14	Khaji Hosalli	31	26	5
15	Kumblehalli	29	22	7
16	Lakkondahalli	31	22	9
17	Mutsandra	36	33	3
18	Mugabhala	35	26	9
19	Nandgudi	34	30	4
20	Nelawagilu	34	25	9

21	Harohalli	34	23	11
22	Samethanahalli	32	17	15
23	Shivanapura	41	27	4
24	Sulibelehalli	21	17	4
25	Thavarekere	39	30	9
26	Wagatta	40	26	14
	Total	870	650	220

6	Chlorides (mg/l.)	250	1000
7	Calcium (mg/l.)	75	200
8	Nitrates(mg/l.)	45	100
9	Sulphates (mg/l.)	200	400
10	Fluorides (mg/l.)	1	1.5
11	Alkalinity (mg/l.)	200	600
12	Total dissolved solids (mg/l)	500	2000
13	Bacteriological test for E - coli (MPN)	0/10ml	<10/100 ml
14	Conductivity (Us/cm)		
15	Temperature		

Detailed information regarding the reason for not sampled sources are enclosedampanchayatwise. Among others the most common reasons for not sampling were due to:

- a) The bore well was out of order / not working
- b) Source being dry during sampling
- c) Bore well being ready during sampling

Bore pump having been removed

Source: RDED Bangalore

Table 1.2 Physico-chemical characteristics of Groundwater of Hoskote Taluk

Col.1	Col.2	Col.3	Col.4
SL.NO	Characteristics	Desirable limitsmg/l	Permissible limits mg/l
1	Colour (Hazen unit)	5	25
2	Turbidity (NTU)	5	10
3	P ^H value	6.5 to 8.5	No relaxation
4	Total Hardness (mg/l.)	300	600
5	Iron (mg/l.)	0.3	1

Col.1	Col.2	Col.5	
SL.NO	Characteristics	Hoskote Taluk	
		Minimum	Maximum
1	Colour (Hazen unit)	1	1
2	Turbidity (NTU)	0.05 NTU	50 NTU
3	P ^H value	6.3	7.8
4	Total Hardness (mg/l.)	40	2550
5	Iron (mg/l.)	0	32
6	Chlorides (mg/l.)	12	1635
7	Calcium (mg/l.)	16	1308

8	Nitrates (mg/l.)	0	25
9	Sulphates (mg/l.)	1.6	232
10	Fluorides (mg/l.),	0	3.6
11	Alkalinity (mg/l.)	32	770
12	Total dissolved solids (mg/l)	70	4130
13	Bacteriological test for E - coli (MPN)	0	1333
14	Conductivity (Us/cm)	87	5670
15	Temperature	20°C in the month of November	31°C in the month of May

3000-3500	2	1500-2000	6
4000-4200	2	2000-2500	-
		2500-3000	1

Col.3		Col.4	
Iron		Turbidity	
Range	No. Of sources	Range	No. Of sources
5	6	7	8
<200	312	<1000	647
200-500	276	1000-1500	2
500-1000	57	1500-2000	1
1000-1500	5		

Table 1.3 Drinking water Quality Data in (mg/l)

Taluk: Hoskote District: Bangalore Rural

Col.1		Col.2	
TDS		Total Hardness	
Range	No. Of sources	Range	No. Of sources
1	2	3	4
<2000	632	<600	514
2000-2500	11	600-1000	112
2500-3000	3	1000-1500	17

Col.5	
Fluoride	
Range	No. Of sources
9	10
<1.5	625

1.5-2	15		
2-2.5	3		
2.5-3	1		
3-3.5	5		
3.5-4	1		
Col.6		Col.7	
Iron		Turbidity	
Range	No. Of sources	Range	No. Of sources
11	12	13	14
<1.0	607	<10NTU	614
1-5	22	10-11	35
5-10	12	11-49	-
10-20	6	49-51	1
20-30	2		
30-40	1		

Calcium affected	338	52
Bacteria affected	33	5.08
Fluoride affected	25	3.85
Chloride affected	3	0.46
Iron affected	43	6.62
Potable water		
Remaining water to be conducted	220	

Discussion

Quality data with respect to 650 drinking water samples is available with ZPED. The same has been collected and analysed to draw conclusion for managing the resource.

Out of 650 samples analysed 70% of the samples were classified under potable category.

In a majority of the samples 136 samples (20.92%) the total hardness is more than the permissible limit of 600 mg per litre.

Among the sample source 338 samples contain Calcium exceed the permissible limit of 200 mg per litre

Among the sample source 3 samples contain chloride exceed the permissible limit of 1000 mg per litre

Among the sample source 43 samples contain Iron accounted for 6.62 % of the total samples exceed the permissible limit of 1mg per litre

Among the sample source 33 samples contain Bacteria accounted for 5.08 % of the total samples exceed the permissible limit of <10/100ml

Among the sample source 18 samples contain Total Dissolved Solids accounted for 2.77 % of the total samples exceed the permissible limit of 2000 mg per litre

Among the sample source 36 samples contain Turbidity accounted for 5.54 % of the total samples exceed the permissible limit of 10 mg per litre

Table 1.4 Analysis of Chemical parameters affected in Hoskote Taluk From Drinking Water Sources

Col.1	Col.2	Col.3
Parameters mg/l	No. Of samples	Percent
TDS affected	18	2.77
Total Hardness affected	136	20.92
Nitrate affected	120	18

Among the sample source 25 samples contain Fluoride exceed the permissible limit of 1.5 mg per litre

After the samples show above the neutral level i.e., more than 7 PH indicating the water is basic in nature.

Conclusion

Initially the water was drawn from shallow aquifers and was found to be safe and potable. As years passed on, the usage of bore wells enormously increased and drawing water from greater depths resulted in contamination of water.

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BIOGRAPHIES



Dr.M.T.Maruthesha Reddy obtained M.Sc Geology in 1981, M.Tech (PMDH-Post M.Sc in Hydrogeology) in 1982, DEP (PG Diploma in Environmental Planning) in 1983 from Mysore University, Mysore and PhD from Bangalore University, Bangalore. He has served the Department of Civil Engineering, M.V.J.College of Engineering, Bangalore 1983, and gaining promotion as an Assistant Professor in January 1985. Since then he served there as an Assistant Professor till 15th

August, 2010, on 16th August, 2010 he joined South East Asian College of Engineering and Technology (SEACET) as a Professor and Head of the Department of Civil Engineering till 29th of July,2012. On 30th July, 2012 he joined Acharya Institute of Technology, Dr.S.Radhakrishnan Road, Soladevanhalli, Bangalore-560 107 as a professor in the Department of Civil Engineering.

He has authored 25 national and international journal papers and 8 text books. He is the recipient of Dr.MVJ award for his outstanding journal publications

Dr.B.C.Prabhakar, Professor,
Department of Geology,
Bangalore University, Janna
Bharathi Bangalore , Karnataka ,
India



Akshatha M.R. obtained B.E in Computer Science & Engineering in 2012 from Visvesvaraya Technological University-Belgavi, M.Tech in Computer Science and Engineering in 2014 from Visvesvaraya Technological University-Belgavi. She joined Rajiv Gandhi Institute of Technology, Bangalore-560 032 as a Assistant Professor in the Department of Computer Science & Engineering. She has authored various national and international journal papers.