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NITRATE LEVELS IN HOSKOTE TALUK, BANGALORE RURAL DISTRICT, KARNATAKA, INDIA

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Abstract— *Hoskote Taluk is one of the eight Taluks of Bangalore Rural District in Karnataka with a current approximate population of 3, 03, 428; the total water demand comes out at around 49.5 MLD @ 135 LPCD, (WHO Standard).*Water and health are inter-twined in many ways and it is important to address the increasing need for adequate and safe water to protect both the people and the planet. Water is one of the earth's most precious and threatened resources and health is each one of our most precious resource. Hence we need to protect and enhance them both. In the recent years, groundwater in the study area forms the mainstay of drinking water supply for meeting the community needs. But the threat of groundwater contamination is looming large over the study area. Contamination of groundwater source could occur due to pollution from industrial, agricultural and community living. Also, geology of the region has an important bearing on certain dissolved constituents in the groundwater supply, in particular like fluorides. In view of this, it is of paramount importance to look for and to evaluate the Nitrate levels in the drinking water of the area and assess their status of potability in the light of the criteria laid by Bureau of Indian Standards (B.I.S).

Nitrate disease caused by excess intake of Nitrate. Results show that there is a definite contamination of ground water in the study area with respect to Nitrate and a clear correlation between the ill health faced by the public and ground water contamination is noticed.

Key words: Paramount,, Levels, Nitrates, Geology

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/I 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 (Fig 1.1). 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.

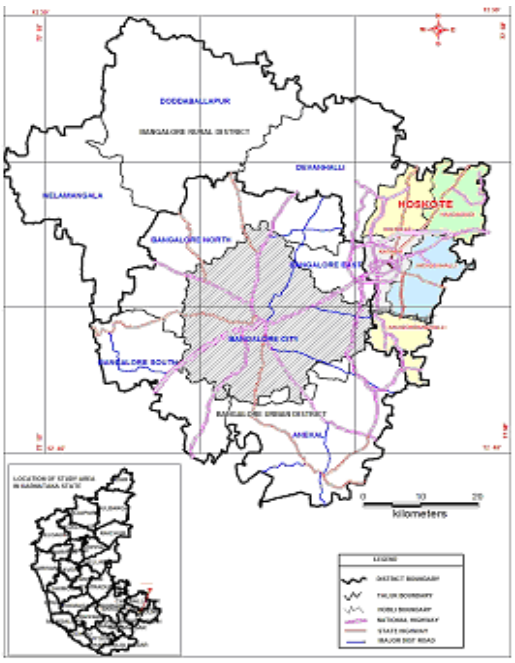

Fig.1.1 depicts the location of Hoskote Taluk in Karnataka State.

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 sorrounding ground level.as in the accompanying fig.1.2

Figure 1.2 Geology of the study area

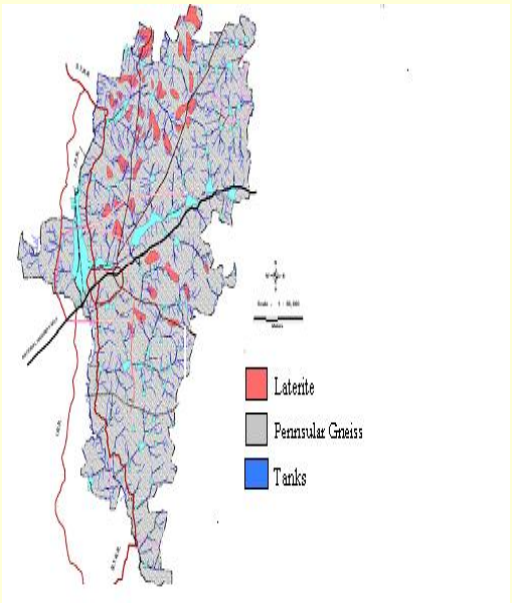

Fig 1.2 Geology of Study area

11. GENERAL PHYSIOGRAPHY OF HOSKOTE TOWN

Table 2.1 General Information about the Taluk

Sl. no	Particulars	Details
01	No. of Hobli's	5
02	No. of farmer communication centers	5
03	No. of Grampanchayats	26
04	No. of villages with public communications.	254
05	No. of villages without public communications.	45
06	Total No. of villages in the taluk and Hobli's Hobli I Hoskote Ii Sulibele iii.Nandagudi ivJadigenahalli vAnugondanahalli	41 69 72 75 42
07	Total No. of villages	299

Table 2.2 Land Use Details of Hoskote Taluk

Sl.No.	Particulars	Area In Ha
1.	Total geographical area	54,587
2.	Land not available for cultivation	13,631
3.	Forests	3,444
4.	Not cultivated	9,492
5.	Barren Land	1,049
6.	Reserved Pastures	456
7.	Trees and Groves	4,041
8.	Dry Land	4,004
9.	Net sown area	35,348

10.	Area sown more than once	2,081
11.	Net irrigated area	7,385
	a) From Tanks	2,702
	b) From Wells	731
	c) From Bore wells, others	3750, 203
	d) No. of tanks	198

111. Hydrogeochemistry

Hydro geochemistry is normally controlled by:

1. Variation in the hydrogeochemical processes.

2. Amount and frequency of rainfall,

3. Composition of soil and through which the groundwater moves,

4. Type and texture of the soil,

5. Drainage facilities prevailing in the area and

6. Anthropogenic influences such as irrigation practices, cropping methods and the use of fertilizers and pesticides as well as due to human activities.

GROUNDWATER CHEMISTRY OF THE STUDY AREA

Water samples collected from eighty-two different localities of the study area have been analysed and have been used in the interpretation of its chemistry.

Iso-concentration map of Nitrate has been prepared for these constituents that vary significantly in different samples.

The statistical parameters like mean and standard deviation have been calculated and tabulated.

Table-1 Sampling Locations and analysis of Nitrates in drinking water

Sl .no	samples	ppm	epm	%
1	Anugondanahalli	62	1	11.2
2	Channapura	85	1.37	13.1
3	Hindiganal	51	0.82	13.5
4	Sulibele	14	0.23	4.33
5	Upparahalli	3	0.05	0.44
6	Tavarekere	38	0.61	7.61
7	Mutkur	10.5	0.17	1
8	Yedagondana Hally	1120	18.1	57.8
9	Doddaganahalli	1250	20.2	39.7
10	Bylnarsapura	145	2.34	8.88
11	Marsandahalli	400	6.45	37.9
12	Agasarahalli	42	0.68	7.98
13	Huluvanahalli	41	0.66	3.46
14	Obalahalli	1	0.02	0.24
15	Devlapura	21.8	0.35	2.9
16	Medahalli	7.3	0.12	1.32
17	Doddaaraligere	4.2	0.07	0.9
18	Thamarasanahalli	3.4	0.05	1.54
19	Thimappanahalli	4.1	0.07	1
20	Dhyavasandra	4	0.06	0.84
21	Bhavapura	7	0.11	1.72
22	Doddahullur	5	0.08	1.36
23	Chikkahullur	20	0.32	12.4
24	Dasarahalli	50	0.81	12.9

25	Pillegumpe	0	0	0
26	Kannurahalli	6.3	0.1	0.9
27	Shemundahalli	5.4	0.09	1.66
28	Chikaabinagabbi	6.7	0.11	0.91
29	Poojenagrahara	4.5	0.07	1.2
30	Bhaktarahalli	4	0.06	1.4
31	Ginnagara	0.4	0.01	0.05
32	Appasandra	7.5	0.12	2.52
33	Guguttahalli	7.1	0.11	4.04
34	Mylapura	7.1	0.11	1.8
35	Gundur	6.2	0.1	0.46
36	Bagur	10	0.16	3.29
37	Siddenahalli	2	0.03	1.47
38	Gidappanahalli	4	0.06	1.49
39	Valagerepura	3	0.05	0.96
40	Hittasandra	5	0.08	2.53
41	Hindiganala	16	0.26	3.41
42	Kollathur	5	0.08	1.86
43	Dhandupalya	16	0.26	4.65
44	Jadigenahalli	4	0.06	1.9
45	S Narayanakere	10	0.16	1.36
46	Bylahalli	14	0.23	2.3
47	Attihalli	2	0.03	1.04
48	Begur	2	0.03	0.84
49	Kabagenahalli	2	0.03	0.3
50	Boymanabande	8	0.13	0.66
51	Thindlu	7	0.11	2.56
52	Tharabahalli	6	0.1	1.35
53	Bylahalli	14	0.23	2.3
54	Attihalli	2	0.03	1.04
55	Begur	2	0.03	0.84
56	Kabagenahalli	2	0.03	0.3
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74	Bylahalli	14	0.23	2.3
75	Attihalli	2	0.03	1.04
76	Begur	2	0.03	0.84
77	Kabagenahalli	2	0.03	0.3
78	Boymanabande	8	0.13	0.66
79	Bandahalli	12	0.19	4.2
80	Beerahalli	8	0.13	2.01

81	Lingapura	0	0	0
82	Gangapura	7	0.11	2.05
Max		1250		
Min		0		
Mean		59.5		
Std dev		187		

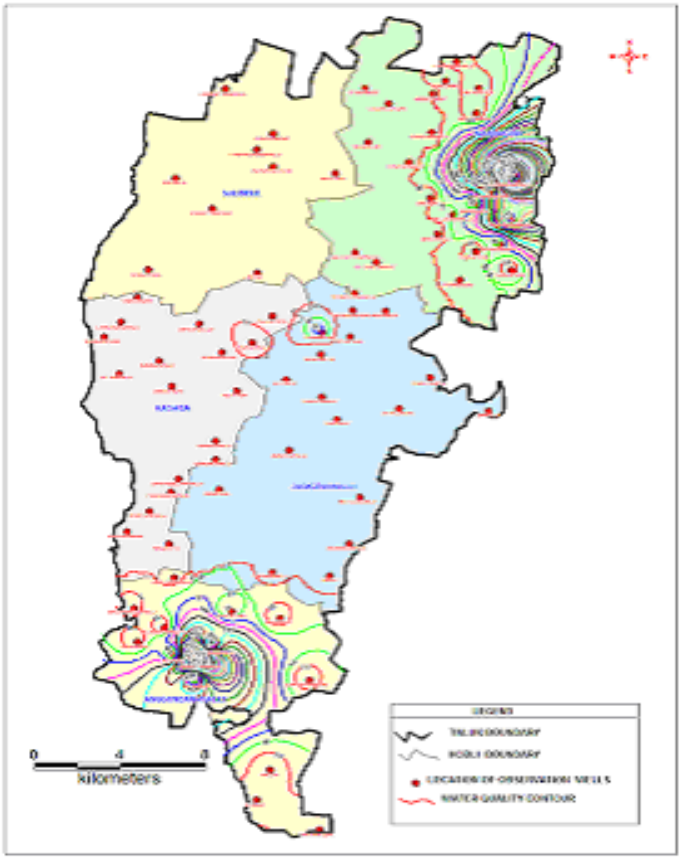

Fig 3.1 ISO NITRATE MAP

- Nitrate compounds are highly soluble in water and a concentration of even 600 ppm could be expected in groundwater.
- The mean and S.D. values of the study area are 59.5 ppm and 187 ppm respectively.
- The highest value of 1250 ppm is noticed at Doddaganahalli and the lowest value of 0 ppm is reported from Nadavati in the study area.
- Two anamolous zones such as Eastern part (Nandagudi Hobli) and southern zone (Anugondanahally hobli) of the taluk , which are presented in the above map

IV.Discussion

Quality data with respect to 82 drinking water samples is available with ZPED. The same has been collected and analysed to draw conclusion for managing the resource.

Results and discussions

82 Samples were collected from Hoskote taluk and tested for the Nitrate concentration (Table 1).The analysis revealed that

Nitrogen is present in small quantities in common rocks and minerals, but the major source are from soils and organic materials. Nitrogen is an important constituents of organic materials and dissociation, the organic material gives nitrate to groundwater. The impact of agricultural farming and use of fertilizers also manifests nitrate concentration of groundwater. Nitrogen dissolved in rainwater occurs as an ammonium ion. The transformation of aqueous ammonia to ammonium ion is half completed at a Ph of 9.24 (Sillen and Maztell, 1964). Nitrate compounds are highly soluble in water And a concentration of even 600ppm could be expected in groundwater.

The mean and Standard Deviation values of the study area are 59.5 ppm and 187 ppm respectively. The highest value of 1250ppm is noticed at Doddaganahalli and the lowest value of 0 ppm is reported from Naduvatti in the study area.Nitrate contamination in the groundwaters of Hoskote Taluk, calling for addressing the problem immediately.

V.Conclusion

The analysis of data collected followed by field investigations reveal that the groundwater in the study area is getting contaminated with Nitrate alarmingly. Indiscriminate disposal of sewage and livestock effluents without proper treatment, mixing of sewage and groundwaters and injudicious use of fertilizers

(Phosphatic) in agricultural activities are increasing the Nitrate levels in the groundwater incessantly. zones such as Eastern part (Nandagudi Hobli) and southern zone (Anugondanahally hobli) of the taluk is highly contaminated by the Nitrate. the need for providing an alternate source of drinking water to the residents. Water treatment facility shall have to be designed for providing potable water. As a result of overexploitation of groundwater and continuous depletion of groundwater table due to insufficient rains and no recharge of groundwater, the concentration of Nitrate is on the rise. Therefore, further drilling of bore wells for irrigation purpose has to be temporarily stopped till the situation improves. This definitely calls for Rainwater harvesting and artificial recharge of groundwater

VI. ACKNOWLEDGEMENTS

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