

RAICHUR DISTRICT



FIG.23 RAICHUR DISTRICT

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1. Location

Raichur district is located in the northeastern portion of Karnataka State with a geographical area of 8442.83 sq. km. It is bounded by Gulbarga district on northern side, Bagalkot and Bijapur districts on western side, Koppal and Bellary districts on the southern side and Andhra Pradesh State on eastern side. It lies between 15° 31' to 16° 33' N Latitude and 76° 14' to 77° 35' E Longitude.

2. Demography

As per the 1991 census, Raichur district has a population of 1,351,809. The total number of villages / habitations in the district are 1,219. Raichur is the district headquarters. Raichur district has 5 taluks viz., Deodurg, Lingsugur, Manvi, Sindhanur and Raichur.

3. Climate, Drainage and Soil

Krishna and Tungabhadra rivers drain Raichur district. Occurrence of heavy rainfalls on a few days is one of the important characteristics of rainfall distribution in this area. Sometimes, one-third to two-thirds of the annual rainfall has occurred in a single day. The intensity of rainfall over short periods of 15 minutes to an hour can sometimes be as high as 125 to 200 mm an hour. The rainfall varies between 400 and 900 mm with average annual rainfall being about 600 mm. The temperature variation recorded is 18 ° C to 39.6 ° C. Major portion of the taluk is covered by red and black soils.

4. Geology and Groundwater occurrence

The Peninsular Gneisses and Closepet granites cover major portion of the district. From the groundwater point of view, these rocks are classified as crystalline formations. The fracture / fissure system developed along with joints and faults traversing the rocks facilitate groundwater circulation and hold moderate quantity of water. The quality of groundwater is governed by the mineralogical composition of the rocks. The district also consists of basic auriferous volcanic rocks intercalated with sediments. In the metasediments, bedding planes and the fractures/joints act as conduits for water movement and accumulation. The joint pattern controls movement of water in the metavolcanics and they normally yield better quality water. Groundwater in general occurs in the water table conditions in the weathered and decomposed mantle and also under semi-confined conditions in the deeper fractures.

5. Groundwater quality characterization

To understand and gather information on groundwater quality, 3666 groundwater samples collected from 1003 villages/habitations in Raichur district have been analysed by RDED.

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9940 ppm (135 samples) and Raichur 2010 to 6450 ppm (46 samples). The highest value of 26,660 ppm is reported from Manvi taluk.

Total Hardness (TH)

Totally 228 samples spread across 154 villages have indicated higher TH value ranging from 610 to 4970 ppm. The ranges of TH values in the other taluks are Deodurg 630 to 950 ppm (31 samples), Lingsugur 610 to 890 ppm (43 samples), Manvi 610 to 4970 ppm (56 samples), Sindhanur 610 to 960 ppm (60 samples) and Raichur 610 to 730 ppm (38 samples). The maximum TH content (4970 ppm) is reported from Manvi taluk.

Calcium Hardness (CaH)

There are 1008 samples spread across 516 villages having CaH above the permissible limit and it ranges from 210 to 3200 ppm. The maximum abnormal samples are from Deodurg taluk 210 to 2550 ppm (271 samples) followed by Lingsugur 210 to 3100 ppm (286 samples), Manvi 210 to 3200 ppm (133 samples), Sindhanur 210 to 470 ppm (208 samples) and Raichur 210 to 900 ppm (110 samples).

Chloride (Cl)

Only 78 samples analysed from 49 villages / habitations have shown higher Cl content in the range of 1010 to 28500 ppm. The abnormal Cl content noted in other taluks are: Deodurg 1010 to 3200 ppm (4 samples), Lingsugur 1010 to 21024 ppm (5 samples), Manvi 1030 to 28500 ppm (57 samples), Sindhanur 1010 to 1200 ppm (3 samples) and Raichur 1010 to 4650 ppm (9 samples). Highest Cl content of 28500 ppm is reported from Manvi taluk.

Sulphate (SO₄)

In the entire district, only one taluk, Manvi is having abnormal Sulphate concentration ranging from 409.6 to 9902 ppm.

Fluoride (F)

The analytical data has revealed that 575 samples from 298 villages / habitations have shown abnormal Fluoride content in the range of 1.6 to 8.9 ppm. The concentrational variations reported in different taluks are Deodurg 1.6-1.9 ppm (16 samples), Lingsugur 1.6-2.4 ppm (232 samples), Manvi 1.67-8.9 ppm (70 samples), Sindhanur 1.6-2.4 ppm (197 samples) and Raichur 1.6-2.10 ppm (60 samples). Highest concentration of Fluoride (8.9 ppm) is reported from Manvi taluk.

Nitrate (NO₃)

There are 137 samples covering 99 villages / habitations, which have analysed NO₃ content in the range of 101 to 370 ppm. The abnormal samples are from: Deodurg (107-120 ppm) 2 samples, Lingsugur (101-370 ppm) 46 samples, Sindhanur (103-314 ppm) 57 samples and Raichur (101-180 ppm) 32 samples.

Alkalinity (Alk)

Only 24 samples from 23 villages have analysed alkalinity in excess ranging from 610 to 1470 ppm. These are from Deodurg (610-840 ppm) 7 samples, Lingsugur (610-690 ppm) 2 samples, Sindhanur (610-1470 ppm) 9 samples and Manvi (630-790 ppm) 6 samples. Raichur taluk has not reported abnormal concentration of Alkalinity.

Iron (Fe)

In the district, 171 samples covering 146 villages / habitations, have analysed higher iron content in the range of 1.1 to 17 ppm. The concentrational variation of Fe in different taluks is Deodurg 1.1-3.7 ppm (30 samples), Lingsugur 1.1-1.5 ppm (44 samples), Manvi 1.1-17 ppm (36 samples), Sindhanur 1.1-5 ppm (36 samples) and Raichur 1.1-1.3 ppm (25 samples). The highest Fe value of 17 ppm is recorded from Manvi taluk.

Bacteria (*E.coli*)

A maximum number, 3372 samples analysed from 994 villages/habitations have shown the presence of Bacteria in the analysed water samples. The bacterial count generally varies between 1 to 12 No.s/100 ml. The bacterial counts reported in different taluks are: Deodurg 1-18 No.s/100 ml (702 samples), Lingsugur 1-17 No.s/100 ml (716 samples), Manvi 1-30 No.s/100 ml (584 samples), Sindhanur 1-21 No.s/100 ml (692 samples) and Raichur 1-82 No.s/100 ml (678 samples).

5.3 Spatial Variation**Bacteria (*E.coli*)**

The map depicting the bacterial incidence reveals that, Bacteria have affected a very large number of villages in the district.

Fluoride (F)

The isoconcentration map (Fig.23A) shows abnormal concentration in patches located in the western part covering Lingsugur taluk, southern portion covering Sindhnur taluk and isolated patches in the eastern part covering Raichur and Manvi taluks

Total Dissolved Salts (TDS)

The isoconcentration map (Fig.23B) depicts that; isolated patches in eastern side covering Manvi and Raichur taluks, in the southern side covering Sindhur taluk and few patches in Lingsugur taluk show higher concentration of TDS.

Total Hardness (TH)

Isoconcentration map (Fig.23C) depicts that; few isolated patches covering Manvi and Lingsugur taluk in the central part have higher concentration of TH.

Iron (Fe)

The isoconcentration map (Fig.23D) shows that, apart from few isolated patches in each taluk, rest of the district is having iron concentration within the permissible limit.

6. Conclusion

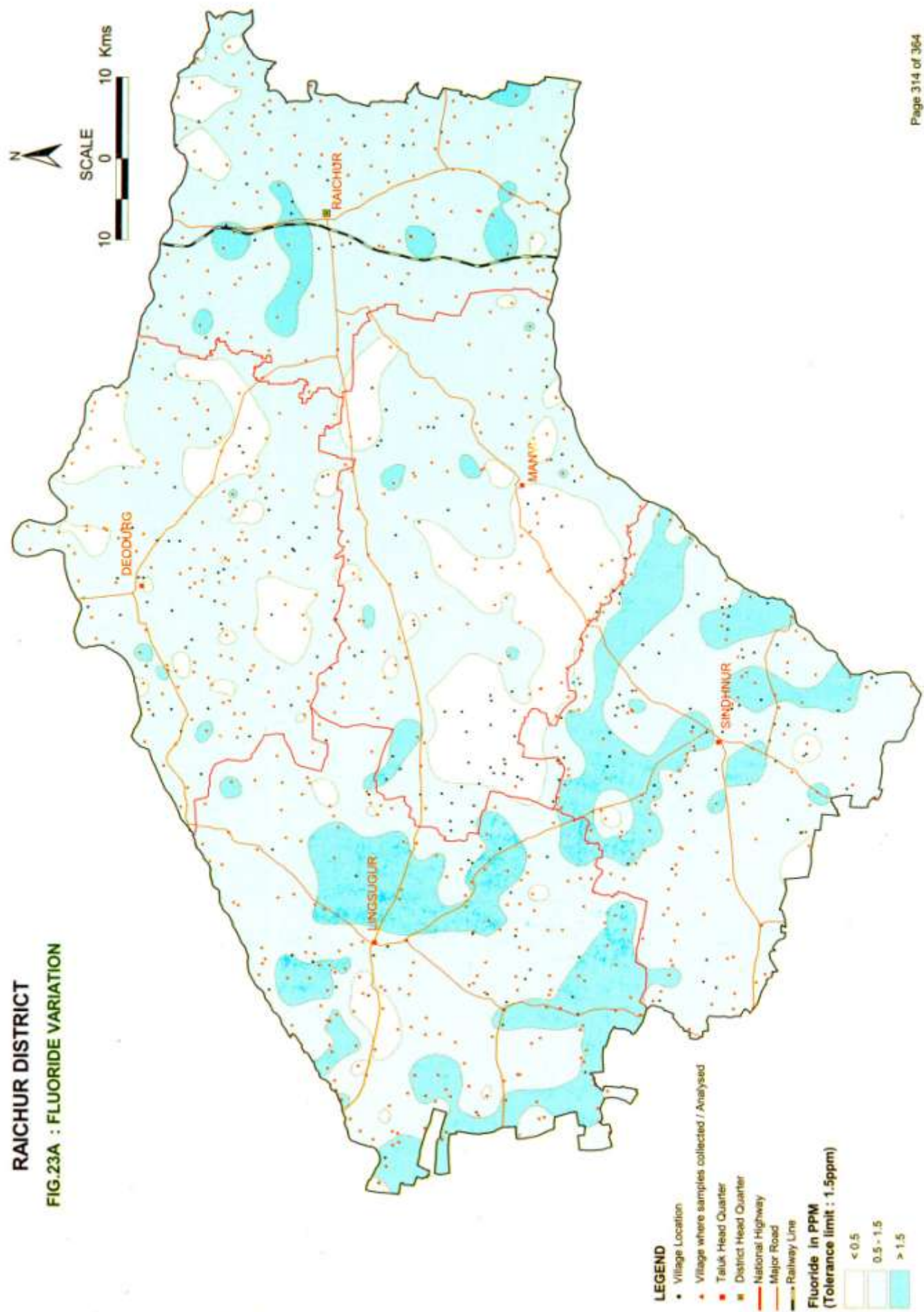
The water quality data of Raichur district has reflected the presence of excess Turbidity, Calcium Hardness, Fluoride and Bacteria. Turbidity can be reduced by simple infiltration and hardness can be reduced by some conventional methods. In case of Fluoride, utmost care has to be taken, since many samples have analyzed excess of Fluoride. Though a little amount of Fluoride is essential for the bone development in the infants, excess consumption of Fluoride will induce physical disabilities and Dental Fluorosis. Therefore, it is very essential to treat the water to the desirable standard before it is supplied for drinking purpose. The most important component, which is much more harmful, is the presence of Bacteria viz. *E. coli* in drinking water. The consumption of such water may cause the diseases such as Malaria, Diarrhea etc. Probably, the organisms might have been introduced into the groundwater regime by anthropogenic activities. This clearly indicates non-hygienic / poor sanitation condition prevailing at village levels. To overcome this both the user and the administrator must be trained properly and awareness has to be created regarding hygienic aspects.

Table: Comprehensive analysis of water quality data of Raichur District

Sl. NO.	Name of the taluks	Number of villages/habitations	Number of sampled villages	Number of samples analysed	Water quality scenario	Bact (c/100 ml) -0	Tur (10) JTU	Color (25) HU	Cond - mmbhos /cm	pH (6.5-8.5)	TDS (2000) ppm	TH (600) ppm	CaH (200) ppm	Cl (1000) ppm	SO ₄ (400) ppm	F (1.5) ppm	NO ₃ (100) ppm	Alk (600) ppm	Fe (1) ppm
1	Davanagur	197	220	737	No. of samples beyond permissible limit	702	65	4	-	13	15	31	271	4	-	16	2	7	30
					No. of villages affected	219	54	4	-	12	11	24	131	4	-	13	2	7	27
2	Ingasigur	218	225	772	Range	1-18	11-20	10-30	220-14880	6.3-9	2220-5940	630-950	210-2550	1010-3200	-	1.6-1.9	107-120	610-640	1.1-3.7
					No. of samples beyond permissible limit	716	138	-	-	7	73	43	286	5	-	232	46	2	44
3	Manvi	178	168	695	No. of villages affected	222	100	-	-	6	43	33	138	5	-	102	32	2	42
					Range	1-17	11-25	-	190-18207.5	6.6-8.8	2010-5880	610-890	210-3100	1010-21024	-	1.6-2.4	101-370	610-690	1.1-1.5
4	Sindhanur	169	228	763	No. of samples beyond permissible limit	594	70	29	-	90	131	56	133	57	10	70	-	9	36
					No. of villages affected	161	44	23	-	59	63	32	69	30	9	46	-	8	27
5	Raichur	193	162	709	Range	1-30	11-36	30-100	160-22000	1.37-8.95	2010-25660	610-4970	210-3200	1030-26500	409.6-9902	1.67-8.9	-	610-1470	1.1-1.7
					No. of samples beyond permissible limit	692	89	2	-	88	135	60	208	3	-	197	57	6	36
Total	955	1003	3666	No. of villages affected	226	45	2	-	65	80	41	117	3	-	102	38	6	30	
				Range	1-21	11-24	40-50	100-16000	6.6-9.5	2020-5940	610-960	210-470	1010-1200	-	1.6-2.4	103-314	630-790	1.1-1.5	
Total	955	1003	3666	No. of samples beyond permissible limit	678	19	-	-	15	46	38	110	9	-	60	32	-	25	
				No. of villages affected	166	16	-	-	13	28	24	61	7	-	35	27	-	20	
Total	955	1003	3666	Range	1-82	11-20	-	100-28020	6.8-9	2010-5450	610-730	210-900	1010-4650	-	1.6-2.10	101-180	-	1.1-1.3	
				No. of samples beyond permissible limit	3372	381	35	-	213	400	228	1008	78	10	575	137	24	171	
Total	955	1003	3666	No. of villages affected	994	259	29	0	155	225	154	516	49	9	296	99	23	146	
				Range	1-82	11-36	30-100	100-28020	1.37-9.5	2010-25660	610-4970	210-3200	1010-26500	409.6-9902	1.6-8.9	101-370	610-1470	1.1-1.7	

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FIG.23A : FLUORIDE VARIATION

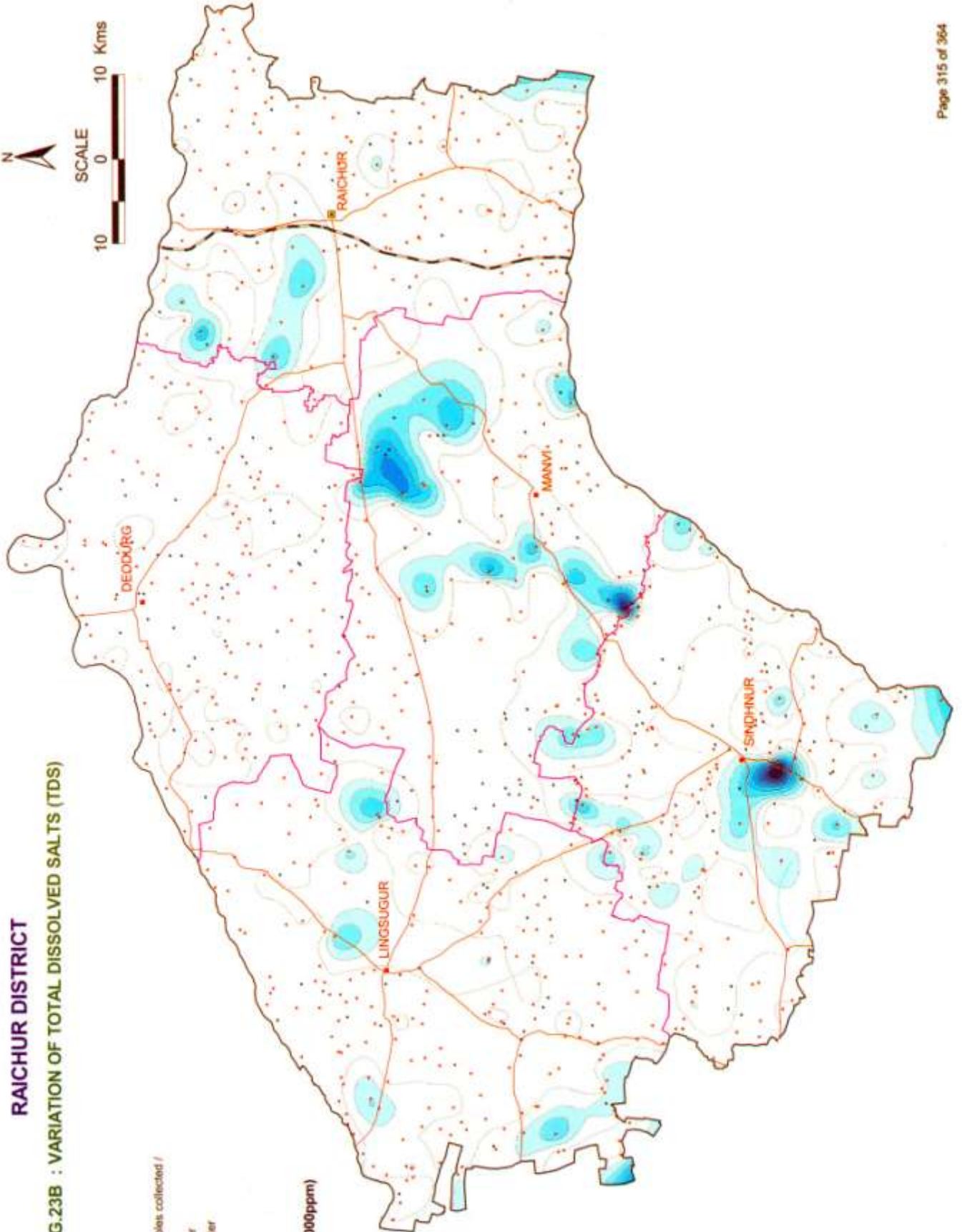


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FIG.23B : VARIATION OF TOTAL DISSOLVED SALTS (TDS)

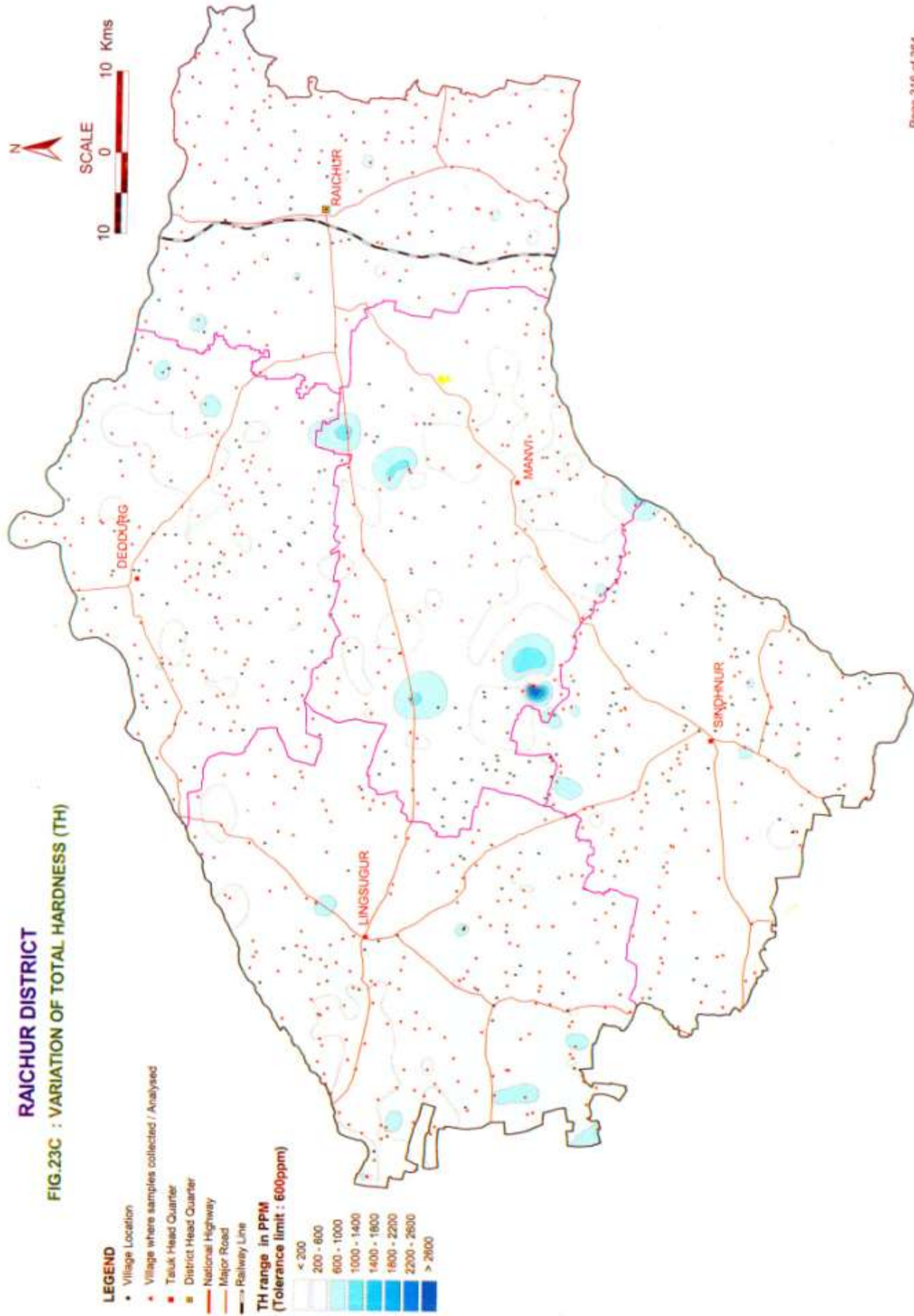
- LEGEND**
- Village Location
 - Village where samples collected / Analysed
 - Taluk Head Quarter
 - District Head Quarter
 - National Highway
 - Major Road
 - Railway Line

TDS range in ppm
(Tolerance limit : 2000ppm)



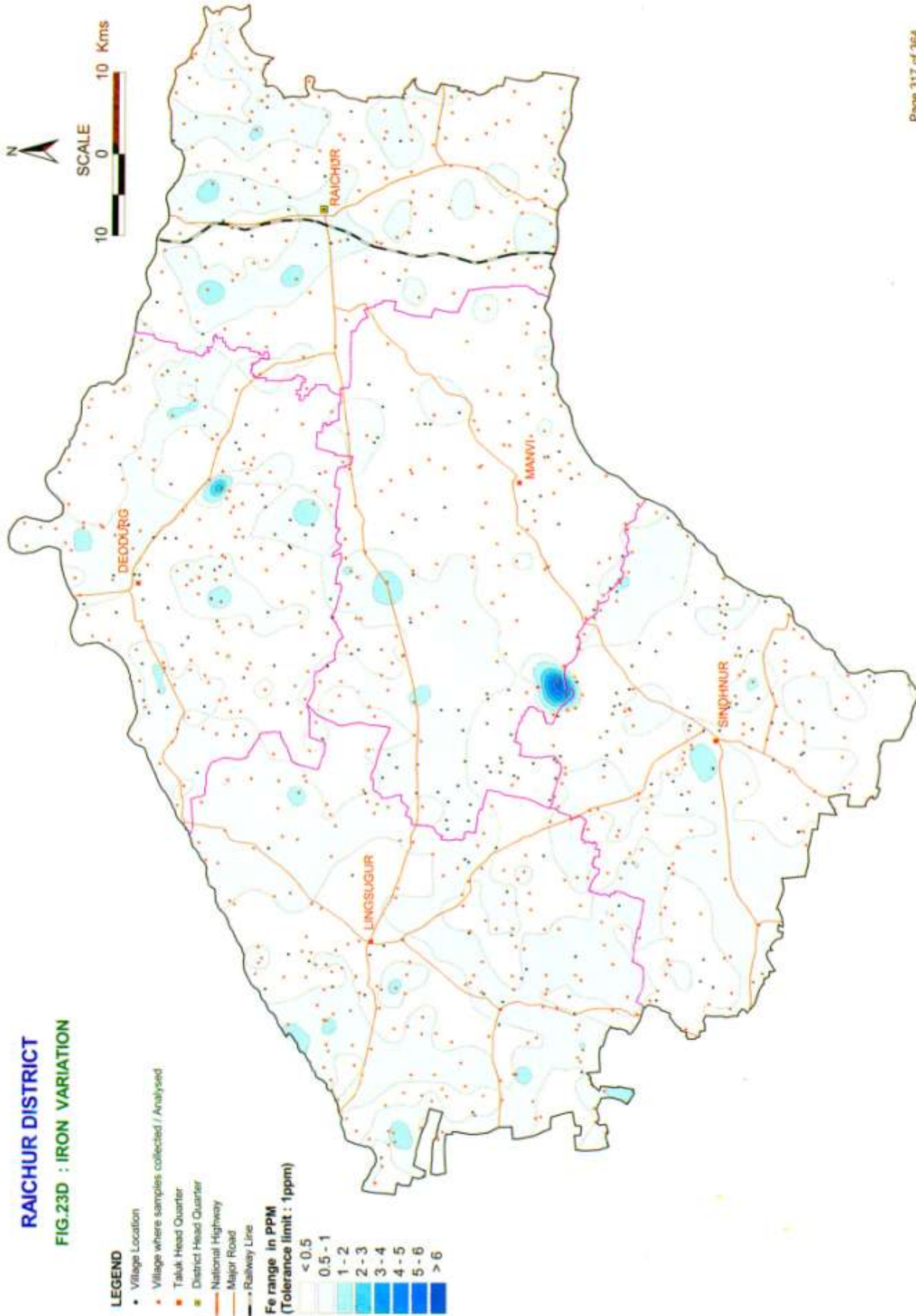
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FIG.23C : VARIATION OF TOTAL HARDNESS (TH)



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FIG.23D : IRON VARIATION



LEGEND

- Village Location
- Village where samples collected / Analysed
- Taluk Head Quarter
- District Head Quarter
- National Highway
- Major Road
- Railway Line

Fe range in PPM
(Tolerance limit : 1ppm)

