

# Potability of Groundwater from Several Villages in Sinnar Area, Nashik District, Maharashtra, India

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## ABSTRACT

The water and environment has become a poignant concern with the societies and approach makers. The contamination of water and atmosphere due to anthropogenic actions of human beings is a serious problem. The primary objective of this paper is to study the various groundwater sources in the surrounding of several villages from Sinnar Area, Nashik District (MS), India. The Iron concentration varied from 0.04 to 1.48 mg/L, and average concentrations of Iron was reached to 0.46 mg/L. Nitrate concentration oscillated from 02 to 162 mg/L, and average value of Nitrate is 53.13 mg/L in the study area. The average concentration of Fluoride in the study area is 0.57 mg/L. Among the fifteen samples collected seven are found to be potable.

**Keywords :** Groundwater Superiority, Anthropogenic Actions

## I. INTRODUCTION

Water is valuable gift given by the nature for all types of live stocks. Availability of clean water is the first priority for human civilization but now a days due to increasing globalization, the groundwater sources have become highly polluted. The primary objective of this paper is to study the various groundwater sources in the surrounding of several villages from Sinnar tehsil, District Nashik (MS), India.

## II. METHODS AND MATERIAL

### 1. Sampling

Total fifteen samples ( $S_1$  to  $S_{15}$ ) are collected for analysis in cleaned polythene bottles. Out of fifteen samples, 04 was from Dug well, 07 are from Hand pumps, and 04 are from power pumps.

### 2. Experimental Methods

The standard methods of APHA are used for the complete analysis. Fluoride is analyzed by SPANDS method at 570 nm. Iron is estimated by UV Visible spectrophotometer at 480 nm (Chemito UV 2100). The Nitrate concentration is measured by phenol disulphonic acid method at 410 nm using UV Visible spectrophotometer (Chemito UV 2100).

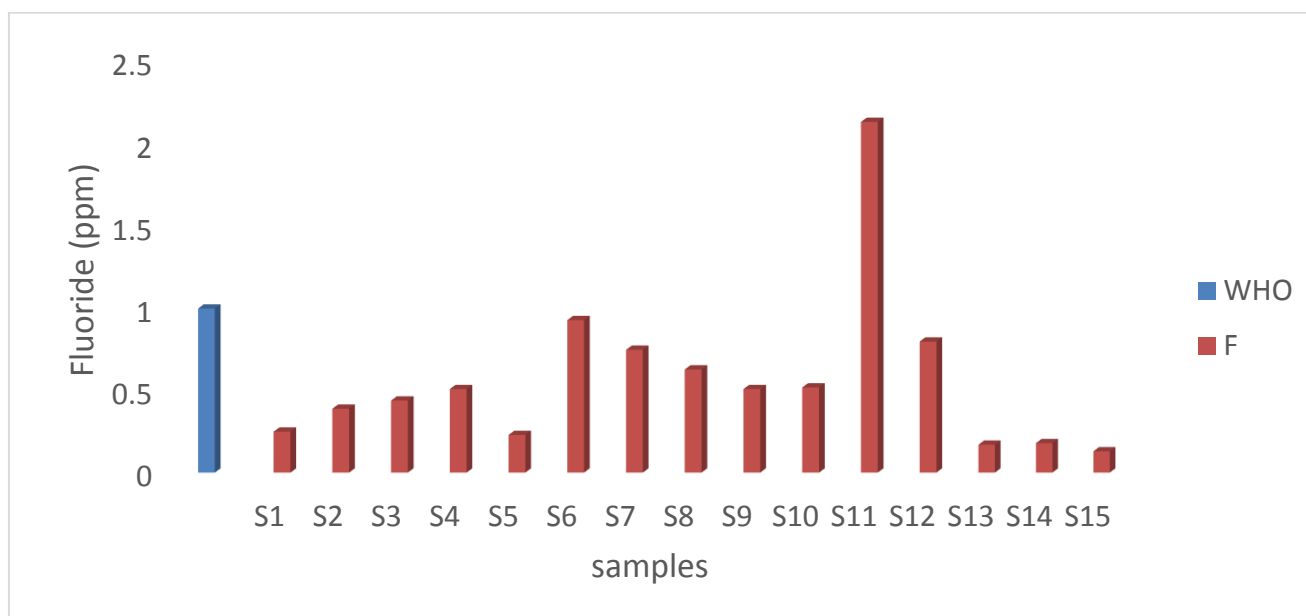
## III. RESULTS AND DISCUSSION

The investigated results are depicted in Table 1 along with permissible range as declared by WHO and BIS. The variation of parameters like Fluoride, Iron and Nitrate is shown graphically through Graph 1, Graph 2 and Graph 3 respectively.

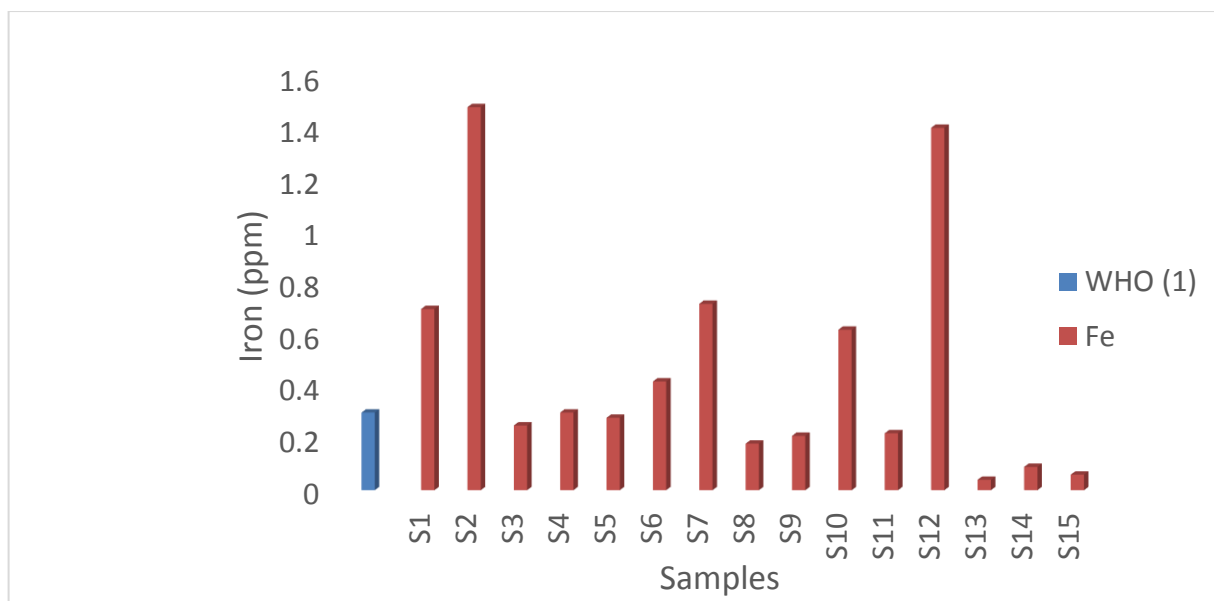
**Table 1 :** Groundwater quality of collected samples compared with standard data

Parameters of drinking water	WHO(1993)	BIS		Analyzed samples range
		Acceptable limit	Maximum Permissible Limit	
pH	Not mentioned	6.5-8.5	No relaxation	6.96-7.99
TDS (ppm)	No guidelines	500	2000	79-1255
Fluoride(ppm)	1.5	1.0	1.5	0.13-2.13
Iron (ppm)	0.3	0.3	1.0	0.04-1.48
Nitrate(ppm)	45	45	45	2-162

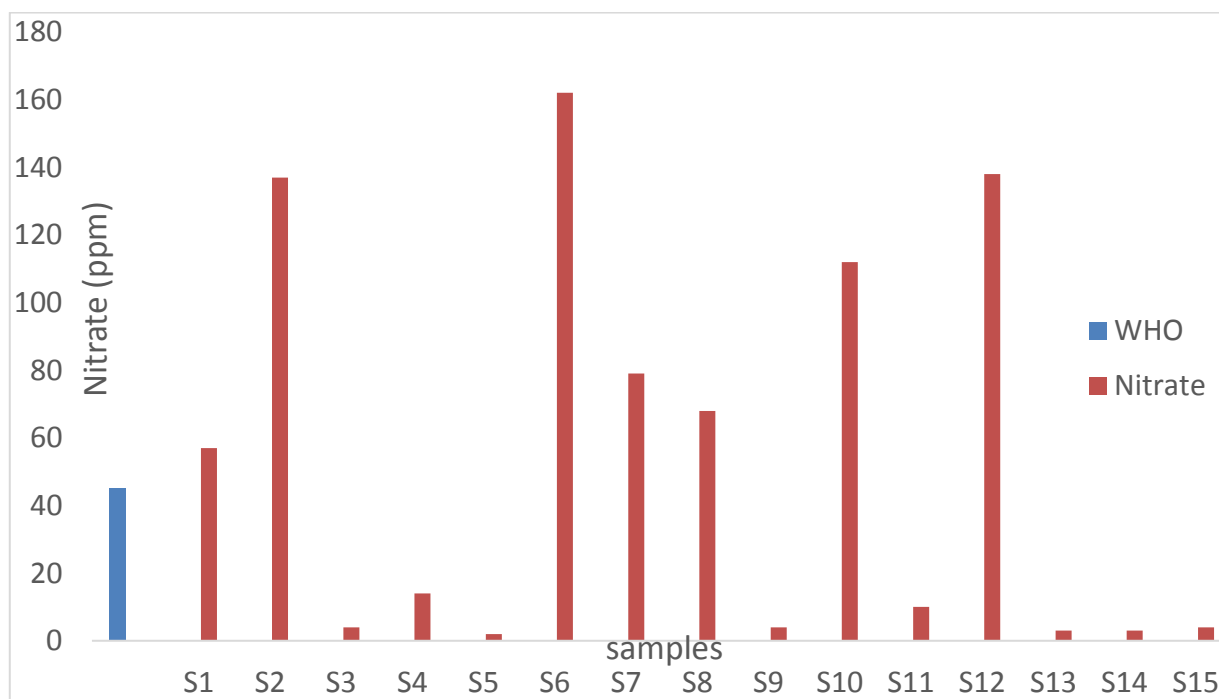
**Graphical representation**



**Graph 1.** Variation of Fluoride in water samples



**Graph 2.** Variation of Iron in water samples



**Graph 3.** Variation of Nitrate in water samples

The analysed samples show pH in the range 6.96-7.99. It is clear that all fifteen samples are having the values within the range given by the WHO<sup>1</sup>. The analyzed samples shown the TDS values ranging from 79-1255 ppm. Out of fifteen, 08 are within the permissible limit.

High concentration of Fluoride ion causes dental fluorosis as well as skeleton fluorosis<sup>2</sup>. The concentration of fluoride in 15 analyzed samples are ranging from 0.13-2.13. Out of fifteen samples, 14 samples are in permissible limit given by WHO.

The high level of Iron may cause several health problems such as liver cancer, diabetes, cirrhosis of liver, diseases related to heart and central nervous

system, infertility etc. The overload of Iron leads to adverse changes in colour, odour and taste of water and it also stains clothes<sup>3</sup>. The Iron concentration oscillated from 0.04 to 1.48 mg/L in the studied area. The maximum permissible limit of Iron in drinking water is 1.0 ppm. Out of fifteen, 08 are within the permissible limit.

Infants and pregnant or nursing women are especially susceptible to health problems from drinking water with Nitrate levels above 10 ppm. The nitrate contaminant affect the human health<sup>4</sup>. Nitrate concentration ranged from 2 to 162 mg/L in studied area. Out of fifteen, 08 are within the permissible limit.

#### IV. CONCLUSION

Parameter	S <sub>1</sub>	S <sub>3</sub>	S <sub>4</sub>	S <sub>5</sub>	S <sub>8</sub>	S <sub>9</sub>	S <sub>11</sub>	S <sub>13</sub>	S <sub>14</sub>	S <sub>15</sub>
pH	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
TDS (ppm)	✓	×	✓	✓	×	✓	✓	✓	✓	✓
Fluoride(ppm)	✓	✓	✓	✓	✓	✓	×	✓	✓	✓
Iron (ppm)	×	✓	×	✓	✓	✓	✓	✓	✓	✓
Nitrate(ppm)	×	✓	✓	✓	×	✓	✓	✓	✓	✓

From the above findings, it is concluded that only five water sources (S<sub>5</sub>, S<sub>9</sub>, S<sub>13</sub>, S<sub>14</sub> and S<sub>15</sub>) qualify to be potable water sources. For rest of the above sources, one has to make compromise for one or two parameters.

#### Acknowledgment

We are thankful to Principal Dr K.K.Deshmukh for providing the facilities.

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#### Cite this article as :

K.T. Bharati, D. B. Gujarathi, V. E. Tambe, N. E. Gite, S. R. Tambe, M. S. Madane, "Potability of Groundwater from Several Villages in Sinnar Area, Nashik District, Maharashtra, India", *International Journal of Scientific Research in Science and Technology (IJSRST)*, Online ISSN : 2395-602X, Print ISSN : 2395-6011, Volume 5 Issue 4, pp. 43-46, ETCS-2019, January 2019.  
Journal URL : <http://ijsrst.com/IJSRST195410>