

GROUND WATER QUALITY ASSESMENT IN AND AROUND PULIVENDULA, KADAPA DISTRICT, ANDHRA PRADESH

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Abstract: Ground water is an essential and valuable natural source of water supply all over the world. Ground water supports not only the life on the earth but also governs the economic, industrial and agricultural growth of human civilization. However its quality is deteriorating due to population growth, agricultural runoff and urbanization. This study was designed to assess the quality of selected ground water samples in and around Pulivendula area of kadapa district. Twenty one samples were randomly selected in pulivendula area and were tested and analysed for different quality parameters viz P^H, Turbidity, Total hardness, Dissolved oxygen, Total dissolved solids, Alkalinity, Chlorides, Fluorides in drinking water in the laboratory. These eight water quality parameters have been considered as important indicators to evaluate water quality status in 21 ground water samples collected in the region. Then the results are expressed for each sample for all quality parameters in tabular form. The results are compared with standard values.

Keywords: Ground water, Assessment, Alkalinity, Fluoride, Quality parameters

I. INTRODUCTION

Water is the most vital source for all kinds of life on the earth. Water is essential component of the environment and sustains life on the earth. Water is raw material for photosynthesis, and therefore is important for crop production. Even though water is a renewable resource, the growing human population is further increasing the demand of this renewable resource. Ground water exhaustion is faster than its percolation back into the ground. Out of the total water available on the earth, only 0.16% is suitable for human use and resources are suitable for agriculture, 3% for domestic and 1% of water for industrial purpose. However for domestic use must be in pure form otherwise it will affect the human health and cause diseases such as typhoid, cholera and other seasonal diseases.

Almost 70% of water in India has become polluted due to the discharge of domestic sewage and industrial effluents into natural water sources such as river streams as well as lakes. The government of India showed its commitment for the protection of our environment long ago by passing the water act in 1974. The quality of ground water in general and portable water in particular may be analysed by its physical, chemical and microbiological characteristics known as water quality parameters. However the number of such characteristics which are necessary to completely specify the quality of water is quite large. But we can find some correlation among water quality parameter of ground water sources of bore well in Pulivendula in Andhra Pradesh has been under taken.

The quality of ground water depends on various chemical constituents and their concentration, which are mostly derived from the geological data of the particular region. Ground water occurs in weathered portion, along the joints and fractures of the rocks. Infact, industrial waste and the municipal solid waste have emerged as one of the leading cause of pollution of surface and ground water. In many parts of the country available water is rendered non-portable because of the presence of heavy metal in excess. The situation gets worsened during the summer season due to water scarcity and rain water discharge.

Contamination of water resources available for household and drinking purposes with heavy elements, metal ions and harmful microorganisms is one of the serious major health problems. Thus there is a need to look for some useful indicators, both

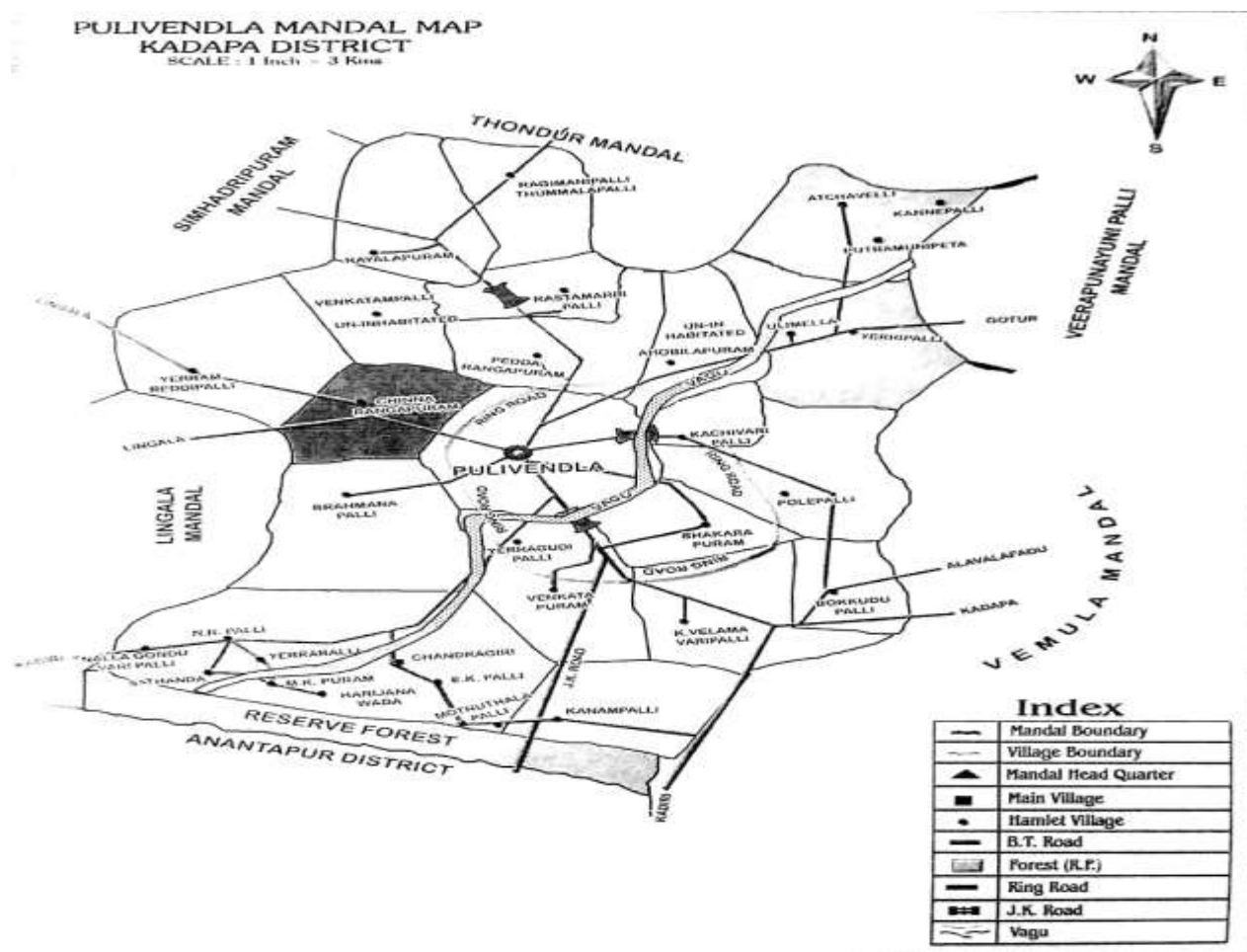
chemical and physical which can be used to monitor both drinking water operation and performance. The water used for drinking purpose should be free from toxic elements, living and non-living organisms and excessive amount of minerals that may be harmful to health. Keeping this in focus, the quality aspects of ground water in pulivendula area were analysed for general water quality. Hence, it is highly essential to examine the presence of toxic substances in distribution water for portable purpose before it is used for drinking.

II. LITERATER REVIEW

- **Dinesh Kumar Tank** study focussed on the hydrochemistry of ground water in the Jaipur city to assess the quality of ground water for determining its suitability for drinking and agricultural purposes.
- **Vikas Tomar** Collected water samples from 67 locations during pre and post monsoon seasons of the year 2011 from Karnal district, Haryana and were subjected to analysis for chemical characteristics.
- **Chidanand patil** carried out physical, chemical, bacteriological analysis of water samples from 7 bore wells located around landfill site at Turmuri, Belgaum to ascertain the magnitude of dumpsite pollution on ground water quality.
- **Sarala** studied the ground water quality parameters in the surrounding wells of jawaharnagar, in upper Musi catchment area of Ranga reddy District in Andhra Pradesh.
- **Priti singh** assessed and mapped the spatial distribution of ground water quality of the Dhankawadi ward, pune by using GIS. APHA's standard laboratory procedure has been adopted to assess the quality of ground water.

III. STUDY AREA

Pulivendula is located at 14.4167°N 78.2333°E . It has an average elevation of 272 meters (895 feet). It has a total area of 87.17 sq.km (33.66 sq .mi) and population of 78,884 with population density as 900 per square km (2300 per sq.mi). The prevailing climate in pulivendula is known as a local steppe climate .The average annual temperature in pulivendula is 28.1°C . About 570 mm of precipitation falls annually. The Rivers Chitravathi and Penna flows in pulivendula. Pulivendula is endowed mainly with red and black soils. The important minerals that are available here are barrytes, asbestos and lime stone.



IV. METHODOLOGY

The quality assessment of water involves two important aspects, sampling and analysis. Twenty one samples were randomly picked in and around pulivendula. The locations of the sampling points were spread within the length and breadth of community. The samples must be handled in such a way that no significant changes in composition occur before the tests are performed. Samples should be collected in polythene containers of two litres capacity. Before taking the sample, the bottle sterilized either by heating or treating with nitric acid. Residual acids must be removed by washing with distilled water.

After the treatment, the bottle can be used. At the site sample collection depends on type of source that has to be collected. The container first half filled, shaken and emptied and later completely filled. A tag is tied to the bottle indicating the following details,

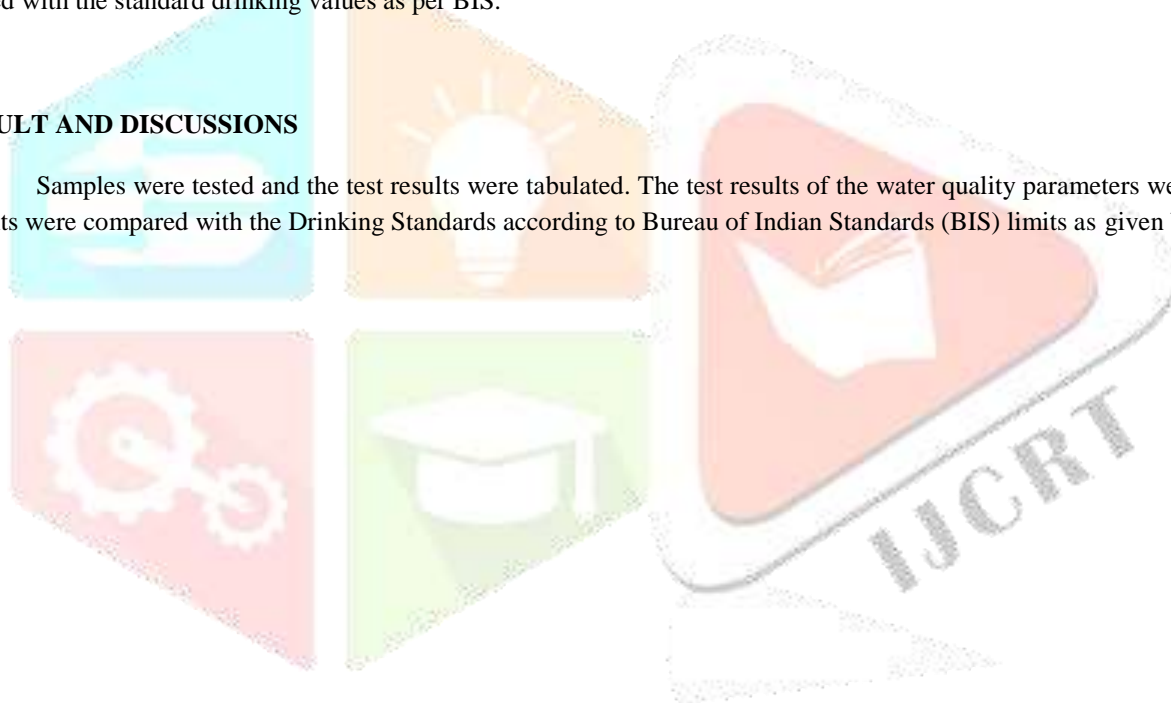


1. Sample Number
2. Date of sampling
3. source of water

These water samples were analysed for water quality parameters such as Turbidity, pH, Dissolved Oxygen, Chlorides, Alkalinity etc. The procedures are adopted for the determination of physiochemical parameters. The results are tabulated and compared with the standard drinking values as per BIS.

V. RESULT AND DISCUSSIONS

Samples were tested and the test results were tabulated. The test results of the water quality parameters were analysed and the results were compared with the Drinking Standards according to Bureau of Indian Standards (BIS) limits as given below.



S.NO	VILLAGE	pH	TURBIDIT	HARDNESS	DO	TDS	ALKALINIT
			Y				Y
1	AHOBILAPURAM	8.04	6.5	520	3.8	0.0161	690
2	ATCHAVALLI	7.88	8.8	365	6.2	0.0227	890
3	BAKARAPURAM	8.23	7.2	485	7.2	0.0138	490
4	BOKKUDUPALLI	7.7	6.6	815	3	0.0155	525
5	BRAMHANAPALLI	7.78	10	635	4.4	0.0134	400
6	CHINNARANGAPURAM	7.99	8	285	4.8	0.0126	375
7	YERRIPALLE	7.09	7	245	3.2	0.0072	455
8	ROTARYPURAM	7.65	6	875	3.2	0.0154	575
9	PULIVENDULA	8.4	5.3	295	12.6	0.0119	575
10	CHANDRAGIRI	7.95	6	390	4.2	0.0048	360
11	BASIREDDY PALLI	8.49	6.1	730	4	0.0073	500
12	RACHUMARRI PALLI	8.16	10.8	785	6.6	0.0212	870
13	THUMMALAPALLI	8.39	5.4	280	3.8	0.0122	555
14	RAYALAPURAM	8.23	13	355	4	0.0261	475
15	ULIMELLA	8.06	6	380	4.2	0.0151	425
16	YERRAMREDDY PALLI	8.27	8	230	38	0.0171	420
17	NALLAPUREDDY PALLI	7.87	5	300	4	0.0129	320
18	NALLAGONDUVARI PALLI	8.14	6.9	440	36	0.0031	360
19	EARRABALLI	8.01	4.7	235	4.2	0.0173	345
20	MALLIKARJUNA PURAM	8.17	7.4	205	3.6	0.0007	260
21	PEDARANGAPURAM	7.66	6.5	770	3.8	0.0126	485

Table 1: Ground water Quality Parameters of the Study Area

Table 2**Drinking Water standards recommending agencies and unit weight.****(All values except P^H is in mg/L.)**

	Standards	Recommended Agency	Unit Weight
P^H	6.5 - 8.5	ICMR / BIS	0.2190
Total Alkalinity	120	ICMR	0.0155
Total Hardness	300	ICMR / BIS	0.0062
T.D.S.	500	ICR / BIS	0.0037
Calcium	75	ICMR / BIS	0.025
Magnesium	30	ICMR / BIS	0.062
Chloride	250	ICMR	0.0074
Nitrate	45	ICMR / BIS	0.0413
Sulphate	150	ICMR / BIS	0.0124
D.O.	5.0	ICMR / BIS	0.723
B.O.D.	5.0	ICMR	0.3723

Table 2: Drinking Standards of Water Quality Parameters

Water quality refers to the physical, chemical and biological characteristics of water. Safe drinking water is one of the most important indicators of food absorption. Many water borne infections spread due to use of unsafe drinking water. Assurance of drinking water safety is a foundation for the prevention and control of water borne diseases. The World Health Organization (1993) has estimated that in India 21% of all communicable diseases are water related.

VI.CONCLUSION

In the present study, attempt has been made to study the composition and concentration of quality parameters of ground water samples collected from 21 locations in pulivendula region. The results are compared with Drinking Standards of BIS. From the information deduced from this study, the values for almost all samples are within the Drinking Standards for pH, Total hardness and Dissolved Oxygen. The values for Turbidity, Total Dissolved Solids and Total Alkalinity are exceeding the permissible limits. This was due to the environments in which these samples were situated, some very close to septic systems. These water samples were not fit for drinking without proper treatment.

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