



## STUDY ON FEW CHEMICAL CHARACTERISTICS OF GROUNDWATERS AT SATTANAPALLI DIVISION OF PALNADU, ANDHRA PRADESH

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### Abstract

Water is an essential resource for human needs given that it is the source of life for every living thing on earth. Water is one of the most essential asset we use for daily activities. It is an essential resource for every type of economic activity, including industry and agriculture. There is an abundance of water on the globe, but just a tiny percentage of it is fit for life. Approximately ninety-seven percent of it is in the seas, and it is too salty to be used for home, industrial, or agricultural purposes. Fresh water makes up the remaining three percent. About three percent of it is trapped in ice sheets or glaciers or is hidden so deeply that its extraction would be too time- and money-consuming. The aim of the present study was carryout on a characteristics of groundwater in five different mandals of sattanapalli division of palnadu area during pre-monsoon. And the groundwater samples were collected by random sampling method from various five mandals of Atchempet, Krosuru, Rajupalem, Nakerekallu, Muppalla and in addition to discover the relative treatment methods to make water for usage.

**Keywords:** Pollution, Pre-monsoon, Palnadu, Mn, Cu, Zn and Groundwater.

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## 1. Introduction

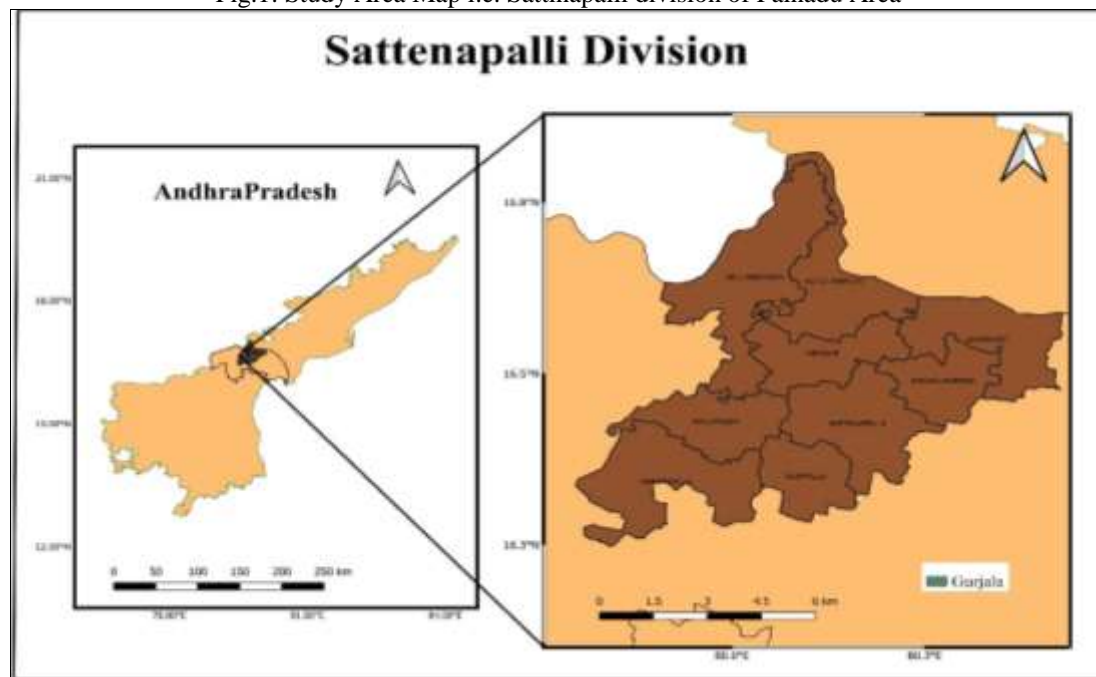
Given their interdependence, surface water and groundwater have frequently been researched and managed as separate resources. Groundwater is generated when surface water seeps into the soil. On the other hand, groundwater can also provide sources of surface water. (Saxena et al., 1978). Depending on where they originated, sources of surface water contamination are typically divided into two types. Alteration in physical, chemical and biological characteristics of these water sources may cause harmful effects on human and aquatic biota. Water is the prime essence of life. Water is a universal solvent and this characteristic grants it a very important role in all the activities on Earth. Water sustains agriculture, industry, energy and life and it is the key compound in our daily life. India receives 1170mm of rainfall on average per year. A total of 4000 billion cubic meters of rain fall annually across an area of 3290 lakh hectares. Out

of the total, 41% of it is lost to evaporation, 40% to runoff, 10% to soil moisture, and 9% is steeped in for ground water recharge. 12% of the stream flow water is used to generate electricity, 8% of it is used for irrigation, 2% for personal use, 4% for industrial, and 40% is used for industry. Only 1122 bcm of the 1869 bcm total available water resources are usable, and this includes 690 bcm of surface water and 432 bcm of ground water. This leaves 1122 bcm as the total available water resources per person at the moment.

### Discription of the Study Area:

The northernmost part of the Indian state of Andhra Pradesh is called Palnadu. The regional capital of Palnadu is Gurazala. And it holds a significant position in Telugu history. The name Palnadu still refers to this region in honour of the Pallava dynasty. The Palnadu-Guntur district experiences an average annual precipitation of 864 mille metres. The Fig.1 The area of Palnadu

Fig.1: Study Area Map i.e. Sattenapalli division of Palnadu Area



### Objectives of the study

❖ The present study's goals are to determine the levels of harmful metals such as Cu, Fe, Zn, F and Mn in groundwater samples and to offer solutions for the safe use of groundwater for diverse applications.

## 2. Methodology

As an chemical analysis, which will be carried out in the Chemistry Laboratory of the Department of Chemistry, VFSTR, deemed to be University, Guntur, Andhra Pradesh, India, groundwater

samples have been collected from hand pumps in the mandalas of Atchempet, Krosuru, Rajupalem, Nakerekallu, and Muppalla.

Cu, Fe, Zn, F, and Mn are among the chemical characteristics tested using industry standards. The purpose of the study is to assess groundwater quality in the study region and its portability during the pre-monsoon season. Water samples have been collected in accordance to UNESCO procedure. The specific location of sample collection in the research area was noted on the well-marked samples that had been gathered. Bottled samples sent to the lab are analysed according to standard

methods (APHA 1998) and Table 1 shows the methods used for water analysis.

Table 1. Methods for assessing groundwater samples

Name of Test Conducted	Units	Principle of the method
Cu - Copper	ppm	AAS (Atomic Absorption Spectrophotometer)
Fe - Iron	ppm	
Zn - Zinc	ppm	
Cr - Chromium	ppm	
Ar - Arsenic	ppm	
Mn - Manganese	ppm	

### 3. Results and Discussions

Groundwater samples were tested for the presence of hazardous metals including Copper, Iron, Zinc, Fluoride, and Manganese to assess the water's appropriateness for various applications. Toxic metal concentrations of Cu, Fe, Zn, F, and Mn have

been identified in the groundwater samples collected during the pre-monsoon season in several mandals. Table 2 displays these concentrations. Twenty-five groundwater sample sites that were found in five mandals in the Sattenapalli division of Palnadu are graphically shown in Figures 2 to 6.

Table 2. Groundwater sample of few metal concentrations in the research area

S. No.	Sample Station	Mn (ppm)	F (ppm)	Zn (ppm)	Fe (ppm)	Cu (ppm)
1	Atchempet - S1	0.040	1.045	0.001	0.091	0.008
2	Atchempet - S2	0.042	1.02	0.002	0.095	0.012
3	Atchempet - S3	0.056	1.055	0.001	0.084	0.011
4	Atchempet - S4	0.062	1.04	0.001	0.078	0.006
5	Atchempet - S5	0.038	1.046	0.001	0.099	0.006
6	Krosuru - S1	0.019	0.45	0.007	0.069	0.005
7	Krosuru - S2	0.016	0.57	0.008	0.039	0.003
8	Krosuru - S3	0.017	0.48	0.008	0.065	0.006
9	Krosuru - S4	0.015	0.59	0.007	0.082	0.007
10	Krosuru - S5	0.018	0.52	0.004	0.059	0.008
11	Rajupalem - S1	0.014	0.9	0.014	0.080	0.011
12	Rajupalem - S2	0.018	0.8	0.009	0.120	0.006
13	Rajupalem - S3	0.014	1.0	0.012	0.150	0.007
14	Rajupalem - S4	0.011	0.8	0.010	0.090	0.006
15	Rajupalem - S5	0.015	0.9	0.012	0.110	0.008
16	Nakerekallu-S1	0.011	1.12	0.004	0.075	0.003

17	Nakerekallu-S2	0.014	1.09	0.003	0.043	0.004
18	Nakerekallu-S3	0.008	0.95	0.002	0.072	0.004
19	Nakerekallu-S4	0.012	1.14	0.003	0.064	0.006
20	Nakerekallu-S5	0.008	1.08	0.004	0.068	0.003
21	Muppalla –S1	0.032	0.865	0.012	0.062	0.008
22	Muppalla –S2	0.024	0.712	0.018	0.048	0.004
23	Muppalla –S3	0.028	0.875	0.014	0.055	0.005
24	Muppalla –S4	0.031	0.812	0.016	0.072	0.009
25	Muppalla –S5	0.028	0.858	0.012	0.068	0.008

Fig 2. Graphical representation of Mn

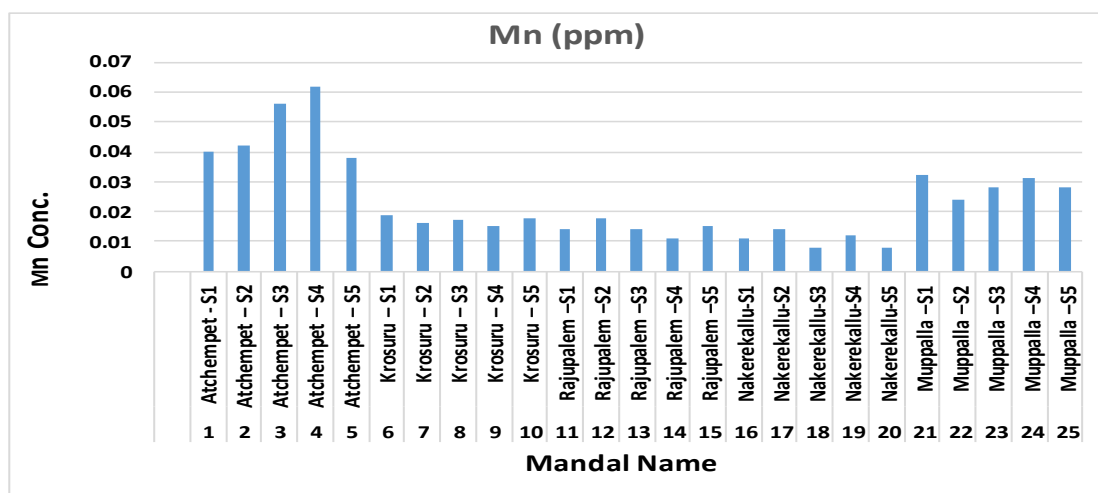


Fig 3. Graphical representation of Fe

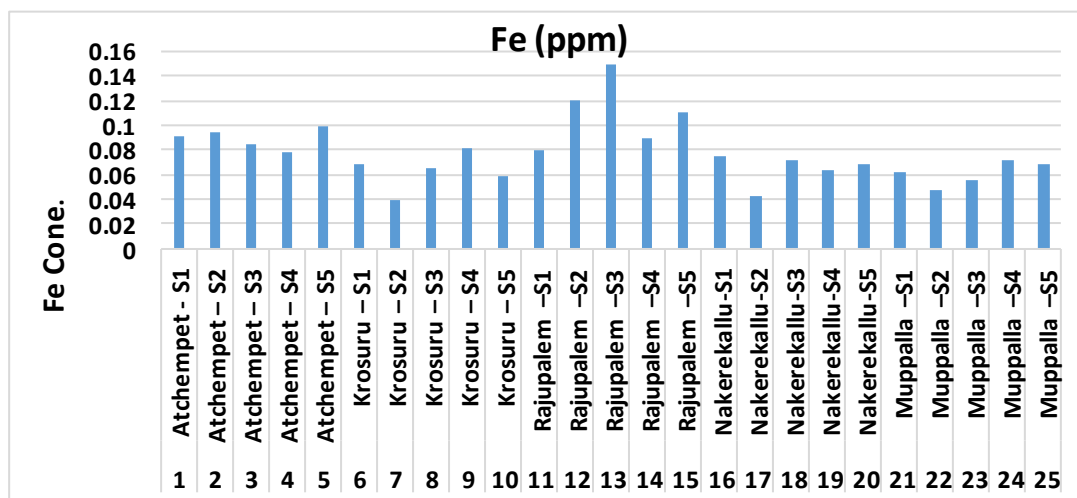


Fig 4. Graphical representation of Zn

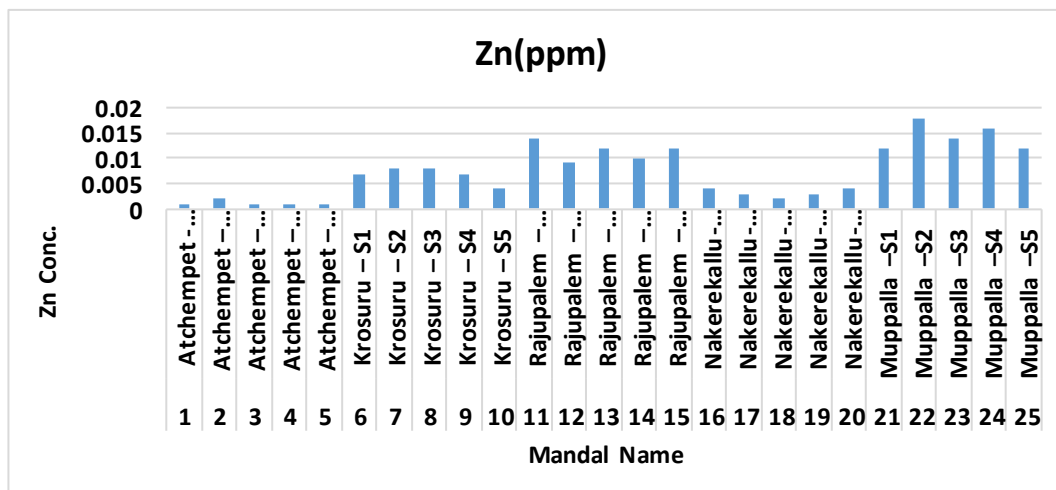


Fig 5. Graphical representation of F

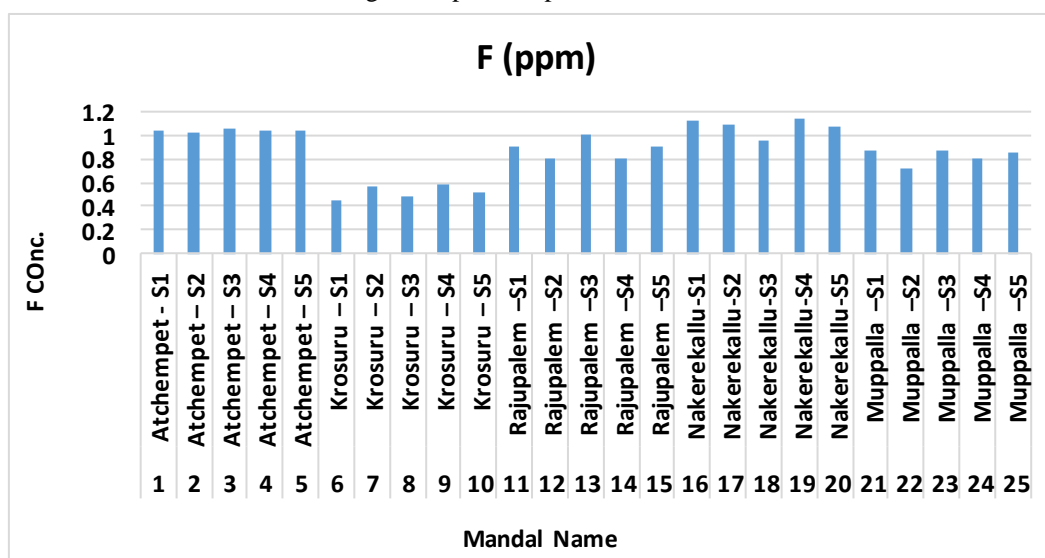
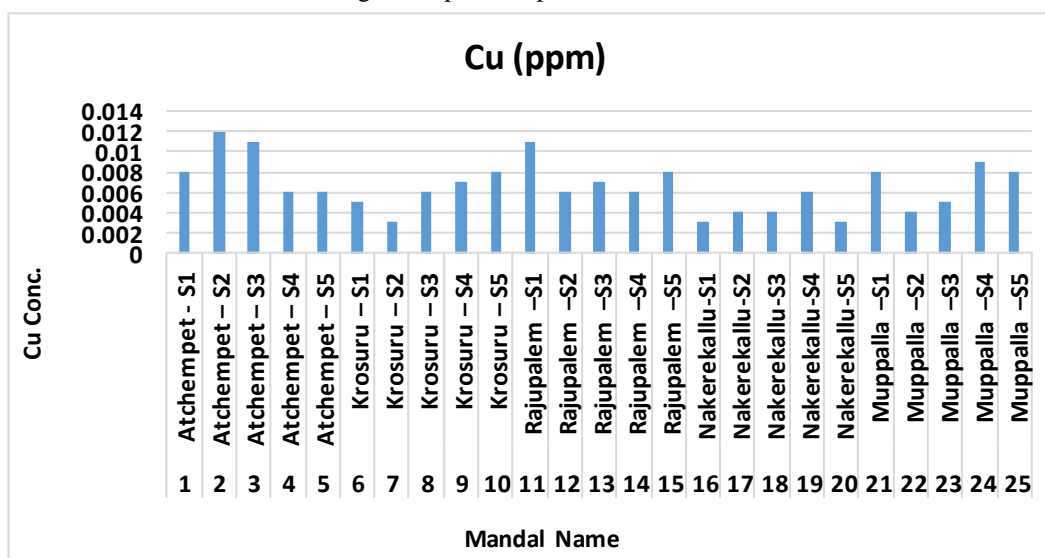


Fig 6. Graphical representation of Cu



#### 4. Consluction

By accumulating groundwater samples from 25 bore wells/pumps, present study's goal is to determine the quality of groundwater in 5 mandals in the Sattenapalli division of Palnadu, namely Atchempet, Krosuru, Rajupalem, Nakerekallu, and Muppalla. Additionally, it was meant to assess how well the water quality for potentially hazardous metals matched various purposes. To evaluate the presence of significant hazardous elements such copper, iron, zinc, fluoride and manganese, groundwater samples from 25 monitoring locations were examined. It was found in the study area, that the Mn concentrations are 0.062 ppm maximum and 0.008 minimum, Cu concentrations are 0.012 maximum and 0.003 minimum, Zn concentrations are 0.018 maximum and 0.001 minimum, Fe concentration are 0.150 maximum and 0.039 minimum, where as other elements like F concentrations are 1.14 maximum and 0.45 minimum. many of the metals concentrations are safe in permissible limits and whereas few metal concentrations are slightly higher than the permissible limits. In order to understand how the conditions of the water quality have fluctuated over time and to offer the required knowledge to the public, an appropriate road map must be developed.

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