



## Assessment of Water Quality Parameters in and Around Proddatur City

*Dr. G. Kondaiah<sup>1\*</sup>, Dr. U. Srineetha<sup>2</sup>, Dr. D. Veera Nagendra Kumar<sup>3</sup>, Dr. C. Narasimha Rao<sup>4</sup>*

<sup>1</sup>Ph.D Scholar, Department of Zoology, Yogi Vemana University, Kadapa, Andhra Pradesh, India.

<sup>2</sup>Lecturer in Zoology, Government Degree college for Women, Pulivendula, (Affiliated to Yogi Vemana University, Kadapa), Andhra Pradesh, India.

<sup>3</sup>Lecturer in Zoology, Government Degree college for Men (A), Kadapa, (Affiliated to Yogi Vemana University, Kadapa), Andhra Pradesh, India.

<sup>4</sup>Lecturer in Zoology, Government Degree college, Mydukur, (Affiliated to Yogi Vemana University, Kadapa), Andhra Pradesh, India.

Email: [kondumsc@gmail.com](mailto:kondumsc@gmail.com)

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### ABSTRACT

Water is an essential and precious natural source among the world. It is one of the most vital molecules that have a significant impact on life, agricultural, industrial, and human growth. Generally, water quality is often defined by its physical, chemical, and biological properties. Rapid industrialization and chemical fertilizers and pesticides in agriculture are producing heavy and diverse pollution, resulting in deterioration of water quality and depletion. Water-borne diseases such as cholera, diarrhea, typhoid, and amoebiasis affect the human population as a result of the usage of contaminated water. However, it is important to check the water quality at regular intervals. Turbidity, salinity, temperature, pH, nitrates, and phosphates are some of the parameters that can be measured. This study was designed to assess the water samples that were taken in and around Proddatur city and tested for various water quality criteria. The research was carried out in the groundwater areas of Rameshwaram, Dorasanipalle, Bollavaam, Gopavaram, and Modampalle. The physical, biological, and chemical properties of ground and surface water are being determined at various places in this investigation.

**Keywords:** Water-borne diseases, water quality, Salinity, pH, Conductivity

### 1. INTRODUCTION:

Water is the most vital source for living organisms to exist. Water scarcity is one of the most serious environmental concerns of the 21st century [1]. Water is the basis of all life and in nature in a variety of ways, including as clouds, rain, rivers, lakes, snow, and fog. But strictly speaking, naturally occurring chemically pure water doesn't last very long. However, for all purposes, pure water is thought to be that which contains suspended particles or low-dissolved, unpleasant gases and low biological life [2].

Water bodies play an important role in the development and sustenance of life, which are being polluted due to rapid industrialization, urbanization, etc. They support agriculture, which depends on most of its water from surface sources such as reservoirs, groundwater, rivers, and watershed resources. In addition to the loss of flow into the main channel due to the construction of dams in the upper reaches, degradation in drainage channels, and loss of forest cover, the environmental pollution due to the draining of untreated industrial waste water and domestic waste water has become a major concern. This has resulted in water pollution among rivers due to changes in the physical and chemical properties of water, causing health concerns, loss of agricultural output, and soil health [3].

Pollution is generally assessed by studying the physical and chemical attributes of the water bodies. Essentially, the surface water quality is characterized by various physico-chemical characteristics, and these parameters are prone to change owing to different kinds of pollution, seasonal fluctuation, water extraction, etc [4].

Increased industrialization and urbanization caused stress on the self-purification mechanism of rivers. It is of major concern that the rate of discharge of the pollutants into the water bodies is far higher than the rates of their purification. In this regard, the water quality assessment is considered both in terms of immediate situation and long-term period. Cleaning and overall assessment of water quality throughout its flow in the river Ganga have received greater attention during recent years. The anthropogenic activities pose a potential for further water quality deterioration in the Ganga River [5].

The present study was aimed at assessing the water samples for changes in physico-chemical parameters in and around Proddatur city and testing them for various water quality criteria. The research was carried out in the groundwater areas of Rameshwaram, Dorasanipalle, Bollavaam, Gopavaram, and Modampalle areas.

## 2. METHODS

### 2.1 Study design:

Water samples were collected for physico-chemical analysis. For the analysis of water quality parameters, 1 L glass bottles were used. All bottles were cleaned with acetone and then distilled water before being dried in an oven prior to sample collection. Water samples were taken at each test site in two polypropylene and one glass bottle. The bottles were thoroughly cleaned three times with the water that would be used for the final water tests. In the sample bottles, date and sampling source information were written. Additionally, details were acquired regarding the kinds of herbicides and fertilizers being applied close to sampling locations. At the moment, it aids a user in anticipating changes in pH, conductivity, TDS, salinity, temperature, DO, nitrogen, phosphorus and heavy metals as these travel through various stages of pollution in ground water systems. With the easily available data from the field trial, the sub-models have been validated.

## 3. RESULTS

### 3.1 Physico-chemical parameters:

Water samples were taken in and around the Proddatur city, including Rameshwaram, Dorasanipalle, Bollavaam, Gopavaram, and Modampalle, and they were examined for physical characteristics, chemical compositions, and microbial counts. Ten sampling locations were chosen, each 250 meters apart. The crucial water quality parameters were examined, including density, conductivity, TH, DO, TDS, pH, DS, ORP, faecal coliform, and NH<sub>3</sub>. Five sites were used to analyse the concentrations of calcium, magnesium, iron, lead, sodium, copper, chromium, and zinc. According to Table 1, the DO value for our samples along our specific reach ranges from 10 mg/L (dry) to 15 mg/L.

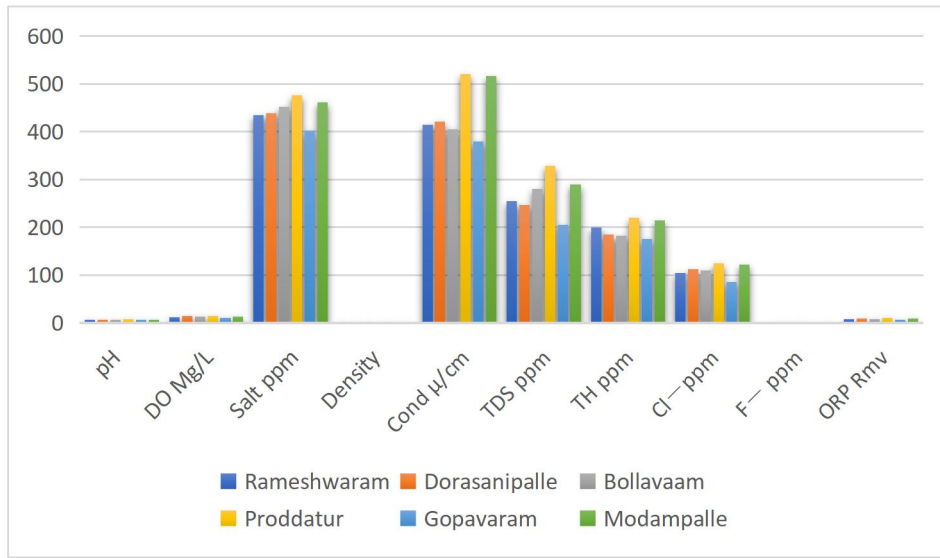
**Table 1. Standard values in Drinking water**

pH	6.5-8.5
DO Mg/L	4Mg/L
Salt ppm	500 ppm
Density	997 kg/m <sup>3</sup>
Cond $\mu$ /cm	179.3-20 $\mu$ S/cm
TDS ppm	50-150ppm
TH ppm	100 mg/l
Cl <sup>-</sup> ppm	1.0 to 4.0 Mg/L
F <sup>-</sup> ppm	0.5-1ppm
ORP Rmv	300 and 500 mv

**Table 2. Statistical analysis of physio-chemical parameters**

Parameater /Place	pH	DO Mg/L	Salt ppm	Density	Cond $\mu$ /cm	TDS ppm	TH ppm	Cl <sup>-</sup> ppm	F <sup>-</sup> ppm	ORP Rmv
Rameshwaram	6.5	12.2	435	1.06	415	255	200	105	0.3	8.2
Dorasanipalle	6.7	15	438	1.07	421	246	185	112	0.5	8.4
Bollavaam	6.3	13	452	1.05	405	280	182	110	0.4	8.0
Proddatur	7.2	14	476	1.09	520	328	220	125	0.8	10.2
Gopavaram	6.1	10	402	1.02	380	205	175	85	0.2	6.8
Modampalle	7.0	13.5	462	1.03	516	290	215	122	0.6	9.2

**Fig. 1. Graphical presentation of physio-chemical of water quality parameters**



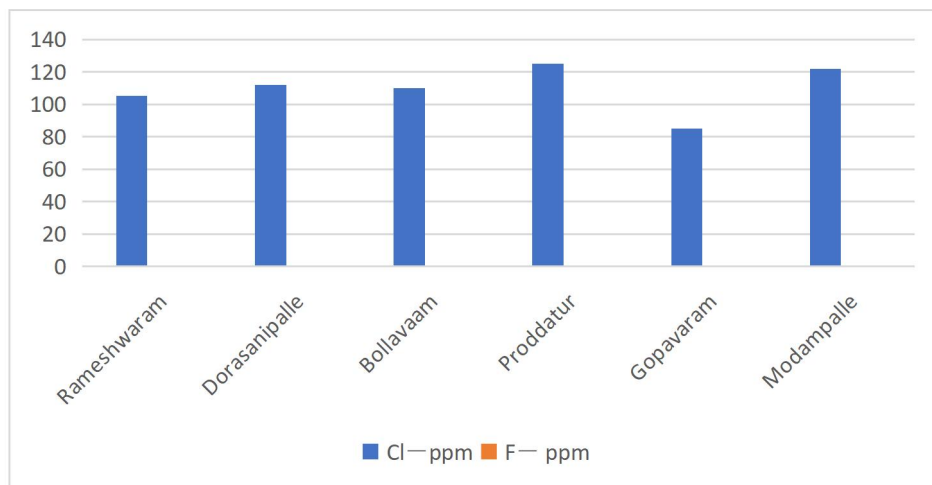
#### 4. DISCUSSION

Water Quality Parameters Based on Government Bore Wells on 7.07.2022. The pH of water is a good predictor for identification of weather it is acidic or alkaline. Standard values in drinking water; the pH ranges from 6.5 to 8.5 for all purposes. A pH of more than 8 suggests water is slightly acidic. Hence, this study results were most significant in Proddatur city (7.2) and in Modampalle (7.0). The pH data from ten sampling locations are represented Graphically in the following Fig. 1.

Concentrations of all solids at particular locations the capacity to assimilate waste increases in the ground level system, which accounts for this variance. Silt and clay particles found in the surface and groundwater are the primary cause of higher total solids readings. However, more than ten samples from each chosen area were analyzed. We listed standard values based on WHO records, and the values of our findings are shown in Table. 1.

Moreover, healthy waters, the ORP level high between 300 and 500 mV (millivolts). this study revealed that the ORP readings in and around the Proddatur city area were Rameshwaram (8.2), Dorasanipalle (8.4), Bollavaam (8.0), Proddatur (10.2), Gopavaram (6.8), and Modampalle (9.2) ppm. At 25 degrees Celsius, the typical water density is 997 kg/m<sup>3</sup>. The above-mentioned fields for water density are 1.06, 1.07, 1.05, 1.09, 1.02, and 1.03, the most optimal and acceptable range for TDS in drinking water, 50 to 150. The TDS levels are 255, 246, 280, 328, 205, and 290 ppm.

The Bureau of Indian Standards has noted a maximum concentration of salts in drinking water of 500 ppm. Total dissolved salts are expressed in parts per million (ppm) or milligrammes per unit of water. Generally, the salt concentrations found in this study, are 435, 438, 452, 476, 402, and 462 ppm. The Standard values of Cl<sup>-</sup> 1.0 to 4.0 Mg/L and F<sup>-</sup> 0.5-1 ppm, different area parameter levels as shown in Fig. 2.



**Fig. 2. Graphical presentation of Cl<sup>-</sup> and F<sup>-</sup> (ppm) parameters in different area**

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## 5. CONCLUSION

In the present study, an attempt was made to evaluate the quality of water in prediction of physico-chemical characteristics and trace metal ions found in taken water samples. Out of all samples, some of the samples need to be treated before being used to drink. It is shown that the turbidity of all samples is above the limit, and in the case of chloride, fluoride, and DO parameters, some samples are not safe to drink without treatment of water.

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