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AN APPRAISAL OF CHEMICAL COMPOSITION OF GROUND WATER OF VISAKHAPATNAM CITY

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ABSTRACT

The ground water require of any given area is generally a sensitive part of the ecosystem and will be the immediate victim to environmental, degradation, resulting due to industrialization and urbanization. The ground water samples from 10 wells (Bore wells 5, Dug wells 5) were analysed for their chemical composition and to assess their suitability for drinking purpose based on chemical analysis, the samples were grouped into different categories.

Keywords: ***ground water, chemical analysis, industrialization, urbanization.***

INTRODUCTION

Standard scientific method have been followed for field and laboratory work as well as in the process of analysing and interpreting the findings. A total of 10 wells were sampled during pre-monsoon and post-monsoon period and water level deaths were measured during pre-monsoon and post-monsoon periods. The laboratory work consists of chemical analysis of water samples by different analytical methods. Determination of pH, Specific conductance and total dissolved solids, Determination of alkalinity, Determination of total hardness, Estimation of Calcium, Determination of Magnesium, Determination of Sodium and Potassium, Determination of chloride, Determination of Sulphate (Grave meter method), Determination of Nitrate and Fluoride, Reaction error, Determination of Trace elements.

The chemistry of ground water in the present area of investigation with respect to the same major and trace elements as well as their chemically related properties have been determined using standard laboratory procedures the major cations of Calcium (Ca), Magnesium (Mg), Sodium (Na), Potassium (K), and anions such as carbonate (Co3), bicarbonate (HCo3), Chloride (Cl), Sulphate (So4), Fluoride (F) and Nitrate(No3) the trace elements such as

Copper (Cu), Lead(Pb), Zinc (Zn) and Iron(Fe) are also determined. Besides those, the chemically related properties such as hydrogen ion activity (pH), total dissolved solids (TDS), total alkalinity (TA) and total hardness (TH) were also determined, while carrying out the hydro chemical analysis, the values are taken in Mg/l units in order to make it easy in comparing them with standards given by 1CMR/18l.

NEED OF STUDY

Wells in these plain areas are predominantly showing very shallow to moderate depth of water table while the walls confined to hilly terrains are more of moderately deep to deeper water levels. The ground water fluctuations have shown an increase with increase in the depth of the well. Lineaments are found to have an impact on the ground water occurrence and ground water configuration and fluctuations the influence of high density lineament is prominent on the wells the plain areas. The low density lineaments are associated with moderately deep and deep wells with poor ground water occurrence lithology has also played a major role in the ground water conditions and also the quality distributions of pH reference to lithology suggest that the wells in the charnockite area have strikingly low pH values (<8) and those in the khondalite areas have moderate to high pH values.

Ground water

city zone													
	pH	TDS	TH	Ca	Mg	Na	K	Cl	So4	F	No3	Zn	Fe
Gnanapuram	HDL	MPL	MPL	HDL	MPL	HDL	HDL	HDL	HDL	HDL	HDL	MPL	MPL
Dwarakanagar	HDL	MPL	HDL	HDL	MPL	HDL	HDL	HDL	HDL	HDL	HDL	MPL	MPL
Nakkavanipalem	HDL	HDL	HDL	HDL	MPL	HDL	HDL	HDL	HDL	HDL	HDL	MPL	MPL
Soldierpeta	HDL	MPL	MPL	MPL	HDL	HDL	HDL	MPL	HDL	HDL	MPL	MPL	MPL
RK beach	HDL	MPL	HDL	HDL	MPL	HDL	HDL	HDL	HDL	HDL	HDL	MPL	MPL
Lawsons bay colony	HDL	MPL	HDL	HDL	MPL	HDL	HDL	HDL	HDL	HDL	MPL	MPL	MPL
East zone													
Rushikada	HDL	MPL	EL	HDL	EL	HDL	MPL	MPL	HDL	HDL	HDL	MPL	MPL
West zone													
Jerripothulapalem	HDL	MPL	MPL	HDL	EL	HDL	MPL	MPL	HDL	HDL	HDL	MPL	MPL
North zone													
P.M Palem	HDL	EL	MPL	HDL	MPL	HDL	MPL	MPL	HDL	HDL	MPL	MPL	MPL
South Zone													
Vadlapudi	HDL	MPL	MPL	HDL	MPL	HDL	EL	EL	HDL	EL	MPL	MPL	MPL

HDL – Highly Desirable Limit
MPL – Maximum Permissible Limit
EL – Exceeding Limit

In this study the ground water potential zones have been identified in the Visakhapatnam city and surrounding areas basing on lithology and lineament alignments, depth of well, water table fluctuations, well density and aquifer the area of the present study has been categorized into the following zones

- Excellent ground water potential zone
- Very good ground water potential zone
- Good ground water potential zone
- Moderate ground water potential zone
- Poor to moderate ground water potential zone
- Poor to nil ground water potential zone

CONCLUSION

The ground water in the study area has been influenced by various factors such as pH, lithology, depths, seasonal fluctuations, lineament, pattern and distance from industrial zone. Significant and positive correlation has few observed between trace elemental concentrations with the parametric ratio namely, So4/TDS indicating the occurrence of other metals in these ground water field information and pollution zone map indicates the sources for pollution of ground water is chemical industries, which are scituated in southern side and northern side. The area old Town although far away the chemical industries the pollution may be due to the sources of the contamination in poor sewage system, organic wastes and sea water intrusion

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