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STUDY OF GROUND WATER POLLUTION IN
VISAKHAPATNAM URBAN AREA

Dr. D.Vijay Kumar[1] and Prof. Dr. M.Uma Devi[2]
[1]Principal/Professor , Kodad Institute Of Technology And Science For Women ,Kodad.
[2]Professor , Department Of Commerce & Management Studies ,
Andhra University Visakhapatnam.

ABSTRACT

This paper presents quality of water samples from various locations (borewells as well as open wells) in and around the Urban Area of Visakhapatnam in order to find out the causes of health problems in urban area. Some ground water samples collected from the study area. The study revealed various parameter of water quality the study was reported some other important parameters which exceed the permissible limit and it is fit for domestic purposes.

KEY WORD: Water Samples, Urban Area, Water Quality, Parameters.

INTRODUCTION

The problem of industrialization, urbanization and regulated reconstruction of Indian Metropolitan cities like Mumbai, Delhi and Kolkata have because chronic pollutants and it is most difficult to get back the situation on highest track. A number of other cities whichever growing with industrial activity and urbanization. The city of Visakhapatnam that forms the study area for this investigation is belonging to this category.

The concept of ground water vulnerability is based on the assumption that the physical environment causes certain degree of protection to ground water against the natural impact. Especially with regard to contaminants entering the subsurface environment consequently some level of area are more vulnerable to ground water contamination than others. In the present study the Aquifer pollution vulnerability is obtained using two approaches, both being department on the GIS concept.

(1)   Identified of ground water polluted area based on overlay index method and various chemical parameter layer in GIS.
(2)   To Analysis the basis of pollution of ground water.
(3)   Recognition of vulnerability areas concerned the study area.

MATERIALS AND METHODS :

Ground water pollution has become an ever increasing problem threatening all over the world. As consequences, the environment has been adversely affected leading to the impairment of the health and degradation of the area.

In this study of Visakhapatnam city selected promptly study which is of 5' latitudinal length and 12' lagitidunal depth the area is subdivided into 31 sub area for ease in analysis and collection data with help of the collected data. The vulnerability index with respect to ground water quality of the study areas is calculated. Chemical

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compositions of ground water depends upon the factors like geology soils, biological process, topography and climate (Davis and De-Wiest 1966, Walton, Todd 1980, Humill and Bell 1986) for each grid the Major parameters – selected for the evaluation of vulnerability index are depth to water, net recharge, aquifer media, soil media, topography (slope) impact vadose zone and Hydraulic conductivity of the Aquifer.

Thereafter for the 10 parameters is collected from various sources and methods, rainfall date and temperature date are obtained from Indian Meteorological Department (IMD), Visakha, Runoff is calculated using the data and the land use / land cover map prepared from satellite data.

The results of the study has been categorized into three (1) Demarcation of ground water polluted zones (2) Identification of vulnerability areas, (3)The pollution of urban ground water. Different workers have studied the ground water quality from different cities of India. Larner at (1992) has carried out the studies on the pollution of ground water from city of Madras. In this study the ground water polluted zones, vulnerable areas has been identified in Visakhapatnam urban and industrial area. Another important point is tapping of ground water resources is after higher is urban aquifer when compared to the rural areas, the quality of ground water affected by the likely pollutants released by human and industrial activity.

GROUND WATER POLLUTION (GWP)

Ground water pollution became an ever increasing problem threatening all over the world. As human populations is growing phenomenally the magnitude of the population also increased. As consequence the environment has been adversely affected lading to the unimpairment of health and degradation of the area.

The international and national norms for drinking water have been presented by various organizations such as WHO, ISI and ICMR.

GROUND WATER QUALITY STANDARDS
(Table 1.1)

	WHO		KMR		ISI	
	Per	Max	Per	Max	Per	Max
TH	100	500	-	-	300	600
PH	7.6 to 8.5	6.5 to 9.2	7.0 to 8.5	6.5 to 9.2	6.5 to 8.5	8.5 to 9.2
TDS	500	1500	-	-	500	1500
Ca	75	200	77	200	75	200
Mg	230	150	50	150	30	100
Cl	200	600	250	1000	250	1000
SO4	200	400	200	400	150	400

In the present study the ground water quality of Visakhapatnam urban and industrial areas has analyzed and distribution of chemical parameters such as Ca, Mg, Na, K, and anions such as Chloride (Cl) Sulfate (SO_4), Flouride (F), and Nitrate (No_3).

Similarly the chemically related properties such as Hydrogen is actively (PH), Total Dissolved Solids (TDS), Total Hardness (TH) is determined for the ground water samples. Sampling stations that are situated around the chemical industries namely HZL, AF, HPCL, CF and AF have shown higher rate of pollutions.

RESULTS OF DISCUSSIONS

In this investigations a detailed account of ground water quality determinants have been undertaken and GIS is applied. Based on these GIS index overlay analysis results. The distribution of different parameters and their ranges indicate that the areas situated around the chemical industries such as HZL, AF, HPCL, CF, and HP shows higher concentrations.

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The quality of ground water from these areas is far from the standards set by national and international institutions. These areas are namely Mulagada, Natayyapalem, Kopprada, Markapuram, Akkireddypalem, Shriharipuram, HS Colony, Venkatapuram, Old Town and Sheela nagar.

HEALTH HAZARDS DUE TO POLLUTION

Chemical parameters	Highest Desirable	Max. permissible	Undesirable Effect	Study area chemical parameters range
PH	7.0 to 8.5	6.5 to 9.2	Undesirable effect	7.12 to 8.9
TDS	500	1500	Taste, Corrosion	163.84 – 3392.00
TH	300	600	Gashoentastenal Irritation	95 – 1187.9
Ca	75	200	Taste, Corrosion, Scale formation	25 – 214.83
Mg	500	100	Taste, Corrosion, Scale formation	7.3 to 174.0
Cl	200	1000	Taste, Corrosion, Scale formation	83.33 to 719.48
SO4	200	400	Irritation	14.08 – 347.16
NO3	20	45	Taste, odaur	1.2 – 1036
F	0.6	1.5	Flurosis	0.76 – 4.92

Based on the distribution diagram, GIS analysis the study/ area has been classified into four polluted zones, which are presented below ground water pollution zones and vulnerable areas, unpolluted water area safe area, area under permissible limit and safe area, area under max permissible limit and moderately vulnerable area, moderate the highly polluted area and highly vulnerable area.

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Dr. D.Vijay Kumar
Principal/Professor , Kodad Institute Of Technology And Science For Women ,Kodad.

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