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Drinking Water Quality Scenario at Kallam's Green City, Ameenabad, Guntur District, Andhra Pradesh

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Abstract: ***Groundwater is the basic and prime component to be considered, as it is directly linked with the developmental activities of any area in the whole world. In the current scenario the availability of groundwater for future generation is biggest problematic question to be asked by every nation. In the actual scenario its availability is minimum and the dependency on groundwater is maximum to meet all the requirements of water demand and this situation has been continuing years long due to excessive and abnormal increments in the growth of population [6] and it becomes more worse especially in the developing countries as well as in the urban areas [8], at one side the population is increasing and at the same time the availability of natural resources like soil, clean air and portable water keep on polluting due to the natural activities like floods, droughts etc apart from manmade activities in order to improving living standards. Water in the aquifers of earth crust depends on the soil porosity, pore size and the geological conditions [10] with respect to the holding capacity of water, even though groundwater is the source to consider as one of the rechargeable resource but it is completely depends on the measures to adopt for recharging such as recharging pits and the average rainfall of that particular area. In this study all the parameters of IS drinking water quality standards 10500 – 2012 are examined for the collected groundwater samples of three cycles and the average values of three cycles were considered as final results. The results were compared to find out the existed water quality scenario at the study area.***

Key words: Aquifers, Drinking water, Groundwater, Porosity, Population.

I. INTRODUCTION

Water is the key component for the survival of any living organism on the earth which is available both in the form of surface water [7] and groundwater, even though surface water availability is much more than the groundwater it is not feasible to drink as major part of its content is existed in the form of oceans which not suitable for human consumption point of view [9] so the groundwater is the only alternative at any area which is available in the form of aquifers from shallow to deeper part of earth crust.

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In particular the flow and the yield of groundwater is good and maximum at shallow aquifers lies below the sub soil than the aquifers lies in the deeper ground.

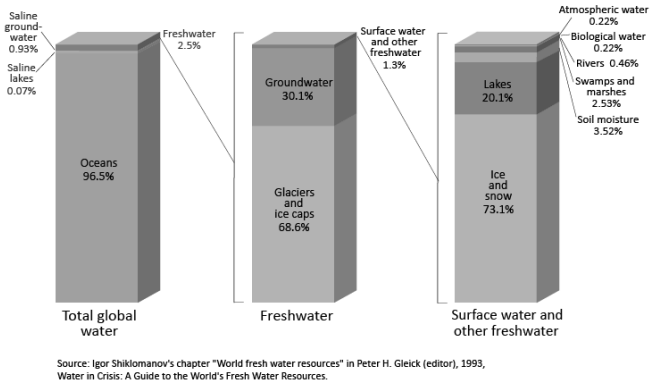

Figure 1: Availability of water in different forms

The yield of aquifers majorly depends on the pore sizes of the associated soil and their permeability factor for recharging process. The water quantity of aquifers can be measured approximately by the water levels in the nearby conventional wells.

Groundwater is portable for all the activities including domestic needs than the surface water with minimum treatment as the chance of contamination for groundwater is minimum than the surface water, but now a days the chances of water contamination is keep on increasing to the groundwater also as the lifting of water is increasing gradually year by year to meet the requirements of all the people as well as to all the developmental activities taking place which in turn leads to underground water contamination [11] especially in fresh water aquifers it is more and reduces the yield of fresh water, when the same situation of over lifting water continues, the pressure on soil damages the pore size and structure which leads to deformation of water holding capacity of soil. The present study was carried out in Kallam's Green city, ameenabad, which is a lush green venture to find out the groundwater quality. Sterilized labelled glass bottles were used to collect the water samples. All the tests were conducted with standard analytical methods [4] then the results were compared with IS 10500 - 2012 drinking water quality parameters.

II. ABOUT THE STUDY AREA

Kallam's Green city is located in the coordinates of 16.2987° N, 80.2997° E, at Ameenabad village in Phirangipuram mandalam of Guntur district, Andhra Pradesh.

The location is very near to capital city of Andhra Pradesh as well as very much easy and near to connect Hyderabad – Guntur and Kurnool - Guntur junction.

Figure 2: Location of the study area

III. OBJECTIVES

1. Location identity for sampling in the study area.
2. Selection of the standard Procedure to conduct tests [2] for all the parameters
3. Correlation of all the parameter of drinking water quality with IS 10500-2012 drinking water quality standards.

IV. METHODOLOGY

IV.I Sampling Location:

1. Three samples were collected for three cycles during the period of three months study period.
2. Clean sterilizes bottles were used to collect the water samples from the bore hole
3. All the samples collected bottles are labelled

Figure 3: Sample collection and analysis

IV.II Water quality Analysis:

1. Water quality analysis was carried out for three times for three cycles.
2. Tests were conducted with standard and suitable analytical methods [5]
3. The average of three months values were considered as final result for water quality at study area.
4. The final obtained results were correlated with standards of drinking water quality IS 10500-2012 to find out the actual existed scenario of the water quality
5. Based on the correlation the suitability of water for drinking and domestic consumption will be evaluated.

Table 1 Groundwater quality at study area

S.NO	PARAMETER	VALUES
1	P^H	6.83
2	EC	240 mmho/cm
3	Colour	4 Hazens
4	Odour	Unobjectionable
5	Turbidity	1 NTU
6	Total Hardness	185 mg/L
7	Iron	0.29 mg/L
8	Chlorides	230.48 mg/L
9	Residual free chlorine	0.02
10	Total Dissolved solids	134 mg/L
11	Copper	0.04 mg/L
12	Manganese	0.1 mg/L
13	Sulphates	196.mg/L
14	Nitrates	35 mg/L
15	Fluoride	0.7 mg/L
16	Total alkalinity	195.12 mg/L
17	Boron	0.9 mg/L
18	DO	3.2 mg/L
19	COD	9.6 mg/L
20	BOD	4.9 mg/L
21	Carbonates	0.49 meq/l
22	Bicarbonates	4.12 meq/l
23	Aluminium	0.01 mg/L

24	Total Suspended Solids	196 mg/L
25	Sodium	85 mg/L

V. RESULTS AND DISCUSSIONS

S.NO	PARAMETER	EXPLANATION
1	P^H	The value of P^H is 6.83 which is within the acceptable limits when compared with IS 10500 - 2012 drinking water quality standards at study area.
2	Colour	The result of colour indicates as 4 on Hazen units which is within the acceptable range as per the standards of IS 10500 - 2012
3	Odour	It is unobjectionable for consumption point of view and the result also unobjectionable so it is within the acceptability limits.
4	Total Hardness	Total hardness of the water must be within the limits of 200mg/ l, here the results were indicating as 185 mg/l which is within the acceptable range.
5	Total Dissolved solids	It is one of the important parameter to consider as per the result obtained it is within the acceptable range when it is compared with IS 10500-2012 standards for drinking
6	Nitrates	Nitrates also important to be considered for domestic consumption point of view as per the results it is within the acceptability range when it is correlated with drinking water quality standards of IS 10500-2012
7	All the remaining parameters also lies within the acceptable limits when correlate with IS drinking water quality standards of 10500 - 2012	

VI. CONCLUSIONS

1. Groundwater quality is always dynamic as it depends on the local geological conditions, climatic conditions along with the developmental activities taking place in the locality where human interference is more with respect to groundwater [1]
2. In the present study as per the results obtained the water quality is within the acceptable limits as per the drinking water quality standards of IS 10500-2012.
3. Groundwater in the study area is recommendable for all domestic and other activities at study area
4. Groundwater is limited natural resource gifted to the human kind so there should be a proper precautions on handling of groundwater [3]
5. Percolation pits must be made mandate for all the upcoming newly constructing buildings to recharge the groundwater for promoting sustainable development with respect to groundwater quality and quantity at study area.

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