A CASE STUDY ON ASSESSMENT OF GROUND WATER QUALITY PARAMETERS IN AND AROUND LAMBAPUR AREA, NALGONDA DISTRICT, TELANGANA STATE

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ABSTRACT
The present study, ground water quality of various water quality parameters (WQPs) such as pH, total dissolved solids (TDS), electrical conductivity (EC), Total Hardness (TH), Chlorides (Cl), Sulphate (SO4), Nitrate (NO3) were studied and contrast with permissible limits of Bureau of Indian Standards (BIS), and World Health Organization (WHO). The samples were collected from bore wells and dug wells in various localities in and around lambapur area. The present work shows the overall groundwater quality of lambapur is poor and undesirable for drinking and another domestic purpose which recommends the use of indigenous technologies to make water fit for drinking purpose.

Key words: Groundwater, WQPS, Permissible limits, Study area.

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1. INTRODUCTION
Many civilizations have flourished along the banks of the rivers. When the rivers changes the course or they became extinct the civilizations have declined. This shows that water is the most important for sustaining life. It is the most precious mineral. The Geosphere, Atmosphere and Biosphere contain large allantities of water in global cycles. But only a small percentage of fresh water is available for human beings. Groundwater is the most important component of the
freshwater and more than 98% of the freshwater available in the form of groundwater, and is more when compared to the volume of the surface water. We can say that groundwater plays a dominant role and therefore its use and protection is of fundamental importance to human life and economic activity. The source groundwater is from precipitation, in the form of streams and small part of it joins into ponds, lakes and reservoirs. groundwater is formed due to precipitation may remain therefore a period of few days to possibly millions of years .Finally it may migrate upward by capillary movement to the ground surface through soil, plant uptake, groundwater seepage into surface rivers, lakes or directly to the sea or by artificially by pumping from wells and bore wells.

The study area lying between North latitude from 16°40′ - 16°35′ and East longitude 79°10′ - 79°15′ is located in the survey of India Topo Sheet No. 56 p12 and experiences semi-arid climate. The study area is covered by Archean granites intruded by dolerite dykes, auastzreets, pegnalites and auastz veins.

2. EXPERIMENTAL

The sampling bottles soaked in 1:1 Hydrogen chloride for 24 hours were rinsed with distilled water followed by deionized water. At the time of sampling, the bottles were thoroughly rinsed two or three times using the groundwater to be sampled. The chemical parameters viz pH and electrical conductivity (EC) were measured, using digital instruments immediately after sampling. Five groundwater samples were collected in 1000 mL polyethylene bottles from hand pump/bore holes in the study area. The bottles were labeled, tightly packed, transported immediately to the laboratory and stored at 4°C for chemical analysis.

The samples were analyzed for Total Alkalinity (TA) as CaCO$_3$, Total Hardness (TH) as CaCO$_3$, Calcim(Ca$^{2+}$), Sodium (Na$^+$), Potassium (K$^+$), bicarbonate(HCO$_3^-$), Chloride(Cl$^-$), Sulphate(SO$_4^{2-}$) and Nitrate(NO$_3^-$). The evaluation of chemical characteristics of groundwater and suitability for drinking, irrigation and industrial purposes have been carried out .Total Dissolved Solids (TDS) were computed as per Hem (1985, 1991) and Karanth (1987) from EC values multiplied by 0.64 and Magnesium (Mg$^{2+}$) was calculated using the values of TH and Ca$^{2+}$.

The Flame Photometer (Systronis, 130 India), concentration of Sodium (Na$^+$) and Potassium (K$^+$) in the groundwater were measured. Electrical Conductivity (EC) and pH were measured by conductivity meter (Systronis, 304) and digital pH meter (Systronis, 502) respectively.

3. RESULTS AND DISCUSSIONS:

Sustainability of groundwater availability for drinking purpose was discussed , following the drinking water quality standards of Bureau of Indian Standards (BIS, 2003) and (cotto ,2004 to assess the adverse impacts of on crop growth was evaluated with respect to the chemical parameters ,that is ,pH , TDS ,TH ,HCO$_3^-$, CI and F(Johnson ,1983) to assess the common undesirable effects of incrustation and corrosion.

The pH of water is easily measured in the field and must be measured in-sites to achieve accuracy. When the groundwater is exposed into the atmosphere, dissolved CO$_2$ escapes and the pH rises. The combination of CO$_2$ with water forms carbonic acid, which affects the pH of water. The pH in the groundwater is varied from 7.7 to 8.08 in all the ground water samples of the study area and is within the safe limit.

Pure water contains low electrical conductance of around 0.1 s/cm (Jeff Lewis, 2010). Ionic species dissolved in the water and increase the conductivity, but conductance measurements cannot be used to estimate ionic concentrations. Natural water contains a variety of dissolved
species in various amounts. The value of EC is between 494 and 1802 s/cm. The EC is a measure of material’s ability conducts an electric current so that the higher EC indicates the enrichment of salts in the groundwater. The TDS which indicates total dissolved ions in the water is between 316 and 1153 mg/unit. Based on total dissolved solids, groundwater is classified (Davis and Dewiest, 1996) into desirable for drinking (upto 500mg/litre), permissible for drinking (500-1000 mg/litre), The high TDS may be due to the influence of anthropogenic sources, such as domestic sewage, septic tanks and agricultural activities. 20% groundwater of the study area is excess. The desirable limit of 500 mg/litre of TDS. Generally, the higher TDS decreases palatability and causes gastrointestinal irritation in the consumers. It also has laxative effect, especially upon transists (Subba Rao, 2011). But, the extended intake of water with the higher TDS can cause kidney stones, which are widely reported from deficient parts of the country (Garg, 2009).

Calcium and Magnesium are the principle ions responsible for total hardness .The observed value of TH in the groundwater is between 285 and 775 mg/litre. The TH can be classified as sotk, if the TH is less than 75 mg/litre.

Moderately hard, if the TH is varied from 75 to 150 mg/litre ;hard , if the TH is between 150 and 300 mg/litre ;and very hard ,if the TH is more than 300 mg/litre (Sawyer ,2003).According to the classification of TH ,approximately 30% of the groundwater comes under the hard category and the remaining 70% of the groundwater comes under very hard category.

Bicarbonate is a major element in human body, which is necessary for digestion. When ingested, for example, with mineral; water, it helps suffer lactic acid generated during exercise and thus reduces acidity of dietary components. It has prevention effect on dental cavities (Subba Rao, 2011). The concentration of HCO3- is observed from 158 to 286 mg/litre (The Cl- plays an important role in balancing level of electrolytes in blood plasma, but higher concentration can develop hypertension, risk of stroke, renal stones and asthma (Mccarthy, 2004). The concentration of Cl- is between 52 and 316 mg/litre. 90% of groundwater is within the desirable limit of 250 mg/litre.

This is the second largest ion, after HCO3-ion. Infact, the Cl- is desired mainly from the non-lithological source and its solubility is generally high and the groundwater is caused by the influences of poor sanitary conditions. The concentration of Na+ is varied from 158 to 280 mg/litre than that of the recommended limit of 200 mg/litre for safe water and all groundwater samples are within the safe limit. Generally, the concentration of K+ is less than 10 mg/litre in the drinking water. It maintains fluids in balanced stage in the body. The K+ is observed between 35 and 279 mg/litre, which is below the prescribed limit.

The Ca2+ is an important element to develop proper bone growth. The concentration of Ca2+ is between 146 and 680 mg/litre. 50% of groundwater has below the standard limit of 75 mg/litre, while that of the concentration of Mg2+ is varied from 35.23 to 99.63 mg/litre. Although, Mg2+ is an essential ion for functioning of cells in enzyme activation, but at higher concentration it is considered as laxative agent (Garg, 2009).

4. CONCLUSION
On the basis of above discussion, it may be concluded that the ground water quality for all WQPS at all the sites of the study area is severally contaminated and not suitable for drinking and other domestic purposes. People depended on this water are prone to health hazards of contaminated water which recommends the use of indigenous Technologies, to make water fit for drinking purpose. Hence, the groundwater quality may improve due to in flow of fresh water of good quality during rain season and also surface water pollution and soil pollution must be controlled.
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REFERENCE