PHYSICO-CHEMICAL ANALYSIS OF GROUND WATER A REVIEW

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Abstract- Ground water is the main principal source for drinking water and other activities in Indapur taluka, Pune district, Maharashtra, India. Ground water is considered as pure form of water, with minute dissolved essentials and non essentials minerals in it. The only way pollution can contaminate ground water is through surface runoff, industrial effluent, runoff from agricultural site and also through river. Due to which the problem of ground water quality obtains high importance in the present day. The quality of ground water depends upon its physical and chemical properties. These properties are inter linked. Therefore interpretation of correlation coefficient between water quality parameters gives good idea about the quality of water. Various author conducted their studies on physical and chemical properties of ground water using co –relation and regression studies. This review attempts to highlight the main achievement in this area and Outline the advantages of co-relation and regression analysis in ground water quality.

Keywords: Groundwater, Physico-Chemical parameter, Correlation and Regression Analysis

I. INTRODUCTION

Due to rapid development of various industries in Indapur, Pune region, the ground water quality is get deteriorate because of the discharge of wastewater from various industries like sugar industry, chemical industry, fertilizer and paper industry, metallurgy etc. in and around Indapur region. Groundwater contamination occurs either natural activities or human activities. Natural contamination of ground water occurs due to geological formations, while man-made activities such as use of gasoline, oil, road salts and chemicals etc. contaminate the groundwater and make it unsafe and unfit for use. The ground water once contaminated, takes very long time to refresh. Groundwater is a source of drinking water for at least 50% of the world population. Due to their increasing application and the above immutable nature, the pollution has naturally become one of the most serious environmental problems today. This directly or indirectly affects the human health. Due to the various problems associated with ground water it become essential to check the ground water quality for various physico chemical properties to check its suitability for drinking purpose and also for secondary use. There are various studies have been conducted in this area using co-relation and regression analysis. The present study attempts to highlight the necessity of ground water quality analysis using co-relation and regression analysis.

II. PREVIOUS WORKS

K. K. Deshmukh in (2008) conducted study on ''The Chemistry of Groundwater in Sangamner Area With Regard To Their Suitability for Drinking Purposes'' from the study it was observed that the modern civilization, industrialization, urbanization and increase in population have led fast degradation of water resources. About 80% of all the diseases of human beings are caused by water. In this study the Sangamner area of Ahmadnagar district, Maharashtra, India was selected to study the chemistry of groundwater quality and its suitability for drinking purposes, where the groundwater is main source for irrigation and drinking. The groundwater samples were collected from fifty seven locations covering the entire study area during pre-monsoon and post-monsoon season. The samples were analyzed for different physico-chemical parameters like PH, EC, TDS, NA+, K+, CA2+ , MG2+ CL- , HCO-3 ,SO4 2-,NO3 - and Fe using standard methods. It was found that the parameters like TDS, Na, Ca, Mg, total hardness and nitrate were exceeded the permissible limit in the majority of the samples particularly from irrigated area. Few samples exceeded the maximum permissible limit of chloride. On the basis of TDS, the ground water is classified as fresh, slightly saline to moderately saline and very saline in character. The comparisons of the groundwater quality in relation to drinking water with Indian standard – drinking water specification – 1991, proves that water quality in most of the Villages in the irrigated area is unsuitable for domestic purposes and proper treatment is needed before using it for drinking purpose.

A. Ravi Kumar, S. M. Mazhar (2012) has worked on "Correlation and regression study on the ground water of Vaiyampatti Village, Tiruchirappalli district". Groundwater is the vital source of sustenance and survival of every living organism. The present study aimed at a statistical regression analysis of twenty two data points of groundwater at eleven locations of Vaiyampatti Village, Tiruchirappalli district, and Tamilnadu. A correlation study has been carried out amongst all possible pairs of 14 physico-chemical parameters to assess groundwater quality. The correlation analysis provides an excellent tool for the prediction of parameter values within reasonable degree of accuracy. The existence of strong correlation between total hardness and magnesium is ascertained.

N.S. Elangovan, M. Dharmendira Kumar(2010) carried out study on "Assessment of ground water quality along the

Cooum river, Chennai, Tamilnadu, India" as ground water quality in Chennai city along the cooum river, during the pre-monsoon (June-July) and post-monsoon (Dec-Jan) for three years, from 2009 to 2011, was analyzed. Ground water samples were collected from 20 Bore-wells on either side of the river. The analysis focused on the determination of seven specific water quality parameters which are pH, E.C., TDS, BOD, COD, Na and Pb, using standard procedures. The statistical analysis, like the mean and standard deviation, coefficient of variance, correlation and Multilinear regression analysis of the obtained data were carried out. The analysis of the collected samples reveals that the stated water quality parameters have not complied with the WHO standards, and the water is not fit for drinking and domestic purposes. The correlation and Multilinear regression analyses suggest that the conductivity has a significant correlation with the other six considered water quality parameters.

M.R.Mahananda, B.P.Mohanty & N.R. Behera (1999) conducted study on, "physico-chemical analysis of surface and ground water of Bargarh district, Orissa, India". The present work has been conducted by monitoring two types of ground water i.e. Dug well water and Bore well water of 10 wards of the town as well as 3 types of ponds, viz. Temple pond, small community pond & large community pond of the town. In this study various parameters like Temp, PH, TSS, and TDS, alkalinity, DO, COD, nitrate, chloride, sodium, potassium, phosphate, fluoride, total coli forms .from result it was observed that the water quality was below the pollution level for ground water, but in case of surface water, the water quality of small community pond are above the permissible limit.

Arunabh Mishra and Vasishta Bhatt(1996) has worked on, "Physico-chemical and microbiological analysis of underground water in v.v Nagar and nearby places of a district-Gujarat, India." they analyzed different parameters like PH, TDS, hardness, conductivity, dissolved oxygen and chemical oxygen demand, MPN. It was found that the quality of water samples was acceptable according to physico-chemical analysis while as per bacteriological standards; the water needs to be treaded before using it in domestic purposes.

III. CONCLUSION

From the literature it was observed that the due to rapid urbanization and pollution the ground water quality is get deteriorated day by day. So it is necessary to analyze the ground water quality for various physico-chemical parameters to check its suitability for drinking purpose and secondary use.

The correlation coefficients give the interrelationship between the parameter; therefore correlation coefficient was useful tool in calculating water quality analysis. The result of correlation analysis shows that electrical conductivity and chloride content are having high correlation with most of the other parameters during pre and post monsoon.

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