Development of Mathematical Model for Ground Water Characteristics

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***Abstract*- Water is one of the most important of all natural resources known on earth. Due to increase in population, advanced agricultural practices, industrialization, man- made activity, water is being highly polluted with different contaminants. Water is a vital resource for human survival. The availability of good quality water is an indispensable feature for preventing diseases and improving quality of life. It is necessary to know details about different physico-chemical parameters of water.The study is based on the analysis of drinking water parameters in a village named Kalyan. In this paper, different author's papers are summarized on water analysis and their treatment processes in different region, which is helpful to know the different treatment processes and parameters used in the study.**

Index Terms- Contaminants, drinking, water parameters Water

I. INTRODUCTION

Maharashtra is one of the major state which contributes towards social and economic growth of country. Large parts of the state fall in rain shadow and hence face water supply and quality challenges. Over 85% of drinking water supply in the state is dependent on ground water.

Groundwater is used for domestic and industrial water supply and irrigation all over the world. In the last few decades, there has been a tremendous increase in the demand for fresh water due to rapid growth of population and the accelerated pace of industrialization. Human health is threatened by most of the agricultural development activities particularly in relation to excessive application of fertilizers and unsanitary conditions. Rapid urbanization, especially in developing countries like India, has affected the availability and quality of groundwater due to its overexploitation and improper waste disposal, especially in urban areas.

Nature of problem

To identify, test and analyse the various physio-chemical characteristics of ground water at Kalyan to get the causes of groundwater pollution and its effects.

II. METHODOLOGY

2.1 Mathematical model

A mathematical model is a description of a system using mathematical concepts and language. The process of developing a mathematical model is termed as Mathematical Modelling. A mathematical model may help to explain a system and study the effects of different components, and to make predictions about behaviour Mathematical models can take many forums, including dynamic systems, statistical model, differential equations, or theoretic models. Correlation model

2.2Correlation

- Simple regression is used to examine the relationship between one dependant and one independent variable.
- After performing an analysis, the regression statistics can be used to predict the dependant variable when the independent variable is known.

2.3 Simulation

Simulation can be used to show the eventual real effects of alternative conditions and courses of action. The act of simulating something first requires that a model be developed, this model represents the key characteristics, behavior and functions of selected physical or abstract or process. The model

represents the system itself whereas the simulation represents the operation of the system overtime.

2.4 Stochastic Simulation

It is a simulation where some variable or process is regulated by stochastic factors and estimated based on Monte Carlo techniques using pseudo random numbers.

2.5 SPSS:

SPSS is a widely used program for statistical analysis in social science. It is also used by market researchers, health researchers, survey companies, government, education researchers, marketing organizations, data miners, and others. The original SPSS manual has been described as one of "sociology's most influential books" for allowing ordinary researchers to do their own statistical analysis. In addition to statistical analysis, data management (case selection, file reshaping, creating derived data) and data documentation are features of the base software

III. ANALYSIS USING CORRELATION (PEARSON COEFFICENT METHOD)

In this section of the paper we use as explanatory bivariate correlation and linear method regression analysis to analyze correlations between variables. This can be done by knowing the ratings and then using bivariate correlation analysis in SPSS software. We have shown linear regression analysis table as a sample reading.

IV. CONCLUSION

Y=C1X1+C2X2+C3X3+C4X4+C5X5+C6X6+C7X7 +C8X8+C9X9+ C10X10

This equation are obtained by 10 variables acting simultaneously, even if a single value or parameter is beyond permissible limit Y will get affected. And it is empirical quantity defined by the ten parameters acting simultaneously. By putting all the Coefficient Value, obtained by the Pearson's Coefficient Correlation (Table No. 4.1) and keeping any one of the variable unknown and remaining 9 variables known, then the unknown variable can be calculated.

Y = Potability

X1= Based on values of correlation coefficients negative (-ve) values Ph
X2=Turbidity
X3=Alkanity
X4=Hardness
X5=Chlorides
X6= Dissolved Oxygen
X7= Sulphates
X8= Nitrates
X9= Conductivity
X10 = Phosphates

1) For summer,

Y= 0.437 X1 – 0.2 X2 + 0.4713 X3 +0.4578 X4 + 0.4429 X5 + 0.3874 X6 + 0.4946 X7 + 0.5963 X8 + 0.2693 X9 + 0*X10

Y=0.437 *7.88 – 0.2 *0 + 0.4713*165 +0.4578*185 + 0.4429*21.24 + 0.3874*380+ 0.4946*4.66+ 0.5963*0.78+ 0.2693*0.53 + 0

Y=325.206

2) For winter,

Y= 0.437*7.8– 0.2*0 + 0.471385 +0.4578*120 + 0.4429*17.72+ 0.3874*230+ 0.4946*3.44 + 0.5963*0.2+ 0.2693*0.318+ 0

Y= 197.270

For rainy,

Y= 0.437*7.7 – 0.2 *2.4 + 0.4713*80 +0.4578 *110+ 0.4429*14.54 + 0.3874*390+ 0.4946*2.78+ 0.5963*0.34+ 0.2693*0.62+ 0*

Y=251.194

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