

A REVIEW PAPER ON THE STUDY OF DELINEATION OF SUITABLE GROUND WATER QUALITY ZONES FOR DRINKING PURPOSE USING GIS

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Abstract – Ground water is an important of drinking and other related requirement .Ground water is used in agriculture, industries and regular human activity. In village nearly 90% of the people use ground water from open dug wells and ISI mark – II hand pump for their domestic and agriculture purpose. This ground water contains fluoride, iron, TDS and nitrate in excess of the permissible limit laid down by Bureau of Indian Standard BIS. The main problem of farmer use more amount of fertilizer and pesticides in farming because of this the toxic substances mixed in ground water causes impurities in drinking water. In rainy monsoon the rain water infiltrate in to ground water sources causes impurities, In this review paper a study of the suitable delineate ground water quality zones for drinking purpose using GIS software is carried out for Samdoli village, Sangli for checking the parameter of this paper is ph, Turbidity, Hardness and Total dissolved solids(TDS) are analyses. After the analysis is completed then show the suitable ground water zones on map using GIS software and give suggestion to the farmer to minimize the impurities in ground water and reduce health problem.

Key Words: Groundwater samples, Parameters, GIS software BSI...

1. INTRODUCTION

Water is the most important in shaping the land and regulating the climate. It is also important for agricultural production. The water demand is increasing day by day. Most people are dependent on natural resources hence it is very important to check the quality of water. As poor-quality water consumption and its use can affect the agriculture and livelihood health of the public. Ground water used for drinking and irrigation purpose for long time. 90% of the people depend upon ground water sources for the drinking and other requirement. Using more amount of fertilizer and pesticides in farming causes toxic level and impurities in ground water this polluted water consume people cause health problem to the people, due to rapid industrialization because of regional imbalance of chemical parameter safe use of ground water for drinking purpose. Decline of water quality can be broadly put down to the following factor.

Pollution of aquifers due to industrialization and domestic effluents. More use of fertilizer and pesticides responsible for increase in toxic level and contaminated in ground water. urban and rural collection exhibit excessive total dissolved solids in the ground water. Hardness increase cause clogging of pipes, efficiency and breakdown. pH of water has a strong effect on the soil and crop. If water is too acidic calcium, magnesium and potassium levels are reduced. Calcium is required for cell growth, magnesium for chlorophyll formation and potassium for synthesizing proteins. Hardness increase cause blockages in crop growth to consume nutrients. That's why it's very important to check the parameters like pH, Turbidity, Hardness, TDS Analyse the water samples collected from different zones and overcome the health problem of people. Due to rapid increase in bulk of population rapid urbanization, industrialization and agricultural demand for water is increasing day by day. As a result of that surface water and ground water level is decreased . The variations of physicochemical characteristics along with WQI of ground water in the different villages surrounding mining region were presented. The quality of ground water shows variations from place to place and time to time . The result is lake water is not good for dinking as well as for washing or any other purpose and well water is good as compared to lake water .

1.1 LITERATURE REVIEW

1.1) Partha Pratim Adhikary & Ch. Jyotiprava Dash & H. Chandrasekharan & T. B. S. Rajput & S. K. Dubey. Contamination of groundwater resources either from anthropogenic activities or from inherent aquifer material composition reduces its supply, posing a threat to development and a challenge to water managers and strategists. Groundwater constitutes about 53% of the total irrigation potential of India. About 50% of the total irrigated area is dependent on groundwater irrigation and 60% of the irrigated food production is from groundwater wells. All these lead to overexploitation and are evident from the fact that "overexploited" and "dark blocks" in the country have increased. Apart from the decline of quantity, deterioration of quality is also a major concern.

1.2) A. S. Jasrotia & B. D. Bhagat & Ajay Kumar & Rajesh Kumar The demand for ground water is increasing with growing population, agricultural expansion and industrialization. Ground water is a most important natural resource of the earth and is required for drinking, irrigation and industrialization. The resource can be optimally used and sustained only when quantity and quality of groundwater is assessed. With rapid population growth and rising expectation for a better life, the natural resources of our earth facing increasing pressure and basic resources for human survival, viz. air, land and water must be properly managed. The quality and quantity of these resources are critical to ensure adequate food supply, public health and transportation

1.3) Y. SRINIVASA RAO & D. K. JUGRAN Increasing population and modern industrial and agricultural activities are not only creating more demand for groundwater resources due to the inadequate availability of surface water resources, but are also polluting groundwater resources by releasing untreated wastes. Consequently, these activities have resulted in an increase of research, not only with regard to groundwater resources, but also with an emphasis on locating groundwater of good quality for human consumption.

1.4) P. Balkrishnan, Abdul Saleem and N. D. Mallikarjun The spatial distribution analysis of groundwater quality in the study area indicated that many of the samples collected are not satisfying the drinking water quality standards prescribed by the WHO and ISI with almost half of the city having non-potable ground water. The results obtained gave the necessity of making the public, local administrator and the government to be aware on the crisis of poor groundwater quality prevailing in the area.

1.5) Renji Remesan and R. K. Panda It represent the desirable and undesirable water quality for drinking and irrigation purpose. It check the ph., turbidity, TDS, DO, hardness, CaCO₃, nitrate, chloride, calcium, etc. This shows the high salinity level of selected area.

1.6) S. Karthikeyan, D. Prabhakar, Dr. R. A. Alagu Raja Due to rapid increase in bulk of population rapid urbanization, industrialization and agricultural demand for water is increasing day by day. As a result of that surface water and ground water level is decreased continuously. In this paper ground water quality analysis was carried by Madurai. The region is damaged due to waste disposal and agricultural practices. Water level affect in this area is due to structures and bore wells. pH, TDS, Chloride parameter are check for these region. In this research paper to know the existing ground water condition of the area. The study area poses critical issues of environmental pollution and water deficiency problem

due to ground water quality monitoring is required. In this paper the graphical display of GIS proposal makes the presentation of ground water easier to understand.

1.7) Soumya Singha Sudhakar Singha Dr. C. P. Devatha Prof. M. K. Verma in this paper effect of mining activities on ground water quality near the Korba Coalfields is check. The water quality index is calculated for various parameters like pH, TDS, Calcium, Nitrate, Iron and fluoride etc. the final result is present water quality status of the study area and needs specific treatment before using for protection of ground water from contamination is known.

1.8) Midhun Dominic C.D, Shino Chacko, Thara Tom In this research paper know the water quality of the region comparing lake water, well water, bore well water. In this study the pH, Electrical conductivity, DO, BOD, COD, Total hardness, Alkalinity, Total dissolved salts, TSS and Chloride etc. parameter check. The result is lake water is not good for dinking as well as for washing or any other purpose and well water is good as compared to lake water.

1.9) Shankar Krupannan Nafyad Serre and kawo in this paper know the water quality index and irrigation are used to determine suitability of ground water for drinking and irrigation purpose. This water samples are analysed to check the parameter like pH, TDS, EC, Cl⁻, HCO₃²⁻, SO₄⁻, Ca²⁺, Mg²⁺, Na⁺ etc. compared with Ethiopian standard world health organisation standard. Result shows the water samples are below desirable limit of WHO and suitable for irrigation purpose.

1.10) Ghulam Shabir Solangi, Altaf Ali Siyal b, Pirah Siyal this research paper shows the suitability of ground water and surface water of the Indus Delta Pakistan for domestic and irrigation purpose. Nearly 180 Georeferance 50 surface water samples collected were analysed and mapped using GIS 10.5 software. And result compared with WHO and FAO guidelines. The analysis shows that the ground water and surface water up to range limit and it is suitable for drinking and agricultural purpose before use to properly treated.

2. ANALYSIS OF WATER QUALITY PARAMETERS

Following are the parameters that are analyzed in this paper: pH, Hardness, TDS, Turbidity.

2.1) pH

The pH of the solution is taken as -ive logarithm of H² ions for many practical practices . The value range of pH from 7 to 14 is alkaline, from 0 to 7 is acidic and 7 is neutral . Normally for domestic uses, water having a pH between 6 and 10 generally causes no problem . As per IS: 10500-2012 is 500 and 2000 mg/l respectively .

2.2) Hardness

It is a measure of variable complex mixtures of anions and cations. In freshwater, the principal cations which impart hardness are calcium and magnesium. Hard water is objectionable for domestic purposes since it needs a lot of soap for lather formation. As per IS: 10500-2012 Desirable limit and Permissible limit for hardness lie between 200 to 600 mg/l respectively. The Treatment of hard Water is Softener Ion Exchanger and Reverse Osmosis process. The degree of hardness of drinking water has been classified in terms of the equivalent CaCO_3 concentration as follows: Soft - 0-60mg/l, Medium - 60-120 mg/l, Hard - 120-180 mg/l, very hard - >180 mg/l.

2.3) TDS

The Total dissolved solids refer to matter suspended or dissolved in water with high content that is inferior and may be polluted. The acceptable limit of BIS is 500 mg/L. TDS comprises the leachate mainly of inorganic salts and dissolved organics substances. The acceptable and permissible limits As per IS: 10500-2012 are 500 and 2000 mg/l respectively.

2.4) Turbidity

In drinking water, turbidity is used to indicate the presence of bacteria, pathogens, or harmful particles during the disinfection process. This makes monitoring turbidity levels crucial in water treatment plants, so the water does not exceed the safe level for human consumption. Turbidity of drinking water shouldn't be more than 5 NTU, and should ideally be below 1 NTU

3. CONCLUSIONS

The review paper was conducted to determine the effect of pesticides and fertilisers used in farming on groundwater. So check the parameters of the collected samples from different zones and show the undesirable or unpotable water on the map by using GIS software and give suggestions to the farmers to treat the groundwater before using it to reduce health problems. The review paper helps to understand the water quality parameters of the given water samples and their specified ranges according to IS: 10500-2012 standards.

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