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Estimation of Ground Water Pollution in Some Areas in Srikakulam by Using Rs& Gis Techniques

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Abstract
The quality of ground water is of great importance in determining the suitability of particular ground water for a certain use (public water supply, irrigation, industrial applications, power generation etc). The quality of ground water is the resultant of all the processes and reactions that have acted on the water from the moment it condensed in the atmosphere to the time it is discharged by a well. Therefore, the quality of ground water varies from place to place, with the depth of water table, and from season to season and is primarily governed by the extent and composition of dissolved solids
Key words: *Alkalinity, Electrical conductivity, Total dissolved solids , Chlorides, Total hardness, PH & RS&GIS Techniques*

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I. INTRODUCTION

A growing human-caused threat to the quality of ground water has gained a lot of attention in recent years. The adverse effects on ground water quality arc the results of man's activity at ground surface, unintentionally by agriculture, domestic and industrial effluents, unexpectedly by sub-surface or surface disposal of sewage and industrial wastes.

ArcGIS is a geographic information system (G1S) that can be used to work with maps and other geographical data. It is used for: creating and using maps; compiling geographic data; analyzing mapped information; sharing and discovering geographic information: using maps and geographic information in a range of applications; and managing geographic information in a database

II. MEASUREMENTS

Physical, chemical, and biological methods are three broad categories that can be used to investigate water pollution. The majority require the collection of samples and subsequent specialized analytical tests. Temperature is one method that can be used in-situ without sampling. Government agencies and research organizations have published standardized, validated analytical test methods to facilitate the comparability of results from disparate testing events

2.1 SAMPLING

There are a number of ways to sample water for chemical or physical testing. based on the contaminant's characteristics and the level of accuracy required. The timing of many contamination events is severely limited, most frequently in conjunction with rain events. Because of this, "grab" samples are frequently insufficient for fully quantifying the levels of contaminants. Auto-sampler devices, which pump water in increments at specific times or discharge intervals, are frequently utilized by scientists collecting this kind of data.

2.2.1. Physical testing

Common physical tests of water include temperature, solids concentrations (e.g.. Turbidity and total suspended solids (TSS)

2.2.2. Chemical testing: Water samples may be examined using the principles of analytical chemistry. There are numerous published test methods for both organic and inorganic compounds. Methods that are frequently used include pH, Biochemical oxygen demand (BOD), chemical oxygen demand (COD), nitrients (nitrate and

phosphorous compounds), metals (including copper, zinc, cadmium, lead and mercury), oil and grease, total petroleum hydrocarbons (TPH), and pesticides.

2.2.3 Biological testing:
Biological testing involves the use of plant, animal, and/or microbial indicators to monitor the health of an aquatic ecosystem.

III. SOURCES OF GROUNDWATER POLLUTION:

Natural sources of groundwater pollution include saltwater intrusion caused by overdrafting of aquifers or leaching from naturally occurring deposits. Most concern over groundwater contamination has centered on pollution associated with human activities. Waste disposal can either directly or indirectly cause human groundwater contamination (private sewage disposal systems, land disposal of solid waste, municipal wastewater, wastewater impoundments, land spreading of sludge, petroleum industry brine, mine wastes, deep-well disposal of liquid wastes, animal feedlot wastes, radioactive wastes) (accidents, certain agricultural activities, mining, highway dcicing, acid rain, improper well construction and maintenance, road salt).

3.1 **Natural:**
groundwater contains some impurities, even if it is unaffected by human activities. The nature of the geological material through which the groundwater moves and the quality of the recharge water determine the types and concentrations of natural impurities. A wide range of compounds, including magnesium, calcium, and chlorides, may be picked up by groundwater as it moves through sedimentary rocks and soils. Arsenic, boron, and selenium are among the naturally high dissolved constituents found in some aquifers. The type of contaminant and its concentrations determine how these natural sources of contamination affect the quality of groundwater.

3.2 **Agricultural:**
Groundwater contamination in agriculture is caused by pesticides, fertilizers, herbicides, and animal waste. Runoff from the loading and washing of pesticide sprayers or other application equipment, as well as the use of chemicals uphill from or within a few hundred (cut of a well) are among the numerous agricultural contamination sources. Many farmers consider agricultural land with inadequate drainage to be lost income. so that they can improve the land's productivity by installing drainage tiles or wells. The agricultural wastes that are washed down with the runoff then use the drainage well as a direct route to the groundwater. storage of agricultural chemicals close to conduits to groundwater, such as sinkholes, surface depressions, and open and abandoned wells where ponded water is likely to accumulate, as well as sinkholes. Chemicals that are stored in locations where groundwater flows from the direction of the chemical storage to the well or in uncovered areas that are unprotected from wind and rain also have the potential to cause contamination.

3.3 **Industrial:**
Water for cleaning, processing, and cooling are in high demand in the service and manufacturing sectors. Groundwater pollution occurs when used water is returned to the hydrological cycle. Modern economic activity requires transportation and storage of material used in manufacturing, processing, and construction. Along the way some of this material can be lost through spillage, leakage, or improper handling. The disposal of wastes associated with the above activities contributes to another source of groundwater contamination. Some businesses, usually without access to sewer systems, rely on shallow underground disposal. They either use dry holes, cesspools, or septic tanks to collect wastewater. Underground sources of drinking water can be tainted by any of these disposal methods. Dry holes and cesspools introduce wastes directly into the ground. Industrial waste cannot be treated by septic systems. Wastewater disposal practices of certain types of businesses, such as automobile service stations, dry cleaners, electrical component or machine manufacturers, photo processors, and metal platters or fabricators are of particular concern because the waste they generate is likely to contain toxic chemicals. Other industrial sources of contamination include cleaning off holding tanks or spraying equipment on the open ground, disposing of waste in septic systems or dry wells, and storing hazardous materials in uncovered areas or in areas that do not have pads with drains or catchment basins. Underground and above ground storage tanks holding petroleum products, acids, solvents and chemicals can develop leaks from corrosion, defects, improper installation, or mechanical failure of the pipes and fittings. Mining of fuel and non-fuel minerals can create many opportunities for groundwater contamination. The mining process itself, the disposal of waste, and the processing of the ores and the waste that results are the sources of the issues.

IV. VALIDATION

Validation is done to the mapped results. The area chosen for the validation is srikakulam.
Samples are also collected from the srikakulam area (near petrol bunk). Tests are conducted on the collected sample and results are compared with the results obtained from the GIS mapping

Test Results

Properties	Test Results	GIS Results
pH	7.49	7.35
Alkalinity	200	208
EC	1348	1357
Chlorides	153.4	156
TDS	863	858
CaH	174	175
TH	582	581

V. CONCLUSION

In the urban areas like srikakulam. there will be additional pollutants for the contamination of water whether it is ground water or surface water. So. it is important to know at least about the pollution standards of the water which is used for drinking purpose.

Our Project dealt with the mapping of properties of water to the areas in srikakulam with the test results obtained from the selected areas. GIS is used to map the approximate values of the water properties with the input of test results obtained from selected areas.

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