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Identification of Landslides Zones at Mettupalayam to Udhagamandalam Using GIS and Remote Sensing

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ABSTRACT: Landslides are one of the most common risks in hilly areas, resulting in the loss of life and property. Landslide analysis is a complicated process including a variety of parameters that must be investigated in order to identify places prone to landslides. We use geospatial technologies to create a landslide susceptibility map of the mettupalayam to udhagamandalam, Tamil Nadu, at a scale of 1:50,000. The location of prospective slope collapses, as well as the assessment of landslide volume and run out distance, were all part of the susceptibility analysis. Landslide magnitude and frequency have been calculated in the vulnerable regions in order to create the Hazard Zoning Map. The weightage should be provided to each map layer in order to determine the landslide prone locations. The Landslide Susceptibility Index, or weightages, was allocated based on the hazard posed by each category. Overlay analysis was used to incorporate the data layers into the GIS. The use of the GIS to handle and process data has enabled for the rapid and repeatable evaluation and mapping of landslide hazards.

I. INTRODUCTION

More than two third of the Earth's surface is covered by water. Water is essential for life. We have the rain as the ultimate source of water in the form of surface and underground water. The water bodies like ponds, lakes, wells, rivers etc. are directly affected and polluted by human activities including industrial and domestic. But the ground water is too deep in the earth to add some waste into it. Still, the ground water is also polluted in some areas where the surface is full of pollutants like the industrial areas where several industries discharge effluents in open tank and left for solar evaporation. The rain water percolates through the top soil and earth crust to underground water resources. We observe that the earth's surface is full of unwanted chemicals and pollutants. The ever increasing demand of the fertilizer for crop further increased the problem. In addition to the fertilizer various chemicals in the form of weedicides, pesticides and insecticides are also used in agriculture to increase the productivity to meet the growing demand of food product.

NEED OF STUDY

All living things on Earth depend upon water. Animals and plants need water to survive and grow. Most of the life processes in animals and plants occur in the aqueous medium. Water also provides a habitat for the large number of plants and animals living in oceans, rivers, lakes, and ponds. Water provides them the dissolved nutrients and oxygen for their survival. On an average, a man needs three liters of water every day. Water is useful to human and other animals in follows

1. It is necessary for the digestion of food.
2. The blood contains mostly water. Nutrients obtained from food and transport them to all parts of the body by the blood.

OBJECTIVE OF STUDY

Due to which pollution is increased to higher level. Government can sanction the funds for water supply projects for these Corporations and they can take the water from clean source for the people living in cities. However, the wastewater from these cities is not treated properly before its disposal. On downstream side of these cities, the villages which are depending on this river only are consuming this polluted water. Generally, Government is not sanctioning the heavy funds for villages to take the water from clean source.

II.LITERATURE REVIEW

Many researchers have highlighted the causes and effects of water pollution.

Dhote et al. (2001) argue that the toxic chemicals used in making the idols tend to cause serious problems of water pollution and also pose a serious threat to the underwater ecological system. When immersed, these colors and chemical dissolve slowly leading to significant alteration in the water quality.

Zafar and Alappat (2004) indicate that the most landfills are located along the banks of rivers flowing through the cities in India. The quantity of waste generation is one of the biggest sources of environmental degradation in Delhi, India's capital. It contributes to river pollution in a significant way through landfill leachate and runoff, especially during the rainy season. All the landfill sites except Tilak Nagar, Hastal and Chattarpur are located close (0-6 km) to the river Yamuna. The leachate produced by landfills finally percolates to the porous ground surface at the landfills or finds its way to nearby drains. A large portion of landfill leachate and runoff produced by these landfill sites finally reaches the Yamuna through ground water flow or surface water flow through the drains. They indicate that river water quality is affected by the presence of landfill locations.

Yogendra et al, (2008) highlighted that freshwater is of vital concern for humans. The surface water bodies, which are the most important sources of water for humans and related activities are unfortunately under severe environmental stress and are being threatened as a consequence of developmental activities. The Pneumonia and Diarrhoea Progress Report (2016) published by John Hopkins in its report states that Pneumonia and Diarrhoea claimed lives of 1.5 million children under the age of five. This prevails disproportionately in a few countries as 72 percent of these two diseases among children deaths occur in just 15 countries.

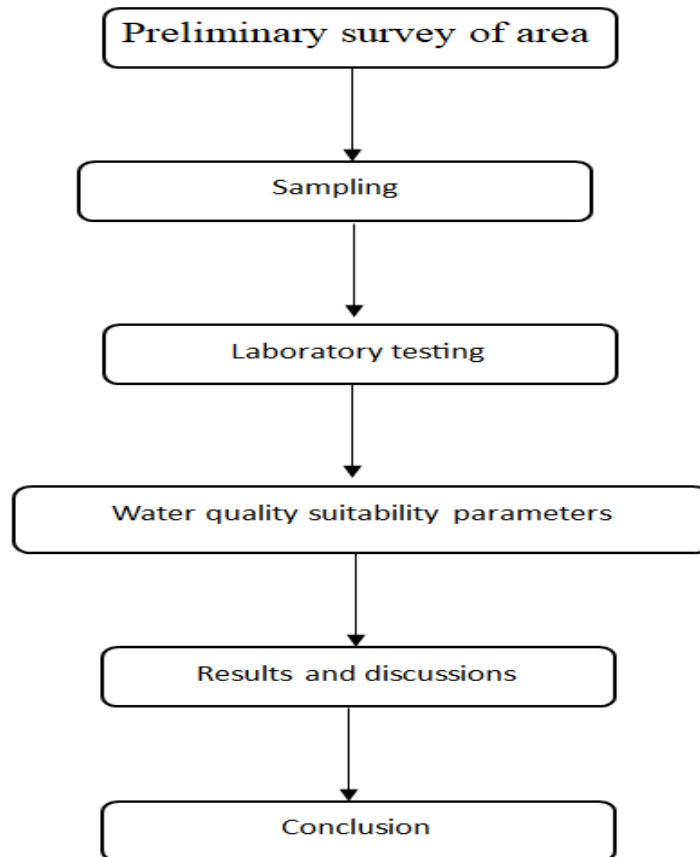
Kumar et al (2017) points out the causes of water pollution in the State of Punjab. Industrial waste and domestic sewage gets discharged directly into water bodies as the predominant causes of water pollution. They revealed that about 70 per cent of the water pollution is caused due to sewage, which pollutes drains and eventually affecting river water and affects the ground water in towns and cities in the state of Punjab.

NarayaniGogoi and Rashmi (2017) studied about the water quality deterioration of Bharalu River and stated that the entry of a pollutant the river sets off a series of physical, chemical and biological events and the effect is mainly determined by the character and quantity of the pollutant.



III.METHODOLOGY

Methods used for this project are summarized under following headings:



VI. MATERIAL PROPERTIES

Preliminary Survey

To identify sampling stations to collect water samples. Based on preliminary survey sites were identified for surface water sampling from river water samples.

Sampling

Collection of water samples was done according to the standard methods for the examination of water and wastewater (IS 10500: 2012). Water samples were taken in 1000 ml pre-washed plastic bottles. Bottles were rinsed with sample water prior to collection. Water samples were taken in 1000 ml pre-washed plastic bottles. Bottles were rinsed with sample water prior to collection. Bottles were filled to brink with water samples, tightly closed and labeled.

Laboratory analysis

Water samples were filtered using Whatman no. 42 filter paper to separate suspended material. Samples were analyzed for different physico-chemical properties of water.

Water quality suitability

An attempt to assess suitability of water for irrigation purposes on the basis of total hardness, total dissolved solids classification was undertaken. The quality was ranked giving numerical numbers (1 to 5). The highest number (5) was given to best quality character and minimum number (1) to poorest quality character.

V. LABORATORY ANALYSIS

In present study, Sarabanga River water sample were collected and analyzed for various physico-chemical parameters to find out the characteristics of the river water of Salem City, Tamilnadu. All the samples were analyzed to determine PH, TSS, DO, COD, BOD, TDS, Alkalinity, Phosphate, Sulphate, Turbidity, Calcium Hardness, Magnesium Hardness, Total Hardness, Nitrate, and Chloride using standard methods.

Parameters	Sample 1	Sample 2	Sample 3	Maximum permissible limit
pH	7.45	6.25	6.48	6.5 – 8.5
TSS(mg/l)	22.8	26	25.5	50
TDS(mg/l)	83	86.5	88	2000
Alkalinity(mg/l)	55.0	57.4	56.5	500
Chloride(mg/l)	53	54.8	53.20	500
Total Hardness(mg/l)	24.50	26.20	26.50	500
Phosphate(mg/l)	0.65	0.70	0.72	50
Sulphate(mg/l)	10.6	11.8	12.2	400
Nitrate(mg/l)	2.20	2.30	2.35	45
BOD(mg/l)	10.80	12.25	10.18	30
COD(mg/l)	15.50	18.20	16.25	100
DO(mg/l)	4.30	4.35	4.48	4
Turbidity(NTU)	17.50	24	23.2	15
Mg Hardness(mg/l)	9.75	10.25	10.40	100
Ca Hardness(mg/l)	14.65	15.4	16.20	100

VI. CONCLUSION

According to the identified sources of pollution, anthropogenic factors such as population growth, excessive consumption, overexploitation, chemical explosions, and subsurface mining are the main contributors to pollution in the catchment area. One of the main causes of this is a general lack of awareness among the general public. As a result, appropriate efforts must be done to restore the river ecology, which, if not preserved, will result in major environmental imbalances. In this study, characterization of the physicochemical parameters of Sarabanga River at 3 sample locations was carried. From the above results and discussion, it may be concluded that water quality of river in the investigation area is safe for domestic, irrigation, and industrial activities. Most of water samples were found to be within the permissible limits. It is clear from this initiative that pollution in the Sarabanga River may be substantially decreased. Since rivers are natural sources, appropriate steps should be taken to prevent pollution.

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