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Quality of Water in Thamirabarani River Basin Originated From Papanasam, Tirunelveli District

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Water is an important natural resource of earth and plays a vital role in our life. Surface water and groundwater are the major sources of water. The surface water qualities of major river basins are contaminated by the municipal and industrial discharges. Mapping of spatial variability of surface water quality is of vital importance and it is particularly significant where it is primary source of potable water. In order to assess the water quality the present study has been undertaken to map the spatial variability of water quality using geographical information system (GIS) approach. The water quality of Tamirabarani river, an important domestic and potable water source of Southern India, Tamil Nadu State has been assessed in the present study. The water qualities of 21 sampling stations were randomly selected in Thamirabarani river basin, Tamil Nadu State for the present study. Geological information system is a powerful tool for representation and analysis of spatial information related to water quality analysis. The spatial variation map for the major water quality parameters are generated and integrated using Arc View 3.2a software. The final integrated map shows 3 priority classes, such as good, moderate and poor water quality zones of the study area and provides a guideline for the suitability of water for domestic purposes.

KEYWORD

Geographical information system (GIS), Groundwater, Arc View 3.2a, Weighted overlay method.

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Assessment of Fluoride Concentration in Drinking Water Sources Around NALCO Smelter Plant, Angul

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An attempt was made to assess the fluoride concentration in different drinking water sources adjacent to aluminium smelter plant of M/s. NALCO Ltd., at Angul in Odisha. From the analysis of water samples, it is observed that fluoride level was much higher in surface water sources compared to ground water sources. A steady increase in fluoride concentration of surface water sources over last several years may be attributed to the emission from aluminium smelter plant of NALCO at Angul.

KEYWORD

Drinking water, Fluoride concentration, Surface water, Ground water.

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Anaerobic Filtration of Coffee Processing Wastewater

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In this study, an attempt is being made to treat acidic coffee processing wastewater using an upflow anaerobic filter packed with polypropylene rings and the performance of the reactor is evaluated with varying Hydraulic Retention Times (HRT) of 48 hr, 24 hr and 16 hr. The reactor performed better at higher HRT. For 48 hr of retention time, the effluent from the reactor has maximum reduction of biological oxygen demand (BOD), chemical oxygen demand (COD), total solids (TS), phosphate and nitrate were 56, 68, 61, 57 and 61%, respectively, with organic loading rate (OLR) of 2 kg/m^3/day. These results indicate the feasibility of anaerobic filter for the treatment of coffee processing wastewater**.**

KEYWORD

Anaerobic filter, Coffee processing wastewater, Hydraulic retention times (HRT), Organic loading rate (OLR).

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Cement Concrete Behaviour With Replaced of Sewer Water

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Water is an important source to induce the concrete, which almost widely used in construction area around world and consuming large quantities of fresh water for mixing. With the current water crises in India there is the need to look for an alternative sources of water. The goal was to search for the optimal specifications to maximize the replacement of potable water with an alternative source. In India treated wastewater is discharged in natural water bodies, which can be used in construction industry. This study investigates the feasibility of incorporating the treated wastewater as a partial substitute for tap water in concrete. Parameters of water were tested which was found well as per IS456-2000 limits. Using treated wastewater tests were conducted on cement, fresh and harden concrete. The concrete specimens were casted with 0%, 30%, 35%, 40% and 100% of treated domestic wastewater for testing compressive strength of concrete cubes for 7 and 28 days. The results suggested that it is appropriate for using in construction industry.

KEYWORD

Water, Heavy metals, Concrete, Compressive strength, Treated wastewater, Flexural strength.

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Case Study on Water Quality : Ground Water and Supplied Domestic Water

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Groundwater is the most common source of fresh water which is used for domestic use as well as drinking. Its treatment and purification prior to consumption is essential to reduce health risks. In such an attempt, water samples from Uni-Homes, Chennai were taken and systematically studied to assess the groundwater quality and the efficiency of the reverse osmosis (RO) system installed in the community. Fresh samples were taken from both the inlet and outlet of the reverse osmosis system for every test to maintain accuracy. Eight important parameters of water quality, namely pH, turbidity, alkalinity, hardness, dissolved oxygen (DO), chloride, total solids and total dissolved solids were tested to find out if the water is suitable for domestic use. It was found that the water needs some other tertiary treatment to meet the drinking water standards and it satisfies the portable water requirements.

KEYWORD

Groundwater quality, Parameters, Reverse osmosis (RO) system.

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Feature Article

A Growth in City Life and Loss in Water Capacity: Kolkata in a New Look

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As per the census record Kolkata's population has increased at a rate of 2% per year when Delhi's population rose by 4.1% and in the case of Mumbai it is 3.1% only and it can be viewed that Kolkata is a place of 16 million people. As of 2011, the Kolkata city had 4.5 million residents; the urban agglomeration, which comprises the city and surrounding, was home to approximately 14.1 million. The total area covered under the city is 185 km^2 as metropolis and 1886.67 km^2 as metro. But it is eventually said that a city is not only 'concrete' built but built with a context of environment. The city is placing it itself as a place for living where the growth of population and expansion in its size are associated with lacking of proper infrastructure. In these days to mitigate the gap in water level is a challenge in the city for a sustainable growth with the determined policy or programmes. This study has taken initiative to find out the relationship among the population growth; rapid urbanization with the water scarcity and its immediate environs for policy action that would help to promote urbanization also.

KEYWORD

Urbanization, Metropolitan, Metro city, water scarcity.

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Assessment of Groundwater Contamination due to Leachates From an Open Dumpsite Using Geoelectrical Resistivity Imaging

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2D geoelectrical resistivity measurements have been conducted to investigate ground water contaminations at a non-engineered, open dumpsite facility in Lagos, southwestern Nigeria. The inferred lithologies from the inverse model of the 2D imaging includes topsoil, sandy-clay and sandy units; while the delineated low resistive top layer has resistivity values ranging 0.64-7.5 typical of leachates, localized within sandy-clay unit extending to depths 42-52 m. The groundwater from the minor aquifer units at shallow depths are observed to be hazardously contaminated in the study area where household, market and industrial wastes are known to be disposed improperly. It is, therefore, recommended that deeper aquifers beyond the contaminated layers are safe to drill with screened borehole in order to avert immediate groundwater pollution within the study area.

KEYWORD

Dumpsite, Leachate contamination, Groundwater pollution, ERT, Waste management.

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Feature Article

Smog Free Tower

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SMOG AND ITS FORMATION

Rapid rise in air pollution all over the places in general and in cities in particular has worsened smog occurrence and extended its duration. Smog is basically derived from the merging of two words; smoke and fog. Smog is also used to describe the type of fog which has smoke or soot in it. Smog is a yellowish or blackish fog formed mainly by a mixture of pollutants in the atmosphere which consists of fine particles and ground level ozone. Smog which occurs mainly because of air pollution can also be defined as a mixture of various gases with dust and water vapour. Smog also refers to hazy air that makes breathing difficult. The atmospheric pollutants or gases that form smog are released in the air when fuels are burnt. When sunlight and its heat react with these gases and fine particles in the atmosphere, smog is formed. It is purely caused by air pollution. Ground level ozone and fine particles are released in the air due to complex photochemical reactions between volatile organic compounds (VOC), sulphur dioxide (SO_2) and nitrogen oxides (NOx). These volatile organic compounds, SO_2 and NOx are called precursors. The main sources of these precursors are pollutants released directly into the air by gasoline and diesel-run vehicles, industrial plants and activities and heating due to human activities (Figure 1).

Smog is often caused by heavy traffic, high temperatures, sunshine and calm winds. These are few of the factors behind increasing level of air pollution in atmosphere. During the winter months when the wind speeds are low, it helps the smoke and fog to become stagnate at a place forming smog and increasing pollution levels near the ground closer to where people are respiring. It hampers visibility and disturbs the environment. The time that smog takes to form depends directly on the temperature. Temperature inversions are situations when warm air does not rise instead stays near the ground. During situations of temperature inversions if the wind is calm, smog may get trapped and remain over a place for days. But it is also true that smog is more severe when it occurs farther away from the sources of release of pollutants. This is because the photochemical reactions that cause smog take place in the air when the released pollutants from heavy traffic drift due to the wind. Smog can thus affect and prove to be dangerous for suburbs, rural areas as well as urban areas or large cities. Smog is a devastating problem especially due to the fast modernization or industrialization as the hazardous chemicals involved in smog formation are highly reactive is spread around in the atmosphere.

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Applications of Remote Sensing and GIS for Delineation of Groundwater Potential Zones in and Around Thondur Mandal, Kadapa

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Groundwater is one of the most valuable natural resources, which supports human civilization. The supply of groundwater is not unlimited and, therefore, its use should be properly planned based on the understanding of the groundwater systems behaviour in order to ensure its sustainable use. Again a judicious use of groundwater, proper evaluation is required. Groundwater development and management programme needs the analyses of a large volume of multidisciplinary data from various sources. Integrated use of remote sensing and GIS can provide the appropriate platform for convergence of multidisciplinary data from various sources for appropriate planning. In the present study, an integrated remote sensing and GIS based methodology is developed and tested for the evaluation of the groundwater resources of Thondur mandal, Kadapa district, A.P., IRS P6 LISS-III satellite data is used for data analysis, existing maps and field observation data have been utilized to extract information on the hydrogeomorphic features of the study area. According to landuse land cover 69.2% of the land covered with agricultural land-crop Land, 0.53% of builtup land, 5.56% of forest land, 3.55% of water bodies and 21.04% of waste lands-barren rocky/stony waste. Utilization of water and land is more because of rapid boost in population, urbanization, industrialization so planning for modern land and water conservation and management need for GIS and remote sensing is essential for extreme feature. The ground water potential zones have been derived for the Thondur mandal and it has been divided into mainly 3 categories, namely high, moderate and poor potential zone. High groundwater potential zones shares about 25.06 km^2 (9.57%) of the total study area. Most of the area is covered within the moderate potential zones. This zone covers within the study extent by 183.35 km^2 (70.04%). The poor groundwater potential zones shares about 53.45 km^2 (20.41%) of the total study area. Further, it is concluded that the integrated approach of geological, hydrological and satellite image interpretation in GIS environment should be applied for sustainable development and management of groundwater resources.

KEYWORD

Remote sensing and GIS, Groundwater prospecting zones, LU/LC, SRTM, Thoundur mandal.

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Heavy Metals: Their Impact on Ecosystem and Methods of Detection

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Heavy metals, naturally present in the earth's crust but its level significantly increase by human activities that altered the geochemical cycles and biochemical balances. Heavy metals, like arsenic, lead, mercury and cadmium cause adverse effects on plants as well as human being. Their presence in the biological system has no significance even at low concentration. Therefore, its presence causes damage to the nervous, cardiovascular, reproductive and other vital organs. Heavy metals interfere with the biochemical pathways by interaction with enzymes and proteins and have the ability to alter the DNA repair mechanism. It acts as inducer of carcinogenesis. Therefore, their quantification and detection has become the prime concern of today's world. Conventional techniques, such as atomic absorption spectrometry, spectrophotometry and inductively coupled plasma mass spectrometry are quite precise but they are moderately high price and need expertise personnel and above all, they are mostly laboratory bound. Biosensors provide the advantages over the cost, portability, specificity and ease of use in real time monitoring. This review highlights the impact of heavy metals and the use of biosensors for quantification and detection of heavy metals. In addition, highlights the recent advances in sensor constructions and the benefits from the use of nanomaterials in conjugation with biotechnology and microelectronics.

KEYWORD

Arsenic, Cadmium, Lead, Mercury, Optical sensor, Electrochemical sensor.

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Embodied Carbon emission – A comparison for sustainable and Normal Building

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Sustainable green building uses eco-friendly processes and various resources utilized through various anthropogenic activities, such as construction, operation, design, maintenance, renovation and deterioration. This paper aims at identifying and henceforth comparing the embodied carbon emission from sustainable and normal building. This analysis helps us to protect the environment by reducing the usage of exhaustible materials and various resources through proper engineering design, execution and construction. As per leadership in energy and environmental design requirements (LEED), carbon emission must be minimum in the environment so as to maintain a green environment. Green building saves maximum energy and hence, protects the environment which leads to sustainability. In comparison to normal building, the carbon emission was less in the sustainable building.

KEYWORD

Sustainable, Normal building, Embodied carbon emission, Green environment.

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Spatio-Temporal Distribution of Iron in Groundwater of Chandrapur City

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To ascertain spatio-temporal distribution of iron in groundwater of Chandrapur city of central India, groundwater sampling was carried out by grab sampling method for summer and post monsoon seasons of 2014. Groundwater from 22 sampling locations comprising of equal number of samples from handpumps (11) and bore wells (11) were sampled. Iron concentration was estimated by Merck iron analysis kit (Merck, aquaquant iron analysis kit, range 0.25-15 ppm, Germany). Results revealed that iron concentration in groundwater varies from below detectable limit (bdl) to 3.0 ppm and below detectable limit to 5.0 ppm for summer and post monsoon seasons, respectively. The average iron in groundwater was found to be 0.34 ppm and 0.40 ppm for summer and post monsoon seasons, respectively which was above permissible limit of WHO standard for iron 1984 (< 0.30 ppm). From the results it was observed that 6 samples (31.81 %) and 7 samples (27.27 %) had groundwater iron concentration for summer and post monsoon seasons. Further observations showed no consistency in iron concentration in groundwater for summer and post monsoon seasons in sampled locations except for Indira Nagar sample area (2.0 ppm, bore well for summer and post monsoon seasons both). Thus, distribution of iron concentration in groundwater in the study area seems to be influenced by space and time. This can be attributed to seasonal variations in groundwater level and geology of the study area.

KEYWORD

Central India, Chandrapur, Groundwater, Heavy metal, Iron.

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