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ABSTRACT VOLUME

One Day Virtual International Conference on "Earth Observation Technologies for Environmental Management"

August 2021

His expertise, unbiased advice and ability to create a relaxed working atmosphere while still upholding demanding standards make him a much most admired mentor among the employees. His thought provoking speeches have influenced thousands of minds. He holds amazing knowledge in every sphere. He is a man of great substance, integrity, social values and vision. Being a disciplinarian, he also possesses great human resource skills essential to lead an organization.

Perspective

The uniqueness of Gyan Vihar will be apparent as you go through these pages. The feedback of our alumni and students will provide insight into their experiences. These experiences comprise of all our programs which include education in a broad spectrum of career building. I invite you to review this information and learn about our approach to achieve the highest quality in higher education.

At the core of this approach is our commitment to values which have characterized Gyan Vihar since its inception in 1994. We believe that success in career is important, but so is sussess in life. In addition to providing superior knowledge, skill development and opportunities to gain hand-on experience, education at Gyan Vihar is permeated by values. Operating ethically and with a passion for high principles is a powerful career startegy.

Although values are the core, many other factors make Gyan Vihar an ideal environment for career oriented individuals wishing to pursue esteemed degree courses. Among them is our extensive, powerful, influential and rapidly growing alumni network, world-class human resource and placements. Gyan Vihar has been dedicated to the latest and advanced educational needs of this region and the whole country.

The career advantages associated with access to this network are amongst the strongest aspects of our community. Another competitive advantage is our state-of-the-art infrastructure. Our facilities enhance our global reach and our ability to teach without limits. Additionally, working in a serene, spacious place truly fosters the ability to focus, dig deep and strive to do one's best. We are an undisputed leader in bringing global perspectives to our classrooms and will continue to expand our presence. This publication is about the worth of Gyan Vihar degree and the special and unique experience you'll have as one of our students. I believe strongly in the University and its ability to create and inspire tomorrow's leaders. Once you are here, you will too.

Sunil Sharma

Chancellor, Suresh Gyan Vihar University Chairman,
Gyan Vihar University

Perspective

Dr. Sudhanshu, the co-founder of Suresh Gyan Vihar University was born on 19 February, 1969. An Indian educationist and polymath: geologist, writer, thinker, photographer, and environmentalist; his invaluable contribution to transforming Gyan Vihar University into a world class institution goes beyond words. Besides being a great academician, Dr. Sudhanshu is a think-tank in himself who is resolute in his efforts to making the world greener and a better place to live in. With over 25 years of experience in successfully administering various educational organizations, his persona mirrors honesty, empathy, consistency, direction and conviction; the making of a visionary and a great leader.

From our selection process to the classroom and beyond, we focus on working with people who are dedicated to be holistic professionals with well developed leadership abilities. Among very bright, ambitious applicants, we select those who know the value of balanced preparedness and then we devote ourselves unconditionally to their Success.

Gyan Vihar has a well-earned reputation as a curricular innovator. We understand the difference between concepts whose relevance may not endure and the lasting ability to think and solve problems logically as well as analytically, and maintain high ethical standards.

Our students are involved in every aspect of our programs as leaders and as sources of constructive review. Their inputs help us assure that we understand their needs and truly fulfill their objectives. Through their involvement, they shape our program while they chisel their leadership skills, complementing what we teach.

As diverse as they are exceptional, our students come from across Rajasthan and around India. Likewise, our focus is global, we have been helping our students compete in a global environment from their beginning.

Our placement cell is one of our integral strengths. Once our students graduate, they want to put their skills, talents, and leadership abilities to work. It is staffed by extraordinarily devoted people who help our students make vital connections to careers and internships, and provide a host of other opportunities for professional growth.

Our commitment to our students doesn't stop at the classroom door, nor does it end when they graduate. Our culture is collegial because our students are partners in the learning process. This culture also underlines our students' interactions with each other and with our alumni, who gladly make themselves available as guest speakers, networking contacts, and sources of inspiration and guidance.

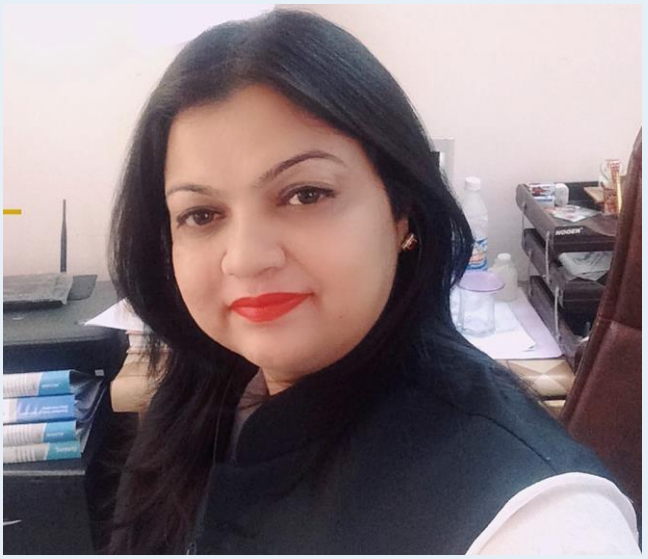
As Chief Mentor, I'm committed to uphold Gyan Vihar traditions while keeping our program focused on building well-rounded, mature and thoughtful, poised career leaders who can compete and succeed wherever they choose to apply themselves.

Dr. Sudhanshu
Chief Mentor, Suresh Gyan Vihar University
Suresh Gyan Vihar University

President's Message

Welcome to Suresh Gyan Vihar University!
21$^{3'}$ century is going to focus on ultra technology, which would be efficient, fast and change the style & quality of life. India has highest population of youth in the world and is going to be a big resource for the economic growth of India and globe. However, it is widely accepted fact that our graduates and post-graduates have poor employable skills due to isolation of academia and industries and it is further widened by the poor industrial exposure of the faculty. Therefore, Suresh Gyan Vihar University is having a strong interface with various industries, corporate houses & research laboratories for tapping faculty of high repute and regular interaction to pace our students with latest requirements of the industry. A few to list are Google, Bosch Rexroth, Amazon, UR Energy, Sun Group BSE etc. We focus on building a career, not a job seeker, by providing essentials career skills in project management and communication to enhance employability and satisfaction.

A professional infrastructure combined with ergonomically designed transaction theater, industrial required laboratories with innovative pedagogy like problem based learning, interactive seminars, brain storms, pre-practicum formulation etc. provide an academic learning environment to the students. To ensure the best academic environment, industrial exposure and to meet your dreams and expectations, SGVU has designed a Mission 20 Points to succeed. To facilitate international exposure the university has collaborations with universities across the globe. It is very important to mention that within a span of less than 10 years, in the year 2017, the university has been awarded 'A' grade by National Assessment and Accreditation Council (NAAC), an autonomous institute of the University Grants Commission and became first private university in the state of Rajasthan, which proves our dedication towards academic excellence. I can assure that my more than a quarter century exposure in academics & industry at national and international level would be able to meet your dream, expectations and shape your career. I welcome you as a part of Gyan Vihar Family and wishing a grand success in your life.



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Spatio-temporal Mapping of the Chembarambakkam Reservoir of Tamil Nadu- India using GIS and Remote Sensing

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ABSTRACT

Remote sensing is extremely beneficial for gathering and managing information about water resources. The amount to which surface water spreads has an impact on the hydrogeology and ecology of waterbodies. Remote sensing technology generates spatial and temporal information that may be used to track the dynamics of surface waterbodies at the regional and global scales. In this study, a spatio-temporal mapping analysis of Chembarambakkam Lake in Chennai, Tamil Nadu, India was undertaken using Landsat 4,5,7, and 8 images. The imagery was taken from 1991 to 2020 for pre and post-monsoon seasons. For the study, all cloud-free Landsat images were chosen. The study was carried out using the QGIS platform, and the Modified Normalized Difference Water Index (MNDWI) was applied to map the reservoir's water spread area. The findings of this study show that the lowest water spread area of 5.199 km^2 was observed in 1991, pre-monsoon and the highest water spread area of but 19.995 km^2 was observed in 2010, pre-monsoon season. During the post-monsoon season, the reservoir had a maximum water spread area of 31.684 km^2 in 1995, and a minimum water spread area of 6.021 km2 in 2000. The reservoir had a maximum water spread area of 31.684 km^2 in 1995 during post-monsoon season, and minimum water spread area of 6.021 km^2 for minimum water distribution in 2000. The study also reveals that MNDWI can be used to extract water features and the distributed area with accuracy. Resulting products basically show the spatial distribution of water content over the study area and also it could be really efficient to predict the water percentage for the areas where in-situ measurements are not available. Remote sensing (RS) and GIS, with its utility for surveying large areas in a time and cost-effective manner, offers a solution to difficulties of this type as illustrated by its successful application to Spatio-temporal Mapping of Water Bodies.

Keywords: MNDWI, GIS, Remote Sensing, Landsat, QGIS

Municipal waste Generation and Environment Degradation in India

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ABSTRACT

In recent age of urbanization when the growth of population and the urban areas, where big cities are emerging specially in developing countries with less planned facilities the problem of environment degradation is more intimidating. The waste which is generated by the households in the territory of a Municipal committee or corporation is increasing day by day and creating a hindrance to the environment. Improper waste management results in environmental, economic as well as social problems. The waste which is generated may be of different –different types, it may be Solid or Liquid having food residue, paper, plastic, textile, wood, rubber etc. It may be bio-degradable or Non- bio-degradable, Electric etc. All these types of wastes can create serious issues that degrade environment.

Keywords: Urbanization, Waste Management, Environment.

Stone Dust as Alternative of Natural Sand for The Development of Sustainable Concrete

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ABSTRACT

As we all know that the global consumption of natural sand is very high, due to the extensive use of concrete. In general, the demand of natural sand is quite high in developing countries to satisfy the rapid infrastructural growth, in this situation developing country like India facing shortage in good quality natural sand. Natural resources are being continuously extracted for the production of concrete which leads to degradation of the ecosystem. This is also a challenge for sustainability to save Nature. As we all know that the term of sustainable development is defined as the development that meets the needs of the present generation without compromising the ability of future generations to meet their own needs. Nowadays, concrete is the most widely used as one of the construction materials in the world as well as in India. The increasing of infrastructure facilities will cause increasing in the need of concrete as construction material. The main constituent of concrete is aggregates that are usually taken from natural ingredients. Sand or fine aggregate in generally is taken from river, which is the most material consumed after coarse aggregate in concrete. Stone dust is a waste material obtained from crusher plants. It has potential to be used as partial replacement of natural river sand in concrete. Use of stone dust in concrete not only improve the quality of concrete but also conserve the natural river sand for future generations.

Keywords: Natural Sand, Manufactured Sand, Stone Dust, Sustainable Concrete.

Lockeia Trace fossils from Thaiat Member of Lathi Formation of Jaisalmer Basin, Western Rajasthan, India

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ABSTRACT

This paper deals with the well -preserved Lockeia trace fossils from the Thaiat Member of Lathi Formation, Jaisalmer Basin, Western Rajasthan, India. Both ichnotaxa viz; Lockeia siliquaria and Lockeia cunctator have been recorded from the yellowish brown fine grained calcareous silty sandstone in Thaiat Section. The Lockeia siliquaria trace fossils are small, elongated and parallel to sub-parallel, almond-shaped and oval-shaped oblong bodies, surfaces are commonly smooth, preserved as convex hyporelief with more or less tapering at both ends. Normally, these trace fossils occurred as isolated specimens. The Lockeia cunctator trace fossils are small, almond-shaped oblong bodies with smooth surfaces, generally preserved as hyporelief with more or less arranged in a row or lines while some specimens are founded in club-shaped morphology. The Lockeia siliquaria ichnotaxa represents those places where the bivalve stopped temporally for feeding whereas Lockeia cunctator interpreted as locomotion trace fossils with a resting or probing component of bivalves. No age can be assigned as Lockeia traces are long ranging (Ordovician – Recent) trace fossils hence based on theropod dinosaur footprints recovered from the same Thaiat Section and the Bajocian coral recorded from the lower part of overlying Jaisalmer Formation, Early to Middle Jurassic age has been suggested for the whole Thaiat Member of Lathi Formation of the Jaisalmer Basin. This study suggests shallow-marine environment for the Lockeia trace fossils bearing horizon of Thaiat Section of Lathi Formation.

Keywords: Lockeia; Trace Fossils; Thaiat Member; Lathi Formation, Jaisalmer Basin and Western Rajasthan.

Assessment Hydrochemical of the Middle Bouareg-Garet Aquifer, Eastern Mediterranean Zone, Nador Province, Eastern Region, Morocco

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ABSTRACT

The concept of groundwater vulnerability is generally studied in terms of the capacity to transmit a pollutant vertically from the surface to the saturated zone. The protection and good management of the groundwater resource are essential. In this context, salinisation is one of the main causes of the degradation of groundwater quality. This salinization is increasingly accentuated in arid and semi-arid regions, particularly in the southern Mediterranean rim, where freshwater resources are limited. The present work is in line with the monitoring of the hydrogeochemical evolution of the quality of the groundwater in the Basin of Garet River (Mediterranean area, Nador province, eastern Morocco) by determining the concentrations of major ions. This basin has a mainly agricultural vocation. From a management of water resource perspective, the objective of this work is to develop a methodology based on physical approaches to extend the concept of vulnerability to the location of wells in the study area. During the winter period of 2020, water sampling campaign were carried out on 20 wells covering the study area. The sampling was carried out according to the ISO 5665 standard. The samples taken were stored in identified plastic bottles and kept cold (2 to 4°C), for the analysis of chemical and biological parameters. The parameters analysed were electrical conductivity (EC), pH, dry residue (SR), major elements (Cl-, Ca^{2+}, Mg^{2+}, K+, Na+, $SO4^{2-}$, HCO3-, NO3- et PO43-). For each well sampled, a "geo-sheet" was developed describing the environment at the sampling location, well specifications, aquifer type, and test results obtained. The latter showed, among other things, that the salinity of the water is high and spatially variable. The electrical conductivity varies between 1.94 et 13.4 ms/cm with a decreasing concentration from upstream to downstream depending on the direction of groundwater flow.

Keywords: Groundwater Vulnerability, Recharge, Nitrates, Garet Basin, Salinity.

Temporal Assessment of Salt Affected Area Through Geospatial Technology in Dalmau Block, Raebareli District, Uttar Pradesh, India

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ABSTRACT

In the present scenario, one of the most devastating environmental hazards for an agrarian economy is the salinization of the agricultural land. Uttar Pradesh is a part of India's breadbasket and like other districts of Uttar Pradesh; Raebareli District also contributes to this basket. Geomorphologically, Rae Bareli District is situated in the middle River Ganga plains in the Indian sub-tropic region. This creates an ideal condition for the primary activities. The main occupation of its resident is agricultural activity. Our study area is Dalmau block where the major source of irrigation is from Purwa branch canals and its distributaries. The average annual rainfall is 1150 mm. Deep and silty soils associated with loamy soils slightly eroded with moderate waterlogging and slight salinity are common in the study area. In arid and semi-arid areas and regions of Upper-Gangetic plain, there is significant presence of salt-affected soils characterized by sodic soils in alluvial plain. This prolonged salinity and waterlogging problems poses a threat to the sustainability of irrigated land. The Census (2011) report, water quality reports, soil survey reports, soil maps, Agriculture Contingency Plan, were collected from the related government departments and utilized for interpretation and field-work. Geographical Information System Software (Q-GIS) was used for delineation of salinity affected area on LISS-3 satellite image, area statistics and map composition. GIS tool is used for temporal monitoring of salt-affected soils due to large spectral coverage and discrete bands. This data is received from Linear Imaging and Self Scanning Sensor (LISS-3) and were collected for February 2013 and February 2018 of both the seasons. The data from different composite bands were integrated to prepare a digital mosaic of the study area. To get a classified image of the study area unsupervised classification (ISOCLUST Module) was applied to the composite image. The salt-affected areas were delineated in the GIS environment. Salt affected land was identified on the ground during the field survey and discovered on the satellite image by image characteristics. After gathering information from the field survey, the preliminary interpreted data was modified. The tentative legends were also finalized and a final

digital map showing salinization in alluvial plain of Dalmau block was prepared for planning purpose of this region.

Keywords: Salinization, Sub-Tropic, Alluvial Plain, Composite Bands, Delineated

Demarcation of Waterlogged Areas by Remote Sensing: A Case Study in Indira Gandhi Canal Project Stage I Command Area

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ABSTRACT

The western part of India is hot desert, where Indira Gandhi Canal Project was introduced to increase agriculture potential of desertic soil. The canal irrigation and subsequently developed groundwater irrigation not only increased the agriculture production but also improvement of fodder and agriculture facilities, it also provided drought proofing by checking spread of desert area and improve ecosystem through large-scale afforestation, increased human settlement by providing the drinking water facility, created employment opportunities and provided requisite opportunities for overall economic development. But the future implications were also negative in few lower lying regions which experienced Waterlogging and soil salinization. Thus in this study the waterlogged areas during pre-monsoon and post monsoon season in an IGNP Stage I command area has been demarcated using a technique of remote sensing. The Normalized Difference Water Index has been used to determine surface waterlogged regions whereas Soil Wetness Index determine by tasseled cap transformation has been used to demarcate the neighboring wet regions where the groundwater level is up to 2 m bgl as has been taken into account of waterlogged regions definition provided by Ministry of Water Resources. The analysis shows that 41 km² of area north eastern part of Suratgarh tehsil is waterlogged due to the presence of hard pan of kankar underlying in this region and the excessive water seepage from the canal to this region.

Keywords: Waterlogging, Groundwater irrigation, Normalized Difference Water Index and Soil Wetness Index

Use of Remote Sensing in The Detection of Illegal Landfills – Case Study Croatia

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ABSTRACT

The environment consists of several components, including humans, that interact with one another and disturbance of one component has an impact on another. Careless waste disposal results in a potential threat to the environment. This survey describes procedures for detecting landfills by using satellite images. Satellite missions constantly monitor the status and changes on the Earth's surface with the aim of providing data. In this survey Pleiades satellite imagery was used for the purpose of detecting landfills. The area which was monitored included the towns of Belišće* and Valpovo, with a couple of their suburbs. Image processing and classification was made by using a QGIS software. In this paper possibility of remote sensing techniques is presented. Supervised and unsupervised classification of different satellite images was used. Sentinel, Landsat and Maxar satellite imagery was used.

Keywords: Landfill, Supervised and Unsupervised Classification, Satellite Imagery.

Impacts of climate change on mangrove ecosystems

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ABSTRACT

There is growing scientific unanimity that environmental change is having huge ecological impacts on the natural ecology of the Sundarbans. In the coming decades the impact of Climate change is likely to appear even more merciless in the Sundarbans. Due to the geographical location and ecologically sensitive the Sundarbans of West Bengal are undergoing constant stress. The study analyses the ways by which the ecological balance of the Sundarbans is constantly threatened by the onslaughts engineered by industrial pollution and human intervention. These man-induced interventions have led to perceived changes in the morphology of mangroves. The mangroves are famous for their natural shield to survive in the face of hurricanes and typhoons have succumbed afterward to the direct and indirect arbitration of human beings. This article also explores how the changes occurring in the structure and functioning of the organisms of mangrove environment, animals and ecological communities of the Sundarbans.

Keyword: Sundarbans, Climate Change, Mangrove.

Influence of Residual Organics and Direct Effect of Mineral Nitrogen On Nutrient Uptake and Yield in Rabi Rice

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ABSTRACT

Field experiments were conducted in soils belonging to clay loam (Kalathur Series- Typic Haplusterts) and sandy clay loam (Padugai series-Typic Ustifluevents) to assess the residual effect of different organics and direct effect of mineral nitrogen on nutrient uptake and yield in rabi rice. The design was RBD with test crop var. ADT 38 with three replications. The treatments consisted of the residual effect of organics viz., composted coir pith (CCP), green manures (GM), sugarcane trash compost (STC), vermicompost (VC), poultry manure (PM) and FYM applied(100%N) and combination of above residual organics with urea@50%N besides 100% RDN as urea and control in rice crop. The results revealed that nutrient uptake and yield were significantly influenced by addition of residual organics or mineral nitrogen or both over control. Integration of organics and fertilizer nitrogen was significantly higher over their individual application. Application of residual poultry manure + 100% fertilizer N registered the highest nutrient uptake viz., N (68.2, 69.1 kg ha^{-1}), P(13.9, 15.9 kg ha^{-1} , K(52, 55.7 kg ha^{-1}) in clay loam and N (56.6,56.4 kg ha^{-1}), P(20.3, 21.4 kg ha^{-1}) , K(115.5, 119.7 kg ha^{-1}) in sandy clay loam soils. Application of residual poultry manure + 100% fertilizer N recorded the highest grain (4603, 5078 kg ha^{-1}) in clay loam, (4672, 4615 kg ha^{-1}) in sandy clay loam soil. The highest straw yield (6782, 6759 kg ha^{-1}) in clay loam, (5956, 5847 kg ha^{-1}) and in sandy clay loam were recorded in residual poultry manure + 100% fertilizer N. With respect to organics alone, the highest nutrients uptake, grain and straw yield were recorded in residual poultry manure (100%N). The lowest grain and straw yield were recorded in composted coir pith (100% N) in rice.

Keywords: Mineral Nitrogen, Poultry Manure, Rice, Residual Organics, Yield

Simulation of Urban Floods by Using Storm Water Management Model (SWMM)

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ABSTRACT

Major cities in India have witnessed heavy floods from past few decades. Due to rapid population growth and improper urban planning, the chances of creek, localized or flash urban floods have drastically increased. Climatic changes are also a key reason for heavy rainfall that increases flood volume and depth in catchment. Modelling of storm water plays a vital role in estimating flood runoff quantity and quality. To check these issues SWMM is used to simulate floods scenario in urban areas. In this study, Begumpet area has been divided into 5 sub-catchments and modelling is done by importing rainfall data as time series plot. The results depict the runoff from the sub catchments and node depth. Thus, the selected area storm network has been planned by placing a storage unit in the area to divert the runoff. Urban floods are caused due to increase in population density, development of urban infrastructure without paying due consideration to drainage aspects and increase in paved surfaces. Storm water modelling plays an important role in checking issues such as flash floods and urban water-quality problems. The SWMM (Storm Water Management Model) has been an effective tool for simulating floods in urban areas. In this study a SWMM model is developed to analyse drainage network for the Begumpet area which is one of the major flood prone areas in Hyderabad city. From the simulation and modelling, it is found that 80% of floods has been reduced by following mentioned precautions.

Keywords: Storm Water Management Model, Urban Floods, Storm Water Modelling.

Crop Establishment and Nutrient Management Practices to Enhance Rice – Pulse Cropping System Productivity and Soil Health Through Soil Carbon Sequestration in Cauvery Deltaic Zone of Tamil Nadu

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ABSTRACT

Rationale of the work was to investigate the effect of crop establishment methods and nutrient management practices on soil carbon sequestration (SCS) which impacts in the sustainable soil and crop productivity (SSCP) of major cropping system (Rice-pulse) practiced in deltaic region of Tamil Nadu. Field experiments were conducted for three consecutive years in 2012-2013, 2013-2014 and 2014-2015 in rice-black gram cropping system in split plot design with various integrated nutrient management practices (organic and inorganic nitrogen sources based on RDF and STCR) in two methods of rice cultivation viz., SRI and conventional system. Experimental results revealed that soil organic carbon content significantly improved in SRI method of rice cultivation over conventional system including the residual black gram post-harvest soil, along with increased yields of both rice and black gram. Also maintaining the soil health was proved with higher soil available nutrient content in post-harvest soil nutrient status. Among nutrient management practices, STCR based IPNS had significantly higher C addition in soil organic pool in both rice cultivation methods with more residual nutrients compared to initial soil status in all the three years of experiment. From the results we found that rice-fallow black gram cropping system had enriched the SOC pool with STCR based IPNS under system rice intensification (SRI) sustainably along with better cropping system productivity in Cauvery Deltaic Zone of Tamil Nadu.

Keywords: Black gram, Carbon Sequestration, IPNS, Rice, Soil health, SRI, STCR

A Review on Environment and Climate Change

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ABSTRACT

Nowadays, environmental issues are increasing at an alarming rate. We have reviewed many research papers on climate change and environment issues. In the review paper an overview of many researches by many researchers on environment and climate change. This paper reports a comprehensive literature review for 1991–2019 (inclusive), the years in which this topic appeared in scientific journals. Our review paper includes all ecological factors, critical thinking on environment, space climate, global environment changes and many more.

Keywords: Environment, Space Climate, Global Environment Changes.

Assessment of Urban Heat Island in Lucknow City using Remote Sensing and GIS

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ABSTRACT

An urban heat island (UHI) is an urban area that is significantly warmer than its surrounding rural areas due to urbanization and anthropogenic activities. The urban area of the city of Lucknow has been rising rapidly in the past decade. In this study, the effect of UHI is analyzed using Landsat 4-5 TM, Landsat 7 ETM+ and Landsat 8 OLI/TIRS data in the period of 2002–2020 of Lucknow City. An algorithm was applied to retrieve the land surface temperature (LST) distribution from the Landsat 4-5 TM, Landsat 7 ETM+ and Landsat 8 OLI/TIRS data and UHI Intensity was calculated between LST of urban and rural points. Land Use Land Cover (LULC) was calculated on the same data using Supervised classification. In addition, the correlation between land surface temperature and the normalized difference vegetation index (NDVI) and the normalized difference build-up index (NDBI) were analyzed to explore the impacts of the green areas and the built-up area on the urban heat island. The results indicate that the effect of the urban heat island in Lucknow City is located in many urban areas. UHI intensities from remotely sensed data shows an average of 4.56°C warmer than the rural areas in the last decade. The negative correlation between LST and NDVI indicates that the green area can weaken the effect on the urban heat island, while the positive correlation between LST and NDBI means that the built-up land can strengthen the effect of the urban heat island in the study area.

Keywords: Urban Heat Island, LST, LULC, NDBI, NDVI.

Integration of Spatial Model and Multi-Influencing Factor (MIF) Decision Making Technique for Delineating Groundwater Potential Zones

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ABSTRACT

In this paper, an endeavour has been made to assess the potential groundwater areas by integrating the geospatial model with Multi Influencing Factor (MIF) technique. Groundwater potential areas are of prime importance in maintenance as well as conservation of available resources of water. Groundwater being the primary source of fresh water, is in great demand due to the increase in agricultural, industrial, population and domestic action. As a result, the groundwater table drops, causing water scarcity and resource deterioration. As a result, evaluating this irreplaceable resource is critical for the long-term sustainability of groundwater resources. In this paper, the prime focus is to find the groundwater potential zone using the MIF technique, which is a decision-making technique widely used in various sectors nowadays. It is a multi-criteria decision-making strategy in which the MIF technique assigns a defined rating and weight to raster layouts of all the subsurface water influencing characteristics. The prospective groundwater zones are then estimated statistically using graded thematic layers. Hence, the researchers and decision-making authorities can collaborate for some systematic exploration plan & the harvesting of zones done for future events. Protective & preservative measures can be taken by knowing potential groundwater zones to lower groundwater levels.

Keywords: Groundwater, MIF, Remote Sensing and GIS.

Categorization of Slums for a GIS Aided Slum Free City Action Plan Proposition: A Case Study of Udhampur District (J&K)

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ABSTRACT

Urbanization is likely to increase the rate of slum growth, as it has in the past. According to the 2011 Indian census, Udhampur urban area has a population of 91,366, with 35,507 in the Udhampur Municipal Council area, and 48,508 in Udhampur's outgrowths. Udhampur city has been divided into 21 Municipal Wards. Out of 21 slums 11 slums are non-notified and 10 are notified. This research attempts to categorise slums, which will aid with formulation of some sustainable development techniques for better implementation of slum improvement projects. Data about socioeconomic and physical condition of the slums has been collected using field surveys. For clustering slums in different categories a 2 x 2 x 2 matrix is formed. As required for the creation of this indicative matrix, basic inputs for the matrix parameters were identified and an overall matrix table for all the slums with their scores was prepared. A georeferenced very high resolution satellite imagery with ward boundary map is used to create a base map. Different maps were generated showing current slum distribution, and also spatial distribution of different slum categories. Maps were validated with field survey and with field photographs.

Keywords: Urbanization, Slum Development, Municipal Council, Indicative Matrix.

Comparison of Multiple Sensors for Crop Mapping Using Machine Learning Method On Gee Platform

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ABSTRACT

Currently Geospatial Big Data gained massive attention and are showing globally. For Remote sensing and GIS data processing Google Earth Engine (GEE) is currently the hot platform, which is widely used. Many problems are arising in Agriculture monitoring and food security, to resolve these problems require perfect crops mapping. Currently few studies regarding the usage of GEE platform to study crop classification. The objective is to evaluate the classification of crops using multiple Machine Learning Algorithms (MLA) and multiple sensors (LANDSAT 8 and SENTINEL 2) with free cloud-based platform GEE. For this purpose, we use Landsat 8(OLI) and SENTINEL 2 data, various methods of ML are applied, then compare all method and sensor's result. Although all classifier gives good result but CART gives best accuracy as 96% in comparison with RF, SVM, Gradient Tree Boost. This study discussed strength and weaknesses of classifier, determine accuracies that can be gained with different classifiers for the study area Mathura (Uttar Pradesh). We found that GEE produce very good output (result) through cloud platformed and support Remote Sensing product with pre- processing in terms of classification accuracy, the ML based approach outperformed CART, RF, GTB and many more classifier are available in GEE. With minimal human interaction and interference GEE has performed fast and well in term of time and processing complexity of multiple dataset and multiple ML methods. GEE has proven to be reliable for achieving the objectives of this study to evaluate the classification of crops with multiple ML methods of study area Mathura (Uttar Pradesh) and give base for further analysis.

Keywords: Google Earth Engine, Classification, Optical Satellite Imagery (Landsat 8 OLI), Image Processing, Vector Data.

Geospatial Analysis of Urban Heat Island Using Remote Sensing Methods: A Case Study of Urban Industrial Zones of Eastern India

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ABSTRACT

Urbanization leads to the contraction of various urban infrastructure in the city areas for residency, transportation, industry and other purposes, which causes major land use changes. The objective of the paper is to assess the spatiotemporal dynamics in land use and land cover (LULC) on land surface temperature (LST) of Durgapur municipal corporation (DMC) in eastern India during 30 years (1991-2021) using Landsat (TM, and OLS/TIRS) and machine learning algorithms. The study reveals that most land in DMC is covered by built-up area (24.7% in 1991 and 66.45% in 2021), followed by vegetation (26.60% in 1991 and 13.12% in 2021) and fallow land (9.96% in 1991 and 11.36% in 2021). LSTs found in the study area were ranged from 15.18˚ to 28.35˚C, 15.17˚ to 27.51˚C, 14.71˚ to 27.52˚C, and 23.16˚ to 38.98˚C for the years 1991, 2001, 2011, and 2021 respectively. Built-up areas drastically increased by 41.48% from losing agricultural land, vegetation, and water bodies during the study periods. The sharp decline of vegetation cover (4053.52 ha, 3253.60 ha, 3850.98 ha, and 1998.84 ha in 1991, 2001, 2011, and 2021 respectively) and water bodies (313.30 ha, 1069.44 ha, 223.79 ha, and 113.18 ha in 1991, 2001, 2011 and 2021 respectively) will continue until 2021 due to increasing built-up areas. The study also shows that normalized difference built-up index (NDBI) were negatively correlated ($p =< 0.01$) with normalized difference water index (NDWI) for all time steps with R^2 0.16, 0.13, 0.18, and 0.02 in 1991, 2001, 2011, and 2021 respectively.

Keywords: Remote Sensing, GIS, Urban Expansion, Land Use and Land Cover, Normalized Difference Built-Up Index, Normalized Difference Water Index

वर्तमान युग मे पर्यावरण की प्रसांगिकता

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सारांश

सभी प्रकार के प्राकृतिक तत्व जो जीवन को सम्भव बनाते हैं वह पर्यावरण के अन्तर्गत आते हैं जैसे. पानी, हवा, भूमि प्रकाश, आग, जंगल, जानवर, पेड़ इत्यादि। ऐसा माना जाता है की पृथ्वी ही एक ऐसा ग्रह है जिस पर जीवन है तथा जीवन के अस्तित्व को बनाए रखने के लिए, पर्यावरण है। पर्यावरण के अभाव में जीवन की कल्पना भी नहीं की जा सकती तथा हमें भविष्य में जीवन को बचाये रखने के लिए पर्यावरण की सुरक्षा को सुनिश्चित करना होगा। यह पृथ्वी पर निवास करने वाले प्रत्येक व्यक्ति की ज़िम्मेदारी है। हर व्यक्ति सामने आये तथा पर्यावरण संरक्षण के मुहिम का हिस्सा बने। पृथ्वी पर विभिन्न चक्र है जो नियमित तौर पर पर्यावरण और जीवित चीजों के मध्य घटित होकर प्रकृति का संतुलन बनाये रखते हैं। जैसे ही यह चक्र विक्षुब्ध होता है पर्यावरण संतुलन भी उससे विक्षुब्ध होता है जो निश्चित रूप से मानव जीवन को प्रभावित करता है। हमारा पर्यावरण हमें पृथ्वी पर हजारों वर्ष तक पनपने तथा विकसित होने में मदद करता है, वैसे ही जैसे की मनुष्य को प्रकृति द्वारा बनाया गया पृथ्वी का सबसे बुद्धिमान प्राणी माना जाता है, उन में ब्रम्हांड के तथ्यों को जानने की बहुत उत्सुकता होती है जो की उन्हें तकनीकी उन्नति की ओर अग्रसर करता है। हम सभी के जीवन में इस तरह की तकनीक उत्पन्न हुई है, जो दिन प्रति दिन जीवन की संभावनाओं को खतरे में डाल रही है तथा पर्यावरण को नष्ट कर रही है। जिस तरह से प्राकृतिक हवा, पानी, और मिट्टी दुषित हो रहे हैं, ऐसा प्रतीत होता है जैसे यह एक दिन हमें बहुत हानि पहुंच सकता है। यहाँ तक की इसने अपना बुरा प्रभाव मनुष्य, जानवर, पेड़ तथा अन्य जैविक प्राणी पर दिखाना शुरू भी कर दिया है। कृत्रिम रूप से तैयार खाद तथा हानिकारक रसायनों का उपयोग मिट्टी की उर्वरकता को नष्ट करता है, तथा हम जो रोज खाना खाते है उसके माध्यम से हमारे शरीर में एकत्र होता जाता है। औद्योगिक कम्पनीयों से निकलने वाला हानिकारक धुंआ हमारी प्राकृतिक हवा को दुषित करती है जिससे हमारा स्वास्थय प्रभावित होता है, क्योंकि हमेशा हम सांस के माध्यम से इसे ग्रहण करते हैं। प्रदूषण में वृद्धि, प्राकृतिक

स्त्रोत में तेजी से कमी का मुख्य कारण है, इससे न केवल वन्यजीवों और पेड़ों को नुकसान हुआ है बल्की इनके द्वारा ईको सिस्टम को भी बाधित हुआ है। आधुनिक जीवन के इस व्यस्तता में हमें कुछ बुरे आदतों को बदलना आवश्यक है जो हम दैनिक जीवन में करते हैं। यह सत्य है कि नष्ट होते पर्यावरण के लिए हमारे द्वारा किया गया छोटा प्रयास बड़ा सकारात्मक बदलाव कर सकता है। हमें अपने स्वार्थ की पूर्ति तथा विनाशकारी कामनाओं के लिए प्राकृतिक संसाधनों का गलत उपयोग नहीं करना चाहिए। हमें इस बात का खयाल रखना चाहिए कि आधुनिक तकनीक, पारिस्थितिकीय संतुलन को भविष्य में कभी विक्षुब्ध न कर सके। समय आ चुका है कि हम प्राकृतिक संसाधनों का अपव्यय बंद करें और उनका विवेकपूर्ण तरह से उपयोग करें। हमें हमारे जीवन को बेहतर बनाने के लिए विज्ञान तथा तकनीक को विकसित करना चाहिए पर हमेशा इस बात का ध्यान रखना चाहिए की यह वैज्ञानिक विकास भविष्य में पर्यावरण को किसी भी प्रकार से नुकसान न पहुचाए।

कीवर्ड: पर्यावरण, प्राकृतिक तत्व, प्रदूषण।

Application of Remote Sensing and GIS for Evaluation of Urban Expansion and Land Use Land/Cover Change

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ABSTRACT

Land is becoming increasingly scarce as a result of population increase and industrialization. One of the reasons for the decline and depletion of land is the rapid increase of population in urban areas. Natural and socioeconomic factors, as well as man's use of them over time and space, all contribute to a region's land use-land cover pattern. The major goal of this work is to use LANDSAT satellite data on a GIS platform to examine multi-temporal land surface temperature (LST) and Normalized Difference Vegetation Index (NDVI) changes in the Ghaziabad district of Uttar Pradesh, India. Landsat LST data for the months of September 2000, 2011, and 2018 were utilised in this work to compute the variations and relationship between Land Surface Temperature (LST) and Land Use Land Cover (LULC). The LST was calculated using measurements from the Red and Near Infrared bands of the Normalized Difference Vegetation Index (NDVI). The present study focuses on Arc GIS Raster functions and Raster calculation using the LANDSAT in September, thermal Bands (10, 11 & 6). The output of this paper shows that the surface temperature was high in the barren and built up area whereas it is comparatively low in the thick vegetation and agriculture land. It is also recommended that in order to reduce the land surface temperature of urban areas, sustainable urban planning strategies that include increasing the vegetated areas and embracing other green initiatives such as urban forestry should be adopted.

Keywords: Urbanization, Land Use Land Cover (LULC), LST, NDVI, Remote Sensing, GIS

A Review On the Application of Microwave Remote Sensing for Estimation of Soil Moisture

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ABSTRACT

Soil moisture plays an important role in recent and numerous environmental studies by controlling the exchange of water and energy at the consolidate between the land surface and atmosphere. Soil moisture information can be utilized for crop yield forecasting, drought management, irrigation scheduling, and reservoir management. Microwave remote sensing has emerged as an important tool for soil moisture estimation due to its high sensitivity to dielectric properties of the target. Passive sensors such as radiometers provide high temporal resolution and larger ground coverage at the cost of coarse spatial resolution, whereas, active sensors such as a SAR provides fine spatial resolution with smaller ground coverage and coarser temporal resolution. Microwave remote sensing is used for monitoring earth resources due to its unique sensitivity to the physical properties and the dielectric of the target that is to be sensed. This paper aims at reviewing the different approaches of microwave remote sensing for soil moisture estimation.

Keywords: Soil moisture, Microwave remote sensing, SAR, Active sensors, passive sensors, etc.

Potential Ecological Impacts of Mining Activity On Environment

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ABSTRACT

A comprehensive survey of existing research techniques has been presented in this study. All the articles that were included in the compendium were thoroughly analysed and separated based on the topics and methods presented. Quantitative analyses were used to measure the different locations of the gaps. The results reveal that environmental consequences (air pollution, water pollution, land use pattern, and pollution), all of which are vital concerns, are most adequately documented in the scientific literature, but human health, the next most vital concern, is woefully neglected. The spike in land cover change studies has been somewhat large, but there are relatively few studies focused on the socio-economic and human health implications. the bulk of the investigations used lab procedures, as well as remote sensing techniques, in their experiments. It is imperative to comprehend both the direct and far-reaching environmental and social repercussions of coal mining for a correct and full understanding of mining impacts.

Keywords: Mining, Feasibility, Surface Mining, Open Cast Mining, Abandoned mines

Assessment of Co-Infection of Dengue, Malaria and Covid-19

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ABSTRACT

Living amidst one of the most historic pandemics of the world that has created severe health, social and economic crisis, and everyone's attention has been focused on the novel Coronavirus. The panic and fear triggered by COVID 19 has consumed so much of our head space that we have sort of forgotten that there are diseases that exist besides COVID 19. In fact, these diseases have become more threatening when compounded with the very lethal and infectious COVID 19. To assess the impact of COVID 19 on other epidemics like dengue fever and malaria, this study has been carried out. The study further understands COVID 19 and its increased incidence with relation to Peltzman effect. Reports and journals have been referred to understand the association of these three diseases in depth. This study has demonstrated that majority of malaria and dengue cases are caused from the disease carrying vectors. When compounded with COVID 19, due to similar symptoms and lack of advanced detection facilities that can distinguish between the three diseases, patients are more vulnerable to getting fatally ill. This paper has provided some preventive measures and solutions to grapple with these diseases and has shown that the crisis generated by this will be more amplified if there is no timely response.

Keywords: Dengue, Coronavirus, Malaria, Peltzman Effect, Pandemic

Application of Remote Sensing & GIS Techniques in Agriculture

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ABSTRACT

In this paper, we discuss that remote sensing and GIS concepts can be important components in agriculture. By using such technologies, we can improve our agricultural old used practices and, we can bring in new changes towards our agricultural fields. By using GPS (Global Positioning System), we can track data of our agriculture fields which includes the slope of the field, Nutrients of crops, yield assessment of our crop. We can also track geographical references i.e. latitude and longitude. GPS is very efficient, that continuously calculates and records the correct position. By this, it can create a large database for its users. GIS (Geographic Information System) is also required for further analysis, by which we can store and handle data that is collected by GPS. By reviewing all those papers, we highlighted here Remote sensing technology, GIS, and GPS that can provide us new ideas, which are much valuable for our agriculture fields.

Keywords: Agriculture, Remote Sensing, GIS, GPS.

Identification of Urban Heat Island and Its Mitigation Strategies: A Case of Kanpur City

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ABSTRACT

This study includes the understanding of UHI effect in Kanpur City. 'Urban Heat Island' is a typical environment problem encountered in dense urban areas in summer. In this, the Kanpur area which shows UHI effect is identified; albedo and extent of vegetation cover in the city are analysed. The study depicts the causes of rise in land surface temperature and UHI effect on urban climate, atmospheric environment, biological habits, material cycles, energy metabolism, resident's health; UHI mitigation strategies such as urban landscape optimization, green roof construction, high reflectivity material utilization and green land cultivation. The study is purely based on remote sensing technology and numerical simulation methods. In this, the spectral bands of Landsat-8 TIR of month May used and are downloaded from USGS Earth Explorer website. Investigation was carried out for estimation of land surface temperature and emissivity of surface of Kanpur city for year ,2013 2014, 2015, 2016, 2017, 2018 using Single-window algorithm which uses NDVI threshold technique using software ArcGis10.6, ERDAS IMAGINE 2014. Supervised classification is done to generate map of Land Use/ Land Cover of Kanpur city.

Keywords: Urban Heat Island, Urban Climate, landscape optimization.

Study of Landscape Change and Its Dynamics of Bhiwani District in Haryana: A Cloud Computing Approach Using Google Earth Engine

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ABSTRACT

This study carried out in the Bhiwani district, Haryana in India, to map Land use and Land cover classification from 1991 to 2021. Land use land cover map for the use of government, companies and human purpose also. Landsat imageries used for the classification due to its high spatial and radiometric resolution and availability from 1972 to now with better quality images. Random forest classifier uses in GEE to classify the feature. GEE is a cloud computing platform, the benefits of this software are that without downloading any data, users can preview that data, no need to download, and are free of cost and easy to handle. RF classification performs in this software with the help of python coding. Accuracy Assessment is also the main factor of Landuse Landcover change detection process. Accuracy assessment gives proof that the map classified is how much accurate. The analysis of the result shows that the overall accuracy of all map is greater than 85 %. For calculation of area, Cropland takes a large land in the Bhiwani district; on the other hand, water source decreases day-by-day and Bhiwani district has only Dohan river as a source of water. The study proves the importance and betterment of land and its use to humankind because urbanization and Growing population are threats for the natural phenomenon.

Keywords: Google Earth Engine, Cloud Computing Platform, Landscape Change.

Estimation of Wheat Acreage and Yield Using Geospatial Technology: A Case Study of Maharajganj District, India

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ABSTRACT

The Estimating Crop Acreage and yield is one of the most important work for the government, farmers, scientists, and agribusiness. This research was conducted on the Maharajganj district of Uttar Pradesh, India. In this Study Sentinel-2A data with Environmental Data of the district Maharajganj for different period throughout the growing seasons. This research work is divided into parts for better understanding of image classification algorithms and their results. Here first used supervised Maximum Likelihood classification approaches for Land Use Land Cover Classification use for masking Agriculture Area. After Masking Agriculture Area obtain 70% area of the total District Area. Crop acreage was estimated through algorithm that is SVM and RF Classifier on Sentinel-2, MSI data (10m x 10m) for Comparative study. The analysis of results thus obtained shows that for Random forest show the total acreage of wheat 2020-21 is 1464.99 km² with Best Overall Accuracy 93.20% and kappa coefficient of 0.84which is better than other classifiers. On other hand Support vector machine show the total acreage of wheat 2020-21 is 1488.66 km² with overall Accuracy 85.58% and kappa coefficient is 0.68 which is best than other classifiers. In addition, a survey on the estimated yield of wheat in the study area was also conducted using the Carnegie – Ames – Stanford (CASA) approach model. Firstly, in 2020-21 the entire Rabi wheat growing season in Maharajanj districts was split into 2 phases. In the first stage, the net primary production (NPP) of wheat is estimated by the CASA using satellite images that is sentinel 2 and meteorological parameters (such as temperature, precipitation, and solar radiation). The model's Net Primary Production conversion is Use for the rabbi wheat yield output in the study area. Finally, the results were compared with the yields measured in the Crop Cutting experiment, verifying that the method had a correct assessment of the grain yield rabbi eliminated from the image and defeated the crop. The results show that the yield of rabbi wheat is estimated to be 50% for below 38.98 Q/ha, and the others are in the range of 50% for 38.98-55.44 Q/ha. It is based on remote sensing images, which is consistent with the measured yield of Wheat and

approximately 0.249 R^2 & 4.218 Q/ha RMSE and some deviation error is -4.61% from the average. The study recommends that the application of the Random Forest Classification algorithm on high resolution satellite data has improved the results obtained for surface estimation in terms of overall classification accuracy and reduced the time and effort required for a classification procedure and this approach meets the accuracy requirements for regional Rabi grain yield estimation and thus can be used in real-world applications.

Keywords: Crop Acreage, Maximum Likelihood Classification, SVM and RF Classifier, Random Forest Classification, CASA model.

Comparative Study of Different DEM Data's for Morphometric Analysis On Panzara River Basin Maharashtra, India Using Geo-Spatial Technique

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ABSTRACT

The morphometric analysis represents an approximately simple approach to describe the hydrogeological behaviour, soil physical properties, landform processes, and erosion characteristics hence, provides an aggregate insight into the hydrologic behaviour of watersheds. The morphometric analysis is done with the analysis of linear parameter, areal parameter and relief parameters of the basin. The measurement of morphometric parameters is order of streams, stream length, stream length ratio, mean stream length, bifurcation ratio, mean bifurcation ratio, relief ratio, drainage density, form factor, stream frequency, circulatory ratio, elongation ratio, relief ratio, aspect, slope, relief basin etc. The present study is focus to check the better result of different DEM generated from SRTM (30 m), ASTER (30 m), and CARTOSAT (30 m). This study deals with four types of DEMs. The DEMs have been generated for the Panzara river basin from this mission and compare the results between them. morphometric parameters are extracted from different DEM using automated methods to understand the accuracy and morphometric analysis was performed and a comparison of the results of these DEMs was done. The results suggest that CARTOSAT generated DEMs have better accuracy than the SRTM and ASTER. This research works on comparing morphometric parameters based on different types of DEM. This study clearly concludes that that the CARTOSAT (30 m) resolution is the best type for hydrology and water resource studies.

Keywords: Digital Elevation Model, SRTM, ASTER, CARTOSAT, Morphometric analysis.

Urban Sprawl using Shannon's Entropy Approach in Gandhinagar, Gujarat

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ABSTRACT

Land use/Land cover change is most important factor for the urban growth analysis because of urban growth is sprawling in haphazard manner. Urban sprawl is considered as a particular kind of urban growth which comes with a lot of negative effects. Thus, monitoring, analysing and modelling of this situation seems not to be avoidable. In current study RS and GIS techniques are used for detecting LULC changes for 1990, 2000, 2010 and 2020 in Gandhinagar by using satellite image and secondary data of this area. The study also makes a point of capability of Landsat data in the urban study at local level. The present finding will have high usefulness in understanding the present and projecting the future growth scenario. This will advance assist in preparation of effective planning and management master plans for controlled and standardized urban growth at regional as well as local level. Using RS and GIS approaches, this study illustrates the periodic variations in urban expansion, population increment and growth pattern.

Keywords: Population, Shannon entropy, Land use/Land cover, Urbanization Landsat 4-5 TM, Landsat 8.

Analysis of Polarimetric Parameter for Characterization of Glacier Surface Parameter

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ABSTRACT

The recent trends in global warming have a direct impact on glaciers. Because Himalayan glaciers are positioned near the Tropic of Cancer, they get more heat, making them more vulnerable to climate change. These glaciers feed Asia's major rivers, which are the only supply of fresh water for millions of people living on the Indian subcontinent. Because of the difficult terrain and inaccessibility of some regions, satellite data is used to observe glaciers. The capacity evaluation of fully polarimetric L-band data for the Ablation zone, accumulation zone and debris covered classifications is examined in this research. The fully polarimetric Advanced Land Observation Satellite–Phased Array-Type L-Band Synthetic Aperture Radar data are the data sets used. In the Indian Himalayan region, several characteristics are utilized to distinguish between Dry snow, wet snow, ice and debris-moraine covered area, including backscattering coefficient, incoherent based decomposition Eigen value- Eigen vector. The difference between ice and wet snow is striking, yet due to comparable backscatter characteristics in previous study, it's difficult to tell the ice from the ground on SAR images. In our research, we discovered that target decomposition can be used to achieve this differentiation.

Keywords: Glaciers, Capacity Evaluation, Synthetic Aperture Radar, Backscattering Coefficient, Advanced Land Observation Satellite (ALOS).

Comparison of Polarimetric Models for Scattering-based Characterization of LULC

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ABSTRACT

This study compares the polarimetric decomposition models for scattering based characterization of land use/ land cover. This research explores the three different types of scattering models – coherent, roll-invariant parameter based & scattering based decomposition models for scattering based characterization of land use/land cover. For this study fully polarimetric C-band RADARSAT 2, SLC dataset of San Francisco, CA USA was utilised for the study. The dataset was both radiometrically & geometrically corrected, then box car filter was employed for noise removal from the imagery. A coherent decomposition & a roll invariant parameter-based decomposition i.e. Pauli & Barnes decomposition respectively used for the analysis of surface, double-bounce & volume scattering scatterer type. Also, Bhattacharya & Frey and Singh decomposition is used for the analysis of scattering parameter-based modelling approaches. Bhattacharya & Frey decomposition is based on Yamaguchi four component decomposition model which expresses the total backscattering response as surface, dihedral, volume & helix scattering. The Singh decomposition added two new scattering sub-models for oriented dipole & compound dipole scattering mechanism and represent the total backscattering response into six scattering powers $P_s, P_d. P_v, P_h, P_{od}, and\ P_{cd}$. Three class of LU/LC i.e. vegetation, water body and urban area was used for the analysis. The scattering contributions of each element retrieved from modelling approaches were evaluated and compared for the respective land use/land cover type. The surface, dihedral and volume scattering response are expected from the smooth surface i.e. water body, urban structure and vegetation region respectively. The contribution of volume scattering response for characterization of vegetation feature described by Pauli decomposition, Barnes, Bhattacharya & Frey decomposition& Singh decomposition was 37%, 44%, 67% and 39% respectively. Similarly, the contribution of surface scattering response for characterizing the water body was 54%, 78%, 95% and 90% and for urban area the double-bounce scattering response was 27%, 63%, 68%, and 65% respectively given by Pauli decomposition, Barnes, Bhattacharya &

Frey decomposition & Singh decomposition. The Bhattacharya & Frey decomposition has shown fruitful result for characterization of urban structure and water body i.e. Bragg's scatter type exhibiting 68% double-bounce scattering and 95% surface scattering response. However, this model has given 13% volume scattering response for the oriented urban structure. The Singh decomposition has provided additional information about the oriented dipole scattering (P_{od}) & oriented quarter wave reflection (P_{cd}); for vegetation class the scattering powers $P_{cd}, and\ P_{od}$. were 10% and 8 % respectively. Whereas for urban area the scattering contribution of Pcd & Pod were 2% & 3% respectively.

Keywords: Polarimetric Decomposition Models, LU/LC, Coherent, Roll-Invariant Parameter Based & Scattering Based Decomposition Models.

Urban Space Change and Future Predication of Kanpur Nagar, Uttar Pradesh using Earth Observation Data

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ABSTRACT

Urban Land use changes, measurements, and the analysis of rate trends of growth would help in resources management and planning, etc. In this study, we analyse the urban change dynamics using a support vector machine model. This method derives the urban and rural land-use change and various components, such as population growth, built-up areas, and other utilities. Urban growth increases rapidly due to exponential growth of population, industrial growth, etc. The population growth also affects the availability of various purposes in its spatial distribution. In this present study, we carried out using multi-temporal satellite remote sensing data Landsat MSS (Multispectral scanner), ETM+ (Enhanced thematic mapper), OLI (Operational land imager) for the analysis of urban change dynamics between years 1980-1990, 1990-2003, 2012-2020 in Kanpur Nagar city in the state of Uttar Pradesh in India. In our study, we used SVM (Support Vector Machine) Model to analyse the urban change dynamics. A support vector machine classification technique was applied to generate the LULC maps using Landsat images of the years 1980, 1990, 2003, and 2020. ENVI and ArcGIS software had used to identify the land cover changes and the applying urban simulation model (CA- Markov model) in Idrisi Selva edition 17.0 software. The LULC maps of 2003 and 2020 were used to simulate the LULC projected map for 2050 using (Cellular automata) CA- Markov based simulation model.

Keywords: Urban growth, Support vector machine, change detection, urban simulation model, and CA- Markov model.

A Geospatial Approach for Site Suitability and Accessibility for Healthcare Services in Bankura District, West Bengal

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ABSTRACT

Healthcare site selection assumes an imperative part in healthcare development and management. From part of the public authority, proper medical site determination will help the distribution of clinical assets, coordinating with the arrangement of medical care with the social and economic demands, organizing the metropolitan and rural wellbeing administration advancement, and facilitating social logical inconsistencies. Site suitability analysis is a variety of analysis utilized in GIS to work out the simplest place or site for one thing. The main objective of the current study was to select a site for new healthcare services with geospatial technologies to intermix spatial and non-spatial data to create a weighted result. The current study had been done into three phases, where many processes are intermixed into a single phase. In the first phase of analysis, distance, density, and proximity were mapped to seek out poor and lower accessible areas of healthcare from existing healthcare. To selecting new healthcare sites, four-factor criteria (Buffer around road and rail, land use land cover and buffer around settlement,) and some constrain criteria considered in the second phase of analysis. Finally, the shortest network path analysis has been done in the third phase to determine the shortest and best route from selected healthcare sites towards district medical college. The current study presents some suitable sites in the poor and inaccessible areas of the district. This study will very helpful for the decision support system of healthcare management in the future.

Keywords: Healthcare Accessibility, Site Suitability, TOPSIS, MCDM, GIS.

Discrimination of Wheat Crop from other associated Rabi Season Crops and Assessment of Yield using Multi Temporal Satellite Data

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ABSTRACT

Agriculture is a primary activity practiced in most countries worldwide. In our country wheat is considered to be one of the major cereal crops. India, the world's second-largest producer of wheat, produced a record output of wheat in the year 2019-2020. Next to rice, being a major staple food, wheat is crucially important for policymakers, planners. decision-makers and researchers to have a timely and accurate early crop acreage production and yield assessment before the harvest. Crop statistics helps in formulating policies regard to supply and demand, stock or inventory, pricing, export/import in the event of shortfall /or surplus The present study has aimed to evaluate the applicability of remote sensing for crop area estimation and yield assessment of wheat, the major crop in Barwala block in the district of Hisar, Haryana, India. For the discrimination of wheat from other associated Rabi season crops multi-temporal satellite data includes the phenological stages (sowing to harvesting) of the wheat crop. Supervised classification followed by maximum likelihood classifier was used through ERDAS Imagine. The area estimation was generated by wheat mask, overlaying the Ground Truth (GT) points. Remotely sensed crop estimated were compared with the crop statistics obtained from the Department of Agriculture (DoA), Govt. of Haryana with a relative deviation of -1.07%. The yield assessment was carried out through an intermediate model called the Semi-Physical method using remote sensing and physiological concepts such as PAR (Photosynthetically Active Radiation) and a fraction of PAR absorbed by the crop.Net Primary Productivity (NPP) was computed through Modified Monteith Model with the parameters of PAR, fAPAR, light use efficiency and Water stress. The wheat grain yield was evaluated through NPP (Net Primary Productivity) from sowing to harvesting stage of the wheat Rabi crop. The light use efficiency and harvest index were collected from the literature review. Water Stress was extracted from Land Surface Water Index (LSWI) which was derived from Sentinel optical data (NIR and SWIR 1). The study was carried during the Rabi-season 2019-2020 at a block level. The crop yield computed through the Model was compared with statistics of DoA,

Govt. of Haryana with the relative deviation (RD%) of 9.3%. It can be concluded from the present study that Optical Remoting is useful for crop classification and discrimination, area estimation and yield prediction.

Keywords: Crop Acreage Production, Yield Assessment, Multi-Date, Rabi Season Crops, Supervised Classification, Water Stress, NPP, Modified Monteith Model.

Assessment of Diurnal Change in Land Surface Temperature of Jammu and Kashmir and Its Impact On Local Climate

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ABSTRACT

Land Surface Temperature refers back to the calculation of floor temperature that is laid low with extraordinary factors. Due to change in the Land Surface Temperature of the area, the climate and vegetation is also affected. Normalized Difference Vegetation Index (NDVI) serve as the indicator of vegetation abundance to estimate the land surface temperature (LST) vegetation relationship. Remote sensing data Landsat 7 ETM+ and Landsat 8 OLI_TIRS images for four years (2005, 2010, 2015, and 2020) are used to study the LST changes of the research area (Jammu & Kashmir). Correlations of NDVI and LST is calculated. Through the study it is clear that Normalized Difference Vegetation Index plays a major role in the calculation of Land Surface Temperature. In this study the change in the higher temperature noted in the year 2005 is 20 ^{0}C and in the year 2020 the highest temperature is 25 ^{0}C, if we talk about the lower temperature the change is 1 ^{0}C. Jammu and Kashmir has semi- deciduous vegetation that includes subtropical pine forest.

Keywords: LST, NDVI, Landsat 7 ETM+, Landsat 7 OLI_TIRS.

Phenological Changes in Uttarakhand Using EO- based Time-Series Leaf Area Index Information

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ABSTRACT

This research work was conducted to analyse the land use and land cover (LULC) and geomorphological change dynamics in the Panchkula District of Haryana. A combination of remote sensing, GIS and GPS approach was utilized for this purpose. The use of Landsat Data (Landsat-1-5 MSS C1 Level-1) and (Landsat-8 OLI/TIRS C1Level-1) the satellite images of the years 1980 and 2020 were used to produce LULC and Geomorphology maps and detect the associated changes. The impact of urbanization on Geo-environment has been studied. Forty years of differences would be coined out from 1980 to 2020. The rapid growth of urbanization increasing population, economic growth due to which the additional pressure on natural resources resulting serious problems like, infrastructure, informal settlements, environmental pollution, ecological imbalance, scarcity of natural resources. The dynamic nature of different forest types, increase in built-up area and significant depletion of water resources were found to be notable among the detected LULC changes in the LULC and Geomorphology maps were annually digitized. All the work has been done through digitization using Arc-GIS, Erdas-IMAGINE-14 and Google Earth for reference.

Keywords: Land Use and Land Cover (LULC), Remote Sensing and GIS, Urbanization, Geomorphology.

Application of Remote Sensing and Geographic Information System to Study Land Use /Land Cover Changes of Kabul Urban Area

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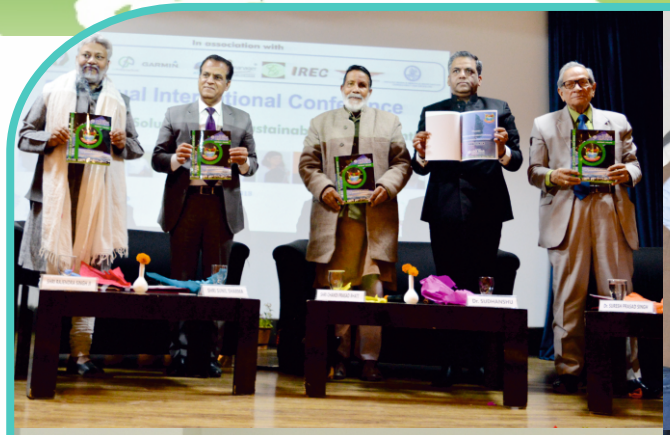
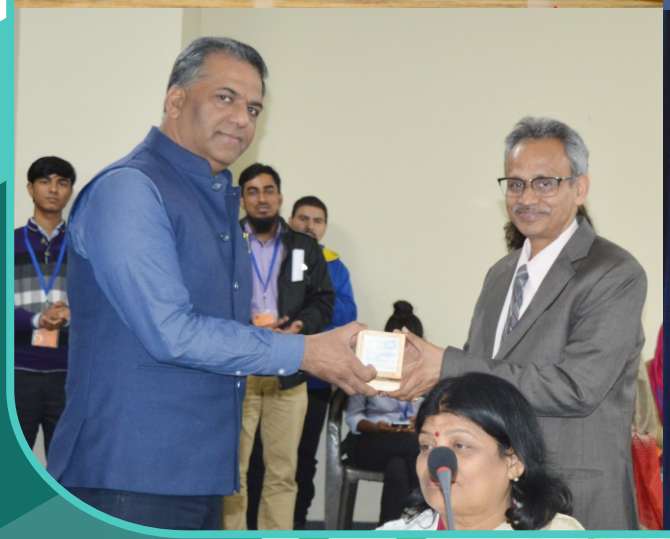
ABSTRACT

Kabul is the administrative and political center of Afghanistan Kabul, is witnessing only unprecedented population growth and geographical growth. This growth has had the greatest change in urban land cover area. Therefore, the present study was undertaken to analyze the land cover and land use change that has taken place in Kabul Urban Area between 1973 and 2020 using Remote Sensing data and GIS by mapping land cover and land use. The land cover and land use study was conducted by mapping Landsat and Sentinel data of six different years (1973, 1983, 1993, 2003, 2013, 2020) with the help of ERDAS and GIS software Maximum likelihood classification was applied. Finally, five types of LU/LC classes identified in the study area: Barren land, Barren rocky, Built–up, Vegetated, and Water bodies. For obtaining more accurate LU/LC maps, for each land use class more than 200 training samples have been selected. Respectively, accuracy assessment performed to verify the quality of the obtained results for the classified maps. In total 30 random points have been selected from each supervised classified map to assess the accuracy of the obtained results. The overall accuracy respectively from 1973, 1983, 1993, 2003, 2013, and 2020, is (90%), (93.33%), (90%), (93.33%), (93.33%) and (96.67%). Meanwhile Kappa coefficient is (87.5%), (91.53%), (87.20%), (91.55%), (91.34%), (95.80%). The result of the work shows a rapid growth in urban built-up area from 1973 and 2020 at the cost of decrease in barren land and vegetated area. Finally, for showing the change detection results a post – classification method was applied, and the LU/LC change direction and change detection matrix between initial and final states was evaluated.

Keywords: LU/LC, Population Growth, Kabul Urban Area**,** Maximum Likelihood Classification.





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