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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 success 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 strategy.

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

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



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.



President's Message

Welcome to Suresh Gyan Vihar University!

21st 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.



Prof. (Dr.) Jagdish Rai Luthra

President, Suresh Gyan Vihar University
Suresh Gyan Vihar University



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Assessment of Groundwater Potential Zone in Bemetara District, Chhattisgarh, India using GIS Based-Multi Criteria Decision Analysis Techniques

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ABSTRACT

The groundwater resource needs quantitative assessment based on scientific principle and recent techniques for sustainable development and management of available resource. In the present study, groundwater potential zone is determined using remote sensing and Geographical Information System techniques using various thematic layers viz. geomorphology, geology, drainage density, slope, rainfall, soil texture, groundwater depth, lineament and land use/ land cover. The weights of various themes determine based on their response of groundwater occurrence to identify the groundwater potential zone. Finally, obtained groundwater potential zones were classified into five categories, viz. low, medium, medium-high, high and very high potential zone. The result depicts the groundwater potential zone in the study area and found to be helpful in better development and management planning of groundwater resource.

Keywords: Groundwater Potential Zone, Remote Sensing, GIS and Multi-Criteria Decision Analysis (MCDA).



Groundwater Resources Management and Sustainable Development in Arid Climatic Regions of Western Rajasthan, India

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ABSTRACT

Arid land of western Rajasthan is known for Drought, Thar Desert and water scarcity. Average annual rainfall varies from <150mm to 630mm along with high evapotranspiration. Ephemeral rivers Luni, Kantli and Ghaggar are the limited drainage systems. Geology is represented by Delhi Supergroup, Igneous intrusives, Bap Boulder Beds, Lathi, Tertiary and Quaternary Formations. Unconsolidated alluvium, Borunda limestone, Lathi and Nagaur-Palana sandstones are potential aquifers. Water level varies from water logging conditions in canal commands to generally deep reaching >130m. Quality of groundwater varies from fresh to highly saline having high concentration of fluoride and nitrate. Groundwater drought situation has developed in major parts due to extensive groundwater irrigation. In IGNP area, water level is shallow/waterlogged. Various issues may be addressed by effective water management incorporating components of water conservation, augmentation and regulations. State Government has made rooftop rainwater harvesting mandatory for new houses having plot area >300m². Central Ground Water Authority has notified 22 blocks to control/regulate groundwater overexploitation. Hon'ble National Green Tribunal is suitably issuing directions for groundwater pollution. The issues may be further effectively addressed by adopting management options including large scale artificial recharge of aquifers(71,000MCM utilizing surplus monsoon water of IGNP & available in northwest India flowing into neighboring country), mandatory rainwater harvesting for all buildings/farms, mandatory pressure irrigation & conjunctive use of surface-groundwater, developing cost effective desalination & de-fluoridation techniques, recycle/reuse of industrial/sewage/other gray water, formulation & enforcement of Rajasthan Ground Water Legislation, constitution of State & District Ground Water Authorities, mass awareness/capacity building, notification of all overexploited/polluted areas, especial status for water to arid areas etc. Integrated participatory groundwater management will ensure safe drinking water, enhanced irrigation/agro-industries (food security), drought resistance, sustainable development, transforming dry lands in to green fields and thereby improving desert climates.

Keywords: arid, aquifer, artificial recharge, drought, drainage, desert, evapotranspiration



The Evolution of Gated Community and Smart City Initiative: An Exploratory Study in Lucknow City

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ABSTRACT

Gated communities are residential areas with restricted access designed to privatize public spaces. Included among the public spaces are streets, sidewalks, parks, beaches, rivers, playgrounds. They include new developments and older areas retrofitted with gates and fences, and they are found from the inner cities to the exurbs and from the richest neighbourhoods to the poorest (Blakely & Snyder, 1997). The Smart Cities Mission is a flagship scheme under the Ministry of Housing and Urban Affairs. This ambitious programme by the Indian Government aims at building 100 Smart Cities across India with focus on planned urbanisation and sustainable development as a support system for the neighbouring cities. In this study the smart city initiative in urban development process is government's one of the major policies and the evolution of gated communities in Lucknow as the initiation of technology-based communities is being explored. The need for sustainable city and community is the current debate and the question that Is the initiative of smart city will provide opportunities and affordable housing? Increased income levels are prompting people to live in gated communities to ensure safety, access to urban services and quality living. The more self-contained a community is, the less frequently inhabitants need to venture outside both reflecting and generating greater social distance between the gated community and the society. The smart city concept provides the understanding that cities where there is automation of all the routine tasks and system is self-healing whether its sanitation or traffic or drainage or condition of civic amenities and smooth flowing city life without civic problems. The Lucknow being City of Nawabs with traditional culture and heritage was prime attraction for the study. The transition of traditional city and culture towards technology-based development and changed lifestyle was worth exploring. The study was undertaken in One Large Gated Community including the in-depth interviews of respondents and use of observation as method for exploring.

Keywords: Gated community, sustainable city, community, technology, urban development, initiative, smart city, transition.



SCS-CN Method and Geospatial Techniques for Runoff Assessment in Sind River Basin, Madhya Pradesh, India

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ABSTRACT

Runoff is important hydrologic factor in the water balance assessment. Rainfall is the prime supply of recharge into the ground water. Evaluation of Rainfall and runoff is essential for estimation of water availability. The runoff creation process is really complex. Precise assessment of runoff is carried out for valuable management and enhancement of water resources. Several methods are presented for estimation of runoff from precipitation; however, the Soil Conservation Service Curve Number (SCS-CN) method and Geospatial Techniques still remains the most accepted, productive and commonly used technique. Runoff curve number (CN) is a main component of the SCS-CN technique and it is depends on land use/land cover, soil category and antecedent soil moisture (AMC). Diverse parameters, like weighted curve number (CN), antecedent moisture condition (AMC), land use/land cover (LULC), potential maximum retention (S), hydrological soil characteristics (HSG), precipitation (P) are the compulsory input to SCS mode. These components can be either obtained from remote sensing data or can be derived from conventional data gathering systems. 26207.02 sq. km is the total area of Sind river basin. Current study done in the part of this river basin for runoff assessment, after successfully estimation of surface runoff, same procedure can be follow for entire study area. The daily rainfall data of 12 weather stations for year of 2005 to 2014 was obtained and used to calculate the daily runoff of study area by using SCS-CN and Geospatial technique for the duration of 2005-2014. Result reveals that the daily average precipitations are 10832.44 mm and estimated daily average runoff are 2562.04 mm. In the present study the more forward application of geospatial techniques used for assessment of surface runoff based on diverse components.

Keywords: SCS-CN method, Geospatial Techniques, Precipitation, Runoff etc.



Impact of Water Quality Index Mapping using Geospatial Techniques in Guna District, Madhya Pradesh, India

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ABSTRACT

The aim of the present study is to deal with the impact of the water quality index mapping using geospatial techniques in the Guna district Madhya Pradesh with an objective to develop a methodology for sustainable management of groundwater resources and availability of safe drinking water in the study area. Water Quality Index (WQI) method has become a most effective tool for the detection and management of groundwater worldwide. Contamination of water can be detected using the different water quality parameters which includes Physico-Chemical (pH, TDS, Conductivity, Turbidity, Iron, Fluoride, Total Hardness, Total Alkalinity, Chloride & Free CO₂) and Microbial (Present/Absent Coliform, Coliform/100 ml & E.coli/100 ml). In present study, 2370 water samples were collected and analysed in the laboratory for estimating the concentration of Physico-Chemical and Microbial contamination in drinking water. The water samples have been collected from wells, tube wells, hand pumps; overhead tanks etc. from entire Guna district. In this analysis all above contamination were determined according to Indian Standard BIS: IS 10500-1991. Water quality (WQI) result indicates that water sources which are safe for drinking purpose by physico-chemical as well as microbial contamination found 1471 & 140 out of 2370 water samples respectively. Present study is helpful for long term planning and management of Ground water resources of the study area.

Keywords: Water Quality Index Mapping, Geospatial Technique etc.



GIS Based Assessment of Inherent Vulnerability (Agriculture Sector) to Climate Change in J&K

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ABSTRACT

The agriculture sector plays an important role in the economy of J&K and the most of the farmers are smallholders who are highly exposed to the impacts of climate change. The Intergovernmental Panel on Climate Change (IPCC), Working Group II Report (2014) expresses the vulnerability as a pre-existing characteristic property of a system. Accordingly, indicators for 'sensitivity' and 'adaptive capacity', which are internal properties of a system, have been employed to assess it. Comparatively, the IPCC 2007 report includes 'exposure', an external factor, as the third component of vulnerability, hence exposure was not employed. This study employed 6 and 7 indicators for measuring the dimensions of vulnerability i.e. sensitivity and adaptive capacity, respectively.

The analysis combines socio-economic data collected and normalized to make values unit free, so that indicators can be readily combined to arrive at the Vulnerability Index (VI) value. Weights were assigned to each indicator according to their importance in determining vulnerability of agricultural system. The vulnerability assessment indicates that the majority of smallholder farmers were moderately vulnerable while four districts were highly vulnerable in the state of J&K. Several drivers of agricultural vulnerability were also identified for the state of J&K.

Keywords: IPCC WG 2014, vulnerability, sensitivity, agriculture, drivers



Potential of Bioethanol Production from Different Agro Residues in the Contemporary Trend of Agro-Waste Production

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ABSTRACT

The increasing human population corresponds to higher production of food crops thereby increasing the agro-waste. Further, the climate-energy-population nexus prompts for quick action to explore alternative sources of energy. Climate change concerns have been peaking a lot in the recent past due to the use of carbon positive emission fuels or the fossil fuels. Waste sector recorded 3-5% of the total global greenhouse anthropogenic emissions in 2005. Biomass energy which is considered to be carbon neutral in terms of its emissions can potentially be the major fuel of the future. Increasing agro waste from the cropland presents a huge potential for the production of biofuels. Bioethanol, one of the major second-generation biofuels has been envisaged in this study, with respect to its production potential from the agro-waste. Developed countries account for higher production of agro waste than the developing ones. Different crops wastes have been evaluated for the production potential of bioethanol. Corn stover, barley waste, oat waste, rice waste, wheat waste, sorghum waste and sugarcane waste have production potential of 58.6 GL, 20.6 GL, 3.16 GL, 221 GL, 115 GL, 4.9 GL and 53 GL of bioethanol production respectively. The total agro-waste can account for the production of 485.56 Gigalitre (GL) of bioethanol which could replace 348.13 GL of gasoline when used with blending of 15% (E85 fuel blend).

Keywords: Bioethanol, Emissions, Agro residue, Agriculture, Biomass, Renewable energy



Application of GI Science in Morphometric Analysis: A Case Study of the Gomati River Watershed in District Bageshwar, Uttarakhand

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ABSTRACT

GI Science is a hi-tech and newly emerging inter disciplinary science which has enormous power in study geomorphic problems. Traditionally we are using Topographic sheets for the analysis of relief and drainage morphometric but now with these studies can be done quickly and more accurately using techniques of GI Science. The fundament objective of this study is to demonstrate application of GI Science in Morphometric analysis using one watershed from the lesser Himalaya terrain in district Bageshwar viz., the Gomati watershed.

Keywords: GI Science application, Geomorphology, Relief morphometric, Drainage morphometric, DEM



A Review on Natural Hazards

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ABSTRACT

A natural hazard is a [natural phenomenon](#) that might have a negative effect on [humans](#) or the [environment](#). Natural hazard events can be classified into two broad categories- [geophysical](#) and [biological](#). Geophysical hazards encompass geologic. Natural Hazards is devoted to original research work on all aspects of natural hazards, including the forecasting of catastrophic events, risk management, and the nature of precursors of natural and technological hazards. Although hazards can originate in different sources and systems, such as atmospheric, hydrologic, oceanographic, volcanologic, seismic, neo tectonic, the environmental impacts are equally catastrophic. Notwithstanding the term natural, a natural hazard has an element of human involvement. A physical event, such as a volcanic eruption, that does not affect human beings is a natural phenomenon but not a natural hazard. A natural phenomenon that occurs in a populated area is a hazardous event. A hazardous event that causes unacceptably large numbers of fatalities and/or overwhelming property damage is a natural disaster. Although humans can do little or nothing to change the incidence or intensity of most natural phenomena, they have an important role to play in ensuring that natural events are not converted into disasters by their own actions. It is important to understand that human intervention can increase the frequency and severity of natural hazards. Although humans can do little or nothing to change the incidence or intensity of most natural phenomena, they have an important role to play in ensuring that natural events are not converted into disasters by their own actions. It is important to understand that human intervention can increase the frequency and severity of natural hazards. Natural hazards are naturally occurring physical phenomena caused either by rapid or slow onset events which can be geophysical (earthquakes, landslides, tsunamis and volcanic activity) hydrological (avalanches and floods), climatological (extreme temperatures, drought and wildfires), meteorological (cyclones and storms/wave surges)

Keywords: Natural Hazards, Remote Sensing, GIS



The Impact of Urban Sprawl on Vegetation Cover & Land Surface Temperature in Barasat Municipal Area

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ABSTRACT

India is a developing country and its growing phase is facing the trio of urbanization, modernization and globalization. The study pertains to find out the impacts of rapid urban development on vegetation cover and its relationship with the variability of land surface temperature. The study area, Barasat municipality is facing rapid urbanization since mid of 90's; hence number of people residing in Barasat is increasing rapidly, resulting in dense, concrete, high-rise buildings. The Barasat city is adjacent to Kolkata metropolitan city and is a part of Greater Kolkata. Therefore, there is escalation in number of multi-storied buildings along with proliferating population leading to urban sprawl in the study area. These facts promote Barasat to be an Urban Heat Island (UHI). The study aims to show the change in variability of surface temperature from 2001 to 2017 with the help of geospatial techniques and using Landsat data of multiple dates in order to uncover the modification/variation in the urbanization and then correlate it with NDVI (Normalized Difference Vegetation Index), and LST (Land Surface Temperature). The 17 years' time scale is very small period for change detection of urban land use change but enough to show the urban growth and its pattern and trend in relation to surface temperature variation. The remote sensing and GIS provides very useful tool for the analysis of changes in environmental condition due to human activity in the study area.

Keywords: Urban growth, UHI, NDVI, LST



Morphometric Component Assessment of Krishi River Basin for Water Resource Management Using Remote Sensing DEM Data

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ABSTRACT

Morphometric analysis of drainage basins thus provides not only a well-designed explanation of the landscape, but also helps as an influential means of associating the form and process of drainage basins that may be extensively unglued in space and time. The Krishi River, tributary of Hindon river basin is important source of water supply for important agrarian and densely populated region of the middle Ganga plan is selected for the present work based on satellite derived hydrological information and field survey. The important aerial, linear and relief aspect of the basin were evaluated from the digital elevation model (DEM) in detail and other important variables such drainage density, slope and aspect map are also created to support the drainage morphometric parameters to assess the groundwater prospect of the area. The basin possesses a maximum third order stream, which is indicates the basin mainly flowing in the plain area and possesses good aquifer formation. The mean bifurcation ratio of the Kali river basin is 4.38 which indicate that the basin is not much influenced by geological structures and the length of stream segment is maximum for first order stream and decreases as the stream order increases. The drainage density (Dd) of basin is observed 0.41 km/km², which indicates that the area possesses highly permeable soils and low relief. The basin also have lower form factor (0.22), representing elongated shape and signifying a flat hydrograph peak for longer time period. Low value of length of overland flow (1.22) indicates steep slopes and shorter flow paths. The present work shows that basin slope, drainage density (D), length of overland flow (Lo) and basin relief (H) are closely connected and expressively related with a large number of morphometric variables. The results observed from the morphometric analysis of drainage basin provide the very informative hydrological information for water resource management program of the basin and flood management.

Keywords: Morphometry, Remote Sensing, GIS, Drainage Density, Bifurcation Ratio, Ganga Plain



Estimation of Changes in Land Surface Temperature using Multi-Temporal Landsat Data for Ghaziabad District, India

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ABSTRACT

The rapid growth in urban population in India is seen to create an essential for the development of more urban infrastructures. Land surface temperature (LST) is a significant factor in many areas like climate change, urban land use land cover (LULC), heat balance studies and also a key input for climate models. The main objective of this paper is to examine multi-temporal land surface temperature (LST) and Normalized Difference Vegetation Index (NDVI) changes of Gaziabad district in Uttar Pradesh, India using LANDSAT satellite data in GIS platform. To compute the changes and relationship between Land Surface Temperature (LST) and Land Use Land Cover (LULC), Landsat LST data for the months of September, of year 1992, 2000, 2011 and 2018 were used in this study. The LST has been estimated with respect to Normalized Difference Vegetation Index (NDVI) values determined from the Red and Near Infrared bands. The Land Surface Emissivity (LSE) is retrieved directly from the Thermal Infrared bands. The present study focuses on ArcGIS Raster functions and Raster calculation using the LANDSAT in September, thermal Bands (10, 11 & 6). The results are feasible to Calculate NDVI, LSE, and LST with appropriate accuracy. 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. As from the Single Window algorithm, the LST derived using them were more accurate and reliable. So the outcome concluded that as temperature increases the relative humidity also increases and soil moisture decreases. 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: Remote sensing, GIS, Land Surface Temperature (LST), Land Surface Emissivity (LSE), NDVI



Data Creation for Property Tax Assessment through Door To Door Property Survey

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ABSTRACT

Taxes on land and property are major revenue sources in all countries. The database of the properties play key role to assess the revenue value of any ward. The information in database should not restrict to the address and owner but also other details parameters which are the major parameters for the tax calculation. Also the collection and storage of database should be digital platform for which GIS is most feasible tool for this task. This paper shares a task of creation of database of properties for HauzKhas Ward, South Delhi Municipal Corporation. This is having enormous information related to properties for property tax assessment such as Property address, No. of floor, Covered Area , Vacant Land area, Type of Property (Residential/Commercial), Type of Occupancy (Owner/tenant), Type of Structure(Kaccha, Pacca, Semi Pucca) , Year of Construction and Owner Type (Single/Joint). All this information cannot be captured through the image only, a door to door ground survey is essential to complete this database. For this exercise the spatial data has been used to create grid wise maps where each building has a unique ID. On the basis of property tax form of Municipal Corporation, a property survey form has been designed to collect this information. At last the collected information has been mapped on GIS platform with buildings polygons to create one database having both spatial and non-spatial database. The database can be used for mapping of tax payers or municipal colony boundaries or urban development models. This one time task will be the key for multiple solutions of municipal challenges.

Keywords: GIS, Property Tax, Municipal Corporation, Data



Climate Vulnerabilities and Economic Determinants: An Assessment of Linkages and Risk Reduction in the Sagar Island, Sundarban

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ABSTRACT

Climate risk is the interplay of exposure, vulnerability and adaptive capacity. With the increasing temperature, changing rainfall pattern, rising sea level and extreme storms, these vanishing islands of Sundarbans are badly exposed on both the degree of vulnerability and resilience to impact. World Heritage Site; largest mangrove forest; biodiversity hotspots Sundarban is inhabited by some of the poorest people whose economic viability is being threatened by climate variability. Low levels of socio-economic indicators, food insecurity, climate sensitive livelihoods, poverty, loss of production and large scale migration, lack of development are some of these determinants. The basic objective of this study is to assess the linkages of socio-economic determinants and their implications on climate risk reduction. Stratified sampling, primary surveys, multiple vulnerability framework, non-linear regression models has been used on micro levels which make this empirical assessment very useful for the decision makers, funding agencies, effective communities, expert officials to find out effective climate action plan and adaptation strategies.

Keywords: Sundarban, Climate risk, Biodiversity hotspots, Food insecurity, Adaptation strategies



An Evaluation of Mining Subsidence Impacts on Native Flora Using Vegetation Index Change Analysis

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ABSTRACT

Having a proper understanding of impacts of mining subsidence is most significant so as to avert/control its negative impacts for the environment as these areas may go under the utilization of farming or the forest environments. The present manuscript endeavors to evaluate the effect of coal mining subsidence on the growth of indigenous vegetation of a mining region of Singareni Collieries Company Limited (SCCL), India. Changes in vegetation index were examined over a time stretch of eighteen years (2000–2018) utilizing four remote sensing data acquired from USGS (United States Geological Survey) webpage on QGIS. The coal extraction was done during August 2001 to June 2002 and the examined years were of 2000, 2005, 2010 and 2018. During the starting years after subsidence, vegetation with high NDVI (Normalized Difference Vegetation Index) values was lessened by 36.22% (1.86 km²) with an increase in unhealthy vegetation with low NDVI values by 32.60% (3.54 km²). In later periods after subsidence, a substantial rise (267.38%) in healthy vegetation with a considerable reduction in unhealthy vegetation was witnessed. Thus, over the long haul of time, the coal extraction had no bigger effect on the local vegetation.

Keywords: Change analysis, Mine subsidence, Underground mining, Vegetation index



A Remote Sensing–GIS Evaluation of Urban Expansion of Muzaffarpur District, Bihar

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ABSTRACT

Urban sprawl refers to the extent of urbanisation, which is a global phenomenon mainly driven by population growth and large scale migration. Uncontrolled and unplanned urban extents will have excessive control on climate and the local environment and its cause to Land Use Land Cover Change (LULC). In this paper we used temporal data of Landsat 5 TM, Landsat 7 ETM+, Landsat 8 OLI from 1990 to 2019 and Sentinel 2A data of Muzaffarpur district, Bihar. To evaluate expansion of urban area in Muzaffarpur district we calculate NDBI (Normalized Difference Built-Up Index) and Create LULC map through supervised classification using Landsat and Sentinel data of different Time series. The main paths for the land use/cover change model were based on five sets of multi temporal land use/cover data derived from remotely sensed images. Using the integrated GIS, several spatial variables were derived, including the proximity to major roads and built-up areas. We found tremendous growth in urban area during period of 2000 to 2009 after the analyse the result we found in present the total urban area of Muzaffarpur district become 78 km² and it's become in the category of class 1 city. Class 1 city mean that city which have more than 100000 population in town area.

Keywords: LULC map, Urban Sprawl, Supervised classification.



Machine-Learning-Based Geospatial Approach for Flood Risk Assessment Over Kosi River Basin Using Geoinformatics

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ABSTRACT

An ensemble method, which has shown the efficiency of GIS based flood modelling, was used to generate flood probability (FP) indices. FP was estimated by combining frequency ratio (FR) approach with support vector machine (SVM) by applying radial basis function kernel. Conditioning layers used were viz. altitude, aspect, geology, distance from river, soil moisture, land use/cover (LULC), topographic wetness index, sediment transport index, topographic roughness index, and surface runoff were selected. Weightage assigned to each conditioning layers by using FR approach and prepared as input for SVM model to get maximum efficiency of all the layers used. Flood probability map and the key triggering factors such as; flood extent, daily rainfall, and flood inundation depth were combined to prepare flood hazard map. Subsequently, the FwDET model was applied to estimate the flood inundation depth. Furthermore, vulnerability-based rankings were assigned to each layer based on knowledge-based approach. Afterward, final flood risk map was generated. Our finding also suggested that the proposed approach would be effective for flood prognosis and could be easily replicated in other areas.

Keywords: Flood Inundation; Machine Learning; Kosi River Basin; Geoinformatics; Vulnerability; Hazard; GIS; SVM; FwDET



Hydrogeological Studies of Rajnandgaon District, Chhattisgarh

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ABSTRACT

Rajnandgaon district is situated in the western part of Chhattisgarh state, the district lies between latitude 20°70"– 22°29" North latitude and 80°23" to 81°29" East longitude covering an area of 8172.33 sq. kms. Physiographically, the district can be divided into three parts (i) Hilly part of the west, (ii) Southern plateau and (iii) Plain region of the eastern part. The surface water irrigation facilities in the district are fairly good as compared to other districts of Chhattisgarh state. There are in total 1685 villages. Systematic hydrogeological studies were taken up in 2017-18 to generate a scientific data base for planning and successful implementation of groundwater development and management. Geophysical studies were also carried out to supplement hydrogeological findings. Through a network of 20 marked stations the monitoring of groundwater regime is carried out four times in a year and water quality analysed once in a year of water samples collected during pre monsoon period. Reappraisal studies were carried out in 2018–19 to assess the change in ground water regime since earlier survey with regards to quality and quantity in time and space. The groundwater occurs under water table condition in laterite and alluvium and weathered mantle and semi confined to confined conditions in fracture crystalline rocks and sedimentary at depth. The ground water development in the study area is mainly through dug wells and tube wells. The interpretation of the results shows that the Transmissivity, Storativity and Specific capacity range from 0.5 to 915.9 m²/day, 9X10⁻⁷ to 2.5X10⁻⁵ and 2.85 to 173.55 lpm/m respectively. It is observed that Charmuria limestone has the highest value of Transmissivity and sp. Capacity which may be due to the having good aquifer in this formation. The Gunderdehi formation and Andesite rocks are having lowest value of transmissivity may be due to not having good potential aquifer system. The other formation like Chandi, Charmuria, Chilpi, Dongargarh are having moderately potential aquifer system as the Transmissivity is of moderate range. The depth to water level map reveals that the major portion of the district falls in the range of 4–09 mbgl. and the area of the range > 5 is represent the least. Water level varies from 2.60 to 10.84 mbgl. The quality of ground water is suitable for both domestic and irrigation purposes.

Keywords: Climate Change, Hydrology, Aquifer, Ground Water



Climate Change: Points to Ponder

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ABSTRACT

The earth is constantly changing in many ways since its formation. It has gone through many phases of cold and warm climate. However these changes need thousands of years to become perceivable. According to scientific studies, the geological and historical past has witnessed periods colder or warmer than today. There were several periods of cold climate with intermittent warmer periods that lasted for several tens of thousands of years, during the last nearly one million years. Thus the climate varied between cold and warm extremes. The latest interglacial phase, Holocene, has witnessed warm climate and human civilization has crossed many milestones of development during this phase. The temperature records of past one and half century show that the earth's average temperature has risen more than 1 degree Fahrenheit. Various climate proxies such as growth rings of trees, tiny air bubbles from Ice core samples of polar ice caps, sediments deposited at the bottom of oceans etc. give us information about the climate of the past. Climate change and global warming are the issues which are a matter of great concern for the scientific community all over the world. There is always been a debate whether human beings are responsible for climate change and global warming or not. The present paper reviews the studies pertaining to climate change on various time scales and the conclusion of the studies brings us to the pertinent point, that, now, instead of debating over whether the human race is causing global warming or not we must shift our focus on how best we should respond to the present conditions and act wisely for the sustainability of life and human race on this planet.

Keywords: Climate Change, Global Warming, Holocene



Naya Raipur Smart City: Challenges ahead

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ABSTRACT

Smart cities are the cities that provide core infrastructure and give a decent quality of life to its citizens, a clean and sustainable environment and application of 'Smart' Solutions. Smart Cities Mission of the Government is a bold, new initiative. It is meant to set examples that can be replicated both within and outside the Smart City, catalyzing the creation of similar Smart Cities in various regions and parts of the country. The core infrastructure elements in a smart city would include: i. adequate water supply, ii. assured electricity supply, iii. sanitation, including solid waste management, iv. efficient urban mobility and public transport, v. affordable housing, especially for the poor, vi. robust IT connectivity and digitalization, vii. good governance, especially e-Governance and citizen participation, viii. sustainable environment, ix. safety and security of citizens, particularly women, children and the elderly, and x. health and education. Naya Raipur is among the shortlisted 98 cities chosen for the first stage of the Smart City Mission. Present paper discusses following challenges, which, the city of Naya Raipur is going to face

1. Establishment of eco-friendly city.
2. Provision of proper healthcare facilities.
3. Infrastructure improvement in order to improve quality of life and sustain the local economy as well as to attract more investments.
4. Provision for good educational institutions (both schools and colleges).
5. Provision of favourable environment for local economy to grow and prosper
6. Development of trade center and hospitality sector.
7. Development of urban ecosystem to provide healthy and sustainable environments for both natural systems and communities.

Keywords: Smart City, Solid Waste Management, e-Governance



Solid Waste Management of Area Lying Under Jammu Municipal Corporation and its Environ: A Geospatial Approach

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ABSTRACT

Solid Waste Management (SWM) is an integral part of public health and environmental control. SWM includes control of generation, storage, collection, transfer/transport, processing and disposal of waste. Improper SWM leads to both economic and environmental sufferings. Now a day, urbanization is growing rapidly in Jammu. This is due to its strategic position and long distance trade routes. The city is expanding rapidly with increasing number of industries and service sectors such as hotels, restaurants, small and micro enterprises. As urbanization grows, so does the amount of waste production specially the solid hazard waste. It is inevitable that waste production and management problems increases with rapid urban growth resulting in pressure on sanitary related problems in the city. Because of improper waste management practices and limited public and community trucks and containers, people are being forced to dispose their wastes in any open fields. Poor sanitary situation has become a common characteristic of many villages in the city. The present research work introduces the use of Geographic Information System (GIS) in the field of SWM. This work in phase 1 of study demonstrated the aid of GIS in finding out the areas that are under service and not under service out of the total 164.53 Km of area and the various malpractices under use. Phase 2 of the study was focused on necessitates of the applications of Geo-information systems on landfill site suitability assessment as a solution to address the problem and effectively manage the wastes in the city. Although the city has already two solid waste disposal site located in Kalagaon, KotBhalwal and Bhagwati Nagar. It not been scientifically chosen and no technological applications have been made in selection of the disposal site. Factor maps such as Land use, slope, aspect, elevation map, proximity map and ground water data have been used on this thesis. All factor maps having constraint are made restricted and the rest are given a suitability scale from the highest four to the lowest one suitability scale. The weights, which have been applied against each factor maps, were based on literatures, personal experiences and judgment. Finally, a weighted overlay tool from spatial analysis tools has been used and factor maps are inserted in accordance of their weighing. As a result, highly suitable areas for a landfill development cover very small area about 0.95% of the total, moderately suitable 52.83% and least suitable 45.78%.

Keywords: Solid Waste Management, Health, GIS



Modeling and Analysis of Hybrid Solar PV/Wind Power System for a Small Scale Electricity Application

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ABSTRACT

Decentralised renewable electricity generation sources are already being recognised as the candid solution towards reducing emissions related to electricity generation, despite the intermittent nature of the resources in electricity generation. Combination of two or more renewable energy sources as hybrid for electricity generation is the most promising solution to intermittent effect of renewable energy resources in electricity generation. This paper provides a comprehensive modelling of solar PV/wind hybrid electricity generation using Matlab Simulink software. A case study of the hybrid system at Central University of Kerala is presented using the 2006-2016 meteorological datasets obtained from PVGIS5. The hybrid model designed in this study is developed to satisfy the maximum load of 3.7kW of all the electrical devices in Climate Change and Renewable Energy Resources (CC & RESs) modelling laboratory of Department of Environmental Science, School of Earth Science Systems, Central University of Kerala. The results show that, the full electrical load of the laboratory can be achieved with the aid of storage option. The analysis also shows that, the weak wind resources at the study site can be hybridized with the abundant solar energy for the generation of uninterrupted power to the whole university buildings.

Keywords: Solar PV; wind energy; hybrid solar PV/wind; load demand; Central University of Kerala.



Remote Sensing Technology Based of Morphotectonic Study Manifest the Tectonic Active Zone of the Mandalgarh to Jahajpur Region District Bhilwara, Rajasthan

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ABSTRACT

Eru, Menali and Unli rivers basin occupies an area of 998.34 Sq. Km. lying in the Mandalgarh to Jahajpur area in the north-east Rajasthan and its joining area occupied by the Vindhyan, Hindoli and Jahajpur group of rocks. The Great Boundary (GBT) is prominent dislocation zone in the Aravalli mountain range, which makes the boundary between pre-Vindhyan rocks of Archean early Proterozoic age and Vindhyan rocks of Meso-Neoproterozoic age in south-east Rajasthan. The methodology is adopted the satellite image and their enhancement by various techniques (contrast, manipulation, spatial filtering, Band rationing, principle component analysis etc) and preparation of thematic maps (Geomorphological, Lineament and Geological maps) from image on the basis of interpretative elements, lineament study and DEM preparation, Morphometric analysis, Fractal analysis of the rivers present in the study area. The collection of various field data (Anisotropic Magnetic Susceptibility and Gravity data), lithology and Geomorphology etc. The Landsat ETM and IRS LISS-III data have been subjected to Digital Image Processing (DIP) and integration of the all data in the GIS environment. The Topographic Sinuosity index is 25% to 66.66% and Sinuosity Fractal Index value are 1.0566 and 1.0412 of Eru basin tectonically deformed and minimum structurally controlled and also indicating moderately folded in elongated form of the basin. The Bifurcation ratio is 4.5025 indicates the high deviation trend give rise to rotational deformation. Menali river corresponding low to higher value 50%-75% Topography Sinuosity Index and Sinuosity Fractal Index dimension values are 1.0092 and 1.0316 indicating the low tectonic activities in the side of Vindhyan groups of rocks and high tectonic activities near Great Boundary Fault is called the active zone. Zone of the Great Boundary Fault demarcate the areas of relatively higher tectonic activity and The Unli river basin is characterized by Topographic Sinuosity index is 60% to 70% and Sinuosity Fractal Index dimension value 1.0314 and 1.0071 indicating the dimension of the Unli river basin is circular to semi-circular, tectonically deformed and high active tectonic zone.

Keywords: Topographical Sinuosity Index, Sinuosity Fractal Index Dimension and Digital Image Processing.



Climate Resilient Housing-An Alternate Option to Cope with Natural Disasters: A Study in FANI Cyclonic Storm Affected Areas of Odisha

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ABSTRACT

A rare summer cyclone named “FANI” hit Puri, a small coastal town of Odisha on 3rd May 2019. As per the report of Indian Meteorological Department (IMD), the maximum sustained surface wind speed of 175–180 kilometres per hour (kmph) gusting to 205 kmph was observed during landfall. Although human casualties has been relatively low when compared to earlier cyclones experienced by the state, cyclone Fani resulted loss of 64 human lives and affected about 16.5 million people in 18,388 villages of the entire state. Puri, Khurda, Cuttack, Jagatsinghpur, and Kendrapara were the five most affected districts of state. Due to the cyclonic storm FANI, power, telecommunication infrastructure, and road services were severely affected. High wind speed also resulted in catastrophic damage to about 3.62 lakh lakh dwelling units which left many homeless. The damage to housing has been extensive, particularly in Puri district of Odisha. The most affected were people in rural areas, urban slums, and those residing in settlements along the coast line living in kutch/semipucca houses with low resilience against cyclonic winds. The current paper critically examines how climate resilient houses with 'build back better' features can save valuable human lives through use of eco-friendly, durable, cost effective and non-pollutant building materials.

Keywords: Catastrophic Damage, Climate Resilience, Eco-Friendly



Artificial Recharge to Ground Water in Urban Areas of Ajmer City, Rajasthan

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ABSTRACT

Ground Water is the main source of fresh water thereafter rivers, ponds/lakes etc. are also sources of fresh water. In India, most of areas are facing water crisis due to over utilization of ground water and the water levels fall down to more depth in the earth's crust. Rainfall Water is the natural way to get fresh/sweet water to the surface of the earth, but here most of the fresh/sweet rain water goes waste without recharge it in to the ground water regime. The study area of Ajmer city, is one of the fastest growing cities in the field of Industry. As most of the Ajmer district is covered in forest/green areas, rooftop, roads/paved areas, during rainy season, the rainfall runoff will be generated from all catchment areas. We recharge that runoff water in to ground water regime by artificial recharge structures. The artificial recharge techniques are based on hydro informatics in terms of rainfall pattern, rainfall intensity and on hydrological & hydrogeological conditions in terms of recharge capacity of sub-surface formations. The artificial recharge to ground water aims at growth of ground water reserves. Green tech Mega Food Park P. Ltd. is a food processing unit located at Roopangarh, Ajmer. The total area (rooftop & road/paved area) of the plant is 2,35,582 m² and the runoff generated from those catchment areas would be 64,077 m³/annum. As per recharge test, the recharge capacity of the aquifer is 82.88 m³/day. According to recharge test, total 17 No. of RWH Structures were made to accommodate total runoff generated from the plant premises. Based on Hydrological & Hydrogeological studies, the ponds at village Salemadras & Nondpura having available excess rainfall runoff generated from controlling catchment area to create a flood of the order of 4,21,117 m³/annum & 2,21,272 m³/annum. As per recharge test (92 m³/day), we have implemented 40 pits in Salemadras pond & 18 pits in Nondpura pond. This studies proves that, the concept would not only help in controlling devastating effects of rain water but would also improve ground water level, quality of ground water, flood preventions to villages and also increase life of roads due to minimum damage to road by runoff water and reduction in cost on maintenance & repair of the road.

Keywords: Artificial Recharge, Rain Water Harvesting, Storm Water Management, Hydrological conditions, Hydrogeological conditions, Flood Management etc.



Socio Economic Vulnerability Assessment to Climate Change a Case Study of J&K State

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ABSTRACT

The Jammu & Kashmir state in Indian Himalayan Region is a home to more than 12 million people. The economy of the state is poor with low per capita income. Most of the population depends on agriculture and tourism sectors. Due to its geographic location, less adaptive capacity, lack of awareness and less preparedness, this region is highly vulnerable to climate change, which is quite evident from the facts like variation in precipitation, variation in temperature, snow melt, retreat of glaciers, erratic rainfall, phonological changes of many species and changes in the hydrology and water resources of most of rivers and increase in forest fires etc. In the present study 15 indicators including 11 social indicators and 4 economic indicators were included for assessing socio economic vulnerability for 22 districts of state. The indicators included are measured and quantified in different units. Normalization process was performed in order to make the values of indicators into dimensionless units and weightage was assigned to each indicator. The normalized values were aggregated to obtain Vulnerability Index. Finally the vulnerability ranking of socio economic index was performed. Based on the vulnerability index, the 22 districts of the Jammu and Kashmir state were categorized into three (high, medium and low) socio economic vulnerability categories. The present study revealed that out of 22 districts 5 has a high socio economic vulnerability and shows low adaptable capacity and higher sensitivity to socio economic indicators, 10 has low socio economic vulnerability and shows high adaptable capacity and lower sensitivity to socio economic indicators and remaining 7 districts has a medium socio economic vulnerability.

Keywords: Socio-economic vulnerability



Identification of Flood Risk Area Using Geospatial Techniques-A Case Study Yamuna River within Delhi Region

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ABSTRACT

Floods are water induced disasters that lead to temporary inundation of dry land cause serious damages in the affected location such as loss of lives, properties and destruction of infrastructures. Proper management of urban flood is to minimize human loss and economic damages, However it is realized flood risks cannot be entirely avoided, thus they have to be managed. River Yamuna has caused serious flood problems in Union territory of Delhi by inundating large areas during flood season, and has a devastating effect on the life of the inhabitants, particularly those residing close to the banks. As per Delhi Govt historical data Delhi got flood in 1977, 1978, 1988, 1995, 1998, 2010, 2013, 2016, 2019 but 1978 saw the worst flood ever when water level reached at 207.49 m with danger level is marked as 204.83 m and was discharge 2.53 lac cusec at old railway bridge out of this 7.0 lac cusec water was released from Tajewala which inundated around 130 villages and 25 urban colonies in Delhi. The management of flood risk begins with identification of flood prone areas. In order to achieve this objective it is crucial that more specific and scientific model must be developed for a better understanding of the flooding phenomena and their related geographical, hydrological and geomorphologic causes. This study used the scientific technique of GIS to identify flood risk areas within Delhi. It can be concluded that the results presented herein could provide valuable aid to policy makers in formulating mitigation strategies to counteract the adverse impacts of flooding in the Yamuna River basin.

Keywords: Remote Sensing, GIS, flood Model, River Yamuna, urban flood management etc.



Climatic Vulnerability and Adaption Assessment in Bundelkand Region

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ABSTRACT

In central India, regional climate model projections indicate that there are possible changes in future weather patterns that will significantly affect climate sensitive agriculture, water, and health sectors. Development deficit and widespread reliance on agriculture as a source of nourishment and income make Bundelkhand region particularly vulnerable to changes in the climate. In the context of Bundelkhand region, exposure to variable climatic conditions causes high physical vulnerabilities. The region is largely rain-fed, it is perturbed with variable precipitation trends. Drought conditions are frequent in the region, leading to unstable socioeconomic conditions. Monsoon is a critical determinant of the sowing time, which has been varying drastically in the past few years, causing significant loss to the farmers due to the paucity of correct and timely information. Livelihood Vulnerability Index (LVI) is utilized to assess the vulnerability in the region. The present paper tries to use LVI methodology to comprehensively evaluate the livelihood risks of the vulnerable communities posed by climate change. The methodology was tailored to meet the local rapid assessment needs of the current study. It measures the socio-economic vulnerabilities of a region using IPCC's three contributing factors to vulnerability - exposure, sensitivity and adaptive capacity. The result of the study shows that livelihood options in the region is limited and primarily based on agriculture and labour sector.

Keywords: Climate, Vulnerability, Adaptation, Poverty, Draught



Effect of Pre-Sowing Electromagnetic Treatment on *Vachellia Nilotica* Seed Germination and Seedling Growth

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ABSTRACT

This study was conducted to estimate the pre-sowing electromagnetic treatment of seeds *vachellia nilotica* to breaking its seed dormancy is a subject of deep research. The seed was exposed to magnetic field 0.1 kG, 0.3kG, 0.6kG, 0.9kG for 15min, respectively. The treated and control seed sown in different trays for seven day in same laboratory condition, electromagnetic field exposure of seeds significantly enhanced all growth parameters, compared to control seedlings, the noteworthy intensification in germination, germination percentage, relative germination percentage, relative root growth (RRG) and relative shoot growth(RSG) and biochemical parameter. Our result suggested that electromagnetic treatment 0.9 kG for 15 minutes respectable for *vachellia nilotica* seed, thus the pre-sowing electromagnetic treatment of seeds can be effectively used for improving growth under normal laboratory condition.

Keyword: Seed dormancy, electromagnetic field, sustainable development



Automatic Feature Extraction Using High-Resolution Satellite Imageries for Hilly Area Using Remote Sensing and GIS Techniques: A Study of Almora Town

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ABSTRACT

As high-resolution satellite images have become readily accessible, this has encouraged researchers to discover advanced approaches for object detection and extraction from satellite images. In this research, using a new approach of automated feature extraction from high-resolution ortho-imagery is presented. The importance of automatic feature extraction from high-resolution satellite imagery is that it gives better information about the object and is also a less time consuming approach in comparison to another approaches. In this research, indices/ threshold values such as NDVI, NDBI, etc. for feature extraction are used. Manual manipulation of GIS databases is expensive, time-consuming, and error-prone. Therefore, feature detection in a robust way requires automated feature extraction from high-resolution satellite imagery. LULC features objects as they are used in urban planning, emergency response, route planning, etc. Automatic LULC detection from satellite images has now become an important topic in photogrammetry with the advances in Remote Sensing technology. This paper aims to discover the potential of high-resolution satellite images for detecting and robustly feature from the VHR extracting the features. Results indicate validity and the superiority of the proposed method to efficiently extract the land use land cover Remote sensing.

Keywords: NDVI, NDBI, Remote sensing, satellite images, land use land cover.



A Geospatial Approach for Assessment of Effects of Changes in Precipitation Patterns in Agricultural Productivity

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ABSTRACT

Climate change is having a severe impact on the ecosystem of the planet. It is subsequently affecting the natural resources, especially water resources, biodiversity, earth system and throughout the globe. In India, it is estimated to experience a higher level effect than the global average. India is already facing more seasonal variations in temperature and the rainfall patterns. After that in recent past India evidenced more drought and floods than ever. As India being the agricultural-based country, the influence of climate changes on agriculture, agricultural production and food security tremendous. In this paper, a study has been made for assessment of effects of changes in precipitation patterns in agricultural productivity of Bhiwani district, Haryana, India. Since the water is the foremost resource for agriculture and the rainfall being the prime source, the rainfall affects the most to the agricultural productivity. Besides, the agricultural yield is more delicate to the precipitation than temperature. In the study area the with the higher temperature and rainfall fluctuations, water availability and agricultural probably going to diminish in the future.

Keywords: Climate Change, Rainfall, Agriculture and Food Security.



Paleodisaster on Earth: Signature from Late Cretaceous Fatehgarh Formation of Barmer Basin, India

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ABSTRACT

Earth witnessed two major impacts at [Chicxulub](#), Mexico and [Boltysk](#), Ukraine in western globe during terminal Cretaceous time. [Chicxulub](#) impacts were considered largest and major paleodisaster responsible for mass extinction of about 70 to 90 percent of life on the Earth at K/T boundary. Hypothesis of Nobel Laureate [Alvarez](#), (1980) clearly suggested that ejecta material of this impact cannot reach to eastern globe. However, Mathur et al., (2005a & b; 2006; 2009; 2018 and 2019) first reported evidences of major paleodisaster signatures from bone bed of Fatehgarh Formation (FGF) of Late Cretaceous from Barmer Basin, Western Rajasthan, India in the eastern globe. 15 cm thick Bone bed also preserved significant signatures to endorse various global events such as Late Cretaceous phosphogenesis, K/T boundary, mass extinction of fauna, and unusual volcanic and impact events. These events can be characterized by significant biogenic and unusual magnetic framework elements preserved in the bone bed. The biogenic framework elements include vertebrae, dental plates, teeth, spines and scales of microvertebrates along with teeth, bones, bone fragments, cranium, vertebrae, phosphatic dung of crocodile, dinosaur and turtles. Maastrichtian age is suggested from the close faunistic association of biota of the bone bed which represent near shore marine environment. Five cm thin, disrupted to discontinuous layer in the topmost part of the bone bed represent the K/T boundary which is characterized by the presence of ejecta material including magnetic spherules, fine magnetic dusts and micro-bracciated matrix. The petrographic and geochemical analysis of these high temperature pressure objects indicate impact events that brought significant biological changes and mass extinction of the biota in Indian subcontinent. However, at the same time a large volcanic event in form of Deccan Trap occurred in India. Significantly, Fatehgarh spherules preserved signature of both impact and volcanic events of those time in form of two types of spherules i.e. Fe rich spherules are of impact and Ti rich spherules are of volcanic origin (Mathur et al., 2018 & 2019). To recognize huge volcano and impact structure, author found that Ti rich spherules were derived from extensive and explosive Ragheshwari - Dhndhlawas volcanism in the Barmer Basin (Mathur 2018 and Mathur et al., 2019, paper accepted in Geological Society of India). To recognize an impact structure, at first instance, geomorphologically, the potential candidate in western India seems to be Siwana Ring Complex (SRC) which is situated about 130 Kms from Barmer city. The SRC is composed of rings of granites nestling around Siwana and covers an area of 290 km². To recognize, it as impact crater, following evidences are significant: 1. Mathur et al., (2009) and Tripathi et al., (2010) reported the presence of high temperature pressure coesite and stishovite minerals from the magnetic particles recovered from the SRC. 2. Additionally, the deformational field features such as shatter cones, impact melt and lithic breccias, pseudotachylite, impact melt sheets. 3. microscopic features such as diaplectic glasses; planar deformation features (PDFs) in minerals, diagnostic textures and microstructures of the impact melt. These evidences are diagnostic target rock deformation features derived due to an impact at SRC and derived Fe rich impact spherules in the bone bed of the Fatehgarh Formation (paper under communication).

Keywords: Paleodisaster, K/T Boundary, Mass Extinction, Western Rajasthan



Comparison of Neural Network Approach and Other Supervised Machine Learning Approach for Land Cover Changes (LCC) Analysis for Dausa District, Rajasthan, India

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ABSTRACT

Land Cover Changes (LCC) is the most important tool which focus on changes in distribution of earth resources and water resources time to time due to natural and anthropogenic changes on temporal and spatial attributes basis. In this paper, Neural Network approach and other Supervised Machine Learning approach is applied on multi -spectral and multi- temporal satellite images data set for year 2018 to analysis Land Cover Changes (LCC) for Dausa District. Both approaches is applied on multi-spectral and multi-temporal satellite images data set and resulting maps are to be compared with each other for types of various Land Cover Changes such as water land, urban land, wet land, agriculture land for Qualitative and Quantitative area of land. The comparative study is useful for comprehensive LCC information to sustain and develop land resources on earth for future use.

Keywords: Land Cover Changes, Neural Network, Supervised Machine Learning, Land Resources



Causes of Landslide at Musuria Hill in Jodhpur, Western Rajasthan, India

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ABSTRACT

The first disastrous landslide have been occurred on 4th Sept. 2019 which created a panic situation in hilly terrain of two areas of Aasan, Uday Mandir and Bank colony of Masuria in the Jodhpur city. Landslide areas are geologically belonging to Jodhpur Group (Ediacaran) of Marwar Supergroup (MSG; Neoproterozoic to Cambrian) of the Western Rajasthan, India. MSG has been subdivided into four major groups viz: Jodhpur Group (JG), Bilara Group, Hanseran Group and Nagaur Groups in chronological order. JG is divided into Umed Bhawan Formation (UBF), Sursagar Formation (SSF) and Motisar Formation (MF) at the top. Recent landslide occurred in rocks of Umed Bhawan Formation. The outcrops of rocks of UBF in and around Jodhpur city occur at Umaid Palace, Masuria Hill, Udai Mandir, Daijar, Mandore, Beroo, Keru, Gangana and Arna Jharna areas. Stratigraphically, 220m thick JG overlies Malani Igneous Suite of rocks (745 to 681 Ma) and underlies Quaternary Jodhpur city Formation (JCF) in these areas. The coarsening upward sequences of UBF are represented by shale at the base followed by silty shale, fine grained sandstone, medium grained sandstone, coarse grained sandstone and pebbly to conglomeratic sandstone at the top. Dominantly, festoon cross bed bearing UBF indicate deltaic environment. Our field observation, lithological and petrographic analysis suggests that [geological](#) and [morphological](#) factors of various facies of JG were responsible for the landslide. These include facies characters, facies disposition, penecontemporaneous deformation, instabilities in slopes, erosion and weathering processes which are responsible for landslide in Jodhpur city. Additionally, Jodhpur received 30 % more rain fall this year along with excess rainfall in the first week of September 2019. All these factors resulted into sever land slide which damaged many houses, properties and also leads to casualties near Masuria hill along with sad demise of three persons at Uday Mandir area. Rock falls at both places occur from vertical or sub-vertical cliff, proceeds down slope by bouncing and flying along ballistic trajectories or by rolling on talus or debris slopes causes more damage to the houses and properties of resident of surrounding colonies. Land slide in rocks of UBF can be mitigated by both passive mitigation and active mitigation. Passive mitigation can be done by using drape nets, rock - fall catchment fences and diversion dams. The first land slide in Jodhpur indicates an alarming situation for future. Local administration should take serious contingency of this year disaster by adopting suggested mitigations to avoid such a disaster in the city as many other areas of hills and ridges of rocks of UBF are prone to landslide.

Keywords: Landslide, Masuria hill, Umed Bhawan Formation (UBF)



Hydrogeomorphological Analysis of Shekhawati River Basin Using Geospatial Technology

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ABSTRACT

In India, a large portion of the populace is dependent on groundwater as the main wellspring of consumable drinking water supply. So that the planning and management of groundwater development using modern Geospatial technique is important for the suitable management and utilization of this precious resource. Evaluating the potential zone of groundwater recharge is tremendously important for the protection of water quality and the management of groundwater arrangements and accessibility of groundwater in the summer season. In this study a standard methodology is projected to define groundwater potential using integration of RS & GIS technique. ASTER DEM (30m.) Digital Elevation Model is used to prepare for Slope and Drainage Density Mapping. The thematic map is generated using GIS tools and techniques. The accuracy assessment of the information is considered for defining the groundwater potential zone such as geology, geomorphology, slope, soil, land use/land cover, drainage density, geomorphic units and lineament mapping are generated on the basis of satellite image and survey of India (SOI) Toposheets of scale 1:50000. It is then overlapped with weighted overlay analysis in ArcGIS. Proper ranks are allocated for each category of these parameters. Finally the groundwater potential zone mapping of Shekhawati River Basin has been generated on the basis of Weighted Overlay Analysis. The final output map were classified into 5 categories, Very Poor, Poor, Moderate, Good and Very Good potentiality zone of groundwater. Very high groundwater potential zone are located randomly on the north-west, south-west, and southern portion of the study area. The slope is related to the groundwater potentiality, where the gentle slope has been found there are high groundwater potential zone also situated. The poor groundwater also found in the north, middle-west, and south-eastern portion of the study area.

Keywords: GIS, Hydrology, ASTER DEM, River basin



Forest Fire Severity Mapping Of Bandipur Reserve Forest Using Remote Sensing and GIS

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ABSTRACT

The frequency and severity of forest fires, coupled with changes in spatial and temporal precipitation and temperature patterns, are likely to severely affect the characteristics of forest and permafrost patterns in boreal eco-regions. Forest fires, however, are also an ecological factor in how forest ecosystems form and function, as they affect the rate and characteristics of tree recruitment. The present study aims investigating the Forest Fire Severity Mapping Of Bandipur Reserve Forest Using Remote Sensing and GIS Techniques. In present study, Forest Fire in Bandipura, 2019. Mostly Fire season January to mid-June, peak season 3rd week of February to 1st week of June. Many Causative factors responsible for forest fire and different maps was prepared by ArcGIS (Arc Map10.3) and ENVI Software. In this work, Different indices derived and prepared map of pre fire NDVI, NBR and NDWI and post fire NDVI, NBR, NDWI images, then subtract the post-fire image from the pre-fire image to create a differenced (Δ) NDVI, dNBR, dNDWI image that indicates Burn severity. The capacity of NBR, NDVI and NDWI indices derived from LANDSAT 8 OLI images has been analysed for fire severity assessment. For this purpose, Firstly, the displacements of burned and unburned pixels in the pre-/post-fire NIR-MIR and NIR-R bi-spectral spaces were analysed with the aim of establishing which of the two indices was the most sensitive for discriminating severity levels. Then, the capacity of the three indices, both from a uni-temporal (post-fire) and bi-temporal perspective (pre and post-fire), to discriminate different severity levels was studied. Based on the results, it was decided that the most suitable way to assess wildfire severity by index segmentation was to discriminate between unburned and burned pixels according to their NBR pre-/post-fire difference values (dNBR), and, subsequently, to distinguish between pixels with an extreme and moderate severity based on the NBR post-fire values. The Burn severity of Bandipur reserve forest classifies the area into five classes of severity: Very high, High, Moderate, Low, Very low severity levels. Validation of fire area was done with overlaying MODIS fire points and Differential normalized burn ratio map using GIS, Hence Remote sensing has been identified as an effective tool for preventing and monitoring forest fires, as well as being a potential tool for understanding how forest ecosystems respond to them.

Keywords: NDVI, NDWI, NBR, dNDVI, dNDWI, dNBR



Identification of Urban Heat Island Using Satellite Data

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ABSTRACT

Urban areas tend to have higher air temperatures than their rural surroundings as a result of gradual surface modifications that include replacing the natural vegetation with buildings and roads. The term "Urban Heat Island" describes this phenomenon. The surfaces of buildings and pavements absorb solar radiation and become extremely hot, which in turn warm the surrounding air. Cities that have been "paved over" do not receive the benefit of the natural cooling effect of vegetation. As the air temperature rises, so does the demand for air-conditioning (a/c). This leads to higher emissions from power plants, as well as increased smog formation as a result of warmer temperatures. In the United States, we have found that this increase in air temperature is responsible for 5-10% of urban peak electric demand for a/c use, and as much as 20% of population-weighted smog concentrations in urban areas. Simple ways to cool the cities are the use of reflective surfaces (rooftops and pavements) and planting of urban vegetation. On a large scale, the evapotranspiration from vegetation and increased reflection of incoming solar radiation by reflective surfaces will cool a community a few degrees in the summer. Since the urban population and urban infrastructure have been growing rapidly which is major factor responsible for urban heat island. Hence, there are several studies have been done on focusing upon the relationships of urbanising land use land cover (LULC) and consequent change in the environment. There are several processes and methods which are used to study the effect of urban sprawl over rise in temperature in the cities, factors which are responsible for the rise in temperature of urban area. The satellite derived parameters of greenness (NDVI), imperviousness of surface (NDBI), bareness (NDBaI), moisture (NDWI) and land surface temperature (LST), are used as indicator of dynamics in temperature of urban area corresponding to rural area. All except NDBaI, shows a high correlation among each other and were found to be significant for measuring environmental condition. Several years of LULC maps could be prepared by merging three seasons (kharif, rabi and zaid) LULC maps to detect the change in land use. With increase area and density of built-up, LST and NDBI are found to increase in same proportion while a respective fall in NDVI and NDBI could be observed. This highlights the impact of urbanization on environment.

Keywords: Urban Heat Island (UHI), Land Use Land Cover (LULC), NDBI, NDVI, NDWI, NDBaI, LST, National Capital Region (NCR).



Detecting Land use Land cover Change of West and East Kamrup Division of Assam Using Markov Change Detection Technique

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ABSTRACT

The mechanism of recognizing the transformations in the form of an object or phenomenon by perceiving it at different times is termed as change detection. For efficient management and utilization of the earth's natural resources, it is obligatory to establish a strong empathetic interactive relationship between human beings and natural environment, which requires precise and timely information of the change occurring on the Earth surface. Vegetation cover is one of the most dynamic phenomena occurring on the surface of the earth, detection of its change across a time period proves to be very critical for various ecosystem services, such as fortification of the land surface, the modification or enrichment of the native weather conditions, the conservation of perilous ecosystem processes, and the maintenance of biodiversity. This paper presents an overview of the change detection over a period of 30 years from 1988 to 2018 through transition probability matrix and identification of the vegetation types of the region with perceptible spectral characteristics using multi temporal satellite such as Landsat TM and Sentinel 2A.

Keywords: Transition Probability Matrix, Vegetation Cover Types, Change Detection, Vegetation Indices, Sentinel 2A, Landsat TM.



Response of Cherry Tomato (*Solanum Lycopersicum* Var. *Cerasiforme*) Grown Under The Influence of Fly Ash And Its Effects on Soil Health In Eastern Plains of Prayagraj U.P.

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ABSTRACT

A pot experiment was carried out at Green shade, in Nursery of College of Forestry Department of Environment Sciences & NRM, Sam Higginbottom University of Agriculture, Technology and Sciences, Prayagraj during Rabi season 2019. To study the “Response of Cherry Tomato (*Solanum lycopersicum* var. *cerasiforme*) Growth Under the Influence of Fly Ash and Its Effects on Soil Health in Eastern Plains of Prayagraj U.P.”. The experiment was laid out in R.B.D (Randomized Block Design) design with twenty five treatments and three replications. The treatments comprised of fly ash 0%, 10%, 20%, 30%, 40% and 50% and together with soil. The results revealed that 40 % fly ash significant effect on plant height (76.923), no of leaves (57.333), no of flower per plant (27.113), fresh weight (gm.) (366.897), dry weight (gm.) (64.800),. The soil fertility has increased significantly by 40% fly ash due to high contents of (%)Organic Carbon, Bulk Density (g cm⁻³), Particle Density (g cm⁻³), (%) pore space, (%) water holding capacity, Soil pH (1:2) w/v, Soil EC (dSm⁻¹), which was present significantly in post-harvest soil (0.627), (1.157), (2.473), (65.930), (66.600), (7.803), (0.220) and significant increase observed on available Nitrogen(kg ha⁻¹) (281.847), Phosphorus(kg ha⁻¹) (46.267) and Potassium(kg ha⁻¹) (258.710) was recorded.

Keywords: Cherry Tomato, Fly Ash, Green shade.



Evaluating the Impact of Geology and Geomorphology on Fluoride Contaminated Groundwater in Ajmer District (Rajasthan, India) Using Geospatial Technology

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ABSTRACT

Ajmer district was selected to assess the groundwater quality with special reference to fluoride contamination. Groundwater quality appraisal is basic to guarantee sustainable safe utilization of assets for drinking, rural and mechanical purposes. Water is essential for life. In the present study, Fluoride Contamination of Ajmer District in Rajasthan state has been approved with the help of remotely sensed data of LANDSAT8 OLI_TIRS data, the Geomorphological map were prepared from the LANDSAT data. The collateral data were collected from the department of CGWB. With the help of following parameters (Geohydrological inputs i.e. Lithology, Weathering etc.,) Fluoride data of each class has been assessed. On the basis of Remote Sensing (RS) and (GIS) technique the various layers of fluoride are prepared. The integration of Fluoride vs. Geology, Fluoride vs. Geomorphology, and Fluoride vs. Aquifer is delineating the analytical hierarchical process of the study area. The groundwater potential zone maps were prepared from the overlapping of Geology, Geomorphology, Soil, Aquifer and land use/ land cover map. The ground water potential zone maps were classified into 3 categories Poor, Medium and Good potential zone. The fluoride contamination map is generated by using IDW interpolation technique in ArcGIS 10.5. Thereafter the map is reclassified to four classes ranging 0.0 – 1.50, (Low) 1.5 – 3.0, (Moderate) 3.0 – 4.5(High) and > 4. (Very High). Further the area contribution of each class is computed out. The class low is contributing 2957.613 km² area with 34.86%, Moderate is contributing 4479.526 km² area with 52.80%, high is contributing 940.045 km² area with 11.08% and very high is contributing 106.935 km² area with 1.26%.

Keywords: Fluoride, geology, geomorphology, groundwater, GIS



Consequences of Vegetation Cover loss and its monitoring from satellite data of Dadri Block, Gautambudh Nagar U.P. India

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ABSTRACT

Urban sprawl and fast population growth leads to the decline of productive soil and environment in urban and peri-urban landscape and, in turn into adversely affects on socioeconomic, environmental degradation, public health, UHI development, food security, water crisis and depletion groundwater level. The fast land conversion practices for developmental activities are largely affecting the loss of natural vegetation cover, which is important for management of natural environmental. The present work represent the important observation on monitoring of urban and sub urban environment due to large scale loss of vegetation cover through the analyses for satellite data to understand the spatial change pattern of vegetation cover and its consequences on urban environment and other resources. The details Normalized Differential Vegetation Index (NDVI) for 2000, 2005, 2010 and 2016 were developed from Landsat Satellite data and reclassify into no vegetation, bare, vegetation and moderate vegetation to understand the spatial change in vegetation cover and its density over last two decades. The results observed from the analysis of NDVI values, the vegetation cover in the area have been decreased due to urbanization, anthropogenic and environmental changes. It is found that the urban set have good vegetation cover due to increasing urban plantation practices, however the per urban area continuously showing decreasing trend due to land conversation practices and infra structural project. The results of the present work can be useful data for urban environmental planning and green area development.

Keywords: Vegetation Loss, NDVI, Landsat Images, Dadri, U.P.



Palaeoclimatic scenario based on high resolution multi proxy records from Baspa Valley, Kinnaur, Himachal Pradesh, India

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ABSTRACT

The Indian summer monsoon (ISM) has been focused on significant scientific inquiry since the last three centuries, pertaining to its unpredictable behaviour and origin. Holocene epoch started 11.7 ka BP show climate records millennial to decadal scale weak and strong phases of the ISM. The lakes, wetland and peat deposits from Northwest Himalaya is climatically more significant and is best place to study the ISM and Western Disturbances (WD's). Only a very few palaeoclimatic studies focused on the Holocene climatic variability from the North-western Himalayan region. So we try reconstructing palaeoclimatic fluctuations using the litho-sections from the Baspa valley, Kinnaur, Himachal Pradesh (31.3517°N, 78.4175°E & 31.3477°N, 78.4664°E). This region experiences the effect of both the ISM as well as WD's. To know about the conversance of ISM and WD's, and monsoonal variability and its focusing factors we used multi proxy analysis (environmental magnetism, diatoms, grain size, accelerator mass spectrometry (AMS) 14C dating and stable isotopes) in which diatoms is one of the biological proxy. We have done Total organic carbon (TOC), mineral magnetism, 14C dating and diatoms analysis and few results awaited i.e. 14C dating and diatoms. TOC values lies between 0.32 to 22.87 and average value of TOC is 3.97 (wt. %) shows the productivity of the area. Diatoms are predominantly useful for climate studies as they are sensitive to different conditions. Environmental magnetism (χ_{lf}) shows the variation in magnetic mineral concentrations due to the physical and chemical weathering and erosion. High-resolution multi proxy analyses from these archives provide the remarkable insights into monsoon variability on annual to millennial scales that helped to assess response of monsoon to different forcing factors. It will also helpful to understand the causal mechanism of temporal and spatial variability of the ISM during Holocene and, establish a link between reconstructed records with regional and global climate.

Keyword: Northwest Himalaya, Western Disturbances, Indian Summer Monsoon, Diatoms



Air Quality Assessment of Birnin Kebbi Metropolis in Kebbi State Nigeria

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ABSTRACT

Air quality is one of the key environmental factors that engenders a good conditioned standard of living. May health concerns today are directly or indirectly connected with lack of air quality or air pollution. Kebbi state itself shares boundary with Niger Republic and receives a quantum of pollutants in the form of harmattan dusts and desert encroachment while Birnin Kebbi Metropolis which is located along latitude 12.466078 and longitude 4.199524 houses some factories such as Labana Rice Mills and some timber processing factories. These factories generates and releases a lot of pollutants into the air due to their activities all-round the year. The more predominant pollutants are PM_{2.5} and PM₁₀ while the less predominant include NO₂ and O₃ The pollutants pose serious health concerns to humans and animals and affect the growth and development of plants. Air quality index measurements indicates that the pollution is higher in the winter, moderate in the summer and low in the raining season with average values as 156, 72 and 42 respectively. These values correspond to an annual air quality index (AQI) average of 90. This indicates that in the winter the air quality is unhealthy, moderate in summer and good in raining season. As such, healthy measures are recommended especially during winter season.

Keywords: Pollution, Air Quality Index, Health Risks, Remedies



Multi-temporal Land use/Land cover change (LULC) analysis using remote sensing and GIS techniques

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ABSTRACT

The objective of this research paper is to understand the land use/land cover change of surface feature of durg block of durg district of Chhattisgarh state. The durg taluka is highly populated in durg district on the basis of census report, 2001 and 2011 population of the durg district increased relatively 997848 and 1126731. (Statistical booklet 2013-14). As urbanization and industrialization increase in these block ,LULC change analysis is very useful techniques of spatial-temporal study, such as shifting agriculture land to built-up land and waste land to built-up land.

For the study of 11 year LULC change, four LANDSAT satellite imageries are downloaded from USGS(United State of Geological Survey), Which belongs to pre-monsoon season February (2006) and February (2017)and also downloaded the post monsoon satellite imageries of (October) 2005 and (October) 2016. The LANDSAT satellite imageries used to identifying LULC features, using on-screen visual interpretation technique on GIS platform. The LULC changes have been observed between both satellite imageries (2005, October and 2016, October) and (2006, February and 2017, February) in both pre monsoon and post monsoon season.

After the comparison of both satellite imageries it is found that the LULC change in pre monsoon is like that - agriculture land converted into built-up land by 0.000153 sq. Km, agriculture land converted in to waste land is 85.43 sq. Km, while 10.46 sq. Km waste land is converted in to built-up land, where 0.32 sq. Km water bodies converted in to wastelands, in post monsoon season agriculture land converted into built-up land is 4.86 sq. Km, 21.21 sq.km agriculture land converted in to waste land , 6.47 sq. Km waste land converted into built-up , whereas 0.45 sq. Km water bodies is converted in to waste land. During this study period it is found that in post monsoon season agricultural land has shown decreasing trend by 05.95 sq.km, while built-up land increased by 11.11 sq. Km. Due to an increase of population growth.

Keywords: - Satellite imageries, GIS, change analysis, visual interpretation, LULC, Durg block



A Review of Fluoride Contamination Issue of Groundwater in Rajasthan

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ABSTRACT

Fluorine is chemically reactive and it is the most electronegative univalent gaseous of halogen family and it is the 9th element of the periodic table. It is found in very small quantity in water, plant, animal and air. Groundwater is a treasurable and purest source of drinking water in all over the world. Presence of various ions and minerals in groundwater contribute in the contamination process which is caused by natural as well as anthropogenic activities. In Rajasthan due to unavailability of surface water groundwater became the first priority for drinking and domestic purpose. It is the driest state of India where as it has total 15 basin while only two are perennial and the precious source of Rajasthan facing a huge problem of salinity, nitrate and fluoride in all the district of Rajasthan. According to the study of WHO more than 20% of villages in India are suffered from fluoride also most of the state of Rajasthan having salinity problem which destroy the quality of water in the state. Fluoride is important for maintaining and solidification of bones and teeth in very small quantity while increased amount of it caused health disorder in humans like fluorosis skeletal, and non-skeletal type of problem. Fluoride is the major issue in almost all the district of the state while nitrate is the second common problem. Throughout the world fluorosis is one of the common issues related to drinking water and human health more than 200 people worldwide suffer from fluorosis including 6 million children. This review paper contains the present status of fluoride of all the 33 district of Rajasthan and its ill effect. It also deals with different Sources of fluoride in groundwater, its distribution in the area, effects on human health and also suggests remedial measures.

Keywords: Groundwater, Fluorosis, Defluoridation



A Review of Application of GIS for Geospatial Analysis of Vector-borne Diseases (Dengue and Malaria)

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ABSTRACT

There have been numerous efforts made in acknowledging Remote Sensing and GIS in the study of vectors, plethora of vector habitat and the vector borne diseases with reference to space and time. This study is designed to examine and evaluate the potential use of remote sensing and GIS applications in temporal and spatial anticipation of vector borne diseases. The nature and the abundance of vectors and vector borne diseases, disease infection and the disease transmission are not pervasive and are restrained with geographical, environmental and climatic factors, and are localized. The existence of vectors and vector borne diseases is complex but it is confined and charged by the geographical, climatic and environmental factors including anthropogenic factors. The efficacy of the present day availability of the information extracted from the satellite data including vegetation indices and its density, soil types, soil moisture, soil texture, etc. is integrating the information in the expert GIS engine for the spatial analysis of other geo-climatic and geo-environmental factors. This study gives the comprehensive information in the traditional studies of the past and the present, and the future role of remote sensing and GIS for the vector borne diseases management. The habitat identification gives us the pertinent information to understand the spatial variation of the vector habitat, vector abundance and the vector-borne diseases in association with geo-climatic and the environmental factors. The probability of geophysical distribution and seasonal changes and distribution of mosquito abundance and its interaction with mosquito borne diseases can be procured through low cost remote sensing data and GIS tool with authentic data.

Keywords: Vector borne diseases, Dengue, malaria, Habitat identification; environmental factors; mapping; remote sensing and GIS



Glacier Fluctuations between Decades in Pheyong Watershed of Greater Himalayas of Ladakh

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ABSTRACT

The melting of snow in the Arctic and Antarctic region due to global warming and climate change is reported frequently while as melting of Himalayan glaciers goes largely unreported, though more people are impacted. Presently 10% of the earth's landmass is covered with snow, with 84.16% of the Antarctic and 0.77% in the Himalayas. Apart from the polar region, Himalaya has maximum concentration (9.04%) of glaciers. The glaciers of the Himalayas are the Third Pole. They feed the giant rivers of Asia and support half of humanity. In Ladakh, a high altitude desert with only 50 - 100 mm of rainfall, all life depends on snow and water that comes from snow melt which provides moisture for farming and pastures. Climate is changing, less snow is falling, so there is less moisture for growing crops. The shorter period of snowfall prevents the snow from turning into hard ice crystals. Ladakh is a liminal zone of meteorological conditions and glacier changes. In this study, we examined the glaciers of Murdok-Pheyong, covering a number of smaller glaciers. Glacier cover status over the past 25 years (1993 to 2017) of Murdok top was monitored using multi-temporal satellite images of the years 1993, 2000, 2010 and 2017. There was a decrease in the area from 4.11 km² (1993), to 2.93 km² (2000), 3.98 km² (2010) and further to 2.97 km² (2017). Year 2010 experienced a good snowfall. The glaciers retreated significantly due to change in temperature and snowfall pattern, which resulted in change in hydrology and seasonal water availability during first months of sowing. Unpredictable increase of meltwater results in runoff and soil erosion.

Keywords: Climate Change, Glacier retreat, Murbok-Pheyong, Himalayas



Sediment Yield and Runoff Frequency of Pheyong Watershed of Cold Arid Region, Ladakh Using Swat Model

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ABSTRACT

One measure of geomorphic activity is sediment yield, which is the amount of sediment per unit area removed from a watershed by flowing water during a specified period of time. Changes in sediment yield can signal changes in many elements of the desert ecosystem, including rates of weathering and erosion, climate, and human activity. Sediment yield affects rates of soil development and influences the recovery of disturbed surfaces downslope from source areas in desert landscapes. Sediment yield is strongly affected by surficial materials, topography, rainfall and vegetation cover and can be increased by soil disturbance, which often occurs as the result of land use. Another measure of geomorphic activity is runoff frequency, which is the number of stream flow events that occur in a watershed over a given time interval. Runoff frequency is closely associated with the pattern of local precipitation and changes in frequency can reflect changes in vegetation, land use, or climate. Runoff frequency can also be a major determinant of sediment yield. In this study, Pheyong watershed was considered with an area of 107.518 km² having 28 sub-catchments. The average precipitation is 201.9 mm and average snow received is 84.97 mm. The average snow melt is 45.07 mm and average snow sublimation is 41.03 mm. Total runoff is 78.84 mm of which average surface runoff (Q) is 31.28 mm and lateral flow to stream flow is 46.21 mm. Ground water contribution to stream is 1.04 mm and recharge to deep aquifers is 0.31 mm. the amount of water moving to plants/soil profile from shallow aquifer is 16.66 mm. Total sediment load is 23.30 tons ha⁻¹. Under existing land use and management practices, average annual organic-N, organic-P, total-NO₃ load entering to INDUS river is 13.36, 1.64 and 0.47 kg/ha/year. Therefore, the watershed needs immediate attention.

Keywords: Sediment yield, runoff frequency, Pheyong watershed, nutrient loss



Village Information System on Village Bhagatua Post Amauli Varanasi, Uttar Pradesh

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ABSTRACT

In today's world- the information about anything which lies in the space and time is most important thing to know. It is the most favorable catalyst for success of the activity. That is the reason the era in which we are living is called as Information Age. Information is wealth today and if the information is containing the geospatial location and features then it becomes more powerful. The digital information revolution has given boost to geographical information sector. Nowadays geospatial information is not only restricted to planning and service to urban area but also playing vital role in development of facilities to the rural areas. In India, where 3/4th population living in rural areas it is very important to work in this sector using geospatial technologies for their physical, social and economic growth. The village information system will gather basic information about the study area which helps in primary step that is decision making for development of study area at various levels. The information can be obtained by surveys, census of India, government offices, local social working bodies etc. The government offices do not have all type of data at housing level and also not accurate at micro level. The information collected need to be stored in databases properly so that they can be updated in future without and data loss and better availability. In this study High resolution satellite data (Google earth...at scale of 1:10000...) of Bhagatua village, Varanasi District, Uttar Pradesh is used for preparation of data with help of ArcGIS 10.3 platform and also from field surveys. The village information system data will be helpful for government regulating bodies, Planners, geographers, surveyors, decision makers for proper growth and sustainable development of the village level.

Keywords: GIS, High Resolution Data, census data, village information system, planning, Remote Sensing, Sustainable development, rural development



Estimation on Suspended Sediment Concentration of Lower Hugli Estuary Using Remote Sensing and GIS Techniques

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ABSTRACT

Information on concentration of suspended sediment in coastal water is necessary for the understanding and management of the estuarine environment, and it is also an indicator of erosion and deposition of coastal landforms. From Traditional method suspended sediment concentration is measured through water sample collection and subsequent laboratory analysis which is very time consuming and costly. But now a day remote sensing from airborne or space borne sensor has given us a useful tool to estimate the suspended sediment concentration of surface layer of any water column. The present Study is attempt to estimate the suspended sediment concentration (SSC) relation with depth condition in lower Hugli estuary (Lower Ganga), West Bengal, India using Sentinel 2 Satellite, Image acquire on 22nd October 2019. This Satellite data has gone through data fusion, gap filling and atmospheric correction to remove the noise and other errors using the ArcGIS10.6, Erdas Imagine 2018 software. 40 water samples have also collected from different depth variation for ground truth verification on the same date and time of satellite flyover schedule. The work in this regard is in progress and all the water samples have already go through laboratory analysis. The empirical multivariate regression algorithm will be used to estimate the suspended sediment from the image at various spatial zones in GIS environment.

Keywords: Suspended sediment concentration, remote sensing, satellite, estuary, multivariate regression, solar radiation.



Forests and Wildfires: Fixing the future by avoiding the past

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ABSTRACT

Each year wildfires destroy 6 to 14 million hectares of fire-sensitive forests worldwide, a rate of loss and degradation comparable to that of destructive logging and agricultural conversion. At the same time, many fire-adapted forests ecosystems are fire-starved. Humans, including government departments charged with the management of forest resources, are altering natural fire regimes around the world without regard to long-term consequences. Decision-makers and the public are better at reacting to short-term recurring crises than focusing resources on long-term and sustainable solutions. Integrated approaches to fire management place greater emphasis on addressing underlying causes and seek long-term, sustainable solutions that incorporate five essential elements: 1) Analysis of the fire issue and identification of options for positive change; 2) Prevention - focusing resources on the underlying causes of altered fire regimes; 3) Use - applying fire as a beneficial and appropriate management tool; 4) Response - ensuring appropriate responses to inevitable wildfires; and 5) Restoration - restoring fire-damaged ecosystems, and re-establishing natural fire regimes. Resources need to be redirected to support research that improves the understanding of fire causes, identifies existing management practices that encourage harmful fires and promotes management systems that mimic natural fire regimes or take advantage of well-established fire use. Finally, key stakeholders, especially local communities, need to be involved in fire management planning, while a concerted effort is required to develop compatible and mutually reinforcing land-use laws for appropriate fire use.

Keywords: Wildfires, Restoration, Forest, land-use laws



Lepraliomorph Bryozoa from Holocene of Middle West Coast of India

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ABSTRACT

This communication describes 10 species of Lepraliomorph Bryozoa from the Holocene rocks of the west coast of Maharashtra and Goa, India. Two out of 10 species are new to science. These species are *Smittoidea savitriensis* nov. sp., *Calyptotheca malwanensis* Hippoporina indica Pillai, 1978; ?*Bryopesanser* sp.(Smitt, 1873); *Parasmittina parsevalii* (Audouin, 1826); *Parasmittina tropica* (Waters, 1909); *Parasmittina raigii* Audouin, 1826; sp.; *Microporella monilifera* Liu et al, 2003; *Microporella lunifera* (Haswell, 1880) and *Margaretta* sp. indet. Some species are already known from elsewhere are reported for the first time in these rocks. The fauna described here is mainly tropical to subtropical, warm water, enjoying euhaline to euryhaline salinities. As observe, the provincial relations of all species show Indo-Pacific affinities.

Keywords: Ascophorina, Bryozoa, Holocene, Lepraliomorph, Palaeoecology, West-coast.



Geochemical and isotopic composition of Gypsum deposits from Sahastradhara region of Lesser Himalaya (India)

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ABSTRACT

Major element chemistry of the gypsum mineralisation in the Himalayan region which represent the ancient seawater of the Tethys Sea. It provides the constraints on the change of global elemental and isotopic ($^{87}\text{Sr}/^{86}\text{Sr}$) variation over a geological time scale. Results indicate that these gypsum lenses, are formed a secondary process of leaching of host rocks and subsequent mineralization. These have close affinities with the seawaters and hence may be a suitable object to represent the ancient seawater compositions. This information could be utilised to infer about the paleo oceanographic reconstruction of the Tethys Sea. As a part of this study, samples from Sahastradhara Lesser Himalaya were analysed for their geochemical and isotopic composition to infer about the chemical variation in the region.

Keyword: Isotope, Sahastradhara, Himalaya, Gypsum



Delineating Different Glacial Lakes in Bhutan Using Earth Observation Data

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ABSTRACT

The mapping and monitoring of different types of glacial lakes through Geospatial techniques is vital to study the impacts of climate change on the Glaciers. It is also useful to alleviate the hazards resulting from glacial lake outburst and catastrophic to human lives. The main goal of the present work was to map different types of glacial lakes in Bhutan during the period of 1989 to 2017. In this study, Landsat-TM, Landsat ETM+ and Landsat 8-OLI images of year 1989,2000 and2017 respectively were used to estimate the changes in the glacial lakes and its inventory. Several glacial lakes i.e. moraine dammed lake, supra glacial lake, lateral moraine lake, erosional lake, medial moraine lake and end moraine lake were mapped within this period. The rapid increase in the number of glacial lakes was found during 1989 to 2017. The number of glacial lakes in 1989 was increased from 213 to 436 in 2017. The spatial dimension of some of the glacial lakes was also observed to be increasing. The study reveals that there was 5 end moraine lakes, 40 lateral moraine lakes, 50 supra glacial lakes, 239 erosional lakes and 15 other moraine dammed lakes in year 2017.

Keywords: Glacial Lakes, Landsat data, Moraine, Mapping



Spatio-Temporal Vulnerability Analysis of Shoreline at Mausuni Island in Lower Ganga Delta

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ABSTRACT

The shoreline process is one of the most common natural processes that prevail over the land margins of sea sides. The most important aspect of coastal deformation or changes is detecting the relative interconnections of vulnerabilities over temporal scale. As the changes varies in spatio-temporal extent. The changes over the shorelines and also over the inner coastal belts where tidal influences are active in the estuarine rivers, the changes of land or the morphological transformation of that landscape may take place due to active works of storm surges, high tides and seasonal inundation. The Mausuni Island is one of the most vulnerable geomorphic units in the lower Ganga deltaic region, situated along the southern tip of West Bengal. The location of this island is prone to activities of river flow as well as wave action. The region has been deformed and modified due to intense tidal hydro dynamic behaviour, storm surges from climatic disturbances and anthropogenic activities resulting into erosion, sedimentation and salt water intrusion in the habitable areas in this micro region. It is, therefore, evidence that the livelihood in this island is a plight to the coastal phenomena between land and sea margins. As a remedial measure, the action of protective events may thus be proposed with the detailed analysis of hydro-dynamic phenomena and the temporal geomorphic effects in the concerned region. It is thus aimed in the concerned research finding to examine the behaviour of the shoreline with the latest quantitative methods to find the possible spatio-temporal vulnerabilities of the shoreline geomorphic units that might cause due to the possible hydrodynamic phenomena in the concerned area.

Keywords: Remote Sensing, Shoreline, Vulnerability



A Review on Disaster Management

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ABSTRACT

India has been traditionally vulnerable to natural disasters and account of its unique geo-climate conditions. Disasters are of two major kinds, natural and manmade and affect the community. Manmade disasters occur due to chemical spills, accidents, terrorism activities, etc. Natural disasters are caused by natural earth processes like flood, draught, cyclones, landslides, tsunamis, earthquakes and epidemics. At global level, there has been considerable concern over natural disasters. These hazards threaten millions of lives and cause large scale financial, infrastructure, agriculture and productivity losses that seriously hinder India's overall development. The high population density combined with poor preparedness planning and management rescue and relief measure inevitably lead to huge losses of lives and property every year in the country. The new approach of Government of India proceeds from the conviction that development cannot be sustainable unless disaster mitigation is built in to the development process. The government of India has a national emergency plan. Disaster Management occupies an important place in this country's policy framework. Considering these problems, these poster attempts to throw light on a more integrated and responsive disaster management system in India.

Keywords: Disaster risk, Safety management, Earthquake, Flash flood, Landslide, Poor Drainage.



Miocene benthic foraminifera from the Western Kuchchh

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ABSTRACT

The field area lies in Gujarat at the western region of Indian subcontinent. This attempts to study the systematic classification of foraminifera and stratigraphic, palaeoenvironmental study of Miocene strata. The two main stratigraphic sections along Kharinadi Formations and Vinjhan Formation (Chhasra member) area of Kuchchh, samples were collected to analysis and study of foraminifers. On the basis of lithofacies and faunal content, rocks units (Limestone) belonging to the Miocene. The base of the Kharinadi Formation has Maniyara fort formation and upper Miocene marked by Sandhan formation. The variation in lithology and fossil assemblages reflects the variety of environmental settings.

Keywords: Kuchchh Stratigraphy, Kuchchh Formations, Miocene; Benthic foraminifera;



3D GIS Flood Visualisation

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ABSTRACT

The 3D model is a mathematical representation of 3D space. 3D models represent an important source of information in crisis situations. Some of the possibilities are visualizations and simulations of various disasters, planning evacuation, training rescue teams for emergency situations etc. 3D visualization can be used for the presentation of hazards, vulnerabilities, and risks. It can help and improve efficiency in the decision-making process because it reduces the amount of cognitive effort. There are many 3D modelling software but 3D modelling software with GIS capabilities are less. Very few software like ArcGIS can do a bit of 3D GIS but 3D models are not realistic enough and functions are also limited. So this study is about the way to create an aesthetically beautiful, realistic looking 3D space with flood water inundated. Every feature in the model like building, river and DEM will be overlaid using the coordinates and no compromise is given to the special accuracy, to create a 3D model is easy but to create 3D GIS model is not that easy. We are using software like ArcGIS, AutoCAD, Sketch up Pro, Lumion and Camstasia, and using this 3D model, animation videos and perspective views are created.

Keywords: GIS, 3D, Flood



Ecotourism Management a GIS based Approach: A Case study of Jodhpur District, Rajasthan

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ABSTRACT

Ecotourism is well accepted phenomenon throughout the world. Ecotourism is one of the fastest growing industries throughout the world and also closely linking the occupation of the rural and urban people to a more sustainable and alternate means of livelihood. Ecotourism could differ from other aspects of the tourism industry as it is identified by its sustainable development outcome such as educating tourists, conserving the flora and fauna, and most importantly, profiting the local people without affecting our local environment. With the help of geospatial approach, we can clearly identify the target ecotourism sites for sustainable environment which ultimately generates large amount of revenue for the local government. Jodhpur is one of the major tourist attractions of Rajasthan. Tourism accounts for over 15 per cent of the Rajasthan's economy and attracts over 10 per cent of the foreign tourists visiting India annually. According to recent trend tourism accounts 2.7 per cent (5.2 per cent after adding indirect effects) in Gross State Domestic Product and 1.9 per cent (7.2 percent after adding indirect effects) in state employment. Compare to other cities Jodhpur is neglected at a wide scale in the means of tourism destination and tourist arrivals were restricted to a few thousand tourists annually and were primarily recorded in select places which is commendable work for the growth of tourism sector. However, over the last few decades, due to the focused efforts of central as well as state government, entrepreneurs / individuals, tourism has grown from elite to a mass phenomenon putting Jodhpur firmly on the foreign and domestic tourist map. As we see today's scenario the tourists have a wide canvas of places, attractions and activities to choose from in the state, which enhances the overall tourism experience. The major goal of ecotourism and GIS is to offer tourists insight into the impact of human beings on the environment and to encourage the development and appreciation of natural habitats.

Keywords: Management, Ecotourism, GIS, Sustainable Development and Revenue Generation.



The Most Important Group of Plant-Parasitic Nematodes According To Crop Losses

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ABSTRACT

The nematodes are commonly known as round worm, eelworm, thread like worm are gaining importance in recent years rather from twenty century because of importance in agriculture and human beings. The most important group of plant-parasitic nematodes several Tylenchida, particularly the families Pratylenchidae, Meloidogynidae and Heteroderidae, have great economic importance as parasites of agricultural crops. In addition to direct damage to crop plant resulting loss of agriculture production, they are also involved in disease complexes associated with fungus and bacteria, they also transmit virus. The role of plant-parasitic nematodes in agriculture remained underestimated and unreported due to their soil borne character, microscopic size, hidden mode of life (either in soil or plant tissues) and non typical and clear cut feeding symptoms and tendency on the part of agriculturist to judge the plant health and growth conditions of plants on the basis of appearance of symptoms on above ground plant parts. The plant parasitic nematodes are very important because they attack all types of plants and cause 12-15% loss in agricultural and horticultural Crops. In India Van Berkum & Sashadri (1970) have estimated crop losses of about 10 million dollars in wheat due to seed-gall nematodes (*Anguina tritici*) and of about 8 million dollars in Barley and wheat due to Moyla diseases caused by cereal cyst nematodes (*Heterodera avenae*) in Rajasthan state alone (Parsad et. al. 1958). In India, the national loss due to plant parasitic nematodes in 24 different crops in monetary terms have been worked out to the tune of 21068 million rupees So needs due attention so as to work out effective nematode management technologies for reducing the losses caused by plant parasitic nematodes.

Keyword: Plant parasitic nematodes, Crops, Production, Annual losses.



Assessment of Ground Water Storage Using Water Budgeting Models

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ABSTRACT

The Decision-maker works to ensure that the groundwater is available for the benefits today and the next generation. But due to the extreme extraction and lesser recharge of groundwater, the aquifer storages are getting lesser, which leads to the depletion in the groundwater depth. The groundwater budgeting models are used to estimate the availability of groundwater in the aquifer. The model depicts inflow, outflow, and the storage of groundwater in an aquifer. Groundwater availability models (GWAM) program are the computer-based programs. These models can be used to predict the impact of significant pumping activities on an aquifer. For the GWAM program, data are collected and organized associated with groundwater and aquifer properties, including groundwater level, well drilling reports, pumping records, rock, and sediment types, lakes, springs, precipitation, climate, surface water runoff, geological structure, vegetation, evaporation and many more. This information is analyzed to quantify aquifer properties and groundwater inflows and outflows. The output of this analysis is a groundwater availability model of an aquifer system. The model generates numbers that require review and interpretation. The comparing model results against real-world measurements, such as water levels of the monitoring Wells. Numerical models' results may be converted into graphics. For instance, water level prediction can be graphed on charts, plotted on maps, or even animated in 3D. But most important of all, groundwater availability models are critical scientific tools on which government and authorities can depend on when decisions making policies are made for groundwater uses and its management.

Keywords: Aquifer, Groundwater, Water budgeting models.



A Review on Natural Hazards

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ABSTRACT

Natural disasters in India, many of them related to the climate of India cause massive losses of India life and property, Draughts, Flash flood, Cyclones, Avalanches, Landslides, brought on torrential Rains and Sandstorms pose the greatest threats. Landslides are common in the lower Himalayas; part of the Western Ghats also suffers from low-intensity landslides. Floods are most common natural disaster in India. The heavy South-west monsoon rains causes the Brahmaputra and other rivers to distend their banks often flooding surrounding areas. Almost all of India is flood-prone and extreme precipitation events, such as flash floods and torrential rains, have become increasingly common in central India over the past several decades, coinciding rising temperature. A natural disaster might be caused by Earthquakes, Volcanic eruption, Flooding, Landslides, etc. There are many natural hazards in history of India, such as '2001-Gujarat Earthquake', '2007-Bihar Flood', '2013-Uttarakhand Flash Flood', etc. Many reasons behind the flood in India due to excessive rain which the results overflow of river, lakes and dams, poor drainage, annual deposition of silt, etc. Reasons for earthquake is India tectonic plate is slowly going underneath Erasing plate with the convergence rate of 47mm per year. Overall these are some Natural Hazards and reasons of this natural hazard and effect of natural hazards in India.

Keywords: Earthquake, Flash flood, Reasons of hazard, Landslide.



Tekkalakota: The Role of Archaeology in Understanding the Dynamics of Climatic Change in South India

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ABSTRACT

Tekkelakota is a small village in modern day Siriguppa tehsil of Bellary District, Karnataka. It has been the subject of archaeological study since 1963 when areas associated with the first sedentary communities were excavated and dated to the 2nd Millennium BCE. It is situated in the southern Deccan which is semi-arid with rocky landscape, rich mineral deposits and fertile river valleys. This site has long been seen as site associated with the Southern Neolithic period (c. 3000-1200 BCE), but our recent excavations have confirmed the communities here also flourished from Iron Age (c. 1200-300 BCE) through Early Historic and Medieval periods. What can't be denied is also the impact of this long history of land use coupled with the dynamic climatic factors that have had shaped the landscape and lives of the people at Tekkalakota over time. Tekkalakota is one of the most vibrant examples of a place where people have been able to thrive in a harsh environment, despite climate fluctuations in the past, but have now been pushed beyond the edge by human induced climate change. Archaeology can address those who deny climate change through systematic empirical research in the field. For example, archaeologists know that the damage being caused by current human-created climate change cannot be compared with prior dislocations, and are able to recover proxy data sets for paleoclimatology reconstruction through their excavations. Additionally with the aid of modern technologies such as GIS, Geo-Informatics, Satellite imagery and Drone technology, archaeologists are capable of harnessing geomorphological and hydrological data that will certainly prove beneficial in examining the role of climate in the shaping of this rich heritage of this region over the millennia. Understanding shifts in the course of river Tungabhadra and fluctuation of monsoon rains, and of the relationship of these things to changes in regional settlement patterns and crop regimes- is one such example. Our project will continue to investigate the long term environmental and cultural history of Tekkalakota through archaeological field research, but we are now additionally developing a program to examine the factors of climate and political ecology impacting communities in the present day. This is an example of the potential of archaeology to engage with collaborative and interdisciplinary efforts in order to supply the discipline to the development of solutions in today's world.

Keywords: Archaeology, Iron Age, Early Historic period, Medieval, Communities, Landscape, Climate Change, Empirical Research, Paleoclimatology, Political Ecology.



Impact of Climate Change on Rainfall Pattern in Kerala

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ABSTRACT

Why it is more critical than ever before for mankind as a whole to have a clear understanding of environmental concerns? Because the rapid degradation of our environment that could take decades to correct, necessitates that our key concerns should not only look at environmental issues but those related to economic growth and the equitable use of resources. Wayanad in Kerala is one of the major places of south India where the impacts of climate change and global warming are acutely felt. Mono cropping, mindless tourism and greedy real estate business has resulted in extreme climate change which has changed the rainfall pattern. There would not be any rain in the early phase of the south-west monsoon in June and July. Then the rains are happening by August with a high frequency which impacts the maturation of a variety of crops. After December, dry season would start. Open-pit quarries and soil piping (tunnel erosion) has led to massive landslides which wiped out hundreds of houses. As many as 250,638 people were displaced due to the rain. Unabated rains bursted the banks of the major rivers in the state, forced authorities to open the shutters of some of the big dams such as Banasura Sagar in Wayanad. Addressing climate change requires a good scientific understanding as well as coordinated action at national and global level. There is a Chinese proverb “if you plan for one year plant rice, if you plan for 10 years plant trees and if you plan for 100 years, educate people”.

Keywords: Climate Change, Mono-cropping, Open-pit quarries, Tunnel erosion, Scientific Understanding, Coordinated action.



Stubble Burning: Its Causes and Solution

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ABSTRACT

Stubble burning is widely practiced in cropping systems and often utilized as a means of reducing stubble loads on the soil surface. Straw carbon, nitrogen and sulphur are completely burnt and lost to atmosphere result in health risk, aggravating asthma, chronic bronchitis and also increased ozone pollution. A direct consequence seen in New Delhi which ranked as having the worst air quality in the world in 2018. The air in Delhi consists of 20 times more polluting particles than the WHO recommends. Every year, Punjab and Haryana generate 220 lakh tons and 65 lakh tons of stubble. Meet Sukhmeet Singh from Punjab the man who is solving the nation's paddy straw burning problem with this nation award winning start up, A2P (Agri 2 Power) Energy solution. But it is not one man's duty of our state government to use advanced machine learning to optimize their operations and track farm fires. The stubble treated with urea used as fodder for animals, use in bio thermal energy production, paper manufacturing, mushroom cultivation etc. Government also distribute cash prizes to those who collect stubble and sent to bio thermal plants.

Keywords: Stubble burning, Pollution, Health risk, A2P solution, Farm fires, Optimize, Bio-thermal energy



Disappearing Rivers: A Climatic Challenge The Classic Case of River Sarasvati

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ABSTRACT

Rivers have been the lifeline of all the great civilizations and many civilizations have thrived on the bank of rivers. The paper deals with the highlighting implications of climate change on the very existence of rivers which serves as lifeline of mighty civilizations by taking up the case study of Ancient river which has disappeared due to change in climate 4000 yrs ago. This river has coursed through region between modern Yamuna and Satluj. The Indo-gangetic plains which are more environment sensitive are more vulnerable towards climate change and henceforth with the dearth of water supply, problems of desertification, and drying up of aquifers creep in. Though it is lost but many of its contemporary rivers like Markanda Chautang and Ghaggar have outlived it and survived today. Sarasvati, Yamuna, Satluj derived waters from glaciers which have extensively covered Himalayas in Pleistocene period. Due to tectonic shifts the river has changed into the non-perennial river which eventually depended on the regular precipitation but due to change in climate it started drying up gradually leading to its complete disappearance 4000yrs ago. Changes in land hydrological structure due to climate change has direct impact on human establishment. In past few centuries it was easy to ignore problems of climate change and its impact. It was even easier to mitigate the consequences of climate change then but with increasing pressure on the land, diminishing resources, and other natural calamities it is becoming difficult and yet more and more necessary to pay heed towards saving rivers from getting disappeared.

Keywords: River, Climate Change, civilizations



Bistatic scatterometer measurements for soil moisture estimation using grid partition based neuro-fuzzy inference system at L-band

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ABSTRACT

The potential of co-polarization ratio ($P = \sigma^{\circ}HH / \sigma^{\circ}VV$) of radar system were investigated for the estimation of soil moisture along specular direction in the present study. The radar data were collected by indigenously designed ground based scatterometer system for 20° - 60° incidence angles at steps of 10° in the specular direction for HH-and VV-polarizations at L-band. The correlation analysis was done between the angle of incidence and P to select the optimum parameters of bistatic scatterometer system. In this study, hybrid machine learning algorithm combined with fuzzy inference system and artificial neural network called neuro-fuzzy inference system were evaluated for the estimation of soil moisture using the L-band bistatic scatterometer measurements. Grid partitions based neuro-fuzzy inference system called G-ANFIS was used for estimation of soil moisture content. The Gaussian membership function (MF) for partitioning of the data sets into grids was investigated to estimate the soil moisture (SM) content. The optimum number of MF was chosen by training the algorithm using different number of membership function from 2 at the steps of 1 by trial-error method and calculating the Root Mean Squared Error (RMSE) values between observed and estimated values at different number of MF. The performance index RMSE was used to evaluate the estimation efficiency of the G-ANFIS algorithm.

Keywords: Bistatic scatterometer system; soil moisture (SM) content; Gaussian MF; G-ANFIS



Impact Analysis of Land Use/Land Cover (LU/LC) Change on Groundwater Quality around Coal Mining Region, Jharkhand, India

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ABSTRACT

Groundwater is an essential water resource for the advancement of society and ecosystem. Land use/land cover (LU/LC) change has a significant influence on the quality of groundwater in the area. The present investigation was conducted to determine groundwater quality through the water quality index (WQI) and its relationship with LU/LC patterns using geographic information system (GIS) in the coalmining region of Ramgarh and Hazaribagh districts of Jharkhand, India. Groundwater samples were collected during pre and post-monsoon seasons from multiple sampling sites and analyzed for physicochemical parameters along with five heavy metals such as As, Cu, Fe, Mn and Pb in which except Fe and Mn rest of the element were in below detection level (BDL). These parameters are analyzed and results compared with standard guidelines recommended by the world health organization (WHO) and Indian standards for drinking and public health. Spatial distribution maps of water quality parameters were generated using inverse distance weighting (IDW) interpolation technique in a GIS environment. Results of WQI analysis indicated that during pre-monsoon 22.34% (189.76 km²) and post-monsoon 81.83% (694.93 km²) area fell under good to excellent water quality zone. LU/LC information of the study area is extracted through LISS-IV satellite data using a supervised classification method. The present study reveals that coal mining activity, a significant number of coal-based industries (Power plant, Steel Plant, Sponge Iron, etc.) and the most substantial portion of agricultural fields having a severe impact on quality of groundwater.

Keywords: Land use/land cover (LU/LC), Groundwater, Water quality index (WQI), Coal mining, GIS



Soil Moisture Estimation using Land Surface Temperature by Artificial Neural Network

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ABSTRACT

Soil moisture is a crucial parameter for many applications like agriculture, hydrology, water resource management, climate change, etc. This parameter helps in agriculture in various ways, such as the prediction of type of soil, which is very important for cultivation and irrigation, and the knowledge of Soil moisture content also essential for sowing different kinds of crops. In this way, this information is not only beneficial for researchers but also farmers, archeologists, regulators, protect water resources and weather predictors, etc. Lots of studies have been presented for the estimation of surface soil moisture with different approaches from ground-based, air-bourn, and space-based measurements. In the present study, an Artificial Neural Network (ANN) was used for the estimation of surface soil moisture using Land Surface Temperature (LST). Datasets of Moderate resolution Imaging Spectroradiometer (MODIS) at the resolution of 6 km was downloaded for the LST. Gravimetric soil moisture was calculated by taking the soil sample and then converted into volumetric soil moisture for the validation. This volumetric soil moisture was used as ground truth data of soil moisture. ANN regression was performed for the estimation of soil moisture with LST as an input parameter. The regression analysis indicated a good correlation between estimated soil moisture and measured soil moisture with correlation coefficient (R) = 0.5876. Therefore, it demonstrates that LST is a good indicator of the surface soil moisture estimation using ANN.

Keywords: Soil moisture, ANN, LST, MODIS



Signatures of Solar Influence on Indian Summer Monsoon for the Last Two Millennia from the Renuka Lake, Northwest Himalaya

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ABSTRACT

We provide the continuous Indian Summer Monsoon (ISM) climate record for the Lesser Himalayas by analyzing a ¹⁴C, ²¹⁰Pb and ¹³⁷Cs dated lake record covering the last ~2000 years, with ~20 years temporal resolution. The ISM variability inferred using various proxies includes environmental magnetism, geochemistry, Clay mineralogy, Grain size and TOC reveal striking similarity with the global climatic events. Based on multi-proxy data, the entire core has been divided into five (5) different zones. The age bracketing for Zone I (100 BC to 400 AD), for Zone-II (400-800 AD), for Zone-III (800 to 1380) for Zone-IV (1380-1850 AD) and Zone-V (1850-present). The multi-proxy based climate data from Renuka Lake responded to the major global climatic events from the last 2ka. The MWP and LIA warm, humid and dry, cold, respectively. These globally recognize events existed between 800-1300 AD and 1380-1850 AD in the study area. The modern data from 1850 AD onward shows more fluctuation and shows mostly warming trend since 1940 AD onward. The data shows strong coherence with solar irradiance data suggested the climate of the area mostly control by solar input.

Keyword: Renuka Lake, Multi-proxy, Little Ice Age, Solar Irradiance



Identification of aerosols and its Radiative forcing over Northwestern India

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ABSTRACT

The identification of aerosols was carried out over Jaipur (26.9°N, 75.8°E, 450 m asl) in Northwestern India using Aerosol Robotic Network (AERONET) dataset during 2009-2017. This qualitative aerosol classification study was carried out using the single scattering albedo (SSA_{440}) and fine mode fraction (FMF_{500}) over Jaipur. Aerosols were classified in seven category i.e. dust, uncertain, mixture, non-absorbing, slightly absorbing, moderately absorbing and highly absorbing. This study estimate the radiative forcing of aerosols over Jaipur for different types of aerosols. The Aerosol radiative forcing (ARF) was found -35.3, -26.8, -39.2, -21.9 W/m^2 at top of the atmosphere (TOA); -68.3, -65.7, -67.4, -75.8 W/m^2 at bottom of the atmosphere (BOA) and 33.1, 38.9, 28.2, 53.8 W/m^2 for dust, mixture, non-absorbing, highly absorbing, respectively.

Keywords: Aerosol type, SSA, FMF, Radiative Forcing



Impact of Nitrogen Deposition on the Soil processes in Dry Tropical Forest of India

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ABSTRACT

Anthropogenic Nitrogen (N) deposition due to immense agricultural activities, fossil fuel combustion, biomass burning, and changes in land use patterns over the past half century has had a detrimental impact on temperate ecosystems in Europe and North America. N deposition affects soil processes viz; mineralization, soil respiration, soil enzymes, microbial activities. The N mineralization is a measure of soil quality, because productivity of many soils depends on the mineralization potential of organic matter. Measurement and concept of N mineralization rate can help in managing the N deposition to meet species N demands and understanding the impact of N deposition on soil health of many ecosystems.

The studies on N deposition and its consequences on soils are mostly available from temperate regions very few from tropical region and rarely from India, which has been marked under high N deposition category due to rise in population and per capita consumption of food and energy, accordingly, the expectation of diverse effects of N deposition on Indian forest soil which are rapidly changing in their soil vegetation composition due to large scale mining, quarrying for lime, thermal power generation and large scale biotic pressure.

Key words: Nitrogen deposition, Nitrogen mineralization, Dry tropical forest



Drone Assisted Reforestation

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ABSTRACT

We can see the increase in the environmental disasters within the past few years due to climate change. Over the last century, the consumption and the burning of fossil fuels such as coal and oil has caused the concentration of the atmospheric carbon dioxide to rise. Practices such as clearing land for agriculture, industries and other human activities have also caused increase in greenhouse gases to a lesser extent.^[1] The average temperature in India is expected to go from 25.1° C to 29.1° C by the end of this decade. Just in the year 2018-19 over 2,400 people have lost their lives to floods and cyclones alone.^[2] From the year 2015-18, 20,000 hectares of forest land has been cut down for development activities in India. Just to put into perspective, 20,000 hectares is as large as the city of Kolkata.^[3] Research shows that planting 1.2 trillion trees has the storage capacity to reverse the carbon monoxide emissions caused in the last decade, and the area require to do so is already present in the existing parks, forests and abandoned land.^[4]

We can help the reduce the greenhouse gases not only by cutting down its production by utilizing efficient technologies but also making a dent in damage we have already caused by adopting methods to reverse it. Planting trees is a great way to counter global warming because it not only helps to get the greenhouse gases in control but they have advantages like providing shelter to wildlife, prevention of soil erosion, et cetera.

Keywords: carbon monoxide emissions, wildlife, soil erosion



Smart AMP Grazing for Low Carbon Footprint

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ABSTRACT

Conventional rearing of cattle is one of the top reasons for climate change.^[1] The USA is one of the largest producers of beef, producing about 11 billion kg of beef a year.^[2] Beef cattle, like most other types of cattle, fall in the category of Ruminants. Mammals that ferment plant-based food prior to digestion are known as ruminants. Fermentation by microbes in the rumen tract produces methane which is emitted via belching. Methane is a greenhouse gas contributing to climate change. Substantial evidence shows that replacing conventional grazing with Adaptive/Flex Multi-Paddock (AMP) Grazing can lead to lower or even negative carbon footprint.^[3] Adaptive Multi-Paddock grazing or AMP grazing, is a labour-intensive process which requires farmers to keep a check on cattle and environmental conditions. Smart AMP grazing can make AMP grazing easier for farmers by reading everyday conditions and giving back output instructions for best results. Adaptive Multi-Paddock grazing:

- Uses high livestock densities for short durations between long periods of forage rest to promote accelerated grass growth.
- Mimics natural pattern of dense herds of wild ruminants
- Highly observant and flexible style of grazing on multiple paddocks

Holds material volumes of carbon and water resulting in better quality and quantity of foliage

Keywords: climate change, conventional grazing, Adaptive/Flex Multi-Paddock (AMP) Grazing



Climate Change, it's implications and mitigation strategies: A Himalayan Perspective

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ABSTRACT

An overview of climate change impacts on agriculture, water and forest ecosystems in the western Himalayan mountains based on literature review and some anecdotal evidences will be presented. A great deal of research work has been carried out on different aspects of western Himalayan mountain ecosystems but the findings have yet to be correlated in the context of climate change. There is a need to strengthen climate data collection network which is presently insufficient to meet the requirement of climate change research. The climate data in the region is scarce and in many instances does not involve uniform methodology and standard instrumentation. The data reliability thus is uncertain as the data are based on crude collection methods without quality control. Climate change impacts also need to be categorized according to various climatic elements viz., rainfall, temperature, CO₂ concentration, snow cover etc. Coordinated efforts are required for adaptation and mitigation as the vulnerable mountain ecosystems and communities are likely to face greater risk of climate change impacts than other ecosystems. Various extreme events due to climate change occurred during recent past will be discussed.

Keywords: climate change, rainfall, temperature, CO₂ concentration, snow cover



बून्दी तहसील के संदर्भ में ग्रामीण विकास का एक भौगोलिक प्रतिदर्श अध्ययन

सत्यनारायण नागर
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सारांश

भारत जैसे कृषि प्रधान अर्थव्यवस्था वाले देशों में ग्रामीण विकास, क्षेत्र के विभिन्न भौगोलिक संसाधनों की पोषणीय उपयोगिता पर आधारित है। एक तथ्य के रूप में ग्रामीण विकास विविध भौतिक, तकनीकी, आर्थिक, सामाजिक-सांस्कृतिक एवं संस्थागत कारकों के मध्य अन्तर्सम्बन्धों का अन्तिम परिणाम है। ये कारक परिवार, गाँव, जिला, राज्य, राष्ट्र तथा विश्व आदि कई स्तरों पर कार्य करते हैं। एक रणनीति के रूप में इसकी संरचना वर्ग विशेष के लोगों की - विशेषतः ग्रामीण गरीबों की आर्थिक एवं सामाजिक समृद्धि में सुधार हेतु की गई है। एक अनुशासन के रूप में इसकी प्रकृति बहुअनुशासनिक है जिसमें कृषिगत, सामाजिक, व्यावहारिक, अभियांत्रिक एवं प्रबन्धकीय विज्ञानों का प्रतिनिधित्व है। रविन्द्रनाथ ठाकुर ने ग्रामीण विकास की प्रक्रिया को इस प्रकार परिभाषित किया है “एक ऐसा प्रयास जो गांव की संस्कृति को बरकरार रखते हुए आधुनिक संसाधनों के उपयोग से ग्रामीणों के आर्थिक, सामाजिक, बौद्धिक एवं नैतिक उत्थान में सहायक है” कृषि की दशा यदि अच्छी होती है, तो लोगों को रोजगार मिलता है और गरीबी, भुखमरी व कुपोषण जैसी समस्याएँ भी बहुत सीमा तक नहीं व्यापती हैं। अतः इन समस्याओं के समाधान के लिए ग्रामीण विकास की संकल्पना सर्वसार्थक संकल्पना है जिसे हम ग्राम पंचायत स्तर पर लागू करके अपना सकते हैं। अध्ययन क्षेत्र तहसील बून्दी, बून्दी शहर के चारों ओर फैला हुआ है। यह प्रदेश मैदान, पहाड़ियों एवं पठारों का मिलजुला स्वरूप है। बून्दी तहसील का फसलों के अन्तर्गत क्षेत्र १२१६६६ हैक्टेयर है। बून्दी तहसील में कृषित क्षेत्र की दृष्टि से महत्वपूर्ण फसलें चावल, गेहूँ, मक्का, सरसों, सोयाबीन, दलहन, गन्ना, मूंगफली, सब्जियाँ तथा फल हैं। बून्दी तहसील में वर्ष में सामान्यतया दो फसलें बोई जाती हैं। बून्दी तहसील में नहरी सिंचाई की सुविधा, उपजाऊ मृदा, सामाजिक-आर्थिक कारक तहसील के कृषित क्षेत्र की दृष्टि से अग्रणी होने हेतु उत्तरदायी है। अध्ययन क्षेत्र बून्दी तहसील में लघु शोधपत्र में प्रमुख उद्देश्य कृषि विकास तथा कृषि उद्योगों का सह-सम्बन्ध विश्लेषण करना एवं मानव विकास स्तर ज्ञात करना है।

मुख्य शब्द - ग्रामीण विकास, ग्रामीण अर्थव्यवस्था, लघु उद्योग, कृषि संसाधन, मानव विकास।



दौसा जिले में भूमि उपयोग के अंतर्गत फसल प्रतिरूप के समक्ष चुनौतियाँ

संजय कुमार मीणा
भूगोल विभाग
परिष्कार कॉलेज ऑफ ग्लोबल एक्सीलेंस, जयपुर

सारांश

दौसा जिले को प्राचीन काल में देवासा, देवांश आदि नामों से सम्बोधित किया जाता रहा है। यह नगर देवगिरि नामक पहाड़ी की तलहटी में बसा हुआ है जिसके नाम पर यह नगर देवासा तथा दौसा कहलाया। यह जिला २७ ३३३' से २७ ३३३' देशांतरों के मध्य स्थित है। ७१ ५०३' से ७६ १०३' पूर्वी देशांतरों के मध्य स्थित है। इसके उत्तर में अलवर जिला, पश्चिम में जयपुर, दक्षिण में सवाई माधोपुर, पूर्व में करोली, भरतपुर अवस्थित है। दौसा जिले में लालसोट, सिकरगढ़, बांदाकुई, महवा, रामगढ़-पंचवारा नॉगल राजवतान उपखण्ड अधिकारी कार्यालय एवं तहसीले स्थापित है। दौसा जिले में ११०० गाँवों में २७० ग्राम पंचायत है। जिले की जलवायु शुष्क एवं गर्म है। वर्षा का वितरण असमान तथा अनियमित है। बाणगंगा, मोरेल तथा सनवान आदि जिले की मुख्य नदियाँ हैं। कालख सागर बड़ा जलाशय है जिसमें बाणगंगा का पानी आता है। जिले में वार्षिक औसत ७६.१० सेमी. है। दौसा जिले का जनघनत्व ४७६ प्रति वर्ग किमी. है। जिले में मेंहदीपुर बालाजी, आभागेरी की चाँद बावड़ी आदि स्थल प्रमुख हैं। दौसा जिले में भूमि उपयोग प्रतिरूप के अंतर्गत वन, कृषि अयोग्य भूमि, जोत रहित भूमि, पड़त भूमि, बोया गया क्षेत्रफल आदि सम्मिलित किये जाते हैं। इस प्रकार जिले की मानव समुदाय के समक्ष कौन-कौनसी चुनौतियाँ हैं? जो इसके विकास को प्रभावित करती हैं। दौसा जिले में ३० वर्ष पूर्व दो फसल प्रतिरूप पाये जाते थे। जिनमें रबी की फसल में सरसों, जौ, चना, तारामिरा, गेहूँ आदि तथा खरीफ की फसल में ज्वार, बाजरा, मक्का, कपास आदि फसलें की जाती थी लेकिन वर्तमान में जलवायु परिवर्तन तथा जल की कमी के कारण इन फसलों के प्रतिरूप में परिवर्तन तथा क्षेत्र में कमी हुई है फलस्वरूप किसानों के समक्ष, आर्थिक चुनौतियाँ उत्पन्न हुई हैं तथा औद्योगिक क्षेत्र भी प्रभावित हुए हैं।
मुख्य शब्द - भूमि उपयोग, फसल प्रतिरूप एवं जलवायु परिवर्तन।



जयपुर शहर का स्मार्ट सिटी के रूप में भौगोलिक विश्लेषण

संदीप शर्मा
भूगोल विभाग
परिष्कार कॉलेज ऑफ ग्लोबल एक्सीलेंस, जयपुर

सारांश

२९२ वर्ष पूर्व निर्मित जयपुर शहर एक वर्ल्ड हैरिटेज सिटी के रूप में विख्यात है। इसका निर्माण सवाई जयसिंह द्वितीय ने १७२७ में करवाया था। जयसिंह ने आमेर से शहर को जयपुर में स्थापित करवाया जो कि जयगढ़, नाहरगढ़, की पहाड़ियों एवं पूर्व में झालाना की सुसज्जित पहाड़ियों में स्थित है। अरावली की इन दो श्रृंखलाओं के मध्य जयपुर शहर का भू परिदृश्य एक स्मार्ट सिटी के रूप में विगत वर्षों से रहा है। उपरोक्त विशेषतायें जयपुर शहर की सांस्कृतिक एवं भव्यात्मक सामाजिक शैली में सुसज्जित सड़कों, भवनों, परकोटे के रूप में, सुरक्षात्मक शहर में प्राचीनकाल से दृष्टिगोचर रही हैं। अगर इसमें सरकार का निवेश और सामाजिक जागरूकता को बढ़ावा दिया जाये तो यह एक स्मार्ट सिटी शीघ्र ही बन सकती है। मरुस्थलीय प्रदेश राजस्थान की राजनैतिक, आर्थिक, राजधानी जयपुर एक उष्ण उपआर्द्र जलवायु में स्थित प्रदेश है। यहाँ के प्राकृतिक पर्यावरण के कारण यह एक विस्तृत पर्यटन का क्षेत्र है, जिससे यहाँ का सामाजिक-आर्थिक स्तर में सुधार परिवहन के साधनों की आसानी से उपलब्धता सम्भव है। यहाँ के लगभग २०० वर्ग क्षेत्र में ३.९ मिलियन घरों का विस्तार है। जयपुर शहर के परुने क्षेत्र में भीड़-भाड़ अधिक होने के कारण यहाँ की सभी समस्याओं में विशेष समस्या वाहनों के कारण प्रदुषण, गरीबों के लिए सार्वजनिक परिवहन, पार्किंग समस्या एवं पशुओं के लिए संकट है। एवं इन समस्याओं के समाधान के लिए जयपुर विकास प्राधिकरण कार्य कर रहा है।

मुख्य शब्द - वर्ल्ड हैरिटेज, जयगढ़, स्मार्ट सिटी, सामाजिक शैली एवं पर्यटन।



द्रव्यवती नदी पर जल प्रबंधन एवं सौन्दर्यकरण का एक भौगोलिक अध्ययन

रोहित कुमार चेची

भूगोल विभाग

परिष्कार कॉलेज ऑफ ग्लोबल एक्सीलेंस, जयपुर

सारांश

वर्तमान समय में मानव अपने भौतिक विकास व निजी स्वार्थों के कारण जल का निरन्तर विदोहन कर रहा है जिसे अलवणीय जल की उपलब्धता घटती जा रही है व इसकी बढ़ती माँग से सतत पोषणीय विकास के लिए इस महत्वपूर्ण जीवनदायी संसाधन संरक्षण और प्रबंधन की आवश्यकता बढ़ गई है। देश में अपवाहिकाओं के साथ घरेलू ठोस और अपशिष्ट पदार्थ एवं औद्योगिक बहिःस्त्राव नदी में मिल जाने से कई नदियाँ नालों में रूपान्तरित होती जा रही है। जैसे दिल्ली में यमुना व जयपुर में द्रव्यवती, भौमजल भी, देश के विभिन्न भागों में भारी विषैली धातुओं, फ्लुओराइड और नाइट्रेट्स के संकेंद्रण से प्रदूषित होता जा रहा है। अतः जल संसाधन के प्रबंधन की अति आवश्यकता है। द्रव्यवती नदी का उदगम प्राचीन जयपुर अर्थात् आमेर व नाहरगढ़ के पहाड़ियों से निकलकर परकोट के बाहर से होती हुई यह नदी टोंक जिले में बनास नदी में विलीन हो जाती है किंतु आजादी के बाद शहर के विस्तार होने व 300 से अधिक नालों व औद्योगिक अवशिष्टों एवं अतिक्रमण के कारण यह नदी आमीनशाह नाले में बदल गयी जो अत्यधिक प्रदूषित होने के कारण इसमें मिट्टी व भू-जल का प्रदूषण प्रारंभ हो गया जयपुर की जीवन रेखा जयपुर के लिए एक बड़ी समस्या बन गयी। इसे सीमित करते हुए इसके दोनों तरफ टाइले बिछाई गई, जिससे जल द्वारा मृदा कटाव रुका व जल स्वच्छ करने के लिए 9 सीवरेज ट्रीटमेंट प्लांट लगाये गये जो 1७ करोड़ लीटर जल प्रतिदिन साफ करने की क्षमता रखते हैं। जल स्तर बनाये रखने के लिए हर 300-400 मी. पर एक चेक डैम बनाया गया व इसके किनारे 3 लैण्ड स्केप गार्डन बनाये गये जो सुबह-शाम भ्रमण के लिए उपयोगी है। इस कंकरीट लाइन के पास टाइल ट्रेक पर वार्किंग व साइविलिंग ट्रेक बनाया गया है। जलधारा के किनारे वाले क्षेत्र में 1७ हजार नये पेड़ लगाये जायेंगे जो शहर को स्वच्छ वायु प्रदान करेंगे।

मुख्य शब्द - संसाधन प्रबंधन, पोषणीय विकास, सौंदर्यकरण, पर्यटन केंद्र।



Evolution of Son Alluvial Fan System (SAFS): A perspective on Dynamic Reorganization of Stream Network Geometry

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ABSTRACT

The Himalayan foreland basin, one of the largest and extremely dynamic terrestrial basins on the earth's surface, is interspersed with huge number of mega and micro sized alluvial fans deposited by progenitors of the three of the world's largest rivers and their tributary systems. The thick deposits of strata record many of the aspects of controlling factors of the Himalayan orogenesis. The disequilibrium of the stream channels and their corresponding basins also record the interplay of control factors at interplay shaping the channel and watershed ridge geometry. Landscape (in)stability and stream network reorganization of the bedrock channel stream profiles quantified through the chi-coordinate measure have been proved to be promising tool to workout the behavioural changes in the stream basin and network geometry. Chi-transformation maps predict the direction of movement of (dis)equilibrium in the landscape through drastic change in value of chi (χ) along the basin boundaries. The chi-transformation, though never applied in the thick alluvial settings, have been applied, as an experiment, in one of the mega alluvial fan systems of the Himalayan foreland basin viz. Son Alluvial Fan System (SAFS) to examine whether the effects of surface, subsurface, lithologic and climatic controls are discernible in the chi-transform map of the SAFS. Some of the reported faults e.g. east and west patna faults (EPF and WPF) and many other reported tectonic features are clearly visible in the chi-map of the first order basins in the chi-map of the SAFS and surroundings. We have attempted to attribute the probable dominant factors which might have contributed to the differences in the chi-values along the first order basins in the alluvial fan setting and its surroundings at the southern margin of the Himalayan foreland basin.

Keywords: Son Alluvial Fan System (SAFS), Himalayan foreland basin, chi (χ)-transformation, stream and basin reorganization



Some more Neocheilostomine Bryozoans from Miocene Sequences of Western Kachchh, Gujarat

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ABSTRACT

Neocheilostomine bryozoans are present in large quantity in Miocene sediments of western Kachchh. A detailed investigation has yielded 12 species in the identification. Most of them are left in open nomenclature until exhaustive study will be done with the well preserved material at hand. A systematic account of 12 neocheilostomine species is given. Taxa belong to families Calescharidae Cook & Bock, 2001; Cellariidae Fleming, 1828; Antroporidae Vigneaux, 1949; Steginoporellidae, 1884; Micropridae Gray, 1848; Cupuladriidae Lagaaij, 1952, Chlidoniidae Busk, 1884 and Skyloniidae Sandberg, 1963. The species are *Tretosina* sp.; *Antropora ramaniensis* n. sp., *Antropora gadhavii* Guha & Gopikrishna, 2005; *Cellaria* sp.; *Labioporella hariparensis* Guha & Gopikrishna, 2007; *Canda ukirensis* n.sp.; *Scrupocellaria* sp.1, *Scrupocellaria* sp.2; *Cupuladria guineensis* (Busk, 1854); *Micropora vredenbergi* Guha & Gopikrishna, 2005, *Crepis gurjarensis* Guha & Gopikrishna, 2005 and *Skylonia* sp.

Key words: Cenozoic, Western Kachchh, Neocheilostomina, Gujarat, Bryozoa.



Climatic Variability and its Implications for Flood in Middle Ganga Plain

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ABSTRACT

Climate variability is one of the major phenomenon occurring worldwide which has caused significant changes in climate variables, such as rainfall, air temperature, relative humidity, and solar radiation. Due to these modifications, there is a continuous warming trend which is clearly reflected by the increasing occurrences of extreme climate events like floods, droughts and heat waves. The floods of recent period are found more in numbers and more destructive in nature in comparison to floods of before 1990s. The next question comes in the research community what are the changes observed in climatic factors such as Rainfall pattern or changes in Temperature or increasing humidity which are directly linked to the unprecedented situation. The present work discusses the climatic factors and its variability in Middle Ganga Plain (MGP) which are directly or indirectly related to the flood. The study is divided into six sections. (1) the month and year wise analysis of meteorological parameters: Temperature, Rainfall and Relative Humidity; (2) spatial variability of all three factors; (3) the Exceedance Probability analysis of the rainfall; (4) Trend Analysis of meteorological parameters; (5) the rainfall occurrence analysis has been done by using the historical highest intensity rainfall of 1-day, 2-days and 3-days for the study area and (6) the wind trajectories were identified to get the changes in pattern the direction of winds in four seasons. The results show that the direct influence of changing in trend and pattern of rainfall, temperature, and relative humidity affect the size and intensity of floods in the MGP.

Keywords: Climate Variability, Flood, Middle Ganga Plain, Trend Analysis, Mann-Kendall Test



Monitoring Glacier Dynamics In Karakoram Himalaya, Using Geospatial Techniques

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ABSTRACT

The Karakoram mountain range is well known for the numerous clean ice glaciers and their surge-type nature. Previous studies inferred the surging phenomenon and continues to present scenario. The present study pertains to the 3 glaciers (G077742E34999N_A, G077742E34999N_B, G077682E34933N_C and G077715E34929_D), in the Ladakh region for temporal change in surge dynamics along the snout position, surface velocity and meteorological conditions that may affect the behavior and health of the glacier. Due to unexplored area of this region, glaciers are named as A, B, C and D. All glaciers have been monitored from 1994 to 2019. The surge of glacier front is estimated during the observed period is 2.02 km. (Glacier A), 3.80 km. (Glacier C) and glacier D is joined with glacier C in 2010 by a heavy surge in frontal part of both C and D. Whereas, glacier B is retreated from 1994 and again surged in 1998. This dynamical behaviour shows a high fluctuations in the cryospheric region. The glacier surface velocity is also estimated for glacier C during the period. Glacier C has a heavy surge in 2010-2011 (1.87 km.). The maximum surface velocity of glacier C in 2010-2011 is estimated 0.23 m/day and 0.79 m/day in 2017-2019. To observe this dynamical change, the satellite based meteorological parameters such as air temperature, land surface temperature (day/night), snow cover, precipitation and wind speed are analyzed from 1980 to till date for assessing the mechanism of surge dynamics. However, LST and air temperature provide negative trend during the study period that may cause of surging front and increase in accumulation area of the glaciers.

Keywords: Glacier surge, Surface velocity, Karakoram, Snout, Accumulation, Meteorology.