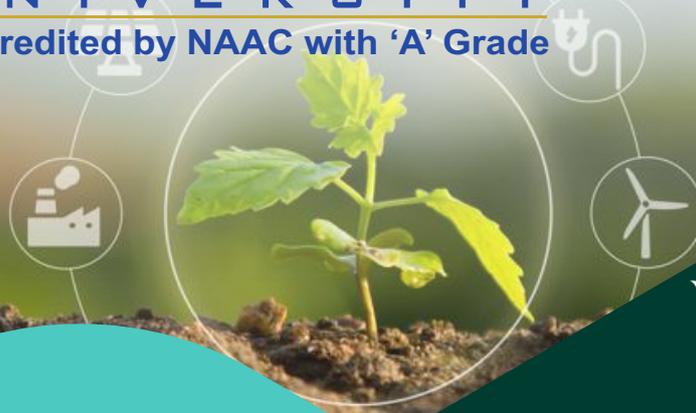




SURESH
GYAN VIHAR
UNIVERSITY
Accredited by NAAC with 'A' Grade



ABSTRACT VOLUME

SGVU-C3W 2020

7th Annual International Virtual Convention
on
“Building Sustainable Society for Future”





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

ORGANIZING COMMITTEE

CHIEF PATRON

Shri Sunil Sharma, Chairperson, Suresh Gyan Vihar University, Jaipur
Dr. Sudhanshu, Chief Mentor, Suresh Gyan Vihar University, Jaipur

PATRON

Dr. Jagdish Rai Luthra, President, Suresh Gyan Vihar University, Jaipur

NATIONAL ADVISORY COMMITTEE

Prof. M.S. Nathawat, School of Sciences, IGNOU, New Delhi
Prof. Suresh Prasad Singh, Vice Chancellor, Himalayan University, Itanagar
Prof. Vinod Kumar Sharma, Division for Bioenergy, Bio refinery and Green Chemistry, Italy
Prof. M.K. Pandit, Department of Geology, University of Rajasthan, Jaipur
Prof. L.K. Sharma, Dept. of Environmental Sci., Central University of Rajasthan
Prof. S.N. Mohapatra, Professor & Head, Dept. of Earth Sciences, Jiwaji University, Gwalior
Dr. Rajesh Sharma, Scientist "G", Wadia Inst. of Himalayan Geology, Dehradun
Prof.A.S. Samdarshi, Centre for Energy Engineering Central University of Jharkhand, Ranchi
Prof. Anurag Sharma Professor, Department of Geography, Himachal Pradesh University
Dr. Praveen Kr. Rai, KMC Language University, Lucknow
Prof. S.C. Mathur, Department of Geology, JNV University, Jodhpur
Prof. Uday Kr. Professor, Department of Geology, Ranchi University
Dr. Kirti Avishek, Department of Civil and Environmental Engineering, BIT Mesara, Ranchi
Dr. K. Mohan, Vellore Institute of Technology, Chennai

CONVENER

Dr. Shruti Kanga, Suresh Gyan Vihar University, Jaipur
Dr. Suraj Kumar Singh, Suresh Gyan Vihar University, Jaipur
Dr. Varun Narayan Mishra , Suresh Gyan Vihar University, Jaipur

ORGANISING SECRETORY

Pranaya Diwate, Suresh Gyan Vihar University, Jaipur
Priyanka Roy, Suresh Gyan Vihar University, Jaipur
Majid Farooq, Suresh Gyan Vihar University, Jaipur

© 2020, C3W, SGVU Campus, Jaipur, 302017, India

Disclaimer

The contents of each abstract are the views of the respective author(s).
Editors do not take responsibility of the originality, correctness and source of the material submitted by the author.



7th Annual International Convention
on
Sustainability in Current Scenario: Challenges & Solutions



Critical Study of Eco-Critical Perspectives in the Hungry Tide by Amitav Gosh

Tanbir Shahnawaz

Department of English, Rishi Bankim Chandra College, Naihati, West Bengal, India
Corresponding author email: tanbir200ns@gmail.com

ABSTRACT

Eco criticism is an umbrella term used to refer to the environmentally oriented study of literature and the art, and the theories that underline such critical practice. It is a new critical method available to critics to analyze the literature. It is concerned with nature writing and ecological themes in all literature. It deals with ecological problems like pollution, global warming, climate change, deforestation, species extinction and other ecological exploitations. Amitav Ghosh is a leading postcolonial writer of present times and his works have been analyzed as illustrations of Postmodern, Postcolonial writing. He has published a number of fictions and has received several awards, honours and due recognition for his exceptional and exemplary endowment in the field of fiction, non-fiction, travelogue, history, anthropology and journalism. Amitav Ghosh's *The Hungry Tide* (2005) is one of the novels which have been written in the current era. In *The Hungry Tide*, Ghosh problematizes the strains between and inside human groups, their particular relations with the regular world, and the additional desultory reality of nature that progresses and is all the while changed by humankind. This paper is intended to explore the topic of eco criticism in the novel of *The Hungry Tide* by Amitav Gosh

Keywords: Eco criticism, Environment, nature, postcolonial, ecology, environment, Sunder ban



**7th Annual International Convention
on
Sustainability in Current Scenario: Challenges & Solutions**



**A Geo Medical Analysis of Primary Health Care Center in Madurai East
Block- Micro Level Study Using GIS**

D. Balaji*, V. Saravanabavan

School of Earth and Atmospheric Sciences, Department of Geography, Madurai Kamaraj University,
Madurai, India

Corresponding author email: dbalaji395@gmail.com

ABSTRACT

Health is a common theme in all nations of the world. Health has evolved over the centuries as a concept of concern from an individual to a worldwide social goal and encompasses the whole quality of life. The scope of health services varies widely from country to country and is influenced by general and ever changing national, state and local health problems, needs and attitudes as well as resources to provide these services. The major purpose of health services is to improve the health status of the population. If not appropriately treated, people may have recurrences of the disease months later. In those who have recently survived an infection, re-infection typically causes milder symptoms. The concept of primary health care is based on practical, scientifically sound and socially acceptable methods and technology. Such care is delivered in multiple settings, such as community nursing centers, health maintenance organizations, and community based clinics. The study area, Madurai East block is located at 9°55' 41." N to 9°92' N latitude and 77 ° 58'29" E to 77°97' E longitude. extension. Madurai East block in the Madurai north taluk is a revenue district in Madurai district of Tamilnadu, India. It has a total of 36 panchayats. Madurai east block has been selected as the study area because of its semi urban characteristics. The main aim of this study is to locate and analyse the spatial distribution of primary health centres in north taluk-East block and to map out them using GIS software. To analyse the patient perception and satisfaction level who avail these healthcare services. the travel pattern and movement pattern of patients from their residence to the PHC with respect to their age and sex indicators. The primary data was collected by administering a questionnaire to the patients who visited the healthcare in the block. The secondary data was collected from records of health centres considered, from the census handbooks and from deputy directorate health service office. The primary survey conducted was based on the method of stratified random sampling and a total 120 samples were collected. The maps became the



7th Annual International Convention
on
Sustainability in Current Scenario: Challenges & Solutions



primary geographical tool of analysis. The study has shown that by integrating spatial analysis using GIS; it is possible to improve the understanding of the distribution of fever cases and pregnancy lady time with delivery within a particular area.

Keywords: PHC, GIS, pregnancy lady time with delivery, fever cases.



7th Annual International Convention
on
Sustainability in Current Scenario: Challenges & Solutions



Mapping of Glacier Lake Outburst Floods (GLOFs) Using GIS and Remote Sensing for Lahul and Spiti District of Himachal Pradesh, India

O. Mohammed Faizan^{1*}, Gopinath Rangoli², K. C. Tiwari²

¹Institute of Remote Sensing, College of Engineering Guindy, Anna University, India

²Multidisciplinary Centre for Geoinformatics, Delhi Technological University, India

Corresponding author email faizan2018107033@gmail.com

ABSTRACT

Sudden release of water from a glacier Lake is referred to as Glacier Lake outburst Flood (GLOF). This is capable of threatening human lives and triggering Environmental Damage and utilities. Climate change will lead to the retreat of glaciers and to creation of new lakes for glaciers. Glacier Lake outburst Flood (GLOF) are among the most common hazards caused by climate change across the Himalayan state of Himachal Pradesh. In this study, GLOFs mapping carried out using GIS and Remote sensing. Landsat 7 and 8 data of the years 2005, 2010, 2015 and 2019 have been used for glacial lake mapping. Landsat images have been used classification and change detection using NDWI (Normalized Difference Water Index) for identification of the temporal variation of Samudratapu Glacial Lake and Geepang Gath Glacial Lakes are two main glacial lakes in Lahul – Spiti District. A 30 m DEM was created by the data providers by the shuttle radar topography mission (SRTM 1ARC SEC GLOBAL) use for calculating some parameter such as max, min, mean elevation, slope and aspects etc. The volume and depth have been calculated using empirical formulae and other parameter such area, slope, Aspects and Drainage network have been prepared using ARCGIS 10.8. The maps for LULC produced using supervised classification techniques using maximum likelihood classification (MLC) algorithm. The lake size has increased from 0.542106 to 0.929685 km^2 for Geepang Gath Glacier lake and 0.84923 to 1.23964 km^2 for Samudra tapu Glacial lake during 2005 – 2019. The results of the Research will assist in the development of risk management plans, spatial planning and better preparedness for future potential hazards of GLOF.

Keywords: Glacial lake outburst flood (GLOF), GIS, Remote sensing, NDWI, Landuse and Landcover (LULC).



7th Annual International Convention
on
Sustainability in Current Scenario: Challenges & Solutions



Impact of Covid-19 Pandemic on Climate Change

Nancy Puri^{1*}, C. R. Akhouri²

¹Amity Institute of International Studies (AIIS), Amity University, Uttar Pradesh, India.

²Amity Humanity Foundation (AHF), Amity University, Uttar Pradesh, India.

Corresponding author email: nancypuri9@gmail.com

ABSTRACT

The COVID-19 has spread rapidly and exponentially all over the world. The confirmed cases from the new coronavirus are more than 976,249 and deaths have reached in lakhs worldwide. The effects are detrimental not only for human health but also for the economy, the tourism and the politics. Surprisingly, there is only one beneficiary from the new pandemic: our planet. In China, where everything started, CO₂ emissions have decreased by a quarter. Similarly, in Italy, COVID-19 has substantially reduced air pollution as nitrogen oxide emissions have decreased drastically during the first two and a half months of 2020. Even in India also, air pollution has been decreased. In this article we propose that the new pandemic may be linked to the on-going climatic change and that COVID-19 actually inaugurated the era of Climate Medicine.

Keywords: COVID-19, climate, deaths, Pollution, Pandemic.



7th Annual International Convention
on
Sustainability in Current Scenario: Challenges & Solutions



**Cultural Eutrophication of Manasbal Lake of Kashmir Himalaya:
Perspectives and Prospects**

Jahangeer Mohd Reshi^{1*}, Jaya Sharma¹, Ishtiyahq Ahmed Najjar²

¹Department of Environmental Sciences, Madhyanchal Professional University, Bhopal, M.P, India

²Department of Environmental Sciences, Govt. Degree College, Ganderbal, Kashmir, India

Corresponding author email: jahangeerevs@gmail.com

ABSTRACT

In lake ecosystems, water quality plays an important role in determining the status and condition of that fresh water ecosystem. During the study, an attempt was made to assess the water quality, pollution and eutrophication status of Manasbal Lake of Kashmir Himalaya. The Manasbal Lake is located district Ganderbal in the UT of Jammu and Kashmir, India and has altitude position of about 1551m a.s.l. The lake catchment is having an area of about 22 km² located in district Ganderbal at a distance of 30 km north from the Srinagar city of Jammu and Kashmir. The Manasbal Lake is a semi urban and deepest lake of Kashmir valley. The lake is currently suffering from cultural eutrophication. Excess nutrients, specifically phosphorus and nitrogen are the primary pollutants that contribute to the cultural eutrophication of lakes. Manasbal Lake being the monomictic lake is getting modified as a result of cultural eutrophication due to anthropogenic pressure, illegal encroachment, siltation and the untreated waste water released from the nearby kilns and residential areas. From the present study, it can be concluded that the higher values of Phosphates (PO₄), Alkalinity, Hardness, Electric Conductivity, Free carbon dioxide and lower values of dissolved oxygen and transparency clearly depicted higher trophic status of Manasbal Lake. It can also be concluded that climatic factors, untreated sewage and solid garbage from surrounding population, fertilizers containing Nitrates and Phosphates and slit load were the main causes for degradation of water quality of the studied lake. Therefore, powerful control and management strategies like community perceptions and priorities are needed relating to lake water management. Hence, immediate remedial measures should be taken up for protection and sustainable management of this monomictic lake in order to save it from further pollution and deterioration.

Keywords: Manasbal Lake, Monomictic, Cultural eutrophication, Conservation.



7th Annual International Convention
on
Sustainability in Current Scenario: Challenges & Solutions



Assessment of Urban Heat Island (UHI) in Manipur Valley: A Remote Sensing and GIS based study

Marina Langhu^{*}, Bakimchandra Oinam

Environmental and Water Resource Department, Civil Engineering, National Institute of Technology,
Manipur, India

Corresponding author email: marinalanghu@gmail.com

ABSTRACT

The phenomenon of Urban Heat Islands is recognised as a direct consequence of urbanisation. Increasing urbanisation may result in micro climates for cities, risking the health of people living there. To study the UHI effect in the Indian context, the Manipur urban area has been explored in this paper using Landsat 7 ETM+/ 8 OLI/TIRS satellite images through remote sensing and GIS techniques. An attempt has been made in this research to assess the Urban Sprawl in Manipur valley which includes four districts viz Thoubal, Bishnupur, Imphal West and Imphal East. Supervised classification methods have been taken to prepare LULC map. Land Surface Temperature (LST) is derived from the three thermal bands of MODIS. The research is carried out to assess the relationship between the Land Surface Temperature (LST) and Land use land cover changes in Manipur valley over the period 2013 to 2019. Urban Heat Island (UHI) effect was found to be increased with rapid urban expansion. The study reveals that green cover and increase in built-up plays an important role in the formation of UHI. With the diversified and rapid development of economy and urban society, urban sprawl in Manipur Valley will likely expand and UHI will become more severe. Satellite remote sensing and application of GIS technologies provide an alternative means of rapidly assessing the dynamics and development of sprawl so that timely action may be taken. ArcGIS have been utilized for data visualization.

Keywords: Urban Sprawl, Urban Heat Island (UHI), Land Surface Temperature (LST), Remote Sensing, GIS, ArcGIS.



7th Annual International Convention
on
Sustainability in Current Scenario: Challenges & Solutions



Climate Change Impact on Water Recourses in Chak Watershed, Afghanistan

Naqiburahman Rahmani*, Deva Pratap, Venkata Reddy Keesara

National Institute of Technology Warangal, Telangana, India
Corresponding author email: nrahmani@student.nitw.ac.in

ABSTRACT

The Chak watershed is one of the important watersheds as it is integral to local economy in Afghanistan. However, recent pressures including population increase, industrial growth and climate change have is impacting the riparian provinces of Wardak, Logar and Kabul. There is no clear understanding of the role of changing temperature and rainfall on the hydrological process in the Chak watershed and any insights through modelling can offer incentives for efficient organization of water resources-based income generation activities. In this study, the Soil and Water Assessment Tool (SWAT) a semi-distributed model is used to simulate and analyse changes in the hydrological regime of the Chak watershed. To simulate the future flow, first calibration and sensitivity analyses are performed at a monthly time step using the Sequential Uncertainty Fitting Version 2 (SUFI2) optimization algorithm and the best performance metrics have been obtained using the objective function, Kling-Gupta efficiency (KGE). From the representative concentration pathways (RCP) scenarios, the watershed is expected to witness decreasing temperatures between 1.8 ° C and 2.7 ° C in the spring and summer seasons. Also, the precipitation is expected to increase in the spring between 50 mm and 132 mm and as a result stream flow could increase from 48 m³ /sec to 130 m³ /sec during the period 2022-2050. The results show that watershed is subjected to major changes in the water equilibrium and hydrological processes in future due to climate change from 2022 to 2050.

Keywords: Stream flow; hydrology; climate change; SWAT; Chak watershed; Afghanistan.



7th Annual International Convention
on
Sustainability in Current Scenario: Challenges & Solutions



Chitosan Nanoparticles and Plant immunity: A Positive Correlation

Anik Sarkar¹, Krishnendu Acharya^{2*}

¹Molecular and Applied Mycology and Plant Pathology Laboratory, Center of Advanced Study,
University of Calcutta, Kolkata, West Bengal, India

²Department of Botany, University of Calcutta, Kolkata, West Bengal, India

*Corresponding author email: krish_paper@yahoo.com

ABSTRACT

Plants are prone to be affected by different types of biotic and abiotic stresses. As people are completely dependent on plant system from the day of their journey, it is urgent requirement to save plants from different types of stress induced damages. The stress induced damages in plants affect food crops globally and ultimately develop questions regarding food security. Good food can be considered as outcome of sustainable agriculture. In the present work we have selected chilli plant (*Capsicum annum* L.) as our model plant and chitosan nanoparticles as potential elicitor molecule. Chitosan is cheap, non-toxic biotic elicitor. Chilli is one of the most important economic cash crops of the World. Chilli is utilized throughout the world in every household. It is important source of different minerals and vitamins. Various biotic and abiotic stresses can hamper chilli production worldwide. In our work we showed that chitosan nanoparticles treated chilli leaves showed enhanced activities and accumulation of different defense related enzymes as phenylalanine ammonia lyase (PAL), peroxidase (PO), polyphenol oxidase (PPO) and antimicrobial compounds as total phenol and flavonoid content and induced expression of different defense related genes after 24 hours of incubation over the water treated control. Chitosan nanoparticle treated leaves also showed improved generation of nitric oxide (NO) than water treated control sets. The spectrophotometric NO generation was further confirmed by real-time NO detection by fluorescence microscopy using DAF-2DA dye. As NO is considered as regarded as important signalling molecule during activation of defense responses in plants, so we have tried to understand the involvement of NO in chitosan nanoparticle induced defense responses in chilli, For this purpose, leaves were treated with potential NO donor and nitric oxide synthase inhibitor and defense profile was recorded. The similar defense responses observed in NO surplus condition and chitosan nanoparticle treatment make NO a potent, orchestrating signalling molecule in chitosan nanoparticles induced activation of innate immunity in chilli.



7th Annual International Convention
on
Sustainability in Current Scenario: Challenges & Solutions



From our study it can be speculated that chitosan nanoparticles can be used as alternative medicine to induce defence responses in plants to develop sustainable agriculture.

Keywords: Elicitor, Innate immunity, Sustainable agriculture



7th Annual International Convention
on
Sustainability in Current Scenario: Challenges & Solutions



**Temporal Assessment of Sedimentation in Siruvani Reservoir Using Landsat8
Satellite Imageries**

J. Brema^{1*}, Tamilarasan A¹, Dharmaveer Singh²

¹Civil Engineering, Karunya Institute of Technology and Sciences, Coimbatore, India

²Symbiosis Institute of Geo-informatics, Pune, India

Corresponding author email: bjayanarayanan@gmail.com

ABSTRACT

Reservoir sedimentation is a process of deposition of eroded and transported sediments into the reservoirs. Annually, about 0.5% to 1% of the total capacity of the reservoirs around the world is lost annually because of sedimentation. Sedimentation reduces the benefits of the reservoir such as energy production, discharge capacity and flood attenuation capabilities. This study was carried out to estimate the quantity of sediment deposited in the Siruvani reservoir using remote sensing techniques with the help of Landsat 8 imageries, DEM, toposheet, rainfall data, land use map, soil map etc. In order to understand the geomorphological formation of the watershed the hypsometric curve and hypsometric integral have been obtained for the study area. The Normalized Difference Water Index (NDWI) has been generated from the satellite imageries corresponding to the study area. Based on the NDWI the water spread area of the reservoir has been estimated for the study period, 2011 to 2018. The Universal soil loss equation (USLE) has been applied for the five sub-watersheds which contribute to the reservoir. The soil loss was found to increase by 5.27% within the study period. The methods for estimation of changes in water spread area and sedimentation have been discussed in this chapter.

Keywords: Sedimentation, Soil Erosion, NDWI.



7th Annual International Convention
on
Sustainability in Current Scenario: Challenges & Solutions



Spatio-temporal Water Spread Mapping of Sattal Lake of Uttarakhand using Remote Sensing and GIS

Vaibhav Deoli^{1*}, Deepak Kumar²

¹Department of Civil Engineering, Dev Bhoomi Institute of Technology, DBGI Dehradun, Uttarakhand, India

²Department of Soil and Water Conservation Engineering, College of Technology, GBPUA&T Pantnagar, Uttarakhand, India

Corresponding author email deolivaibhavdeoli@gmail.com

ABSTRACT

Remote sensing and GIS technology has been accurate and frequent for surface water mapping. For this purpose index methods are mostly used for separation and estimation of water spread areas with the help of threshold value. Threshold is the fix value, but maybe change in the case of forest, clouds, environmental noise and clouds. In this study, water spread mapping of Sattal Lake has been done for every year which is situated in the Nainital District of Uttarakhand in Northern part of India. For this purpose, Landsat data from 2001 to 2018 have been used. From 2001 to 2012 landsat-7 and for year 2013-2018 Landsat-8 data has been used. The change in water spread area has been observed in summer season and winter season. To detect the change a model has been developed in QGIS 2.18 software and Water Ratio Index (WRI) has been used for unsupervised extraction of lake from Landsat imageries. After calculating area for every year (2001-2018), trend in water spread area has been calculated to determine either the change is significant or not. Mann-Kendall and San slope test has been used for determine trend analysis and magnitude of trend and based on this significant change has been observed at 10% significance level. The result shows decrease in the water spread area for both summer and winter season. Based on Mann-Kendal test the lake water spread area is decreased significantly in winter season with z-value -2.620 whereas in summer season the area is decreasing but not significant with z-value -0.525. The result might be helpful in reclaiming and restoration of water in the lake. Also, this type of studies can be used for change detection for other water bodies, flood estimation where physical mapping is not possible.

Keywords: water spread, Sattal Lak, Water Ratio Index, Mann-Kendall, San slope.



7th Annual International Convention
on
Sustainability in Current Scenario: Challenges & Solutions



The Impact of Climate Change on Agricultural Production: A Short Review

K. R. Padma^{1*}, K. R. Don²

¹Department of Biotechnology, Sri Padmavati Mahila Visva Vidyalayam (Women's) University, Tirupati, Andhra Pradesh, India

²Department of Oral Pathology, Saveetha Dental College, Saveetha Institute of Medical and Technical Sciences, Saveetha University, Velappanchavadi, Chennai, Tamil Nadu, India

Corresponding author email: thulasipadi@gmail.com

ABSTRACT

Estimates of climate change influence are often considered by large uncertainties that reflect unawareness of many physical, biological as well as socio-economic processes. This climatic change obstructs and results in changes in crop yield, livestock yields, as well as the economic consequences of these potential yield changes. A key to reducing these uncertainties is improved understanding of the relative contributions of individual factors. Specifically, in our review article we have focused on the relative contributions of four factors: climate model projections of future temperature and precipitation, and the sensitivities of crops to temperature and precipitation changes. Surprisingly, uncertainties related to temperature represented a greater contribution to climate change impact uncertainty than those related to precipitation for most crops and regions, and in particular the sensitivity of crop yields to temperature was a critical source of uncertainty. These findings occurred despite rainfall's important contribution to year-to-year variability in crop yields and large disagreements among global climate models over the direction of future regional rainfall changes, and reflect the large magnitude of future warming relative to historical variability. We conclude that progress in understanding crop responses to temperature and the magnitude of regional temperature changes are two of the most important needs for climate change impact assessments and adaptation efforts for agriculture.

Keywords: Crops, Temperature, Climate change, Agriculture.



7th Annual International Convention
on
Sustainability in Current Scenario: Challenges & Solutions



Image Fusion: Fashionable Technique for Urban Planning

Chandrakant Tank*, Pawan Kumar Tiwari

Sai Consulting Engineers Pvt. Ltd. (Systra group India)
Corresponding author email: chandrakant.tank@yahoo.com

ABSTRACT

Image Fusion is an assessment of the sharpness, clarity and reliability of information with respect to mapping of urban feature identification. Study was carried out with Cartosat-2 satellite sensor data is high resolution panchromatic data with coarse low resolution multispectral data and IRS P6 LISS IV is high multispectral data with coarse low resolution panchromatic data both generate high-spatial and high-spectral resolution data especially for GIS based Urban Studies or Mapping. Image fusion data was micro-level spatial information interpreted through multiplicative pan sharpen (image fusion) Technique. The data will be use full for cartography applications, urban rural applications. Has immense potential for infrastructure development studies.

Keywords: Data fusion, Cartosat-2, LISS-IV, Pan sharpen, Multiplicative, Urban, Feature Identification.



7th Annual International Convention
on
Sustainability in Current Scenario: Challenges & Solutions



An Assessment of Soil Salinity Status and Mapping in Ethiopia

Anwar Mohammed

Wolkite University, Department of Natural Resource Management, Collage of Agriculture and Natural
Resource Management, Wolkite, Ethiopia
Corresponding author email: anwarmohammed4311@gmail.com

ABSTRACT

Soil salinization is a major problem affecting the productivity of irrigated lands in arid and semi-arid areas. Managing salinity to minimize environmental impact is a prerequisite for sustainable irrigated agriculture. Remote sensing has outperformed the traditional method for assessing soil salinity offering more informative and professional rapid assessment techniques for monitoring and mapping soil salinity. The major objective of this review is to explore the status of soil salinity and mapping in Ethiopia for enhancing the understanding of soil salinity mapping. Soil salinity can be identified from remote sensing data obtained by different sensors by way of direct indicators that refer to salt features that are visible at the soil surface as well as indirect indicators such as the presence of a halophytic plant and assessing the performance level of salt-tolerant crops. The understanding of soil salinity through mapping and monitoring helps understand subtle differences across the landscape and agricultural fields and allows their precise management. Mapping on regional and national levels is appropriate to be accomplished through interpretation of Remote Sensing imagery supplemented with limited ground truthing and through using Geographic Information System salinity maps can be developed.

Keywords: Salinization, GIS, RS



7th Annual International Convention
on
Sustainability in Current Scenario: Challenges & Solutions



Effectiveness of Flood Early Warning Methods: The Case from Yabaroluwa North in Biyagama

Rangana M. P. T.

Development studies, University of Kelaniya, Department of Geography, Colombo, Sri Lanka
Corresponding author email: thushanrangana33@gmail.com

ABSTRACT

Flood is one of the major natural and human -induced disaster in Sri Lanka and the majority of people who live in low-lying areas in both Wet and Dry Climatic Zones of Sri Lanka are highly vulnerable for the flood. The risk of Flood disasters would be significantly reduced by an effective early warning system. The main objective of this study is to investigate the effectiveness of current early warning systems of Sri Lanka and to make re commendation to improve the current early warning systems. The study has selected the Kelani River basin as a study region and Yabaroluwa North village in Biyagama DSD has been selected to filed study under the case study method. To achieve the objectives, the stratified sampling method was used and the sample was selected randomly. The quantitative data were collected by questionnaire and qualitative data were collected by focus group discussions and key informant discussions. Relevant articles, study reports, research findings, other published documents, and different databases were used for secondary data. Both Descriptive and analytical methods were used. The study reveals that the main weakness of the flood early warning methods is that the message does not receive to the grassroots and many warning systems are too common and not specified the message and the target areas. Still the disaster Management Centre uses traditional ways to convey the message. The government's regular and active intervention and assistance to promote new technological methods and about knowledge warning given from the main three languages and warning should warning go directly for vulnerable people

Keywords: productivity, Flood early warning, new technological methods



7th Annual International Convention
on
Sustainability in Current Scenario: Challenges & Solutions



Facile Synthesis of Titanium (IV) Based Nanocomposites for Efficient Photocatalytic Degradation of MB and MG Dyes

Yahiya Kadaf Manea

Department of Chemistry, Aligarh Muslim University, India
Corresponding author email: Kodaf2006@yahoo.com

ABSTRACT

A highly efficient and recyclable catalysts, mesoporous poly o-anisidine titanium phosphate (POA-TP) and Sm co-doped POA-TP have been synthesized by chemical in situ polymerization in micellar media. Mesoporous nanocomposites of POA-TP and Sm@ POA-TP have been characterized by instrumental techniques such as FTIR, XRD, TGA-DTA, SEM, TEM, PL, electron-paramagnetic resonance (EPR) spectroscopies & UV- vis diffuse reflectance spectroscopy (DRS) and their photocatalytic performance were investigated based on the degradation of methylene blue (MB) and malachite green (MG) dyes. The optical properties revealed that the band gap of Sm@POA-TP was reduced from 3.76 eV (POA-TP) to 3.70 eV (Sm@POA-TP) due to the presence of new donor energy levels with Sm³⁺ loading. The experimental results indicated that the enhanced photo-catalytic performance with Sm@POA-TP could be attributed to the increased optical absorption and efficient separation and migration of photo-produced charge carriers with decreasing the recombination of electrons e holes creating from doping effects. Cyclic voltammetry study was employed to investigate the redox behaviors and the current producing ability of the materials. This study could lead to the synthesis of low cost photocatalysts highly efficient for the removal of environmentally hazardous dyes aqueous systems.

Keywords: Nanocomposites, Poly o-anisidine titanium (IV) phosphate, Optical properties, Photocatalytic degradation



7th Annual International Convention
on
Sustainability in Current Scenario: Challenges & Solutions



The Effects of Particulate Matter Air Pollution on Human Health: A Review

Pratik Sengani^{1,2*}, Gaurav Agarwal²

¹Gujarat Institute of Desert Ecology, Bhuj, Kachchh, Gujarat, India

²School of Engineering (SOE), RK University, Bhavnagar Highway, Kasturbadham, Rajkot, Gujarat, India

Corresponding author email: dpratik139@rku.ac.in

ABSTRACT

Air pollution has now become a global environmental issue due to its potential to cause health hazard and degrade the environment. According to the WHO every year air pollution kills seven million people worldwide. There are major six criteria pollutant includes, particulate matter (PM) ground-level ozone, carbon monoxide (CO), sulphur oxides, nitrogen oxides, and lead. Particulate matter is a portion of air pollution, is made up of extremely small particles and liquid droplets contains organic and inorganic constitute. Particulate matter (PM) has a serious toxicological impact on human health and the environment because it can penetrate deep into the lung tissues and causes respiratory disorders like asthma and chronic obstructive pulmonary disease COPD. There is indication that cardiovascular, neuropsychiatric complications and inflammatory airway diseases are also caused by PM. The sources of PM vary from small unit of cigarettes to larger unit such as volcanic activities. However the anthropogenic sources of air pollution are emission from motor engines of automobiles and industrial activities. As per the World health organization, globally 93% children live in the polluted environment and causing one in every four deaths of children under 5 years is directly or indirectly by outdoor and indoor air pollution. Moreover it is estimated total 4.2 million globally premature deaths due to ambient air pollution, among which 29%, 17%, 25% and 43% of all death and disease caused from lung cancer, acute lower respiratory infection, ischemic heart disease and chronic obstructive pulmonary disease, respectively. The broad area of research in this context is benchmark for understanding effect of air pollution on human health which further is relevant to clinical research by investigating clinical outcomes.

Keywords: Health effects, human, air pollution.



7th Annual International Convention
on
Sustainability in Current Scenario: Challenges & Solutions



Geospatial Technology and Application of Local Level Urbanisation Analysis and Development in The Word No 13 in the Jhargram Municipality West Bengal

Sanjib Mahata

Vidyasagar University, Midnapore, West Bengal, India
Corresponding author email: sanjibmahata5@gmail

ABSTRACT

Geospatial technology and application the principal Spatial Data Urban planning has the potential to contribute to planning in Town level government. The paper defines the object-based land use land cover, buffer zone in local essentials facilities area like bank, hospital, education, and groceries shops and road and drainage network, and population distribution of the study area. This simple and strong tool will assist the decision-makers to generate various urbanization planning and socio-economic views for identifying the village level suitable area. The paper also imagines the future development and usefulness of this community-level GIS tool for grass-root planning.

Keywords: Land use Land cover, Road Network, Buffering zone of facility area, Road Network, Drainage Network, and Population Distribution.



7th Annual International Convention
on
Sustainability in Current Scenario: Challenges & Solutions



Urban Planning and Smart Cities in India

Biplab Auddya^{1*}, Riya Auddya²

¹Sidho-Kanho-Birsha University, Purulia, West Bengal, India

²SACT, Panchakot Mahavidyalaya, Purulia, West Bengal, India

Corresponding author email: biplabauddya1998@gmail.com

ABSTRACT

Urban planning also known as Town Planning, City Planning, Urban Development, Urban Management or Regional Planning. The term of Smart City concerns about smart people, smart economy, smart environment, smart governance, smart mobility and smart living. In the present time it is very important to make sustainable urban life. Urban Planning is the art or method of giving shape, structure and design to cities and towns, also include manage the transport system, drainage system, building management, land management etc. Over population in urban areas is the major cause for urban planning. It is important to solve overpopulation problem in urban areas, global warming, pollution and offer a better life to the people of urban area. Urban planning is not only the modern method. Urban Planning describe first time in the epic of Gilgamesh. Mesopotamian, Indus Valley and Egyptian are some examples of urban planning. The importance of the urban planning is mainly increasing in the 21st century. An urban planner called as a green collar professional. In India nearly 30% of population living in urban areas and day by day it is increasing. It is the true that urban planning is importance in present time because to improve public health, housing, over population management and also include many other activities. Urban planners take some steps for urban or city planning like identify proper place means city data collection, identify alternative approaches, detailed plan, plan implementation and post management. On 25 June 2015, 100 Smart City Mission was launched by Prime Minister Narendra Modi in India and a total 98000 crore was approved for this mission by the Indian cabinet to the development of the 100 smart cities. The Smart Cities Mission will cover 100 cities in India and its duration will be five years (FY 2015-2016 to FY 2019-2020). This mission manages by The Ministry of Urban Development (MOUD). Some different steps are to select smart cities. The total number of 100 smart cities select among the states and UTs in India. Pradhan Mantri Awas Yojona (PMAY) (Urban) or housing or all, Swachh Bharat



7th Annual International Convention
on
Sustainability in Current Scenario: Challenges & Solutions



Mission – Urban (SBM-U), Jawaharlal Nehru National Urban Renewal Mission (JNNRUM), AMRUT (Atal Mission for Rejuvenation and Urban Transformation), National Urban Sanitation Policy (NUSP), Heritage City Development and Augmentation Yojana (HRIDAY), National Urban Livelihoods Mission (NULM), National Urban Transport Policy (2016) etc. are some urban development schemes in India. But some challenges are faced for city or urban planning like over population, uneducated people, low or bad technology, natural disaster, unkind of local people, poverty, sanitation problem, low training, capacity building, waste etc.

Keywords: Urban Planning, History, Importance, Smart City Mission in India, Smart cities in India.



7th Annual International Convention
on
Sustainability in Current Scenario: Challenges & Solutions



Groundwater Quality analysis around Champua Block of Kendujhar District of Odisha, India

Nishant Kumar Mohapatra

Department of Earth Sciences, Sambalpur University, Jyoti Vihar, Burla, Sambalpur, Odisha, India
Corresponding author email: nishant_kjr@rediffmail.com

ABSTRACT

Water is one of the most precious resources and is an essential commodity to mankind. Without it, there is no meaning of life. Groundwater is one of the most important natural water resources used not only for drinking but also for irrigation and industrial purpose. The resource cannot be optimally used and sustained unless the quality of groundwater is assessed. So management of its quality is very important as the demand is increasing day by day. The present study involves determining the groundwater quality around Champua block of Kendujhar district and hence determine its suitability for drinking and irrigation purposes. Groundwater samples were collected from the tube wells and bore wells of 60 locations covering the study area in 1 litre polythene bottles using standard procedure during the pre-monsoon season (In the month of May, 2020). The samples were analysed for various physio-chemical parameters such as pH, EC, TDS, TH, TA, Ca^{2+} , Mg^{2+} , Na^+ , K^+ , Fe^{2+} , HCO_3^- , CO_3^{2-} , Cl^- , SO_4^{2-} , NO_3^{2-} and F^- . To interpret the chemical characteristics of groundwater, diagrams such as Piper Trilinear diagram, Chadha's diagram and Durov's plot is used. For accessing the suitability of water for drinking purposes, the standard proposed by BIS 2012 is used. For determining the irrigational suitability of water, various irrigational parameters such as such as sodium adsorption ratio (SAR), magnesium adsorption ratio (MAR), percent sodium (%Na), permeability index (PI), potential soil salinity (PS), residual sodium carbonate (RSC) and Kelley's ratio (KR) were calculated from the above parameters using standard formulas. The various diagrams such as U.S. Salinity diagram, Wilcox diagram and Doneen's diagram were prepared to evaluate the suitability of water of the area for irrigation purpose. Spatial interpolation diagrams were prepared to interpret the distribution of various parameters in the study area. The overall analysis shows that the quality of groundwater is suitable for drinking and domestic purposes in most of the locations except a few locations due to more hardness, fluoride and iron contaminations. The groundwater is also suitable for



7th Annual International Convention
on
Sustainability in Current Scenario: Challenges & Solutions



irrigation purposes in most of the locations. So overall, the groundwater of Champua block is safe for drinking and irrigation purposes in most of the locations.

Keywords: Champua Block, Piper Trilinear diagram, Durov's plot, BIS 2012, Sodium adsorption ratio, Kelley's ratio, Spatial interpolation.



7th Annual International Convention
on
Sustainability in Current Scenario: Challenges & Solutions



Adsorbents to Address Water Pollution: A Popular Research Theme of BS Chemistry Students of the Polytechnic University of the Philippines (PUP)

Keith T. Ostan, Rhowain N. Aguanta, Eliza B. Magtibay, Paul Angelo C. Manlapaz, Jemimah Christine L. Mesias, Mercy Joy I. Malicse, Chester C. Deocarís*

Department of Physical Sciences, College of Science, Polytechnic University of the Philippines, Sta. Mesa, Manila, Philippines

Corresponding author email: ccdeocarís@pup.edu.ph

ABSTRACT

The Philippines being an archipelago, it is blessed with both coastal and inland bodies of water. As the country grows more urbanized, its waters and its resources are threatened by pollution. To address the burgeoning problem of water pollution different treatment technologies are being developed. Adsorption is one of those technologies that can be utilized remove dissolved pollutants in water. Developing such technologies requires more research related to adsorption phenomena and the discovery of adsorbent materials. In this paper, we describe interest of student BS Chemistry of the Polytechnic University of the Philippines (PUP) in adsorption research as evidenced by their chosen topics in their undergraduate thesis projects. The popular thesis topics was identified from a corpus of thesis abstracts from 2014 to 2019. We were able to identify 33 distinct research topics from 111 thesis abstracts using the Latent Dirichlet Allocation (LDA) topic modeling. The most frequent topic studied has a label “*adsorption, adsorb, remove, and model*” which makes up 14 (13%) of the abstract in the collection. This topic is focused on the discovery of adsorbents from indigenous materials and applied to the removal of heavy metal ions in water. This topic also includes the estimation of adsorption parameters using different isotherm models. Recently, a research group published the package PUPAIM (<https://cran.r-project.org/web/packages/PUPAIM/index.html>) in the Comprehensive R Archive Network (CRAN). This R package can fit adsorption data obtained from experiments to known adsorption isotherms models. With the growing interest of PUP BS Chemistry students in adsorption, research themes directed to pollution control, environmental protection and water purification are be expected emerge in foreseeable future.

Keywords: chemistry, water pollution, adsorption, text mining, topic modelling



7th Annual International Convention
on
Sustainability in Current Scenario: Challenges & Solutions



Room for Rivers: A Sustainable Alternative to Conventionally Engineered and Structural Measures for Controlling Catastrophic Floods in Assam, North-East India

Subhashish Dey

Department of Geology, Cotton University, Assam, India
Corresponding author email: subhashishdey265@gmail.com

ABSTRACT

Floods are catastrophic, especially when it comes to parts of Asia, precisely South-East Asia. Necessary implementation and the innovation engaged in the development of alternative flood management strategies, absolutely doing away with the dam, embankment and structural measure approach to control floods is the need of the hour. Times are changing, with South-East Asia's critical topography and increasingly growing population leading to more floods, countries now are largely shifting from the conventional engineered way to cope with floods to rather sustainable and alternative ways of flood management, keeping full harmony with the nature and posing negligible threat to the ecosystem. The largely practised concept of the Dutch “Room for Rivers” can play a pivotal role in containing catastrophic floods in parts of North-East India, precisely in states like Assam. The aforementioned technique has produced viable results in parts of flood stricken Netherlands and this framework of idea when applied to solve the problem of floods in North-Eastern states of India can seriously yield effective results. The paper largely focuses upon the various pros of the “Room for Rivers” concept and how it can actually defeat the old conventional way of dealing with floods, precisely in the state of Assam. Moreover, the vast calamitous characteristics associated with the Assam floods and the highly detrimental ecological and environmental effects that the old engineered measures for flood control have caused, is discussed here. In these times of need for sustainability, “Room for Rivers” can definitely have a positive effect in mitigating floods that cause immense havoc in this part of India. The technology and specificity associated with “Room for Rivers” has been discussed thoroughly via this paper. Assam’s flood scenario in the past few years and the utterly failed strategies to contain it in the past span of time has also been an important matter of discussion



7th Annual International Convention
on
Sustainability in Current Scenario: Challenges & Solutions



here. Climate Change and the increased risk from flood like calamities call for an alternative and evidently sustainable mitigation process that goes hand in hand with the environment.

Keywords: Floods, Room for Rivers, Conventional Engineered Way, Assam, Ecological, Environmental, Climate Change, Calamitous, Sustainability, North-East India, Technology.



7th Annual International Convention
on
Sustainability in Current Scenario: Challenges & Solutions



**Sustainable Management of Vehicular Pollutants by Roadside Vegetation
Barrier in Urban Area**

Sushil Kumar Shukla

Department of Transport Science and Technology, Central University of Jharkhand, Ranchi, Jharkhand,
India

Corresponding author email: sushil.shukla@cuja.ac.in

ABSTRACT

In the present scenario of burgeoning population, industrialization and urbanization have resulted in rapid motorization. This has caused serious problems in city areas, due to inadequate emission control and lack of stringent environmental regulations. Pollutants of ambient air are a threat to both human and environmental health. In order to improve and protect the environment from pollution, sustainability between environment and development is vital. In the era of modern civilization, to achieve the goal of development by enhancing the transportation facility, a large amount of greenhouse gases (GHG), particulate matter, VOC and heavy metals are emitted. To reduce the emission of these pollutants levels without compromising on development in developing country like India, a sustainable approach is needed. Keeping this in view, the use of plants as natural purifier of atmosphere and its bio monitoring approach is to be the most worthwhile and eco-friendly technique to minimize and monitor air pollution in urban areas. Air Pollution Tolerance Index (APTI) is considered as a good tool to select pollution resistant and bio indicator species. Species that score higher APTI values are considered as the most tolerant species against polluted environment and preferred for the development of green belt and the species which scored low APTI value are the most sensitive species and act as bio indicator species of air pollution. The current paper provides an integrated comprehensive approach of assessment of both the pollution tolerant and sensitive tree species along the roadside and its effectiveness to control air pollution in city area.

Keyword: Sustainable management, Vehicular pollutants, greenhouse gases Volatile organic carbon, Air pollution tolerance index.



7th Annual International Convention
on
Sustainability in Current Scenario: Challenges & Solutions



Recent Dynamics of Kolahoi Glacier, Kashmir Basin, Western Himalaya

Riyaz Ahmad Mir^{1,2}

¹Department of Earth Sciences, Indian Institute of Technology Roorkee, India.

²Geological Survey of India, UT: Jammu and Kashmir, Srinagar, India

Corresponding author email: riyazgeol@gmail.com

ABSTRACT

The present study is focused on the Kolahoi Glacier (KG) located in upper River Jhelum basin of Kashmir valley, western Himalaya. It is a mountain glacier covering an area of 11 km². A peculiar characteristic of KG is that a major part of it discharges into the Lidder catchment/stream whereas a relatively small but significant part also drains into the Sind catchment/stream. Moreover, the KG is also an extensively studied glacier in the Himalayan region. Therefore, an analysis of recently published 15 studies was initially carried out to understand its dynamics over a period of 3-5 decades. The results indicated that the KG has been monitored most frequently using the SOI toposheet and recent satellite datasets of different sensors such as Landsat, IRS etc. About 9 studies have used SOI toposheets (1962) and 6 studies have used Landsat MSS scenes (1980, 1979, 1976) as base maps for the assessment. The results however indicated that there exists a discrepancy in the estimation of glacier area that is varying from 3.1 km² (1980) to 14.5 km² (1962) for the selected base years. Similarly, the area varied from 1.7 km² (2015) to 11.6 km² (2010) for the respective selected final years considered by these studies. Consequently, the glacier area also revealed discrepancy in the shrinkage that is varying from 4.9% (0.04 km²) to 27.6% (3.76 km²) as reported by different previous studies. In order to have a better insight into the KG shrinkage, an average of the previous results was calculated and it was found that the KG has lost an average area of 18.2% (2.3 km²) area during last 5 decades. Furthermore, using semi-automated approach based on ASTER GDEM and other datasets such as SoI map, Landsat data series (MSS, TM, ETM+, OLI) and Google Earth images, the KG was divided into Kolahoi Glacier 1 (K1) and Kolahoi Glacier 2 (K2) as per the discharge drainage to better understand its dynamics. The results indicated the total area of K1 and K2 to be 8.09 km² and 2.91 km² with an average length of 4.98 km and 3.53 km based on OLI (2016). From 1979 to 2016, the results showed an area loss of 11.66 % (30 m²/year) for K1 and 18.7 % (19 m²/year) for K2 with a combined loss of 13.63 % (1.74 km²) at a rate of 48 m²/year for the



7th Annual International Convention
on
Sustainability in Current Scenario: Challenges & Solutions



whole KG which is however lower than most of the above studies. While considering the SoI map, the study indicated a loss of 2.6 km² (19.1%) area loss from 1962 to 2016 which is very close to the above estimated average loss of 18.2%. The higher area loss of the KG is most probably due to the on-going climate change and warming. However, the K1 and K2 units showed a heterogeneous pattern of area loss that is strongly influenced by the topographic configuration and other local factors. Nevertheless, it is recommended that the glacier must be monitored using high resolution satellite and continuously for better understanding of the its dynamics and response to on-going climate change.

Keywords: Kolahoi Glacier, K1, K2, Jhelum, Kashmir, Himalaya



7th Annual International Convention
on
Sustainability in Current Scenario: Challenges & Solutions



Geographical Vulnerability to Respiratory Infections Using GIS – A Micro Analysis Study in the Himalayan Region of India

Manzoor Ahmad*, Ishtiaq A. Mayer

University of Kashmir, Srinagar, India
Corresponding author email: manzoorwani8559@gmail.com

ABSTRACT

Kashmir Himalaya with unique geographical identity encountered with vibrant atmospheric process and pre-existing discrete nature of socio-economic and behavioural environment among the residents are associated with high relative risk of developing respiratory infections. Geographical vulnerability index was estimated by inter-linking atmospheric variability (temperature, wind speed, relative humidity, atmospheric pressure, rainfall and aerosol optical depth), socio-economic and behavioural variability with the incidence of respiratory infections, by calculating incidence rate, relative risk rate, odds ratio (OR), and normal standard score (Z) value. The intensity of respiratory infections were calculated using Kendal ranking method and composite index technique and heat map was generated using Geographic information System (GIS), that will be useful in formulating and executing plans at the ground level more effectively and efficiently.

Keywords: Environment, Vulnerability, Risks, Respiratory infections, GIS



7th Annual International Convention
on
Sustainability in Current Scenario: Challenges & Solutions



**Agroforestry Solutions to Address Food Security and Climate Change
Challenges in India: An Overview**

Saima Farooq*, Khanday Mehraj

Sher-e-Kashmir University of Agricultural Sciences and Technology of Kashmir, India
Corresponding author email: saimafarooq623@gmail.com

ABSTRACT

Trees inside and outside forests contribute to food security in India in the face of climate variability and change. They also provide environmental and social benefits as part of farming livelihoods. Varied ecological and socio-economic conditions have given rise to specific forms of agroforestry in different parts of India. Policies that institutionally segregate forest from agriculture miss opportunities for synergy at landscape scale. More explicit inclusion of agroforestry and the integration of agriculture and forestry agendas in global initiatives on climate change adaptation and mitigation can increase their effectiveness. We identify research gaps and overarching research questions for the contributions in this special issue that may help shape current opinion in environmental sustainability. Variability in climate happens to be the primary concern of the entire world as it is hampering the integrity of the whole earth ecosystem. Human civilization is mostly dependent upon food, fodder, and fuel wood. The development and progress of human civilization lie with the sustainability of the environment. Climate change imposes negative consequences in terms of food insecurity, less agricultural productivity, depletion of natural resources, spread of pests, and diseases upon human civilization. In the agricultural sector, the impact is much more severe due to imbalances in the natural processes due to variability in climate. The present situation of 2perturbation in the climatic elements agroforestry appears as one potential practice under sustainable agriculture system to boost up agricultural productivity as well as a strategy for combating climate change. Such land-use practices promote elevated carbon (C) sink. Under these circumstances, agroforestry seems to have very high potential to combat climate change, but successful implementation of agroforestry does require some issues. Among them, development of suitable marketing mechanism, production of high-quality planting material, to become self-sufficient in terms of transportation and harvesting of agroforestry



7th Annual International Convention
on
Sustainability in Current Scenario: Challenges & Solutions



produce, ownership of lands on a long-term basis, the small holdings of land area are the key issues. Farmers need to be trained with extension activities, and awareness generation regarding long-term benefits of agroforestry should be inculcated in them. The major strategies throughout the country are to develop a uniform agroforestry policy having relaxations in the existing rules and regulations needs to be formulated, and the various agroforestry schemes under varied agro-ecological conditions should be implemented by framing some government bodies which also promotes research and development (R&D) activities in agroforestry. As India is a nation with diverse conditions, therefore, screening of suitable species along with specific agroforestry model should be done on the basis of local needs and desire.

Key words: Agroforestry, climatic change, agriculture, environment, productivity



7th Annual International Convention
on
Sustainability in Current Scenario: Challenges & Solutions



Urban Planning and Smart Cities

Gyan Prakash Sarkar

Department of Sociology, Dr. Ram Manohar Lohiya Avadh University Ayodhya, Uttar Pradesh, India
Corresponding author email: sarkargyanprakash@gmail.com

ABSTRACT

Today, if we talk about urban planning, it is directly based on European art, that is, Western civilization, but if we draw attention to Indian history, then the basis of urban planning in India is from the Indus and Harappa civilization itself. Urban planning in India is established by the Indus civilization. If we consider the basis of urban planning in the context of the present situation, modernization of rural civilization will be considered. Analysing the current urban planning, only technical changes have taken place. The rural houses which were made of mud. Brick and stone have replaced clay in urban planning. Eating and drinking have been replaced by the city's restaurants. Western cuisine has replaced food. The biggest change that is seen today in rural and urban planning is that even today there is no specific change in the caste system in rural areas. Caste has taken the place of category in the city. Capitalists dominate the urban planning civilization. The entry of urbanization planning into modernization is the main reason for smart cities. In today's India, as much as the smart cities are seen, it is seen especially that the capitalists have the right or influence on the poor and the poor have no existence. Mainly modernization system of road, house, transport, school, medical, restaurant has been adopted in smart cities, which is also the main requirement in the present society, but from a social point of view, modernity in urban planning and smart cities has brought Indian tradition and culture. Is extinct. Today, European civilization is being dominated all over the world. With this, our own civilization and culture is constantly in danger. The need for education, medicine and employment is important in modern India, which is being constantly tried by some intellectuals in urban planning and promoting and building smart cities. While the smart cities and complexes have taken their place but the understanding of humanity has ended. Urban planning has increased its proximity to less machines than humans. Urban planning and smart cities have reduced the importance of fertile land. People today have given more importance to cement and stone than grain. What is true that with such technology and civilization, we can



7th Annual International Convention
on
Sustainability in Current Scenario: Challenges & Solutions



ensure or streamline the destiny of the future. In the end, I will just take the view that modernization and technological change of the historical Indian rural environment is the framework of present day urban planning and smart cities. Where only the capitalists have left their place. Civilization and our important heritage rites have been ridiculed.

Keywords: Urban planning, Civilization, Smart Cities, Caste, Modernization, Technology, Capitalists, Rural areas.



7th Annual International Convention
on
Sustainability in Current Scenario: Challenges & Solutions



Mapping the Metropolitan Cities and Their Pollution Levels in a Cloud Platform Using Satellite Images

Susmita Paul¹, V. S. K. Vanama^{2*}

¹Department of Planning, School of Planning and Architecture, Vijayawada, India.

²Centre for Urban Science and Engineering, Indian Institute of Technology Bombay, Mumbai, India.

Corresponding author email: vsaikrishna1990@gmail.com

ABSTRACT

Urbanization is happening at a rapid growth rate in India. With the advancement in technology, there is a paradigm shift in cities' functioning and expansion. The emissions from various infrastructure, transportations, and industrial setups, have resulted in inhabitable conditions in the majority of the urban population classes, especially the low-income group (LIG). Air quality assessment in Indian megacities is urgently required as inadequate environmental policies turned those into hotspots of environmental issues. To this end, the Kolkata metropolitan city and its surroundings are selected as a study region. Kolkata is one of the megacities urgently needed policy and strict implementation measures to ensure clean air in the near future. The paper demonstrates the urban growth of Kolkata city is mapped through high and medium-resolution temporal optical satellite images from Landsat-8 and Sentinel-2. The air pollution parameters such as NO₂, SO₂ are mapped from the Sentinel-5P satellite. Furthermore, the relation between urban growth and air pollution is explored before and during the Coronavirus pandemic by integrating multi-temporal remote sensing images on the Google Earth Engine (GEE) platform. The study found that the non/moderate functioning of the Kolkata city results in minimal air pollution during the months of Apr-Aug 2020. This research provides an easy-to-adapt process in determining the change of the rate of emissions in the environment and can be scalable to other cities. From the findings of this study, the planning authorities can consider the possible human vulnerability to pollution associated with rapid urbanization while preparing the city development plans.

Keywords: Google Earth Engine (GEE), Kolkata, Urbanization, Air pollution, Sentinel-5P.



7th Annual International Convention
on
Sustainability in Current Scenario: Challenges & Solutions



Reducing the Carbon Footprint in Sri Lankan Datacentres towards the Sustainable Development

Herath H. M. Y. L. P.

Department of Environmental Management, Rajarata University of Sri Lanka, Mihintale, Sri Lanka
Corresponding author email: Yukthi.h@gmail.com

ABSTRACT

As number of growing organisations seeks to become major players in today's data-driven economy, the data centre remains one of the most important pieces of the business infrastructure. At the simplest form, a data centre is a physical facility that organizations use to house their critical applications and data. The researcher the United States Department of Energy computer-based models have shown that an increase in greenhouse gas emissions results in the gradual rise of the Earth's average surface temperature. It expects that the rising temperatures over time may have an impact on the climate changes. Though there is no an exact definition for 'Carbon footprint' the common baseline is that the carbon footprint stands for a certain amount of gaseous emissions that are relevant to climate change and associated with human production or consumption activities.. The main objective of this study was to identify the impact made by the datacentres towards the carbon footprint and to suggest new technologies and concepts for the Sri Lankan datacentres in order to reduce their energy consumption and the carbon footprint. Since only the authorized personals are allowed to access the data centres the Primary data were collected through interviewing 2 personals who have been to the respective data centres. Secondary data were collected by reviewing previously published journal articles, research papers & etc. As per the research carried out, the researchers were able to identify that most of the global data centres were using greener concepts than the Sri Lankan data centres. Especially the Sri Lankan data centres are using the main electricity as the primary energy source and continuous running generators as the secondary energy source while most of the global data centres use much renewable energy sources as their primary energy source which reduces the carbon footprint. Further, most of the Global data centres use renewable energy sources like Solar, Wind as their primary energy source and they use biogas to power up the data centres. But when we look at the Sri Lankan context in the Sri Lankan data centres, they are powered up with the general electricity lines and the backup is provided by the continuous running generators



7th Annual International Convention
on
Sustainability in Current Scenario: Challenges & Solutions



which consume a huge amount of diesel which has a direct impact on the carbon footprint. So, based on the research carried out, the researcher was able to conclude that the presented hypotheses (Cooling technologies used, primary/ secondary energy sources used, Use of continuous Running Generators) are the areas which have an impact on the carbon footprint of the Sri Lankan Data Centres. Therefore, implementation and improvements of these concepts would lead a greener, sustainable IT infrastructure in Sri Lanka.

Keywords: Datacentres, Carbon Footprint, renewable energy sources, Sustainable Development, Climate Change



7th Annual International Convention
on
Sustainability in Current Scenario: Challenges & Solutions



Groundwater Quality Assessment with Respect to Heavy Metal Content by Using Heavy Metal Pollution Index (HPI) of Moradabad District, Uttar Pradesh, India

Saddam Husain^{1*}, Shadab Khurshid², Salman Ahmad¹

¹Department of Geology, Aligarh Muslim University, Aligarh, Uttar Pradesh., India

²Interdisciplinary Department of Remote Sensing and GIS, Aligarh Muslim University, Aligarh, Uttar Pradesh, India

Corresponding author email: husain.saddam28@gmail.com

ABSTRACT

Heavy metal pollution index (HPI), is a rating method to assess the water quality and to categorize the groundwater pollution with respect to heavy metals content. The aim of the present study is to look over the current status of heavy metals pollution in and around Moradabad city. Heavy metal pollution in water has gain universal consciousness due to its tenacity, accumulation in the food chain and negative effects on ecological as well as human health. The study focuses on examining the content of heavy metal (Zn, Fe, Cd, Mn, Pb, Ni, Cu, and Cr) in the 30 water samples from the surrounding areas of Moradabad city. The concentrations of Cd, Mn, Fe, Cu, Pb, Zn, Ni, and Cr in water samples have recorded in the Pre and Post-monsoon season 2017. The examined samples reveal that the contamination level of heavy metal is in following sequence Ni>Fe>Pb>Cd>Cr>Cu>Zn>Mn in premonsoon 2017, whereas in postmonsoon, heavy metal are show values as Fe>Pb>Ni>Mn>Cr>Cu>Zn>Cd. The HPI average value in pre-monsoon 2017 is 13.07, which recommended that the groundwater quality is good. While in post-monsoon season HPI average values has been found 159.26 suggesting that the water quality is poor to inferior. The correlation matrix has been evaluated and shows a positive correlation with the elements. Heavy metal leaching from these disposal points may contaminate the groundwater as well as surface water resources. The study shows that heavy metal concentration has a noticeable rise in water due to different anthropogenic and various natural sources of contamination.

Keywords: Heavy metal pollution, HPI, Spearman's correlation coefficient, Groundwater quality.



**7th Annual International Convention
on
Sustainability in Current Scenario: Challenges & Solutions**



Review on Deep Learning Applications in Agriculture

Priyanka Gupta

Centre for Climate Change and Water Research, Suresh Gyan Vihar University, Jaipur, Rajasthan, India
Corresponding author email: mail.er.priya@gmail.com

ABSTRACT

Deep Learning is a new technique which integrates the big data analysis with modern technique for image processing and data analysis. Deep learning has big potential and is already being applied in various fields like medical research, self-driving cars, automated speech recognition, NLP (Natural Language Processing) and image restoration to name a few. The potential is vast and only limited to our imagination. In agriculture, Deep learning has been introduced recently and it has already shown great promises. With this, various agriculture problems such as identification and detection of disease can be resolved. It can also help in automated identification of plants, fruits and even counting them. In this study we perform a review of research effort that employ deep learning techniques, applied to various agricultural problem such as disease identification or detection, food production challenges, crop mapping, crop monitoring, irrigation, weed detection, pest detection and management, fruit grading, herbicide and identification of seeds and reorganizations of species etc. This paper review particular agricultural problems, specific models, framework employed, the sources, pre-processing of data used, the overall performance achieved according to the methodology used at each work under study. Furthermore, we study various deep learning techniques applied in various field and also compared it existing techniques. Deep learning performed different in classification and regression performance. Our findings indicate that deep learning provides high accuracy result, exceed than traditional image processing technology in terms of accuracy. Deep learning provides high accuracy and performed better when compared to existing used image processing techniques. The deep learning model is extended from classification task to yield production, detections and disease segmentation.

Keywords: Deep Learning, agricultural problem.



7th Annual International Convention
on
Sustainability in Current Scenario: Challenges & Solutions



Geo-morphometric Analysis of the Dehar Watershed Himachal Himalaya

Arun kumar^{1*}, M. Prashanth¹, Sunil Dhar²

¹Discipline of Geology, School of Sciences, IGNOU, New Delhi, India

²Department of Environment Sciences, Central University Jammu, Jammu and Kashmir, India

Corresponding author email: arundhawan92@yahoo.com

ABSTRACT

Himachal Pradesh with its complex geological structures presents a complicated topography with intricate mosaic of mountains ranges, hills and valleys. The Dehar watershed lies in the Kangra and Chamba district of Himachal Pradesh that forms a part of Beas river drainage system. The study area is the part of lesser and outer Himalaya. The study area encompasses 450 km² of Himachal Pradesh state and assumes significance on account of its seismo-tectonic history that reveals the area to be wedged between the two collision boundaries and linked with intense continental convergence of the northward moving Indian plate. The morphometric prioritization is considered to be a more suitable approach than other prioritization techniques to assess the erosional constraints and in the sustainable soil resource planning and management. Keeping this in view, the present study was taken-up for priority ranking and categorization of eight sub-watersheds of the Dehar watershed of the Beas river basin, located in the tectonically fragile and erosion prone zone of the Himachal Himalaya using weighted sum analysis method. The present study involved hypsometric analysis and calculation of different linear, aerial and relief parameters of the watershed. The study revealed that the maximum region of the watershed is in moderate to high erosion zone. The reasons for the high rate of soil loss are fragile geology, high rainfall and the continuous structural activism in the region. The results of the study can play a handful role in the future soil resource planning and watershed management.

Keywords: Watershed, Soil-erosion, prioritization & Planning.



7th Annual International Convention
on
Sustainability in Current Scenario: Challenges & Solutions



Realizing the Dream of Climate Resilient Smart Cities in India: Indicators for Sustainable Urbanization

Majid Farooq^{1*}, Suraj Kumar Singh²

¹Centre for Climate Change & Water Research, Suresh Gyan Vihar University, Jaipur, Rajasthan, India

²Centre for Sustainable Development, Suresh Gyan Vihar University, Jaipur, Rajasthan, India

Corresponding author email: majid.60669@mygyanvihar.com

ABSTRACT

In our country, urban areas cater to about 377.1 million out of the total population of 1210.2 million. The net addition of 91.0 million population over the last decade, particularly in the urban centers, makes it evident that the path to sustainable development revolves around these urban areas. Rapid urbanization brings the issues that tend to damage 'urban centers' basic functionalities, which makes it challenging to be a liveable place. The sanctioning of 100 new smart cities by the Government of India shows that the country is on the path of development and has tactically responded to the foreign and national populace. A city's response to climate change mitigation and adaptation is crucially linked to how the city operates. Climate change is recognized as a significant risk faced by almost all the urban and regional economies. This study intends to identify the critical challenges of urbanization and its environment. Addressing these challenges depends on assessing and monitoring several indicators that include socio-economy factors like demographic analysis, educational infrastructure, health facilities, and the environmental (biophysical) indicators. The monitoring and assessment of bio-physical indicators are dynamic and need to be presented in multiple layers; hence it would require a geographical information system to prepare a sustainable management plan. This study aims to identify a few environmental indicators that need to be integrated into smart cities' planning process. These factors include indicators of geographical setting (slope, aspect, elevation), climate (temp, precipitation, humidity), atmospheric pollution (levels of CO₂, NO_x, SO_x, PM), water resources (supply, demand), energy resources, and urban green space. This study also discusses the rationale for selecting these indicators and analyzing multiple data sets to manage smart cities.

Keywords: Smart cities; GIS, Indicators; Mitigation; Climate change



7th Annual International Convention
on
Sustainability in Current Scenario: Challenges & Solutions



Environmental Aspects of Wastewater Reuse in Agriculture

Ghufran D. Abdulhussein Almahdawi

Ministry of Water Resources, Directory of Planning & Follow-Up, Environmental Policies Department,
Baghdad, Iraq
Corresponding author email: ghufran.almahdawi@yahoo.com

ABSTRACT

The discharge of wastewater from the clarifying stations is one of the main problems facing the world at present, which is increasing at high rates due to the increase in the amount of water consumed at the national level and the high standard of living and urbanization because of the negative effects that water causes on the environment and human beings in particular when they are thrown into nearby rivers, especially if that water banking does not conform to the discharge specifications or design standards of the station due to the increase in the population, which leads to the diversion of excess water not treated directly into the river, so the use of treated wastewater in agriculture is a valuable resource in terms of quantity and can be used as an alternative to traditional river water in terms of :a) Providing additional sources of water, nutrients and organic materials to improve the soil. b) Improving the environment by preventing or reducing discharge to surface water .c) Conserve freshwater sources and reduce their consumption .The most important determinant of the reuse of treated wastewater is that of public health and environmental considerations because of the potential risks to these aspects of the biological and chemical elements in those waters .The research aims to study the use of wastewater for the Al-Rustamiyah station for sewage clarifying in the irrigation of agricultural land and orchards near the site of the station by measuring the concentration thrown into Diyala River and its compatibility with environmental determinants of drainage, in addition to comparing it with the specifications of use for agricultural purposes and showing the environmental aspects achieved by not draining that water into the Diyala River to take preventive measures and maximize the health prevention plan .

Keywords: wastewater, wastewater clarifying stations, environmental impact, agricultural.



7th Annual International Convention
on
Sustainability in Current Scenario: Challenges & Solutions



Delineation of Groundwater Potential Zones Using Bivariate Statistical Model, Remote Sensing and GIS in A Semi-Arid Watershed

K. C. Arun Kumar^{1*}, G. P. Obi Reddy¹, P. Masilamani², P. Sandeep¹, S. Arun²

¹ICAR-National Bureau of Soil Survey and Land Use Planning, Amravati Road, Nagpur, India

²Department of Geography, Bharathidasan University, Tiruchirappalli, Tamilnadu, India

Corresponding author email: way2akc@gmail.com

ABSTRACT

Groundwater is an important natural resource in arid and semi-arid environments, where extracted from the wells utilized as the principal water supply for human practice and induced for sustainable agricultural development. The objective of the present study is to evaluate the groundwater potential zones (GWPZs) by using the bivariate statistical model of the frequency ratio (FR) in the Sarabanga watershed located in the Tamil Nadu State of South India. There are eight conditioning factors were considered for GWPZs delineation which included land use/land cover, drainage density, slope, lineament density, geology, geomorphology, rainfall, and soil texture. The well inventory data has been developed from 135 well locations in the watershed. Based on the GWPZs of FR model, 9.0% of the study area is covered by poor zone of groundwater potential, and 67.8% of Sarabanga watershed is covered by very good and excellent potential zones, respectively. The GWPZs map was validated by using the area under curve (AUC) method with test data and the prediction rate for FR model is 0.7313, and the FR model illustrates good performance in groundwater potential assessment. The bivariate statistical model of FR provides the efficient, reliable and cost-effective results and it helps the thorough evaluation of the development of groundwater exploration and environmental management in strategic planning for government agencies and policymakers.

Keywords: Groundwater potential; frequency ratio; bivariate model; Semi-arid region; GIS



7th Annual International Convention
on
Sustainability in Current Scenario: Challenges & Solutions



Climate Change and India: Challenges and Development

Pradeep Adhikary

Department of Political Science, South Malda College, Malda, West Bengal, India
Corresponding author email: pradeepadhikary.net@gmail.com

ABSTRACT

Climate change is one of the main environmental challenges facing the world today. India is facing several problems. Climate change is associated with various adverse impacts on agriculture, water resources, forest and biodiversity, health, and an increase in temperature. Climate change would represent additional stress on the ecological and socio-economic systems that are already facing tremendous pressure due to rapid industrialization, urbanization, and economic development. The research paper is aimed at bringing out the impact of climate change in India. The present study highlights major challenges before India is to address the issue of climate change and minimize its adverse impacts. The paper will review the findings from different policies of government on climate change. There are few issues before India in particular: reducing the emission of Green House gases, reliance on fossil fuel to renewable and clean sources of energy, provision of adequate finance of efficient technology to make this shift a sustainable one, overpopulation is one of the biggest challenges before India which is indirectly linked to the issue of climate change, rapid population growth has resulted into the environmental degradation. This paper analysis the efforts made by the government of India to reduce environmental challenges. These are the initiative of the National Solar Mission, National Mission for Enhanced Energy Efficiency, National Mission on Sustainable Habitat, National Water Mission, Green India Mission, National Mission for Sustainable Agriculture, Swachh Bharat Mission, Clean Ganga Plan. These policies are launched by the government but all these depend on proper implementation and political awareness on the issuer of climate change both at the international and domestic level.

Keywords: Climate Change, Global Warming, Green House Gas, Sustainable Development, Renewable Energy.



7th Annual International Convention
on
Sustainability in Current Scenario: Challenges & Solutions



**Water Reaping Structures Strategy for Biodiversity Conservation through
Hydro-Geomorphological Analysis - A Case Study of Lakhpat Taluka,
Kachchh District, Gujarat, India**

Ajoy Das

Department of Geography, School of Sciences, Gujarat University, Ahmedabad, Gujarat, India
Corresponding author email: ajoydas@gujaratuniversity.ac.in

ABSTRACT

Micro-Watershed management in rain fed areas of arid and semi-arid regions aims at easing agronomic drought by applying water reaping measures. Water reaping measures serve as mechanisms for boosting groundwater recharge, and for earth surface storage, While the water reaping structure benefits and it is widely accepted, there is cumulative apprehension regarding their sustainability and effectiveness. The Lakhpat taluka is located along with the 23° 24' North Latitude to 23° 50' North Latitude and 68° 25' East Longitude and 69° 12' East Longitude. This taluka is recorded with last conserve tropical thorn forest in our country, with having Narayan Wildlife Sanctuary and many Reserve Forests, which are very significant for unique biodiversity. Lakhpat taluka is also recorded with maximum deposition of minerals including lignite, which is an economically very rich resource. So, for better planning on the utilization of natural resources and biodiversity conservation in this taluka, this study is very beneficial. The total area of the Lakhpat taluka including nearby coastal islands (Govt. Land) is 2113.2 sq. kilometres. The elevation of this region is ranging from 12 to 390 meters. The Kachchh peninsula is characterized by Aeolian deposits of Pleistocene and recent age. The soil of this region covered by Aridosols, dry with paedogenic horizons, and very less organic matter with saline and alkaline in nature. The northern portion of this area has two major rivers as Kali and Korwadi. This area comes under the Kali river watershed. Korawadi is the tributary of the Kali river. The Kali river flows towards South to West and Korawadi from East to West and discharges into the Kori creek. The Kali rises from Lakhpat Hills which belongs to the central part of western Kachchh mainland. The upper watershed of the Kali river developed a highly rugged terrain mainly of Decan basalt. The application of water reaping measures in upstream influences to reduced inflows to downstream segments. Presently watershed management is strategically designed by considering basic information about the hydro-geomorphological regime. This approach will be



7th Annual International Convention
on
Sustainability in Current Scenario: Challenges & Solutions



effective for the upstream and downstream channels with its associated habitat areas for rich biodiversity. This method will help to find out the probable site for the water reaping structures like check dams based on the various hydro-geomorphological factors (Soil, relief structure, slope, catchment area, LULC, etc.). The results from this study indicate that the proposed sites can be used to construct the check dams for a successful sustainable and effective micro-watershed management plan.

Keywords: Watershed, Management, Catchment, Conservation, Structure, Strategy, Geomorphology, Hydrology, Biodiversity.



7th Annual International Convention
on
Sustainability in Current Scenario: Challenges & Solutions



Effect of Amphan Cyclone in West Bengal

Supriyo Halder

Dr. C V Raman University, Bilaspur, Chhattisgarh, India
Corresponding author email ssupriyo2011@gmail.com

ABSTRACT

The super-cyclonic storm ‘‘AMPHAN’’ hit Eastern India, specifically the state of West Bengal, Orisha and parts of Bangladesh in May 2020, and caused severe damage to the regions. In this study, we aim to understand the self-reported effects of this natural disaster on residents of the state of West Bengal. To that end, we conducted an online survey; door to door survey some parts of this region, to understand the effects of the cyclone. This report describes our findings from the survey, with respect to the damages caused by the cyclone, how it affected the population in various districts of West Bengal, and how prepared the authorities were in responding to the disaster. We found that the participants were most adversely affected in this disaster due to disruption of services like electricity, phone and internet(as opposed to uprooting of trees and water-logging). In summary, our study analyzes self-reported data collected from grassroots, and brings out several key insights that can help authorities deal better with disaster events in future.

Keywords: ‘AMPHAN’, damage, disaster, uprooting of trees, self-reported data



7th Annual International Convention
on
Sustainability in Current Scenario: Challenges & Solutions



**Kibra Slum: The Effects of Disposable Diapers on Sustainable Environment
in Kenya's Slums**

Wycliffe Otieno Ouma

Centre for climate change & water Research, Suresh Gyan Vihar University, Jaipur, India
Corresponding author email: otienowycliffe30@yahoo.com

ABSTRACT

Kibra slum is situated in the capital city of Kenya called Nairobi. It is the biggest and poorest urban slum in the entire Africa. Kibra has an area of 2.38 km² and has a population about 700,000 people which means more than 300,000 inhabitants per square metre according to the UN-habitat/research international report, 2005. Kibra has very poor drainages, and crowded houses that leave no space for toilets, proper drainages and disposal sites for domestic wastes like disposable diapers and others. According to CMI report, 2015, the young children between the age of 0 to 3 years constitutes 9% of the total Kibra population which translates to about 63000 children. Putting this big population of children to consideration, it therefore translates to at least 126000 diapers disposed daily from the households as each child can use at least two disposable diapers per day. The national environmental management authority states that after the ban of polythene bags, the main source of solid waste is now the disposable diapers. The disposable diapers are made from variety of plastic-based materials e.g. polyethylene materials that are non-biodegradable. These materials have greater impact on ozone depletion and thus greatly affecting the sustainability of the environment. Once these large quantities are carelessly disposed off in a highly dense populated area, they tend to be washed by runoff water into the rivers thus making water in this area unfit for drinking and for other domestic consumption. It also affects the aquatic life as the dissolve oxygen in water is compromised and even brings about eutrophication of the water bodies and its subsequent impacts. Secondly, when they are left into the open air without proper management, they tend to produce greenhouse gases like methane thus global warming effect The main reason behind the massive use of these disposable diapers are: first, they are cheaper and readily available to the poor inhabitants, two, there is lack of environmental awareness on their impacts, there is insufficient information about the washable diapers or other eco-friendly diapers and lastly, lack of government policy to govern



7th Annual International Convention
on
Sustainability in Current Scenario: Challenges & Solutions



the production, distribution and usage of disposable diapers. This presentation therefore seeks to mitigate these problems on environment.

Keywords: slum, biodegradability, eutrophication, ozone layer, eco-friendly etc



7th Annual International Convention
on
Sustainability in Current Scenario: Challenges & Solutions



**Sustainable Management of Natural and Public Resources at Panchayat Level
Using Geoinformation**

Tufail Mohi-u-Din Wani*, Gowhar Naseem, Majid Farooq

Department of Ecology, Environment & Remote Sensing, Srinagar, Jammu & Kashmir, India
Corresponding author email: tufailaatif@gmail.com

ABSTRACT

Panchayati Raj system is autonomous body of self-governance which deals with all aspect of village. Villages are the basic unit of administration; it is therefore imperative to provide adequate powers to villagers so that they have real sense of development. For almost all the panchayat level activities, like education, health, water, works, energy, etc there are several analyses available which reveals that there is huge inefficiency of system associated with the planning and management of funds as well as works. The rural villages of Himalayan regions are blessed with rich forests, water and land resources. Over the years geoinformatics has emerged as an effective tool for decision making and planning. The main purpose of the study was to analyze the management of natural and public resources at panchayat level. The GIS domain provides the capabilities of layered information which is beneficial for grassroots level planning, e.g. planning a new school, a new health center, a new anagnwadi center, etc. Besides, it can provide timely information to farmers about soil health, land utilization, fertilizer application, etc. Analyzing of multi-layered information in GIS can be helpful in effective water utilization, finding suitable water recharge zones, feasibility of new irrigation canals scientifically. It was found that geoinformation can prove very beneficial for analyzing various ground scenarios and developmental works can be effectively executed, managed and monitored in a sustainable manner.

Keywords: Geoinformatics, Panchayat, planning, decision support system, monitoring



7th Annual International Convention
on
Sustainability in Current Scenario: Challenges & Solutions



Feasibility Study on the Sustainability of Circular Management of Water Resources in Developing Countries

Ajoge, H. N.^{1*}, Muhammad Jamil²

¹National Water Resources Institute, Kaduna, Nigeria

²Nigerian Defence Academy (NDA) Post Graduates School, Kaduna, Nigeria
Corresponding author email: deezama0@gmail.com

ABSTRACT

Developing countries are in a great position to take full advantage of the new economic opportunities available globally posed as a result of recent happenings. With regards to circular economy in developing countries, a lot of informal sectors in these regions are already incorporating circular practices and with proper integration it could create higher value supply chains and business opportunities (Chatham House, 2019). These are practices that deal with the minimization of waste, emission, and energy leakage through recycling, reuse, remanufacturing, and treatment of materials which will create and optimize a closed resource loop system that could help meet the material needs of the population's per capita resource utilization. With water being a primary necessity in our day to day activities, circular water management can contribute greatly to the circular economy by closing water loops; i.e. regeneration of urban and industrial wastewater, storm water, and saltwater and their reuse in sectors such as agriculture, industry, and public green, resource recovery from the water; such as phosphorus, and energy from wastewater and its sludge (Peter, 2020). The circular water management covers vast aspects of the water sector, which includes recovery of resources and energy from water streams and other waterways, the development and implementation of water related technologies that could contribute towards energy transmission, and the reuse of water for robust freshwater provision and its sustainability. These innovations have the potential to address the water shortage issues faced by some of these developing countries and help achieve the UN SDG's target of 6.1 billion people to have access to safe water by the year 2030 (UNSD, 2020). In this paper we will study how water resources can contribute to the realization of circular economies in developing countries, the drivers and the barriers to the circular water management in these regions, its feasibility, sustainability, economic impacts and effects to the society, as well as mitigate the



7th Annual International Convention
on
Sustainability in Current Scenario: Challenges & Solutions



shortage and efficiency issues that affect water, energy and materials, and develop new supply chain for water users to achieve a higher water, energy and materials efficiency level, whilst curtailing environmental and societal impact and creating business opportunities for these regions.

Keywords: Circular-Management, Water Resources, Wastewater, Sustainability, Economy.



7th Annual International Convention
on
Sustainability in Current Scenario: Challenges & Solutions



Assessment of Geoheritage for Geotourism Promotion: A Study from Mehrangarh Ridge in Jodhpur City, Western Rajasthan, India

Saurabh Mathur^{1*}, Sudhanshu¹, S. K. Singh¹, S. C. Mathur²

¹Centre for climate change and water research, Suresh Gyan Vihar University, Jaipur, India

²Department of Geology, J.N. Vyas University, Jodhpur, India.

Corresponding author email: saurabh.59659@mygyanvihar.com

ABSTRACT

One of the largest Mehrangarh ridge (MGR) of Jodhpur situated in north western part of India is endowed with significant georesources of volcanic rocks of Malani Igneous Suite (MIS) of Cryogenian age and Jodhpur Group (JG) of Ediacaran age belonging to Marwar Supergroup (MSG). MIS is the third largest, felsic, anorogenic and terrestrial volcanic province of the world that witnessed Pan African orogeny related to the splitting of Rodinia Supercontinent. Unique and rare volcanic features of MIS at MGR have been declared as the National Geological Monuments of India with its interface with JG. Rocks of JG at MGR display a distinct suite of fluvio-deltaic to coastal sediments that preserve treasure of sedimentary structures with rich assemblage of oldest and complex Ediacaran fossils. MIS and JG together constitute strato-type sections and outdoor geological museums in India that display geological processes of about 200 million years of the Earth's history. Such records of past tectonics, climates and environments characterize the land-sea interaction and distribution in this part of the Eastern Gondwana land that represent global geodiversity and provide eminent narratives for geo-education. However, these relicts, volcanic - sedimentary forms and site-specific landforms of MGR have received less attention and significance towards their geoheritage values. MGR also endowed with many archaeological heritage monuments (HM) with additional cultural values are constructed by indigenous Heritage Stone Resources (HSR) of JG. The HM represent old patronage of Jodhpur since medieval time that make it a famous tourist destination of the world. In absence of geotourism applications and infrastructures in India, efforts are made under present study primarily to provide suitable qualitative methodologies to identify geosites and assess geoheritage of educational and geotourism values taking MGR as a case study. Based on the proposed methodologies, we propose twelve geosites of geological, geomorphological and archaeological types of geoheritage at MGR. These significant geosites of the Cryogenian -



7th Annual International Convention
on
Sustainability in Current Scenario: Challenges & Solutions



Ediacaran successions should be conserved as important geoheritage sites for geotourism through the proposed Geopark at MGR in Jodhpur.

Key words: Mehrangarh ridge, Cryogenian and Ediacaran landscape, Georesources, Geosites, geoheritage, Geotourism, Geopark and Promotion of tourism.



7th Annual International Convention
on
Sustainability in Current Scenario: Challenges & Solutions



Potential Calculation Methods for Soil Organic Carbon Stock Estimates and Evaluating Their Methodological Biases

Haftay Hailu

Department of Land Resource Management and Environmental Protection, Water Resources and Irrigation Management, College of Dryland Agriculture and Natural Resources, Mekelle, Ethiopia
Corresponding author email: haftay.hailu@mu.edu.et

ABSTRACT

Assessment of soil organic carbon content (SCC), bulk density (BD), rock fragment content (RFC), and depth of specific soil layer are vital to compute soil organic carbon stocks (SCS). However, various uses of these soil parameters could create substantial biases. Four different calculation methods were reviewed from 495 publications and explained why three out of four often applied calculation methods overestimate SCS. In soils with more RFC (>35 vol. %), SCS could be overestimated by greater than 33.31 t ha⁻¹, as showed by using northern Ethiopia agricultural soil data. Due to the difference in RFC, the average methodical overestimation for these soils were varied from 0.46 to 31.31 t ha⁻¹ for three different commonly applied equations. The equation combine as rearranged in this paper could help to unify SCS estimation and evade overestimation in future uses. Furthermore, the misused calculation methods of BD and RFC must be corrected to estimate correct values of SCS for its future maintainable uses and to alleviate the unprecedented increase in CO₂.

Key words: soil organic carbon content (SCC), bulk density (BD), rock fragment content (RFC)



7th Annual International Convention
on
Sustainability in Current Scenario: Challenges & Solutions



Evaluating Land Use and Land Cover of NCR Using Google Earth Engine

Sukanya Ghosh*, Deepak Kumar, Madhulika Singh

Amity Institute of Geoinformatics and Remote Sensing, Amity University, Noida,
Uttar Pradesh, India

Corresponding author email: sukanyaghosh772@gmail.com

ABSTRACT

Ever since the advent of geospatial technology, contributing significantly to numerous earth science domains like environmental data analysis and monitoring climatic change. Also, used effectively in hazard mitigation, managing calamities, and allocation of resources. Combined with emerging cloud-based technology providing remarkable opportunities in real-time analysis with rapid processing of big datasets. This technology takes less time and completes all analyses without consuming much storage thus offsetting remote sensing limitations. The spatial analysis represents the realities of the earth's surface by studying the land cover and connecting it with the usage phenomena performed by the generations of human existence. The present study highlighted the Land use and land cover information for better understanding aspects of land utilization and planning development in a sustainable manner. LULC of National Capital Region (NCR) with an area of approx. 50,000km² through advanced techniques of image classification using Sentinel-2 satellite images served on Google Earth Engine (GEE). This study helped in monitoring the spatial patterns and environmental changes. The overall accuracy obtained from the classification is convincing. Therefore, the designed method aims to generate accurate land use and land cover mapping automatically based on a cloud-based platform like GEE that is promising to resolve global environmental challenges.

Keywords: Environment, geospatial technology, Land-use Land-cover (LULC), and Google Earth Engine.



7th Annual International Convention
on
Sustainability in Current Scenario: Challenges & Solutions



**Application of Various Indices to Extract Litchi Cultivation Area of
Muzaffarpur District, Bihar**

Bhartendu Sajan^{*}, Varun Narayan Mishra

Centre for Climate Change & Water Research, Suresh Gyan Vihar University, Jaipur, Rajasthan, India
Corresponding author email sajanthakur4994@gmail.com

ABSTRACT

The progress of spatial, temporal, spectral and radiometric solutions in satellite technology has led, with success, to a more precise and enhanced research into agriculture. Vegetation Indices (VIs) obtained from remote sensing-based canopies are quite simple and effective algorithms for quantitative and qualitative evaluations of vegetation cover, vigor, and growth dynamics, among other applications. The purpose of this study was to analyse the various vegetation indices and give comparison between them and find out which of the vegetation index model is appropriate to extract litchi cultivation area so in this study, I have applied 10 different vegetation indices such as IPVI, NDVI, RVI, GRVI, DVI, GDVI, GNDVI, VARI, NDSBVI and NGBDI. Accuracy assessment have been done based on 40 training samples over each of the VI, training have collected from google earth image on the basis of visual interpretation. The overall accuracy of 63%, 55%, 50%, 53%, 48%, 35%, 59%, 47%, 45% and 83% were achieved respectively. So, On the basis of accuracy assessment it has analysed that NGBDI (Normalized Green Blue Difference Index) model is appropriate for mapping of litchi cultivation area and on this analysis, it is found that the area of Litchi plantation field is increased from 1990 1311.53 hectare to 2020 15002.63 hec in Muzaffarpur District, Bihar.

Keywords: Vegetation Indices, Remote Sensing, GIS, Accuracy Assessment



7th Annual International Convention
on
Sustainability in Current Scenario: Challenges & Solutions



**Monitoring of Snow Cover Variations in the High Mountain Asia Region
Using Cloud Mitigated NASA MODIS Snow Products**

Nishu Bhardwaj^{1*}, Bhaskar R. Nikam², S. K. S. Yadav¹, Sudhakar Shukla¹, Manaruchi Mohapatra², Joyeeta Poddar¹, S.P. Aggarwal²

¹Remote Sensing Applications Center Uttar Pradesh Lucknow, India

²Indian Institute of Remote Sensing Dehradun, India

Corresponding author email: nishubhardwajrsac@gmail.com

ABSTRACT

Snow cover is an important resource of freshwater for the region of High Mountain Asia which directly affects the ecosystem as well as the 240 million people who live in the region fed by snow and glacier melt water. Mapping and monitoring of snow cover changes is of utmost importance for estimation of snow melt runoff using Hydrological models. Monitoring of snow cover is necessary but the presence of cloud pixels in the snow cover data hinders its applicability; hence a methodology to remove cloud pixels in the data is required. We know that generation of snow cover maps using in-situ observations is an arduous task, so we use an approach of remote sensing not only for the generation of snow cover maps but also for the calculation or estimation of different parameters of snow and the estimation of regional snow line elevation. The present study uses the MOD10A2 & MYD10A2 MODIS 8 day snow cover products. These MODIS snow cover products (MOD10A2 & MYD10A2) are freely available at spatial resolution of 500m but main problem in the available imagery is the availability of cloud coverage. For this we mitigate the cloud cover using three Spatio-temporal filters. The first step (Terra and Aqua Combination) removes approximately 51.044% of the total existing cloud. This first Terra-Aqua combination filter was an effective filter for cloud mitigation. The second step (short term temporal filter) removes approximately 36.157% clouds. 87.201% of clouds are removed by these two filters. For removing the remaining clouds we use the nearest neighborhood filter which removes approximately 12.528% of clouds Remaining 0.271% cloud cover is exists in the imagery. For the accuracy assessment of snow product we comprise the 8 day MODIS snow cover product with Landsat-7 ETM+ and Landsa-8 OLI snow cover products. The validation showed a strong agreement with Landsat imagery and provides an accuracy of 93.56%. We analyzed the total 506 images of 8 day MODIS snow products and estimates the



**7th Annual International Convention
on
Sustainability in Current Scenario: Challenges & Solutions**



area of snow cover i.e. SCA . It is found that the maximum SCA is on the 02nd February 2008 which is equal to 1.07892875 million sq. km. while the minimum snow cover area is found on 20th July 2009 and which is equal to 0.3229235 million sq. km. Our study estimates the SCA with the 8 day MODIS snow cover product 2008 to 2018 and found that the average snow-covered area is equal to 0.652 million sq.km. This estimated snow cover area is the 15.52% of the total geographical area of the HMA region. After that we calculate the different snow cover indices like Snow Cover Area, Snow Persistence Index, and Snow Cover Probability maps, variations in the snow cover area. This MODIS snow cover data over the region can be further used to study the climatology and Cryospheric properties of the HMA region. After that, we use this data for the estimation of Regional Snow Line Elevation.

Key Words: SCA, SPI, SCPM, HMA, MODIS, RSLE



7th Annual International Convention
on
Sustainability in Current Scenario: Challenges & Solutions



Seismogenic Structure in Quaternary Lacustrine Deposits of Dariyaoganj Lake in Upper Ganga Plain Uttar Pradesh, India

Gufran Ali*, M. Shamim Khan

Department of Geology, Aligarh Muslim University, Aligarh Uttar Pradesh, India
Corresponding author email: gufranpasha786@gmail.com

ABSTRACT

Many workers have studied the tectonic geomorphic and seismic aspects of the northern tectonically active part of Ganga Plain. The aim of our study is to find the soft sediment deformation structures in the sediments of Dariyaoganj Lake, an oxbow lake of the Ganga River, located at the western Ganga plain. The structures have been recognized in the area by making vertical section or somewhere by pitting and trenching at the western margin of Dariyaoganj Lake. Soft sedimentary deformation structures can be good indicators of paleoseismicity. The present study reports the Soft sediment deformation structures formed by fluidization or liquefaction of unconsolidated Quaternary sediments triggered by seismic shaking in sand and clay deposits of Dariyaoganj Lake such as fluid escape structures, load cast, load and flame structures soft sedimentary intrusion (clastic dykes clastic sills), and small scale faults. The presence of these seismites is indicative of Himalayan tectonics seismic activity. The seismites observed from the western Gangatic plain are the proof of the advancement of stress regime from the Himalayan front to the Indian Peninsula.

Keywords: Himalayan Tectonics, Ganga Plain, Soft Sediment Deformation Structures, Liquefaction, Earthquake, Dariyaoganj Lake.



**7th Annual International Convention
on
Sustainability in Current Scenario: Challenges & Solutions**



Landslide Susceptibility Zonation Mapping and Risk Analysis of NH1A from Srinagar to Jammu, Using GIS Based Statistical Model and Remote Sensing Data

Irshad Ahmad Lone^{*}, Rabi-ul-Islam

Haryana Space Application Centre (HARSAC), Hisar, Haryana, India
Corresponding author email: irshadsahil903@gmail.com

ABSTRACT

Hazards are part of our lives. It is impossible to live in a totally risk free environment. Natural hazards are indeed geophysical events, such as earthquakes, land sliding, volcanic activity and flooding. Although landslides can result in significant human and economic losses, they also play a role in maintaining ecological diversity. A number of landslide mitigation techniques are explored. The Jammu-Srinagar National Highway is the northernmost segment of NH 44. It runs from Srinagar in the Kashmir Valley southward to the city of Jammu. It is one of the two road links that connects the Kashmir Valley with the rest of India. The National highway NH-1A and NH-44, 663 km long in the north India, which connects the Kashmir valley to the rest of the India. The northern terminal was in Uri in Jammu and the Southern terminal was in Jalandhar. Stretches of old NH1A ran through some extremely treacherous terrain and shut-off because of avalanches of landslides common in winter months of the year. The famous Jawahar tunnel that connects Jammu with the Kashmir valley across the pir-panjal Range falls en-route. The total length of NH-1A was approx-663 kilometers. The NH-1A represents the backbone of the Kashmir valley near about 273 km long. The present study has been made to develop and pinpoint the key factors (topography, geology, slope stability) contributing to landslide incidences in the region. These factors were collected from the topographic maps, satellite imageries, field visits and available published maps. A detailed landslide hazard map was developed on a GIS and geological based platforms. The subsequent landslide hazard Zonation map demarcates the area into different zones/classes of landslide hazard. The study aims to analyze the direct impact of massive landslides that occurred around the area of NH1A which is running from Srinagar to Jammu, this research presents the results of the GIS-based statistical models for generation of landslide susceptibility mapping using geographic information system (GIS) and remote-sensing data. The factors including slope, aspect, soil, lithology, NDVI, land



7th Annual International Convention
on
Sustainability in Current Scenario: Challenges & Solutions



cover, precipitation, and distance to fault and distance to road were extracted from SAR data, and SPOT 5 images. The relationships between the detected landslide locations and these ten related factors were identified by using GIS-based statistical models including analytical hierarchy process (AHP), weighted linear combination (WLC) and spatial multi-criteria evaluation (SMCE) models. These models are based to better predictions. These landslide susceptibility maps would be useful for hazard mitigation purpose and regional planning.

Key words: NH-1A, Kashmir valley, Landslide hazard management practices, AHP (Analytical Hierarchy Process) & WLC (Weighted Linear Combination), Remote sensing, Susceptibility, Mitigation



7th Annual International Convention
on
Sustainability in Current Scenario: Challenges & Solutions



**Contribution to Improvement the Methodology of Measuring of Flow in
Water Courses: Case Study River Plitvica, Croatia**

Bojan Durin¹, Lucija Plantak^{2*}, Damira Keček³, Petra Bigor¹

¹Department of Civil Engineering, University North, Croatia

²Faculty of Geotechnical Engineering, University of Zagreb, Croatia

³Department of Mechatronics, University North, Croatia

Corresponding author email: lplantak@gfv.hr

ABSTRACT

Limnigraphs are used for continuous measurement of water levels on watercourses, which are mostly located in a small number of locations, often distant from each other. The relationship between the measured water levels and the flow of the watercourse in its cross section is represented by the stage-discharge relationship, called rating curve. Most often different software packages are used for modeling of the flow conditions within the watercourse, which simplifies the actual (real) conditions. Continuity of the measuring is required to obtain the real situation, despite the fact that it is difficult, due to costs and a lot of required time. For these reasons, the goal of the presented paper is to improve the procedure for measuring flow and water levels in watercourses. Mentioned will be shown on the river Plitvica near Varaždin in Croatia. All measurement difficulties (deposits, sediment, vegetation, control interventions, etc.) will be taken into account. Rescaled Adjusted Partial Sums (RAPS) method will be applied to determine the subseries within the original time series of the averaged daily flow. Such is required to determine the time period(s) in year when flow changes could be expected, which definitely affects measuring.

Keywords: watercourse, water level, water flow, measurement, time series, RAPS



7th Annual International Convention
on
Sustainability in Current Scenario: Challenges & Solutions



Sustainable Wetland Ecosystem Management

Moeti Mohapi

Department of Land Management, Maseru, Lesotho
Corresponding author email mmohapi5@gmail.com

ABSTRACT

Lesotho is a landlocked country in the Southern Africa. It is surrounded by the Republic of South Africa. With the introduction of integrated catchment management (ICM), the country is now divided into 74 catchments for management purposes. Lesotho is a semi-arid country with average rainfall that is not exceeding 600 mm per annum. The catchments are currently facing deterioration due to poor land use activities and accelerated land degradation. Initially the country was divided into four catchments. In order to avoid deterioration of catchments, integrated management of catchments is implemented into the catchment. The management of catchments entails the holistic management of all non-living and living organisms within the catchment. The management of catchment has to introduce the social importance of management of catchments. Wetlands ecosystem is an integral part of the catchment. My presentation is going to concentrate more on the management of wetland and water resources in the catchments of Lesotho. Lesotho being the water tower of Southern Africa is blessed with good sources of fresh and clean running water from the wetlands that are located in the highlands of the country. Water from the highlands of Lesotho needs minimal treatment because the sources are clean. Communities living in the vicinity of the catchments are being made aware of danger that is being caused by the deterioration of wetlands. Communities living in the highlands of Lesotho are livestock owners and crop farmers. Their poor grazing practices are imposing deterioration of wetland and range resources. Grazing management plans have been introduced to the livestock owners. Grazing associations and water user associations have been introduced; these associations are tasked with the governance of wetlands and rangelands. A monitoring team of individual experts in watershed management has been formed and it is currently doing monitoring of wetlands and range resources. Monitoring is done on monthly basis. Change, whether a positive or negative change is recorded. Community council, grazing and water user associations are represented in the monitoring team. Piezometers for monitoring water table are



7th Annual International Convention
on
Sustainability in Current Scenario: Challenges & Solutions



installed on the wetland area. Weir is constructed on the mouth of the wetland, this is used to monitor yield (how much does the wetland releases) of the wetland. GPS is used to monitor the wetland area. An increase or decrease in wetland area is being monitored. Biodiversity within the wetland is recorded. Range resources managers will be doing the management of range resources. At the end of each visit that takes place every month, a report is being produced by the monitoring team. The monitoring team reports to the project steering committee. Monitoring reports will be filled and changes from the previous month are being recorded. The monitoring team has the authority to recommend any thing that they believe it would be of paramount importance to the project. The valuation team will be valuing the monitoring report thus giving the outcome of innovation that is being put into place.

Keywords: Integrated Catchment management, GPS, Piezometers, Grazing Associations, Water User Associations, wetland ecosystem



7th Annual International Convention
on
Sustainability in Current Scenario: Challenges & Solutions



Study of Major Air Pollutants in Different Areas of Pune City

Kazi Erum^{1*}, Kulkarni S. D.²

¹Department of Environmental Science, Abeda Inamdar Senior College, Pune, India.

²New Arts, Commerce and Science College, Ahmadnagar, India.

Corresponding author email: environmentalisterum@gmail.com

ABSTRACT

Air pollution has been aggravated by developments that typically occur as countries become industrialized: growing cities, increasing traffic, rapid economic development and industrialization, and higher levels of energy consumption. The majority of Indian cities are suffering from extremely high levels of urban air pollution, particularly in the form of suspended particulate matter (PM), SO₂ and NO_x. Increased levels of the air pollutants are responsible for various Respiratory diseases among living beings, having impact on plants as well as materials, structures. Pune city has too joined to be most polluted Indian cities. The causes of increased levels of air pollution in city are rapid expansion of city, mechanical grinding, construction, quarrying, increased number of vehicles, Industrialization. Pune city has shown rise in level of PM 10, 2.5, NO_x and SO_x in various parts of Pune city. The study aimed to find out major air pollutants in different areas of Pune city- Hadapsar, Lohegaon, Katraj, Shivajinagar, Bavdan and Sadashiv peth. Major air pollutants were analysed such as PM10, PM 2.5, NO_x and SO₂ using Ambient Fine Dust sampler in month of October 2018 and 2019. The study revealed that 2018 was most polluted year after 2013, on analysis it was found that pollutant concentration was in the following order Shivajinagar, Hadapsar, Katraj, Sadashiv peth and Bavdhan. Among the pollutants studied PM 10 & PM 2.5 were highest in all the areas. Particulate matter is the main source of Air pollution in all areas. Study in the year 2019 revealed decline in the concentration of air pollutants Shivajinagar, Hadapsar, Katraj, Sadashiv peth and Bavdhan because of heavy rainfall that washed away all the pollutants from the atmosphere. So the concentration of pollutants in all the areas was low. Further the study will aim to find out various mitigate methods to control air pollution in Pune city.

Keywords: Particulate matter 10(PM 10), Particulate matter 2.5(Particulate matter 2.5), NO_x, SO₂



**7th Annual International Convention
on
Sustainability in Current Scenario: Challenges & Solutions**





7th Annual International Convention
on
Sustainability in Current Scenario: Challenges & Solutions



**Spring Development and Rejuvenation in Himalayan Terrain: A Case Study
of District Almora, Uttarakhand**

Rayees Ahmad Pir^{1*}, Riyaz Ahmad Mir²

¹Central Ground Water Board, North Western Himalayan Region, J&K UT Jammu, India

²Geological Survey of India, UT: Jammu and Kashmir, Srinagar, India

Corresponding author email: rayeeshg@gmail.com

ABSTRACT

Springs are one of the major sources of freshwater supply for drinking and other domestic purposes. In Himalayan mountainous region, the springs are also considered as the lifeline and a source for sustainability for better livelihood. The present study deals with the development and rejuvenation of springs present in parts of Himalayan region between the North Almora Thrust and South Almora Thrust, falling in Almora and parts of Nainital and Pauri Garhwal districts, Uttarakhand, India. The study covers approximately an area of 2000 km². In this area, the main lithounits include the garnetiferous-mica-schists with subordinate quartzite, phyllite and graphite schists and lesser granite-gneisses. The study indicated that the groundwater in the major part of the area occurs in localized, disconnected bodies within the secondary porosities such as fractured, jointed crystalline and meta-sedimentary rocks. In this study an inventory of 40 springs was developed during May-June 2013 for the area. The correlation of spring discharge with rainfall indicated that all the springs are rainfed and a direct infiltration of rainwater takes place through the porous zone, fractures and joints that later move through interconnected openings following the local topography. The discharge and temperature of the spring water fluctuated throughout the year depending upon its recharge and discharge factor. During the rainy season (monsoon), the favorable geological structures result in higher discharge of spring whereas; the discharge of springs reduces gradually with time, and is minimal during other seasons (postmonsoon and premonsoon). Overall, the discharge of springs ranged from 1.50 to 25 LPM during premonsoon season and 3 to 60 LPM during postmonsoon season. During premonsoon season, the springs with high discharge were mainly observed at high altitudes and the highest spring discharge (100 LPM) was observed at Village “Dhansari” (1001 m amsl) whereas, the lowest spring discharge (0.37 LPM) was found at Village “Mehala” (1226m amsl). During postmonsoon season the highest spring discharge (600 LPM) was observed at Village



7th Annual International Convention
on
Sustainability in Current Scenario: Challenges & Solutions



“Dhansari” (1001 a msl) whereas lowest discharge (1.50 LPM) was at Village “Mehala” (1226 m amsl) and “Plna” (1598 m amsl). Overall, the study indicated that the springs need to be developed for sustained water supply to meet the needs of drinking and irrigation purposes. A spring can be developed into a drinking water supply using suitable techniques such as by collecting the discharged water using pipe and running water into some type of sanitary storage tank. Nevertheless, protecting the spring from surface contamination is also essential during all phases of spring development.

Keywords: Springs, Development, North Almora Thrust and South Almora Thrust, Uttrakhand.



7th Annual International Convention
on
Sustainability in Current Scenario: Challenges & Solutions



Analysis of Ground Water Quality in Rudraprayag District, Uttarakhand, India

Rayees Ahmad Pir^{1*}, Riyaz Ahmad Mir²

¹ Central Ground Water Board, North Western Himalayan Region, J&K UT Jammu, India

² Geological Survey of India, UT: Jammu and Kashmir, Srinagar, India

Corresponding author email: rayeeshg@gmail.com

ABSTRACT

Groundwater is used for agricultural, industrial, household, recreational and environmental activities all over the world. However, the quality of ground water is vital for mankind since it is directly linked with human welfare. In the last few decades, there has been a tremendous increase in the demand for freshwater supply due to the rapid growth of population and the accelerated pace of industrialization. In India, most of the population is also dependent on groundwater resource as it is the only and easily accessible source of drinking water supply in the region. Keeping this in view, the present study was carried out to check the suitability of groundwater for drinking purpose in parts of Rudraprayag district, Uttarakhand state of northern India. The district covers an area of 2439 km² and lies between 30⁰19'00" and 30⁰49'00" North latitude and 78⁰49'00" and 79⁰21'13" East longitude. In this area, the ground water in the major part of the district occurs in localized, disconnected bodies under favorable geological conditions. There is no homogenous aquifer system having wide area extent. It occurs along the thrust plains, fault plains, joints, folds, fractures and at the contact of two different rock formations in the area. In this study, 41 ground water samples from hand pumps were collected during May-June 2012 from different places of Rudraprayag during pre-monsoon period for the physicochemical assessment. The physicochemical quality was assessed in terms of physicochemical parameters such as pH, electrical conductivity (EC), total dissolved solids (TDS), total hardness (TH), Calcium (Ca²⁺), magnesium (Mg²⁺), Sodium (Na⁺), Potassium (K⁺), Chloride (Cl⁻), Nitrate (NO₃), Sulphate (SO₄²⁻) and Fluoride (F⁻). The results were compared with standards prescribed by BIS 10500-91 for understand the chemical quality and status of pollution. The correlation matrix has also been generated to understand the chemical quality of the groundwater. Overall, it was found that the ground water was contaminated at few sampling sites in terms of F- only, whereas the remaining sampling sites showed physicochemical



7th Annual International Convention
on
Sustainability in Current Scenario: Challenges & Solutions



parameters within the permissible limits of BIS standards. Correlation studies have also indicated the contribution of human activity in contamination of groundwater. The quality of water is good and it is fit for drinking purpose. However, the higher F- concentration at certain sites must be taken care off before use.

Keywords: Groundwater, Physiochemical Parameters, Quality, Fluoride, Correlation coefficient.



7th Annual International Convention
on
Sustainability in Current Scenario: Challenges & Solutions



Cyclonic Disaster of Amphan in West Bengal and its Management

Satya Ranjan Das^{1*}, Neha Singha²

¹Vivodhananda Saraswati Teachers' Training, Durganagar, Ramakrishna Pally, Kolkata, West Bengal, India

²Sarojini Naidu College for Women, Kolkata, West Bengal, India
Corresponding author email: Satyaranjandas2515@gmail.Com

ABSTRACT

As India is a subcontinent being surrounded three sides by oceans, it is more cyclone prone area. Although cyclones affect the entire India, eastern coastal part is more prone to cyclone than western coast. Among the entire east coastal states southern part of West Bengal is worst affected by tropical cyclones. Cyclone Amphan made its landfall in Digha (east medinipur) in West Bengal on the afternoon of 20 may 2020, as a very severe cyclonic storm with sustained wind speeds of 155-165 km/hrs. spiraling up to 185 km/hrs. The coastal state of Odisha and the neighbouring country of Bangladesh were also affected by the Amphan cyclone. Kolkata along with coastal parts of West Bengal were the worst affected with thousands rendered homeless and shelter less, huge agricultural area and crop loss and thousands of trees destroyed and uprooted and near about 90 people's died. So,proper planning, management and mitigation strategy and preparedness is needed to reduce the disastrous consequences of any cyclone. Measures to check the spread of COVID-19 pandemic situation have compounded efforts to keep people safe from cyclone Amphan even as migrant workers return home. Before, during and after the cyclone amphan, the state government, the central government and other organizations played an important role in dealing with the natural disaster.

Keywords: Cyclone Amphan, Disaster, Management, NGO.



7th Annual International Convention
on
Sustainability in Current Scenario: Challenges & Solutions



**Forest Policy of India as a Tool for Land Acquisition, Case taken: Karnal,
Haryana**

Vaishali Kapoor

Regeneration, Kaizeen consultancy, Jaipur, India
Corresponding author email: vaish13.1109@gmail.com

ABSTRACT

The Indian Forest Act, 1865 defines 'forest' as "land covered with trees, brushwood and jungle". Individually Forest makes a natural biodiversity on earth. Holistically with manmade environment like Urbanized land and Agricultural land they act as Shock absorber by reducing carbon dioxide and greenhouse gases; managing heat waves through microclimates; maintaining moisture, improving quality of water, ground and life. Despite their importance, forests are exploited for their resources. The total forest cover in India as per MoEF (2017) Assessment is 21.54% of the total geographic area. State wise in 2015-17, Haryana got the lowest Forest cover i.e., only 3.53 % of its geographic area which is a major concern. India in the 'Nationally determined contribution to the Paris Agreement (NDC): India, UNFCCC' (2016) had vowed to adapt to the climate change. In this respect, though, India's forests geographic area had increased from 23.4% in 2005 to 24% in 2013; their goal is to increase it to 33% by 2030. Thus, it is important to protect and promote forest cover in India. The following research is focused on conserving the forest land. It aims to diagnose the loopholes of the forest Policy of India thereby acting as a tool for land acquisition. The research diagnoses the Indian National Forest Policy (1988); the Indian Forest act (1927) and the forest Conservation act (1980) through literature study. It highlights the impact of the provision of diversion of forest land in the act. To reflect upon the impact of metro cities on small towns for forest land acquisition, a case of Mughal canal, Karnal, Haryana is taken. The case is examined through the transformations of the canal from a water source into a covered sewerage drain. It mainly focuses on how the transformation has triggered the acquisition of the forest land alongside the canal. The research concludes with loopholes in the central and state policy framework which is used by the government and the real estate; and also the violation of the 12th schedule of the 74th amendment act in the city municipality. The research thus proposes design based and policy based interventions protecting



7th Annual International Convention
on
Sustainability in Current Scenario: Challenges & Solutions



the green and blue belt of the city. The proposals like decentralized bio-waste water treatment (phytorid system), Pishiculture are proposed in collaboration with the institutes available in the city like CSSRI and NDRI. A community led socio-ecological corridor is proposed on site thereby conserving local forest land. The case can be taken as a pilot project though the limitation that forest is less qualitative and more quantitative entity always remains a matter of approval by the society.

Keywords: Indian National Forest Policy, Pishiculture, land acquisition



7th Annual International Convention
on
Sustainability in Current Scenario: Challenges & Solutions



Impact of Watershed Interventions on Land Use & Land Cover Changes In Bundelkhand Region, Central India: A Case Study

Liansangpuii^{1*}, Ramesh Singh², R. M Singh¹

¹Department of Farm Engineering, Institute of Agricultural Sciences, BHU, Varanasi, Uttar Pradesh, India

²ICAR-Central Agroforestry Research Institute, Jhansi, Uttar Pradesh, India
Corresponding author email: fanaisangpuii@gmail.com

ABSTRACT

Bundelkhand region of Central India lies between the Indo-Gangetic Plains to the north and the Vindhya range to the south. The region comprises of seven districts of Uttar Pradesh and six districts of Madhya Pradesh. Most inhabitants in the region are dependent on agriculture/livestock-based activities. In this region, availability of water is the main limiting factor for crop productivity and failure in agriculture has become a cyclical phenomenon. To increase availability of water and transform agriculture, Parasai-Sindh watershed located in Babina block of Jhansi district in Uttar Pradesh covering 1250 ha, was develop between 2012 and 2016. The study site comprises three villages, namely Parasai, Chhatpur, and Bachauni located between 25°23'56" to 25°27'9" N and 78°19'45" to 78°22'42"E. The major interventions included the renovation of traditional rainwater harvesting structures called *haveli*, building check dams, field bunding, and farmer participatory crop demonstrations. Impact of watershed interventions on land use and land cover (LU/LC) change was assessed by analysing remote sensing data of pre and post intervention periods. Following the National LU/LC classification system of NRSC and ISRO (NRSC, 2012), the LU/LC of the watershed was divided into eight different classes. It was found that increase in groundwater availability as a result of watershed interventions have led to conversion of fallow land into productive agricultural land.

Keywords: Bundelkhand Region, Watershed Interventions, Land use & Land Cover Changes, Remote sensing.



7th Annual International Convention
on
Sustainability in Current Scenario: Challenges & Solutions



**Land Use/Land Cover Changes in Sajnam Catchment, Lalitpur District
(Uttar Pradesh) Using Remote Sensing and GIS Techniques**

Sadia Mazahir*, Akram Javed

Department of Geology, Aligarh Muslim University, Uttar Pradesh, India
Corresponding author email: sadia.mazahir@gmail.com

ABSTRACT

The study has been carried out in Sajnam catchment of Lalitpur district (Uttar Pradesh) in Bundelkhand region that provides an insight into the land use/land cover changes using remote sensing and GIS techniques. The study area covers a total geographical area of about 5039 sq.km that falls under SOI topographic map no. 54L/7, 54L/10 and 54L/11 on 1:50,000 scale that lies between 24°10'N to 25°14'N latitudes and 78°10'E to 79°00'E longitudes. The study has been carried out using multi temporal IRS data of 2005 and 2015 which has been visually interpreted to derive thematic maps on drainage, land use/land cover, DEM and slope. DEM and slope map have been generated from ASTER data shows that the elevation of the area ranges between 351-559m above MSL while slope map shows that the major part of the area falls under gentle slope category. The study has utilized GIS as a tool for data integration, analysis and final output and software used are ArcGIS, ERDAS Imagine and SAGA. The land use/land cover analysis of study area reveals a wide variety of different categories of land use and land cover namely cultivated land, uncultivated land, dense forest/ridge, water body, waste land and settlement and shows that the catchment is mainly dominated by uncultivated land, cultivated land and dense forest/ridge while other categories i.e. settlement and waste land are recognised in association with water bodies and cultivated fields. Land use/land cover changes by LULC analysis of 2005 and 2015 IRS P6 LISS III data sets suggest that uncultivated land, dense forest/ridge and waste land has been decreased whereas cultivated land, water body and settlement has been increased from year 2005 to 2015. The study demonstrate that the Sajnam catchment is dynamic in nature as it has shown remarkable land use/land cover changes during last 10 years. Hence, effects should be made to bring uncultivated land into cultivated land through various land/soil development methods as this area is typically known for recurring droughts and scarcity of water



7th Annual International Convention
on
Sustainability in Current Scenario: Challenges & Solutions



during last couple of decades. Conservation efforts are also required to achieve sustainable development of the natural resources of the catchment.

Keywords: Land use and land cover, remote sensing and GIS, IRS P6 LISS III data sets of year 2005 and 2015, LULC categories viz; cultivated land, uncultivated land, dense forest/ridge, water body, waste land and settlement



7th Annual International Convention
on
Sustainability in Current Scenario: Challenges & Solutions



Infant Neonatal and Post Neonatal Mortality in Madurai District, Tamilnadu, India: A Geomedical Study

S. Eswari

Department of Geography, Tourism and Travel Management, Madras Christian College, Chennai, India
Corresponding author email: eswari@mcc.edu.in

ABSTRACT

The Infant Mortality Rate is a public health indicator of a complex societal problem. Numerous frameworks have been used to help understand the multiple determinants of infant mortality in a society and to identify interventions to reduce infant mortality. While the root social causes of infant mortality persistent poverty, pervasive and subtle racism, and the chronic stresses associated with them may not be easy to address, it is still possible to understand the risks of infant death by examining the biological pathways through which these societal forces act. The present study observes the impact of infant neonatal and post neonatal. The study area of Madurai District is located in the Southern part of Tamil Nadu, India. This study analyzed the infant mortality for the year 2017-2018 in Madurai District. The main aim of this study is to identify the infant neonatal and post neonatal mortality rate in the study area and associate with “Z” Score variation based on GIS techniques. Identification and interpretation of infant mortality rate results in framing suitable policies and decisions for an effective health care planning. Geographical Information System and statistical analyses are important in guiding health care agencies, public health officers and relevant authorities in progressing efficient control measures and contingency programs in identifying and prioritizing their efforts in effective infant mortality rate control activities. Findings suggest that some progress has been made in reducing infant mortality rates in Madurai particularly in most of the areas with very high infant mortality rates.

Keywords: GIS, Neonatal, Post Neonatal, Infant Mortality Rate



7th Annual International Convention
on
Sustainability in Current Scenario: Challenges & Solutions



Stream flow Dynamics in the Upper Jhelum Catchment, North-Western Himalayas

Durdanah Mattoo^{*}, Sajad Ahmad Mir, M. Sultan Bhat

¹Department of Geography and Regional Development, University of Kashmir, Jammu & Kashmir, India
Corresponding author email: mattodurdanah@gmail.com

ABSTRACT

Discharge regimes in Upper Jhelum Catchment, were studied in a multi-site assessment in six watersheds, namely Arapal, Brengi, Lidder, Rembiara, Sandran and Vishow. A thirty-six years long study interval (matching the climatic analysis study period) was chosen to study the annual and seasonal discharge regimes. Tail gauges were selected for the analysis of discharge regimes; such gauges better represent the outlets of the watersheds. . Almost in all the streams in UJC over the years of the study interval the streamflow has been affected by decreasing trends. The streamflow in all the watersheds of the UJC whether annual or seasonal, show a decreasing trend owing to various reasons. The worst affected streams in this regard are Rembiara and Lidder, while as the least affected is the Vishow and Arapal stream. The area averaged run-off depth also shows significant decadal curtailment all over the upper Jhelum catchment. Since, the area is under agrarian (agricultural and horticultural) landuse, this sector is bound to be affected by the depreciating hydrological input. With growing population, the incumbent pressure on the water resources would accentuated with the significant cut in the supply. Unlike many glaciated catchments of the Himalayas the discharge in the Upper Jhelum is decreasing, and therefore calls for a region based assessment, followed by adaptive as well as mitigative strategies.

Keywords: Streamflow, Mann Kendall test, Sen's Slope Estimator, Pettitt test, Run-off Depth



7th Annual International Convention
on
Sustainability in Current Scenario: Challenges & Solutions



Assessment of Vulnerability and Risk by Factor Analysis and IPCC frameworks in Sagar Island

Aparna Bera

Centre for Climate Change & Water Research, Suresh Gyan Vihar University, Jaipur, Rajasthan, India
Corresponding author email: aparna.62232@mygyanvihar.com

ABSTRACT

Climate variability and extreme events impose serious threats on environment and people through potential impacts on biophysical and socio economic aspects. Apart from broad scale influences existing vulnerabilities of rural marginalized population further aggravate through overpopulation, poverty, exploitative land use and unsustainable livelihoods. With increasing risk and exposure of submergence erosion and flooding low lying coastal areas experience increased number of trapped population and induced migration as well. This study assess the vulnerability and risk through exploratory factor analysis of 30 different socio economic, demographic and climate variables for the 41 inhabited mouzas of Sagar Island of Sundarban. The results indicate that the majority of the vulnerable community are living in the marginal areas. Shivpur- Dhablat is having high risk while Kochuberia- Muriganga is showing higher vulnerability with lower risk of exposure according to the conceptual framework of IPCC. This kind of micro level identification of hotspots can be very effective for immediate mitigation and robust sustainable management planning in these contagious, homogeneous villages of this part of subsiding fragile Ganga-Bhramaputra delta.

Keywords: Climate induced migration, Vulnerability, Risk, Sustainable Management, PCA



7th Annual International Convention
on
Sustainability in Current Scenario: Challenges & Solutions



Disaster Management and Sustainability of Indigenous People of Canning Sub Division, Sundarbans, South 24 Parganas, West Bengal, India

Sanat Kumar Purkait

Department of Geography, Raidighi College, Raidighi, West Bengal, India
Corresponding author email: sanatkumar05geog@gmail.com

ABSTRACT

With the advancement of the modern civilization, the relationship between the nature and man has gradually become worse in course of time. The excessive demand of the excessive population of this earth imbalance the natural system of the man-nature. Sundarban sprawls over an area of nearly 9,650 sq km is popular for its largest deltaic mangrove ecosystem. Natural Disaster is basically a companion known in the locational context of the Sundarbans. This terrible disaster can never be prevented. It is the regular response of nature to the activities of the human being. But a well-planned initiative is enough for this and we need the proper developmental strategy without hampering the nature and the animal of this tidal forest. Disasters can only be overcome if our overall service can be brought under a well-planned management by acknowledging these geographical limitations and prioritizing the severity of disasters. During disasters, women (pregnant women, children, girls) are the most affected in our country. The vast majority of the population is women and children. Women are more involved than men in the family. Cattle and poultry, poultry rearing, planting vegetables in the backyard and even in the production of crops and overall maintenance is done by women. Sundarban is well known for its natural disaster like cyclone, flood, saline water intrusion, river bank erosion etc. The study area is disaster prone area but the indigenous people of this area are always in their stable life with the daily struggle. They are oriented their distressed life after the disaster period with the combination of indigenous knowledge and traditional education. This paper is an attempt to highlight management approaches to cope up with the troublesome conditions caused by the natural disaster in the study area and sustenance of the indigenous people of this area.

Keywords: Sundarbans, Disaster, Management, Sustainability, Indigenous, People



7th Annual International Convention
on
Sustainability in Current Scenario: Challenges & Solutions



Impacts of Climate Variability on Growth and Variability of Agricultural Productivity: A Review

Rekha Kumari*, Shruti Kanga

Centre for Climate Change and Water Research, Suresh Gyan Vihar University, Jaipur
Correspondence author email: rekha2lamba@gmail.com

ABSTRACT

This paper presents a comprehensive review of different research papers, reports, and articles associated with the impacts of the variability of climatic parameters mainly temperature and rainfall on agricultural productivity and its variability. In the high altitude and hilly regions due to increase of temperature from low temperature, it makes those regions more favorable to more crop yield. Whereas in the planer region due to the increase of temperature the crop yields are getting affected to a greater extent. The rainfall is also having a great impact on the crop yield. However, due to irregular seasonal patterns, an increase in the number of dry days and extremely high rainy days are affecting the yield of almost every crop. Apart from temperature and rainfall, the crop yields are also affected by greenhouse gases, for example, carbon dioxide, carbon monoxide, methane, etc. In opposite to that, the high volume of agricultural practices can decrease the level of greenhouse gases and climate change.

Keywords: Agricultural Productivity, Crop Yield, Climate Change, Climate Variability



7th Annual International Convention
on
Sustainability in Current Scenario: Challenges & Solutions



Sustainable Carrying Capacity of Ecotourism based activities in Dachigam National park, Jammu & Kashmir

Muzamil Ahmad Rather*, Majid Farooq

Department of Ecology, Environment & Remote Sensing, Srinagar, Jammu & Kashmir, India
Corresponding author email: rsmuzzammil@yahoo.com

ABSTRACT

Protected areas are one of the most significant means for conserving biodiversity and safeguarding species and natural habitats. Tourism in protected areas is as old as the history of protected areas. To limit the unnecessary flow of tourists in the protected areas a carrying capacity model is required for proper management and sustainable ecotourism. The carrying capacity model is one of the key tools for the conservation and sustainability of the protected areas. Carrying capacity is the number of individuals who can be supported at a given level of consumption while the environment is not damaged. The present study aims to devise a framework for ecotourism carrying capacity model for sustainable development of Dachigam National Park. Dachigam has a good diversity of pristine vegetation types (broadleaved, pine, alpine, etc) with strong contrasts supported by different microclimatic conditions prevailing due to the changing aspects of the undulating terrain makes it a habitat of numerous faunal species (hangul, black bear, brown bear, musk deer, leopard, marten, etc). The Dagwan river originates from Marsar Lake and is fed throughout its course by a complex of mountain streams draining through numerous gullies which potentiates it as an excellent ecotourism site. In the present study citation method and interviews with the expertise and visitors were used for collecting information. Accordingly, effective pressures were determined using questionnaires, which were completed by expertise from environment and ecotourism background. As per the results of the study, the physical carrying capacity has the highest value of (500 persons per day), followed by ecological carrying capacity (300 persons per day) and social and cultural capacity has the least value of (100 persons per day). The study area has a low carrying capacity keeping in view the fragile ecosystem and critical hangul habitat as per the findings.

Keywords: Protected Areas, Carrying Capacity, Questionnaire, Dachigam National Park



7th Annual International Convention
on
Sustainability in Current Scenario: Challenges & Solutions



**Application of Soil and Water Assessment Tool (SWAT) model to Predict
Runoff from Sindh Watershed, Jammu and Kashmir**

Mudasir Ahmad Dada^{*}, Majid Farooq

Department of Ecology, Environment & Remote Sensing, Srinagar, Jammu & Kashmir, India
Corresponding author email: dadamudasir1@gmail.com

ABSTRACT

Hydrological modeling is developing a central component in water resources modeling, planning, and management. The soil and water assessment tool (SWAT Model) as a semi-distributed model is suitable for quantifying runoff and sediment load at the subwatershed level. The input data sets include Digital Elevation Model, Land use/Cover, Soil data, and climate data. In the current study, SWAT model was run on the Sindh Watershed which is one of the main watersheds of Kashmir valley. The Land use/cover classes of the study area include Barren land, Settlement, Agriculture, Waterbody, Plantation, and Forest. The soil classes include Sandy Loam, Clay, Clay Loam and Sandy Clay Loam. Climatic input data like daily precipitation, maximum and minimum temperature, relative humidity, wind speed and solar radiation. The entire watershed is divided into sub-basins during watershed delineation. Each sub-basin was then divided into a series of Hydrologic Response Units (HRUs) which is the smallest unit of a SWAT model, characterized by similar soil, land use and slope groupings. The Sindh watershed was divided into 23 sub-watersheds. Infiltration, Surface Flow, evapotranspiration, lateral flow and percolation, sedimentation are the main hydrological processes that were computed during SWAT run. The model was calibrated from 1990 to 2010 and was validated for the years 2010 to 2015. The results show decent agreement between measured and simulated values both at monthly and annual discharge values. Coefficients of determination were used for the assessment of model performance (R^2) which is equal to 0.71. The discharge data of Sindh River was available from the one-gauge station from 2010 to 2015. The sensitivity of parameters in SWAT model is important for calibration and validation of the model. Model Sensitivity analysis was calculated by SWAT cup tool using the SUFI-2(Sequential Uncertainty Fitting 2) algorithm.

Keywords: Swat Model, HRU, Sensitivity Analysis, Swat cup



7th Annual International Convention
on
Sustainability in Current Scenario: Challenges & Solutions



Utilizing the ICT (Geoinformatics) Based Services for Sustainable Planning of Rural Land Use Patterns

Mudaseer Ashraf*, Gowhar Naseem, Majid Farooq

Department of Ecology, Environment & Remote Sensing, Srinagar, Jammu & Kashmir
Corresponding author email: mudasir.ashraf@gmail.com

ABSTRACT

In order to produce an environment for sustainable development of land resources that meets the public needs and demands, a systematic and iterative procedure of sustainable planning of land use patterns needs to be carried out. Planning, Management and monitoring of land resources are integral parts of any rural development programmes. Geoinformatics is nowadays an important tool in developmental planning and decision making. This study determines the application of GIS in sustainable rural development planning. An all-inclusive method was adopted, bearing in mind, the production and the conservation functions of the ecosystem. All the natural resources layers were derived from remote remotely sensed satellite data. A vigorous spatial analysis viz, climatic, topographic, socio-economic and natural resources indicators was carried out. A query-based tool for intersection, buffering, interpolation and networking was developed to get the integrated results for the preparation of effective action plans. An ICT based approach is necessary to fulfill these requirements. It must take into account the problems and sustainable development in harmony with the environment.

Keywords: Rural, GIS, ICT, modeling, planning, management, resources.



7th Annual International Convention
on
Sustainability in Current Scenario: Challenges & Solutions



Sedimentation Pattern and its Controlling Factor in the Indian Lakes

Pranaya Diwate¹, Firoz Khan^{2,3*}, Sakshi Maurya³, Narendra Kumar Meena³, Samaya Humane⁴,
Rushikesh Baburao Golekar⁵

¹Centre for Climate Change and Water Research, Suresh Gyan Vihar University, Jaipur, India

²Department of Geology, H.N.B. Garhwal Central University, Srinagar Garhwal, Uttarakhand, India

³Wadia Institute of Himalayan Geology, 33 GMS Road, Dehradun, India

⁴Department of Geology, RTM Nagpur University, Nagpur, India

⁵Department of Geology, Khare Dhere Bhosale College Ratnagiri, Maharashtra, India

Corresponding author email: firozgeology@gmail.com

ABSTRACT

The deposition of sediment in the lake occurred as soon as the lake was formed and goes on through the life of the lake. In the present study, we investigated distribution and variation in the sedimentation rate in the Indian lake. The present study has been carried out in the Indian lakes which further subdivided into three zones, north Indian lakes, central Indian lakes and south Indian lakes. The total number of 25 lakes are studied from north India, central India and south India. The correlation of sedimentation rate data with catchment area, surface area, lithology, etc. has been in order to understand the controlling factor. The rainfall and temperature data are also taking into consideration to know the effect on the sedimentation rate. We observed that the north Indian lakes show a relatively higher sedimentation rate compared to the central and south Indian lakes. The slope factor found to be having significant control over the regional variation in the sedimentation rate in the Indian lakes along with a minor contribution from other independent factors.

Keyword: Sedimentation rate, Indian Lake, Radioisotope, Slope, Rainfall, Temperature



7th Annual International Convention
on
Sustainability in Current Scenario: Challenges & Solutions



Variability of Aerosol Optical Thickness (AOT) and Precipitable Water Vapor (PWV) Concentration over Coal Mining and Urban Area Using Satellite and Ground-based Observations

Akshay Kumar*, Akhouri Pramod Krishna

Department of Remote Sensing, Birla Institute of Technology, Mesra, Ranchi 835215, Jharkhand, India
Corresponding author email: akshay61296@gmail.com

ABSTRACT

Aerosol or particulate matter (PM) suspended in the atmosphere has a major association with adverse human health effects and climate change. Regular monitoring of aerosol concentration is an essential measure to estimate the atmospheric condition in any urban and mining-impacted area. In the present study, the MICROTOPS-II Sunphotometer instrument was used to collect aerosol optical thickness (AOT), temperature and precipitable water vapour (PWV) data during the winter season of the year 2014 over Ranchi city, Jharkhand, India. The pattern of measured AOT concentration (at five different wavelengths 340, 500, 870, 936 and 1020 nm) along with water vapour is spatially analyzed in a GIS environment. It is observed that AOT concentration showed variation with high values (0.68-0.34 at 340 nm) at the main centers of railway and road traffic junctions. In contrast a lower concentration is found in the residential area over the study area. The variability of PWV over Ranchi city indicates ranges of 0.2 to 0.45 cm. Ångström parameters (α , β) for the wavelength pair 340-870 nm also derived that indicates the values of ' α_{340} ' have a range of 0.60 to 1.04, whereas ' β ' has a range of 0.07 to 0.20, respectively. Comparison is also done of MICROTOPS-II Sunphotometer data with Moderate Resolution Imaging Spectroradiometer (MODIS) onboard Terra (MOD08_D3 v6.1) satellite that indicates a good correlation. The study provides a quantitative assessment of the air quality over Ranchi city and the coal-mining region to formulate environmental policy in the area.

Keywords: Aerosol optical thickness (AOT); Sunphotometer; Ångström exponent; Ranchi city; GIS



7th Annual International Convention
on
Sustainability in Current Scenario: Challenges & Solutions



Coastal Landforms of Konkan, Maharashtra, India

P. T. Hanamgond

Department of Geology, GSS College, Belagavi 590006 Karnataka, India
Corresponding author email: hanamgondpt@gssbgm.edu.in

ABSTRACT

The coast is a unique environment where land, sea, atmosphere and biosphere interact and influence continuously making this strip of land called coastal Zone quite dynamic. Hence, the coastal zone, is always under dominant influence of both marine and terrestrial processes. However, this strip of land is often under pressure from both anthropogenic activities and natural processes. It is quite well known that most of the world's population (over 40%) lives along the coast. More than 10% of the earth surface is covered by the coast covering about 35, 6000 km. It is also well known that, about 35% of Indians live within 100 km of the country's coast line that measures about 7500 km. Coastal landforms are conspicuous and important relief features formed as a result of combination of coastal and geological processes- mainly the physical processes, sediments and the geology of the area itself. Majority of these coastal land forms are related to depositional and erosional processes. Konkan is the littoral lowland extending from the Arabian Sea to the Western Ghat escarpment and from north of Bombay (Mumbai) to north of Goa (16 °to19° 30' N). The Konkan Coast has the distinct morphological features. The coastal eco system of Konkan is unique and divergent owing to the multidisciplinary geomorphological processes such as tectonic, fluvial, coastal and aeolian processes. These processes have acted in varying degrees and duration during the Quaternary period and have produced various coastal landforms such as- beaches, tombolo, beach-ridges, barrier, offshore islands; backwater-lagoon; estuary-creek, and spit-bar systems, etc. The coast is influenced predominantly by semi-diurnal tides. The coast here exhibits evidences for both an emergent and submergent coast, suggesting a combined or intermediate nature of coast. It is endowed with a very wide range of habitats such as coral reefs, mangroves, coastal sand dunes, mudflats/tidal flats, salt marshes, estuaries, lagoons, islands (especially well-known fort Islands) etc., which are characterized by distinct biotic and abiotic processes.

Keywords: Coast, Landforms, Konkan Coast, Maharashtra, India.



7th Annual International Convention
on
Sustainability in Current Scenario: Challenges & Solutions



Water Quality Assessment of Ameenpur Lake, Hyderabad, Telangana, India

N. S. Srinidhi^{1*}, P. Madhusudhana Reddy², M. Anji Reddy³

¹Department of Forest Ecology and Climate Science, Forest College and Research Institute, Mulugu, Siddipet, Telangana, India

²Department of Geology, BRAOU, Hyderabad, Telangana, India

³Centre for Environment, JNTUH, Hyderabad, Telangana, India

Corresponding author email: srinidhifcri@gmail.com

ABSTRACT

Ameenpur Lake was considered as the first Urban Lake to be declared as the Biodiversity Heritage Site in the year 2016. In the present study the water quality of Ameenpur Lake has been carried out. The water samples were collected during Pre-Monsoon, Monsoon and Post-Monsoon seasons of the year 2019-20 and analysed for various physico-chemical parameters such as pH, Electrical Conductivity, Total Dissolved Solids, Turbidity, Total Hardness, Total Alkalinity, Calcium, Magnesium, Sodium, Potassium, Chloride, Sulphates, Carbonates, Bicarbonates, Fluorides, Phosphates, Nitrates, Dissolved Oxygen, Chemical Oxygen Demand and Biological Oxygen Demand in the laboratory using American Public Health Association (APHA) standard methods for water and wastewater treatment. Obtained results were compared with Bureau of Indian Standards (BIS 2012). The results indicate that lake water is slightly alkaline in nature and TDS, TH, Turbidity and BOD were exceeding the permissible limits in all the three seasons.

Keywords: Ameenpur Lake, Physico-Chemical Parameters, Biodiversity Heritage Site, BIS 2012, Urban Lake.



7th Annual International Convention
on
Sustainability in Current Scenario: Challenges & Solutions



Effect of Climatic Conditions on Variation of Salinity and Hardness in Surface and Groundwater in an Around Upparu Lagoon Jaffna

A.K. Wickramasooriya^{1*}, N. Sujeevan²

¹Department of Geography, University of Peradeniya, Sri Lanka

²Postgraduate Institute of Agriculture, University of Peradeniya, Sri Lanka

Corresponding author email: ashvin@pdn.ac.lk

ABSTRACT

Majority of the people live in and around the Jaffna lagoon area are depend on dug wells, deep tube wells and other surface water resources for agriculture, drinking and other daily domestic water requirements, inland fishing and industries, etc. Therefore, groundwater and surface water is a highly valuable resource for the Jaffna region. However, there is a serious water quality issues arises in this region. This is mainly due to the Jaffna peninsula is underlain by Miocene limestone and water resources in the area are contaminant with sea water intrusion. etc. However, according to the villages' drinking water quality specially the salinity and the hardness in water varies in different periods in a year. To understand whether there is a relationship between rainfall pattern and the tidal influence on variation of depths to water table, salinity levels and hardness in water the behavior of rainfall pattern as well as influence of tidal activities were monitored. Rainfall data are collected from the Meteorological department while tidal heights are obtained from the National Aquatic Resources Research and from the Development Agency and Coast Conservation Department. Thirty two sample locations are demarcated and their coordinates and distance from the coastline are estimated using a GPS. Correlation analyses have been conducted against different climatic conditions and salinity levels as well as hardness in water samples of surface and groundwater. After these analyses it was identified that during high tides, there is no significant change in groundwater levels however, salinity levels of surface and groundwater has increased. Also it was noted that during high precipitation, salinity level increased in both surface and groundwater. This is more significant in Upparu lagoon area. However, during this period, hardness has increased only in deep tube wells. Therefore, it can be concluded that in the study area, salinity levels and hardness id control by precipitation and tidal influences

Keywords: Tidal, salinity, precipitation, hardness



7th Annual International Convention
on
Sustainability in Current Scenario: Challenges & Solutions



Sociocultural Practices and Environmental Determinants for Dengue Incidences: A Case Study in Jaipur City

Priyanka Roy

Centre for Climate Change and Water Research, Suresh Gyan Vihar University, Jaipur, India
Corresponding author email: priyanka.roy@gmail.com

ABSTRACT

Determining the Dengue risk based on sociocultural factors and their spatial relationships with dengue-endemic in Jaipur. Data were collected from households for both; Dengue affected Cases and Dengue unaffected Cases, statistical analysis of socio-economic and sociocultural variables like (i) frequency days of cleaning of water storage containers, (ii) housing pattern, use of water coolers, (iii) frequency of cleaning water coolers, (iv) protection of water storage containers, (v) mosquito protection measures, (vi) frequency of water supply, (vii) frequency of waste disposal that bore a significant contribution to the incidences of DF/DHF/DSS. The paper enlightens the spatial distribution based on the analysis of sociocultural practices adopted by Dengue reported Cases and Dengue unaffected Cases and with the help of GIS. This study illuminates a new methodology to developed dengue social risk categories in Jaipur. The appropriate technique for identifying the significant social risk indicators contributing to an increase in transmission of the disease was done through systematic analysis. It can be presumed that any preventive steps to address any of the eight sociocultural practices identified from the study conducted will have favourable effects on reducing dengue cases. The objective of the study was to build a linkage between households, their sociocultural practices and dengue incidence. The study has the efficacy for identifying four different risk level (low, medium, high and very high) incidences for Jaipur. The study would contribute extensively to the spatial prediction of sociocultural risk levels in Jaipur. Therefore, the approach could assist in focusing on and implementing preventive and control management strategies to monitor and control dengue incidences more effectively. The final outcome delivers valuable guidance for planning preventive control measures and in managing the transmission of DF/DHF/DSS.

Keywords: Spatial relationships, Dengue, DF/DHF/DSS, Transmission, sociocultural.



7th Annual International Convention
on
Sustainability in Current Scenario: Challenges & Solutions



**Role of Distribution System of Private and Public Banks in Regulating
Climate Change: A Case Study**

Sakshi Arora*, Swati Mishra

School of Management, Suresh Gyan Vihar University, Jaipur, Rajasthan, India
Corresponding author email: swati.mishra@mygyanvihar.com

ABSTRACT

This paper provides an overview of role distribution system of green banking creating competitive advantages and new enterprises opportunities for public and private sector banks. After adoption of green banking it protects the financial system and also manages the risk of each financial institutions. Environmental change is expected to quicken and is not, at this point thought about just as an ecological danger since it influences every financial area.

private and public sector banks have created atmosphere strategies and play a different role in green money instruments through using the distribution channels. Distribution channels are play a crucial role in green economy.

Keywords: Green banking, Sustainable banking, Climate change, financial institutions, Regulator, Financial sector, Climate risk, Distribution channel



7th Annual International Convention
on
Sustainability in Current Scenario: Challenges & Solutions



**Cultural eutrophication of Manasbal Lake of Kashmir Himalaya:
perspectives and prospects**

Jahangeer Mohd Reshi¹, Jaya Sharma², Ishtiyaq Ahmed Najar³

¹Department of Environmental Sciences, Madhyanchal Professional University, Bhopal, M.P

²Department of Environmental Sciences, Madhyanchal Professional University, Bhopal, M.P

³Department of Environmental Sciences, Govt. Degree College, Ganderbal, Kashmir

Corresponding author email: jahangeerevs@gmail.com

ABSTRACT

In lake ecosystems, water quality plays an important role in determining the status and condition of that fresh water ecosystem. During the study, an attempt was made to assess the water quality, pollution and eutrophication status of Manasbal Lake of Kashmir Himalaya. The Manasbal Lake is located district Ganderbal in the UT of Jammu and Kashmir, India and has altitude position of about 1551m a.s.l. The lake catchment is having an area of about 22 km² located in district Ganderbal at a distance of 30 km north from the Srinagar city of Jammu and Kashmir. Excess nutrients, specifically phosphorus and nitrogen are the primary pollutants that contribute to the cultural eutrophication of lakes. From the present study, it can be concluded that the higher values of Phosphates (PO₄), Alkalinity, Hardness, Electric Conductivity, Free carbon dioxide and lower values of dissolved oxygen and transparency clearly depicted higher trophic status of Manasbal Lake. It can also be concluded that climatic factors, untreated sewage and solid garbage from surrounding population, fertilizers containing Nitrates and Phosphates and slit load were the main causes for degradation of water quality of the studied lake. Therefore, powerful control and management strategies like community perceptions and priorities are needed relating to lake water management. Besides periodic monitoring of Manasbal Lake is necessary for assessing the quality of water for human and animal consumption as well as for aquatic life. Hence, immediate remedial measures should be taken up for protection and sustainable management of this monomictic lake in order to save it from further pollution and deterioration.

Keywords: Manasbal Lake, Monomictic, Cultural eutrophication, Conservation



7th Annual International Convention
on
Sustainability in Current Scenario: Challenges & Solutions



**A GIS-Based Approach in Drainage Morphometric Analysis for water
resource management of the Wainganga Basin, India**

Nanabhau Santujee Kudnar

C. J. Patel College Tirora, Gondia, Maharashtra, India
Corresponding author email: nanabhaukudnar@gmail.com

ABSTRACT

Qualitative and quantitative analysis of Watershed Characteristics of a river basin is necessary for the evaluation of its resources and its sustainable management. Watershed Characteristics of the Wainganga River Basin (WRB) in Central India is evaluated using Remote Sensing (RS) data and geographic information system (GIS) applications. The morphometric approach is found relevant for the extraction of the river basin and its drainage networks. The WRB comprises a dendritic drainage pattern where the maximum number of streams was found in the first order and the stream order increased with a decrease in stream number. The GIS-based morphometric analysis of this drainage basin revealed that the Wainganga is 7th order drainage basin. The drainage pattern of the river under study is mainly sub-dendritic to dendritic, thereby indicates homogeneity in texture and lack of structural control. Bifurcation values range from 2.97 to 9.00 and the average bifurcation value is 3.97 which indicates that the drainage pattern is affected by structural disturbances. The elongation ratios are 0.12 which reveals that the basin is strongly elongated and composed of highly homogenous porous in WRB. The mean value of stream frequency (SF) and drainage density (DD) was 0.19 km/km² and 0.66 km/km² and respectively. These characteristics showed the dominance of coarse drainage texture, low runoff, low erosional potential, permeable sub-surface material, high vegetation cover, and low relief. The elongation ratio and form factor were 0.12, which suggests the elongated shape of the basin having a flatter peak of flow for a longer duration. This study, along with high-resolution RS data and the GIS, will help to better understand the state of geographical features and their process, soil erosion, drainage management, and potential soil conditions for effective planning and managing the uptake of the reservoir.

Keywords: Wainganga River, Morphometry, Remote Sensing, GIS, Soil erosion, Sustainable Management



Suresh Gyan Vihar University
Mahal Road, Jagatpura, Jaipur-302017, (Raj.) India
0141-2988411/12
c3w@mygyanvihar.com | www.gyanvihar.org

