ABSTRACT VOLUME

NATIONAL SEMINAR

13TH JANUARY 2017

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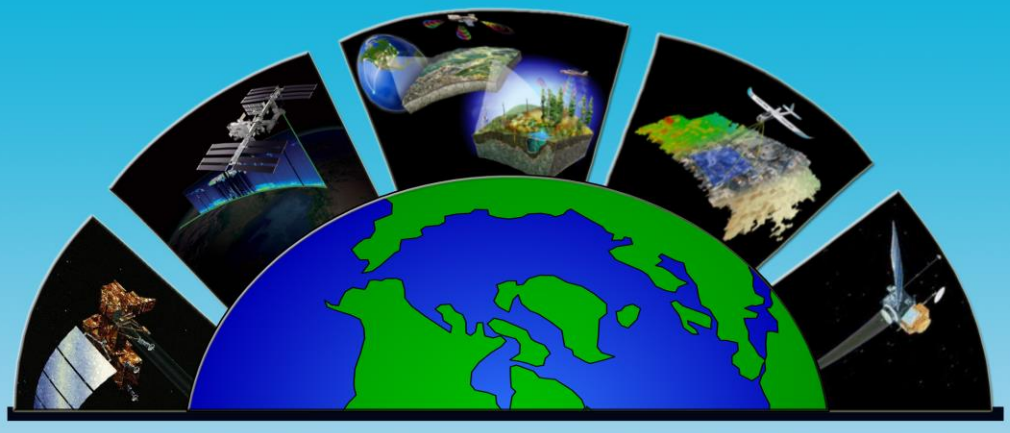
ज्ञान - विज्ञानं विमुक्तये

ON

APPLICATION AND EMERGING TRENDS OF GEOSPATIAL TECHNOLOGIES FOR SUSTAINABLE RESOURCE ANALYSIS & MANAGEMENT



ORGANISED BY
DEPARTMENT OF GEOGRAPHY
KABI SUKANTA MAHAVIDYALAYA

IN COLLABORATION WITH
DEPARTMENT OF GEOGRAPHY
TARAKESWAR DEGREE COLLEGE

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Department of Geography

Kabi Sukanta Mahavidyalaya

Bhadreswar, Hooghly,West Bengal

In Collaboration with

Tarakeswar Degree College

Tarakeswar, hooghly, WB

Venue

Kabi Sukanta Mahavidyalaya

Bhadreswar, Hooghly, West Bengal

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About the College

Kabi Sukanta Mahavidyalaya is an affiliated to University of Burdwan, Burdwan, Grant-in-aid College, Govt. of West Bengal, accredited Grade 'B' (2nd Phase) by National Assessment & Accreditation Council (NAAC), UGC of India in 2015. The College started its journey in December, 1986.

Geography Department initiated its Journey in the session 2005-06 with only general course. Since session 2007-08 honours Course was introduced. Now the department is emerging as one of the most well equipped & well placed under graduate department of the University of Burdwan.

Focal Theme of the Seminar

The exploitation of resource is considerably growing due to ever increasing requirements. The rapid industrialization and the increasing demand of growing population have caused a great impact on land-water-air. While planned development of resources brings prosperity, the indiscriminate exploitation of nature leads to destruction of environment and depletion and degradation of resources. So there is a growing need of proper analysis and sustainable management of our resources.

Sustainability is a dynamic concept rather than a static state, it requires decision makers to be flexible and willing to modify their approaches according to changes in the environment, human needs and desires, or technological advances. This means that actions that contribute to sustainability today, either in perception or in reality, may be detrimental tomorrow if the context changes. Policy-makers are also aware about the issue to implement appropriate strategies. So there is a necessity to develop a scientific and technical understanding of resources which will be an accurate and cost effective system in future. Here come geospatial technologies as a solution of the concern.

Geospatial technology is relating to the collection or processing of data that is associated with location. It is a multidisciplinary field that includes disciplines such as surveying, photogrammetry, remote sensing, mapping, geographic information systems (GIS) etc.

Geospatial Technologies are vital for Sustainable Management of Natural Resources and the Environment for purposes of expedient and accurate decision-making. It determines strategic plan and sound management practices for extraction. And also useful for identifying impacts of exploitation of natural resources on environmental health. It also helps in expedient and quick decisions and Actions which is needed to deal with changing management decisions.

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Geospatial Technology, Resource Use and Sustainable Development

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Formerly: Professor and Head, Department of Geography (Presidency College, Presidency University, Chandernagore College) and currently, Visiting Faculty: North Bengal University and Guest Faculty: University of Calcutta, West Bengal State University, NetajiSubhas Open University, PrabhuJagatbandhu College, and Sarat Centenary College, West Bengal). He is the Editor-in-Chief / Managing Editor of the Indian Journal of Spatial Science (ISSN 2249 3921, EISSN 2249 4316, www.indiansss.org).

As a student, Prof Sarkar has been awarded Presidency College Prize (1975), SubrataSengupta Silver Medal, University of Calcutta (1976), Jubilee Post-Graduate Merit Prize, University of Calcutta (1976), National Scholar (1976 – 1980), Gold Medalist, University of Calcutta (1978), and West Bengal State Scholar (1984).

With keen interests in fluvial geomorphology, geostatistics, quantitative geography, cartography, geoinformatics, and development issues, his research principally centers round a wide variety of fields related to geomorphology, rural / urban geography, landuse and resource management, and development issues. Till now, he has supervised 42 M.Sc Dissertations, 2 M.Phils, and 5 Ph.Ds. He has finished in his tenure 2 UGC Major Research Projects and 5 UGC Minor Research Projects and examined 15 Ph.D. Thesis as well. He has in his credit 39 research articles and 76 research papers published in several reviewed national and international journals and 10 books by Orient BlackSwan and New Academic Publishers, New Delhi. He has presented his various research papers in 17 International, 73 National, and 41 State-Level/Local Seminars; he has also acted as Resource Person in at least 30 Seminars, Conferences and Winter Schools all over India. Currently, he is a Peer Reviewer of the *International Journal of Family History* (doi:10.1177/0363199016652618), *Journal of Geography and Regional Planning* (ISSN 2070 1845), *Spatial Information Research* (ISSN: 2366-3286 EISSN: 2366-3294), *Eurasian Journal of Soil Science* (ISSN: 2147 4249), and *Egyptian Journal of Remote Sensing* (ISSN: 1110 9823). He is also an examiner of M.Sc Dissertations and M.Phil Dissertations of International Universities like Post Graduate School, PNG University of Technology, PNG.

Abstract

Geospatial Technology (GST) is a term used to describe the wide range of *modern tools contributing to the geographic mapping and analysis of the Earth and Human Societies*. Basically, the geospatial information is *data referenced to a place* — a set of geographic coordinates — which can often be gathered, manipulated, and displayed in real time. Currently, the increasingly intensified relations between and among "communities" in different parts of the world justifies the need for understanding and managing phenomena / geospatial information on a variety of geographic scales. From global warming to credit crunch, and from epidemics to terrorism, causes and solutions are sought on local, regional, national as well as inter-continental levels. With the advent of GST, scholars, policymakers and entrepreneurs have now the required tools in hand to proceed. The GST is being used more and more to enhance several different jobs, to create new jobs. More and more jobs (that are not traditionally geospatial jobs) are now using GIS to help in decision making. It's "in demand" because a) employees are well paid, b) there is an emerging market, c) it enhances several jobs, d) technology is potentially strong as it combines computers and outdoor activities, and e) automated decision making can be used to find solutions related to "man" and "environment" in order to maintain sustainable development based on the five key principles: quality of life, fairness and equity, participation and partnership, care for our environment and respect for ecological constraints. The GST is used to formulate strategies to solve any problem in real time environment on local, regional and global scale through "Spatial Analysis" involving the core principles of Geography, Mathematics, Statistics, Natural Sciences, Economics, and Sociology.

Using GIS to solve real world problems

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Dr. Ashis Kumar Saha is a Geologist, teaching Remote Sensing – GIS at Department of Geography, Delhi School of Economics, University of Delhi for the last 12 years. He did his BSc (Geology) from Presidency College, Kolkata, MTech (Applied Geology) from University of Roorkee and PhD from IIT Roorkee in the field of Geo-informatics and Landslide Applications. He is a recipient of DAAD Fellowship, Germany. His research interests include Geo-environmental Applications of Remote Sensing – GIS, especially on Landslides, Droughts and Mangrove Ecosystem. He has nine highly cited research papers in peer reviewed international Journals along with several book chapters. He is also holding a position of Joint-Secretary in National Association of Geographers, India (NAGI).

Abstract

Geographic Information System (GIS) has seen an unprecedented growth and user base over the last three decades. From a mere map making tool, it has become an indispensable tool for geographers, geologists, environmentalists, planners, engineers, army, facility providers, and retail sector among many others. GIS being benefitted in analysing location based information in a map like and easily interpretable format, can efficiently answer basic questions in a spatial domain: Where? What? Trend? At what condition? What if? Currently, the main use of GIS has expanded to spatial analysis, predictive modelling, cartography and visualisation. People are wisely using it as a tool for decision making exercises. In this presentation, a series of case studies have been reviewed to show the current trend in GIS analysis, GIS-Remote Sensing-GPS integration and how GIS is used to solve real world problems, viz. disaster management, transportation planning, landuse/landcover modelling – urban planning, resource exploration, environmental management, health, security to participatory GIS.

Emerging Trends in Geospatial Technology

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Dr.BalenBasu – Has an experience since 1995 in the field of GIS and Remote Sensing and has been associated with Computech International, New Delhi, ROLTA India Ltd, PCI Geomatics Canada.

Having M.Sc Tech degree (1993) in Applied Geophysics (Remote Sensing as special paper) from Indian School of Mines, Dhanbad, he earned the doctorate degree from Jadavpur University from the department of Geological Sciences using GIS and Remote Sensing tools for ground water exploration. He is the fellow of council of Scientific and Industrial Research (CSIR - 1993)

He has national and international experience in this field and has been trained in PCI Canada and has traveled Canada, China, Sri Lanka, Thailand, Nepal and Bangladesh on various occasions to participate in International seminars during his tenure in various organizations.

Dr.Basu is the life member of Indian Society of Remote Sensing and Indian Society of Geomatics. He is visiting faculty at School of Ocenography, Jadavpur University and currently the Director of OPSIS SYSTEM PVT LTD since 2004.

Abstract

The emerging trends of Geospatial technology are fast embracing our digital interactions to synchronize our experience across traditional boundaries of devices, time and space. Everything surrounding us in the digital mesh is producing, using and communicating with virtually un-measurable amounts of information. The trend is to make people use & understand map produced by hybrid mechanisms for daily use.

The experience blends physical, virtual and electronic environments, and uses real-time contextual information as the ambient environment changes or as the user moves from one place to another.

We are slowly moving from “machines that can produce” to “machines that can navigate while producing” – almost every device needs a spatial reference and referential mobility. This is where the Geospatial knowledge unifies the different technology.

The use of Unaided Aerial Vehicle (UAV) is coming up in a bid way. The conventional survey is being replaced by crowd-sourcing. The Augmented Reality will soon be used for daily use like Google maps. The haptic technology (Haptics (pronounced HAP-tiks) is the science of applying touch (tactile) sensation and control to interaction with computer applications) will be used in medical applications widely very soon. The CAD is getting unified with Geospatial tools to evolve Building information modelling (BIM is a process involving the generation and management of digital representations of physical and functional characteristics of places). The space technology is improving in leaps and bounds to provide information about impending disaster rather than a post-mortem resource.

The discussion shares the emerging trends in geospatial technology that will focus in doing things faster and cheaper rather than bigger and better.

Drought risk and food security estimation using remote sensing perspective

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Mr.Kundu graduated with a first class M. Sc. in Geography (2006) from the University of Calcutta, Kolkata, India. Later he appeared in a highly competitive national level admission test to join M. Sc. degree program (2010) in Geo-information Science and Earth Observation jointly from the Faculty of Geo-Information Science and Earth Observation (ITC), University of Twente, The Netherlands and Indian Institute of Remote Sensing (ISRO), Dehradun, India. Afterward, he worked as a *Research Fellow* in Dept. of Science and Technology, Govt. of India sponsored research project for 2.6 years at Centre for the study of Regional Development, Jawaharlal Nehru University, New Delhi, India. After completing this research, he joined as a *Senior Research Fellow* in Water Technology Centre, Indian Agricultural Research Institute, New Delhi, India sponsored by Ministry of Agriculture, Government of India for 1 year. Presently, he is working as a *Scientist* in Dept. of Science and Technology, Govt. of India sponsored research project since September 2013 to date. On the other hand, he is pursuing his Ph. D. in remote sensing and GIS jointly from Sam Higginbottom University of Agriculture, Technology and Sciences and Indian Institute of Remote Sensing (ISRO), Dehradun, India and the thesis will be submitted within short during this year.

With a total experience of 6 years 7 months (research) and 5 years 3 months (teaching) in climate change impact, dry-land issues (drought, desertification), water resources management, geography, urban and coastal studies using geo-spatial techniques; he can manage multiple tasks simultaneously within compressed time frames. He has published 18 articles in peer-review international journal and 1 in national journal, 3 book chapters (national), presented paper more than 20 international and national conferences and attended several trainings at national level and abroad also. He has the life membership of national repute society viz. Indian Society of Remote Sensing, Indian National Cartographic Association, Geographical Society of India, Indian Institute of Geomorphologistsand Himalaya SamikshaParishad. In addition, he is the reviewer of several peer-review international journals and visited foreign countries i.e. the Netherlands, Italy, France, Belgium, Germany.

Abstract

Drought is a familiar climatic extreme that often spread across large spatio-temporal scales. The drought event is usually described using drought revealing and monitoring indices. Usually, droughts are categorized into four major classes: meteorological, agricultural, hydrological and socio-economical. In the present study, drought risk has been integrated with food security in the central part of India. The region comprises seven districts of Uttar Pradesh and six districts of Madhya Pradesh state. A remote sensing based approach used to perform this study. This region constantly facing drought stress since last few decades owing to its a lesser amount of productivity of crops, water scarcity and migration of people for employment. The results indicate a good conformity between drought scenario and food security over the region.

Keywords: Drought, geo-spatial techniques, food security, central India.

Forest Cover Change Detection Using Remote Sensing And GIS Techniques: A Case Study Of Ausgram-I And Ausgram-II Blocks.

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Ausgram-I and Ausgram-II C.D. blocks comes under the subdivision Burdwan sadar (North) and bounded by Birbhum district in the North; Kanksa in the West; Galsi in the South and Mongalkote , Bhatar in the East. The total area of Ausgram-II & I block is 360.45 hectare and 222.34 hectare respectively, total population is 136263 and 106850, total worker is 67258 and 45008 where main worker for both the block is 38879 and 32325, main cultivator is 12600 and 9858, main agricultural labour is 14639 and 15338, marginal worker is 28379 and 12683, marginal cultivator is 2253 and 1013, marginal agricultural labour is 21542 and 10716 respectively. Before the independence the Western part of Burdwan district was covered by forest, and the area of forest were more extensive in block of Kanksa, Salanpur, Barabani, Ausgram, Jamalpur, Purbasthali. Ausgram-I and Ausgram-II C.D. blocks containing significant portion of *sal* forest. Various anthropogenic activities directly and indirectly leading to degradation of forest cover. But at present forest cover has been changed and the decline of forest has taken place due to residential and agricultural purposes mainly.

This paper mainly focuses on the temporal as well as spatial changes of forest cover on behalf of the Remote Sensing and GIS techniques. To show the changes on land use and land cover unsupervised image classification techniques have been applied and to represent the forest cover changes different types of Remote Sensing and GIS techniques have been adopted like NDVI (Normalized Difference Vegetation Index), NDWI (Normalized Different Water Index), Change Detection etc.

Keywords: Degradation, GIS, NDVI and NDWI

Evaluation Of Chemical Properties Of Soil And Mapping Using Open Source GIS Software Of Gurbari-1 Gram Panchyet Under Dhaniakhali Block, Hooghly, West Bengal

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Soil is one of the best gifts of nature for the sustenanceof the living world. Physical and chemical properties of soil are responsible for determining the nature of agriculture of any region. Knowledge about the chemical properties of soil is very essential, because the same field is being used for cultivating different type of crops based on seasonal changes. Gurbari-I Gram Panchyet under Dhaniakhali CD Block of district Hooghly, W.B., has been selected as the study area. Evaluation of chemical properties of soil samples have been done by kit method and all the required maps are prepared using open source software i.e. QGIS-2.8.2. Through the survey and laboratory experiments it reveals that the study area is under balanced state of condition in different chemical properties of soil that required for crops cultivated here.

GIS As A Tool To Study The Maternal Health Status Of Hugli District In West Bengal

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Good health is the key to a happy and productive life and an important indicator of human development. Each and every step of life is recurrently exposed to state of helplessness if human being is prone to commonplace ailments. Long healthy life is the basic aspiration of human development. From the standpoint of both personal and social level a healthy person is an asset. Safe Motherhood reflects the strength and capability for bearing and rearing healthy children. It is a form of human capital and an important dimension of human development which is necessary to achieve a healthy society. The reproductive health of mother depends more on social phenomena than the biological determinants. To show the intra district status of maternal health is the main purpose of the study. The present study mainly based on secondary data processed and analyzed by different GIS and statistical techniques. In rural areas maternal health services mainly delivered by Government primary health centers and sub centers. On the other hand in urban areas this service are mainly available through Government or municipal hospital, urban health posts, hospitals and nursing homes operated by non-government voluntary organizations and various private nursing homes. The maternal health is closely related to socio-economic development in the study area as well as all over world. So, the deprived section of the society having an adverse affect on their maternal and reproductive health. Weaker parts of the district in terms of urbanization, education, awareness are holding higher ranks in the vulnerability status of pregnancy and maternal health outcome. So, these parts of the study area need more attention through ensuring high maternal health facility.

Key words: maternal health, vulnerable pregnancy, reproductive health, GIS.

Assessment Of Government Schemes For Enhancing Status Of Women With Special Reference To West Bengal

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Prevalence of Child marriage and trafficking affects far more number of girls than boys. These are the most prevalent form of sexual abuse of minor girls and cast a negative impact by making them socially and financially vulnerable and prone to child labour, sexual harassment and other forms of exploitation. In this study, an attempt has been made to uncover the impact of the programs implemented by the Government to uplift the status of women in West Bengal. The work has been done by analysing the primary data collected by conducting focussed group discussions among the girls and their families. In West Bengal, attendance of girls in school drops remarkably from the age group of 6-10 years to 15-17 years. Secondary education incurs considerable amount of expenditure, hence many impoverished parents who fail to see the economic rationale behind investing in their daughter's education marry them off at an early age believing that this will enhance the security of the girl and the family as well. This leads to a life of financial and social insecurity of the girls. Field studies conforms that in most cases women have to take part in economic activities. Their lack of education pose major problem and increases their susceptibility towards poverty and exploitation throughout their lives. Although a lot of projects have been proposed for development of girl child but none of those have achieved any appreciable result. However, in West Bengal one such project called KanyashriProkalpa has achieved considerably in the recent years almost 34,83,183 girls have been covered. KanyashriPrakalpa aims to improve the wellbeing and status of girls mainly those hailing from socio-economically disadvantaged families by Conditional Cash Transfers. However, despite the widespread publicity the implementation of this programme faced problems in several districts in West Bengal as in the rural areas the concept of the programme has not been very clear to the authorities of the educational institutions who are responsible for implementing the programme. The project has met with certain amount of success in the urban fringe areas but is yet to achieve desired result in the rural areas. Hence the Government needs to focus more attention on the successful implementation of this scheme in the rural areas where gender based discrimination is immense.

Key Words: Trafficking, KanyashriProkalpa, Rural, Urban Fringe

Assessment Of Forest Fragmentation And Disturbance Patterns In Kanksa Block Of Barddhaman District, West Bengal: A Geospatial Approach

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Environmentalists have been highly concerned with declining forest cover as well as increasing forest fragmentation in different scale across the world from last several decades. Considering the major fourfold effect of forest fragmentation i.e., reduction in habitat area, increased number of habitat patches, decrease in habitat patch size, and increase in the degree of isolated patches; forest fragmentation is recognized as a major threat to forest ecosystems. Indicators of forest fragmentation are reported by several national and international environmental programs in assessments of forest health. But Spatio-temporal change of forest cover using forest fragmentation along with incorporation of population growth and associated anthropogenic intervention a causal entity has become the major thrust area in the present study. Kanksa is one of the few forest dominated block in Barddhaman District mostly affected by the rapid population growth, land use change in terms of agricultural and irrigational development as well as rapid urbanization in the last three decades. Present study focus on forest fragmentation and spatio-temporal dynamics of forest cover during 1990 to present by incorporating geospatial techniques by using Landsat TM and Landsat 8 OLI satellite images. Beside this, forest disturbances in terms of three major anthropogenic factors i.e., population growth (1991-2011), settlement and road transportation in relation to fragmentation classes (both in open and Durgapur PF) by clear and proximity analysis in Arc GIS environments have been assessed and analyzed.

Key Words: Forest Health, Forest fragmentation, Forest disturbances, Clear and proximity analysis, Population growth, anthropogenic interference

Status Of Ambient Air Quality During The Festival Of Diwali In Kolkata

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"Diwali" or "Deepaboli" means the festival of light, burning of firecrackers etc. In Sanskrit Diwali or Deepaboli means "series of light". It is celebrated in the month of October-November in every year during the season of autumn. The internal meaning of Diwali signifies the victory of light over darkness, good ever evil, knowledge of ignorance and hope over despite. In West Bengal it is celebrated with "Kali Puja" of "Shyama Puja" with burning of large number of Diyas/Candles and huge quantity of firecrackers. The firecrackers are made with aluminium sodium oxalate, manganese sulphur, iron dust powder, potassium per chlorate, Manganese dioxide (MnO2), Phosphorus (P4), Potassium chlorate (KCl03) etc. Different types of toxic air pollutants are released and mixes into the atmosphere After burning of this components which were used into firecrackers. It is said that the firecrackers have approximately 75% potassium nitrate, 15% carbon (C) and 10% sulphur (S). Potassium nitrate is a strong oxidising agent. Major types of air pollutants such like as CO2, NO2 and SO2 are released from burning of firecrackers. Inhalation of smoke from fireworks causes cough, fever and leads to acute eosinophillic pneumonia (AEP) basically respiratory diseases. Instead of this other diseases are Allergic bronchitis, bronchial asthma, chronic bronchitis, chronic obstructive pulmonary diseases (COPD), allergy, rhinitis, sinusitis, pneumonia, common cold etc. Patients who were admitted into hospitals, old aged persons, new born baby did not able to sleep at night due to presence of excessive quantity of air pollutant into atmosphere.

Key words: - air pollution in Kolkata, components of firecrackers, gases which were come from burning of firecrackers, burning effect of firecrackers in Society.

Assessment Of Landslide Hazards In South Sikkim Himalaya Using Geo-spatial Techniques: An Approach Towards Planning And Development

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Landslides are the most widespread natural disaster in Sikkim Himalaya which increases its spatial extent day after day. During landslide the materials like soil, rock, vegetation, and existing construction may move very rapidly within a second where as some may take longer time to develop. Thus it is required to identify the landslide vulnerable area in advance for proper planning and management in the concerned study area. In the study area of South Sikkim Himalaya, landslides are much more destructive which causes havoc loss of human life and properties. To minimize the damages caused by landslides, the preparation of landslide susceptibility zonation map is one of the concrete steps to planners and policy makers. To study landslide phenomena in the present study, some landslide inducing factors i.e. slope, aspect, curvature, relief, geology, geomorphology, soil, drainage, lineament, rainfall, land use, NDVI and seismicity were taken into account and their integration has been made on R.S & GIS platform to obtain landslide susceptibility zonation map of South Sikkim Himalaya. To prepare various thematic data layers the topographic maps (SOI), Landsat image, field data and published maps i.e. geology (Geological Survey of India), Geomorphology and Soil (NATMO) were being processed with full care on ARC GIS (9.3). To integrate all the data layers Weighted Overlay Analysis Model (WOAM) on GIS platform were performed and finally landslide zonation map of South Sikkim district were prepared and spatial distribution of slope instability was predicted. The study revealed that the further concentration of settlement, expansion of communication lines and others developmental activities should be introduced in the low landslide susceptible areas of South Sikkim Himalaya for reducing the damages caused by landslide phenomena.

Keywords: Landslide, weighted overlay model, frequency ratio model, South Sikkim Himalaya, RS & GIS

Food Security In India : Challenges And Remedies

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The National Food Security Bill in India passed in 2013 with the aim of achieving food security for all by empowering 'Right to Food' for all Indian citizens. It emphasizes more on social justice for poor rural and urban people of our country. This national mission is dreaming to sweep away the social curses like poverty, hunger, malnutrition, infant death, child labour and also social inequality from our country. But at the same time it facing a lot of challenges like our corrupted government system, poor infrastructure of Public Distribution System (PDS), lack of proper Food supply Chain Management (FSCM) , rapid growth of population per year, uncertainty of monsoon based agricultural production due to the global climate change and alarming declining of ground water level. This paper discusses the challenges and also suggests the remedies to achieve the ultimate goal of Food Security for the people of India.

Key Words:-Food Security, Poverty, Hunger, Malnutrition, Infant Death, PDS, FSCM

Arsenicosis: A Social Menace –A Case Study InKalyanpur Village, Burdwan District

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Arsenic pollution in ground water in vast areas of Burdwan district has created alarming health hazard which has affected hundreds of people residing in those areas every year. Arsenicosis resulting from arsenic poisoning gives rise to a number of health problems including gastro-intestinal disturbances, hyperpigmentation and neurological disorder and even skin cancer in severe cases. Excess arsenic in ground water (used as drinking water) not only creates physiological problem of human being, but it has a great impact on man's social life too. Kalyanpur village in Purbasthali II block of Burdwan district shows the terrible impact of arsenicosis.This paper tries to find out the causes of arsenicosis and social problems arising due to the arsenicosis in Kalyanpur village.

Key words: arsenicosis, health hazard, social impact

Socio-Economic Scenario Of Slums In Barddhaman Municipality, West Bengal

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A slum is a heavily populated urban informal settlement characterized by substandard housing,poverty, high unemployment. In a class-I town Barddhaman of Barddhaman district in West Bengal there are 141 slums sharing 29% of the municipality population (2011). However there is variation in socio-economic development across the slums of this municipality as found from a case study of three selected slums of wards no. 1, 13 and 35. Of them the slum at ward no. 13 is composed of East Bengali refugee and local poor East Bengali people, ward 1 slum by Santal tribes and Muslims and ward 35 slum by Santal tribes and East Bengali refugees. In ward 13 literacty rate, sanitation, housing conditions are better than two other slums at wards 1 and 35. About 40% workers are small businessmen and servicemen, whereas 100 day workers, agricultural labourers, cook, maid, daily wage labourers form the working population base in the other two slums. These two slums are also affected more by natural hazards and health hazards than the slum at ward 13. Still the East Bengali refugees in ward 35 enjoy a better socio-economic condition. So slums dominated by East Bengalis have better socio-economic development than Muslims and tribe dominated slums.

Keywords: Barddhaman Municipality, slum, social amenities.

Development of Rural Connectivity in Rural India

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Rural Road connectivity is considered to be a key component of rural development as it promotes access to economic and social services. This in turn generates increased agricultural productivity, non-agricultural employment as well as non-agricultural productivity. This leads to expansion of rural growth opportunities and real income through which poverty can be reduced. Rural areas account for about 69% of the total population of India as per the census of India, 2011. This studies envisages to analyse the various plans and programmes of the government of India regarding the status and development of the rural roads with special reference to West Bengal. In addition, this study aims to investigate the objectives and motives of the plans and how these have been implemented. Statistical analysis of the secondary data collected from various sources have used to derive the inferences of the status of rural road infrastructure in West Bengal.In West Bengal the conditions of the roads have improved a lot over the years specially after the implementation of the PMGSY. In West Bengal, the total length of National Highway is about 2578 km while density of road is 0.032 per 1000 people. The national highways numbered 2, 2B, 2B Ext., 6, 31, 31A, 31C, 31D, 32, 34, 35, 41, 55, 60, 60A, 80, 81, and 117 passes through the state. A total of 10,904 habitations have been cleared for connecting with an All-weather road by constructing about 16,334 km of road length upto the year 2012-13 since the inception of the PMGSY. However, against this, the state has connected around 8,154 habitations by constructing 12,139km of road length. Out of the sanctioned amount of about Rs 5,997 crore, the state has utilised Rs 3,983crore which shows that the state has made considerable progress in utilising the funds and implementing the plans and proposals of the scheme.

Keywords: Road Connectivity, Agricultural Productivity, Poverty, Non agricultural employment

Ecotourism In Meghalaya: Case Studies From Selected Spots In East Khashi Hills District

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Ecotourism is a term used in tourism business for the sustainability of both natural and cultural landscapes in the area experiencing tourism activities. It is an alternative approach to popular mass tourism because mass tourism is purely based on optimum utilisation of tourism resources in the destination areas creating variety of socio-environmental problems resulting to the destruction of the attractions in the tourist spots.

In the remote rural areas tourism can be vital ingredient for development activities avoiding its disastrous impacts. In this respects ecotourism can be a solution to avoid negative impacts on the natural environments and society. Besides, ecotourism helps in extending the scope of conserving and developing the environment and culture in any area.

Meghalaya, a state in the 'Land of Seven Sisters' in the North East India comprises mainly of tribal population in its vast rural areas, offers indigenous knowledge based tourism activities-effectively the ecotourism which can be a lesson for other Parts of India. The remote rural areas in the East Khashi hill District have a number of ecotourism destinations attracting a large number of domestic as well as foreign tourists every year. As in other parts of the state, in the tourist spots of East Khashi Hills District women take leading role in the economic activities in both home and outside the home establishing a new socio-economic paradigm creating an advance ecotourism heaven in the remote rural areas in harmonious relationship with nature by extracting the natural resources as livelihood ingredients.

The preset paper is thus an attempt to highlight the ecotourism characteristics in the different parts of East Khashi Hills District of Meghalaya emphasising their role in economic sustenance of the people of remote rural areas. The major data sources are website of the department of tourism in Meghalaya as well as field visit in various tourists' destinations of East Khashi Hills districts of Meghalaya.

Key words: Ecotourism, mass tourism, ethno tourism, rural tourism, nature based living, green economy etc.

Anthropogenic Activities And Their Impact On Char-land Environment: A Case Study Of Some Selected Chars In Hooghly District, West Bengal

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River bar, popularly known as "Char land" in Bengali, is a distinct depositional feature, frequently seen in the lower reaches of Bhagirathi-Hooghly river in West Bengal. It is referred as 'mixture of land and water-part land and part water' (Dutt and Samanta,2013); formed by the sedimentation and accretion of river as it is originated from the Himalaya. Extensive river bars (chars) are created along the river bank or bed of this river. These are mainly sandbars emerged either as islands within river channels or as attached lands to the river banks. The present study focus on these naturally formed phenomena which are used (rather misused) by different anthropogenic activities. This paper considers some char-lands of Hooghly district which can be classified into three categories from the morphological point of view: stable char, semi stable and unstable chars. However, stable chars are more resourceful than the semi stable and unstable chars. But, unprecedented population growth and increasing demand for land lead to deterioration of these char areas. Excessive sand mining, brickkiln industrial set up etc. ultimately impacts on the environment and causes for land degradation. Sometimes, as a consequence the char dwellers livelihood becomes vulnerable to disaster like flood, river bank erosion etc.

The present study is an attempt to focus on spatio-temporal dynamics of char-lands of the selected study area since 1980s to present by using satellite images in accordance with geospatial techniques. So far the environment is concerned, it aims at discussing the ways for rational uses of these char land areas in a sustainable manner.

Key Words: Char-land, Anthropogenic Activities, Land degradation, Livelihood, Sustainable management

The Geographical Analysis Of Groundwater Fluoride Contamination In Smlapal Block Of Bankura District, West Bengal

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There can be no subject more important than water. Water, the crystal and clear liquid, is the origin and of all living creatures in the world. Ground water of Bankura District is well known for its fluoride content in recent time. People from many of the villages have been marked with fluorosis from consuming fluoride contaminated groundwater as only 10% people are fed with PHE water supply scheme. People of the area are compelled to use ground water for drinking as well as irrigation purposes. Geologically the area is principally underlain by Precambrian Metamorphic rock like granitic gneisses (1.84%) and unoxidised or occationally oxidised (90.29%) with occationaly gernatiferous (5.33%) lithology. These rocks have fluoride-bearing minerals like fluorite and apatite. Fluoride ions from these minerals leach into the ground water and contribute high fluoride concentration. Total 150 water samples of tube well taken from rural areas of different Gram Panchayats of Simlapal block have been tested and the results are statistically analysed. Health impacts like dental fluorosis, skeletal fluorosis are found in many villages. Removal of fluoride from drinking water and supply of clean fluoride free water is urgent necessity. The present study has been taken keeping in view the physical, hydrological and socio-economic parameters in Simlapal block of Bankura district to study the distribution of fluoride contamination and development strategies.

Analysis Of Drainage Basin Properties And Flood Potential Of Ajay River By Applying Various Geospatial Technologies

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River Ajay originates on a small hill Chakai (86°21'40" E, 24°25'N, at 346.3m. above MSL), southwest of Munger in Bihar. It then flows through Jharkhand and enters West Bengal at Simjuri, near Chittaranjan (86°42'30" E, 23°55'N, at 233.8m.MSL). It forms the border between Burdwan and Birbhum districts and finally joins the Bhagirathi River near Katwa town of Burdwan (88°08'E, 23°39'N, at 14m.MSL). Total length of the Ajay is 288 km. out of which 152 km. lays in West Bengal. The important tributaries of Ajay are Pathro and Jayanti in Jharkhand, Hinglow in Birbhum and Kunur in Burdwan district of West Bengal. Total area of Ajay river basin is 6093 sq. km. with the perimeter being 783 km. that covers three consecutive states of India like Bihar (386sq.km.), Jharkhand (3204sq. Km.) and West Bengal (2503sq. Km.). For this study, the Shuttle Radar Topographic Mission (SRTM) Digital Elevation Model (DEM) is used for evaluation of watershed boundary, flow direction, flow accumulation, flow length, stream ordering, have been prepared using hydrological tool and slope-aspect have been prepared using surface tool in ArcGIS. To identify the downstream nature of Ajay River, long profile and cross profile have been done by Google Earth from Pandabeswar to Katwa and Dumpy Level survey near Gitgram respectively. At plateau-fringe due to sudden decrease of gradient of slope river velocities decrease and the material transported by river are deposited upon its bed and the result is mid-channel bar formation. On the other hand same case occurred during dry period scarcity of rainfall in upstream region decreases water supply in both the river channel Kunur and Ajay. As a result, during monsoon shallow river channel can't bear excessive rainwater and flood occurs.

Key words: SRTM-DEM, Arc-GIS, flow direction, flow accumulation, stream ordering,

Analysis of Land use land cover changes in Coal Mining areas of Raniganj-Asansol Using Remote Sensing and GIS

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Abstract: Asansol and Raniganj is one of the most important coal mining and industrial zone in India. Continued and long term mining without reclamation operations usually produced large qualities of wastes, overburden and under grade ore materials etc which destroys or significantly alters all other physical features that influence the capabilities of the land. This paper discusses the role of remote sensing and GIS techniques for identification of various land use / land covers features by employing satellite imageries over time. To conduct the study remote sensing data, ground truth information, socio-economic data has been collected for preparation of data base for all the required physical & cultural parameters & the overlaying, integration & analysis of all spatial, non-spatial & attributes. The result indicates that mining is the dominant among all land use classes and are responsible for environmental degradation. The changes develop adverse impact on the entire vegetative community, human & wildlife however, in spite of many adverse impacts. Large areas of forest, agriculture & pasturelands have been converted in to collieries, colonies & fallow lands due to rapid expansion of coalmines.

Application Of Geospatial Technology In Geographical Study

With Special Reference To
Grain Size Analysis Of Sand-Sized Bed Particle Of Panchanoi River, Matigara, Darjeeling, West Bengal

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The present paper deals with the application of GPS and GIS platform for the grain size analysis of sand-sized bed particles in a selected reach of the river Panchanoi at Matigara. The samples were collected from different morphological units within the channel with specific GPS location during field survey in 2016. Mean, sorting, skewness and kurtosis are the statistical indices used (by using the Gradistat version 8.0) to represent the spatial distribution of grain size and the correlation matrix represents the nature of inter-relationship of the statistical parameters. The spatial mapping of grain size represents a wide range of sand particle with a significant range of sorting, skewness and kurtosis (by using Surfer version 6.0), indicates the differential energy condition in transportation and depositional environment. Tests of hypothesis determine the statistical significance of relationship at 0.05 or 95% level of confidence with specific degree of freedom. The mean diameter (ϕ) of sand-sized particles increases in sections with greater widths, as an evidence of higher energy condition. The particles are poorly sorted in the narrow cross sections. Wide cross sections are characterised by coarsely skewed leptokurtic distribution. The fluctuation in energy condition occurs due to the regular flow throughout the year and the occasional flash flood discharge in the monsoonal months. It creates irregular hydraulic dynamics with changing velocity in the river bed with varying tractive stress and lifting force in different regimes.

Key Words: Granulometry, Sand-sized bed sample, Cross-sectional area, Mean, Sorting, Skewness, Kurtosis, Transportation process, Depositional environment

Identification Of Landslide Susceptibility Zones In Gish River Basin, West Bengal, India

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Darjeeling Himalaya is one of the several mountainous areas of India which is often affected by landslide hazards. Proper identification of landslide susceptible areas is very much necessary in order to take mitigation measures against landslide hazard. In this paper a multi criteria evaluation is applied using some selected indicators to identify the areas vulnerable for landslide hazards. A series of techniques is used in ArcGis 9.3 and Erdas 9.2 for preparing the individual data layers as well as composite model. Thirteen parameters are selected to prepare the landslide susceptible zone for this basin. To find out the weightage value of each indicator Analytic Hierarchy Approach has been taken into consideration. All the layers again divided into some classes and weightage value of each class is calculated based on Analytic Hierarchy Approach. The obtained results show that near about 7 sq. km (Approximately 4%) area within the basin is highly susceptible for landslides. In this zone, drainage density is high (5 km/sq. km), relief is greater than 600 metre and slope is greater than 21^0. This land slide model is validated by frequency of land slide occurrences already taken place in the study area. The result shows that very high landslide susceptible zone is associated with very high frequency of landslide occurrence. So, the proposed method can be applied for predicting landslide susceptible zone.

Keywords: Landslide susceptibility, Gish river basin, Analytic Hierarchy Approach, Landslide inventory and Model validation

GIS Application In Municipal Governance – A Case Study Of Kharagpur Municipality, West Midnapore District

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India is witnessing rapid urbanisation in recent times. High urban growth and migration from rural to urban areas are associated processes. Urban centres act as catalysts of economic growth in developing nations. The rate and level of urbanisation depends on economic, social and historical factors. The mean level of urbanisation in India is only 31.16% according to 2011 census, whereas West Bengal is one of the most urbanised states in the country owing to its colonial history. The growth rate of urbanisation in West Bengal is far ahead of the national figures. This growth in population in urban areas demands strengthening of both physical and social infrastructure and requires strong governance. The Urban Local Bodies (ULB's) have been recognised as the third tier of government by the 74th Constitution Amendment Act, 1992. This is an initiative of the Government of India (GOI) towards strengthening municipal governance. The ULB's are entrusted with the responsibility of provision of various services related to housing and water supply, inadequate sewerage, waste disposal, pollution, traffic congestion, slums and urban encroachments in fringe area, poverty and social unrest. These issues make urban governance a challenging task.

Geographical information System (GIS) is an important tool used by the ULB's to ease the process of governance. Proper GIS database in the Municipalities/ULB's provide invaluable inputs for planning of municipal infrastructure. With the assistance of thematic maps prepared with GIS, a high visual impact is created which makes assessment of civic amenities an easier task.

Kharagpur in West Midnapore is a significant and multi-cultural industrial city. According to 2011 Census, the population of Kharagpur Urban Agglomeration was 293719. It is part of the Midnapore-Kharagpur Development Authority (MKDA) which was formed in October 2003. This paper is an attempt to assess GIS based decision support system for Kharagpur Municipality.

Keywords: Urbanisation, Urban Local Bodies (ULB's), Municipalities, GIS, Kharagpur Municipality

Geospatial Approach For Allocation Of Potential Tourism Gradient Sites At Maithon Dam Of Damodar Valley Corporation (DVC), India

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And

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Abstract

The present paper explores the possibility of tourism development at Maithon dam site through the lens of 'geospatial approach' for the development of 'ecologically and economically viable' tourism in the destination area. The dam site holds a huge promise and prospect for the development of pleasure tourism. Since, flood control, irrigation and water management being the immediate thrust area as well as its inter-state buffer location of Damodar Valley Corporation (DVC), recreational importance of the site has been neglected over all. In the present study, geospatial approach is used to find the gradient suitability in respect to adventurous and scenic beauty depending upon the tourist interest. The gradient of tourist potential places is created in GIS environment with binary and weighted overlay methods. Topographical maps and thematic maps are used in GIS environment for the preparation of final output.

Key words: Geospatial approach, weighted overlay, sustainable tourism, pleasure tourism

Process And Patterns Of Urbanization In West Bengal: A Geographical Study

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Urbanization is a process by which the proportion of the urban population of the country increases and there is a shift in employment from primary sector to secondary, tertiary and quaternary sectors. A universal feature of most developing countries is rapid urban growth. Over the last few decades, urbanization has accelerated at an unprecedented scale. Globally, more people live in urban areas than in rural areas, with 54% of the world's population. The term 'urban' has been defined differently in different country depending on the local condition and criteria. About 65 years ago, 30% of the world's population was urban; and according to the estimates of the United Nations, by 2050, 66% of the world's population is projected to be urban. This is the overall trend of urbanization across the world and India as well as West Bengal is no exception to this common trend. In reality, West Bengal has also been following the same tract. The process of urbanization in West Bengal is faster than the national average. The purpose of this paper is to provide a broad overview of the recent patterns and trends of urban growth in India and West Bengal.

Key Words: Urbanization, Urban population, Developing countries, Urban, Urban growth.

Integrated Urban Flood Risk Management: The Scenario of the Indian Cities

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Urban Floods are becoming increasingly familiar events in these days in all the metropolitan cities, especially in the Asian cities. As the name suggests, it is the influx of huge amount of water due to torrential rainfall, at time may be associated with the extreme events like cyclones but the main cause behind this is the unplanned growth of urban centres, excessive rate of concretisation and so on. Like all other disasters, when urban flood takes place it shuts all other urban amenities also- transport, electricity, schools, banks etc. Integrated Urban Flood Risk Management is an approach which tries to reduce the impact of urban floods and as well as manages these socio-economic crisis during the floods. This paper aims to seek how far this approach can be applicable in case of Indian Cities and whether with this integrated approach the risk of urban flood can be eliminated at all or not.

Key Words: Urban Flooding, Integrated Urban Flood Risk Management, Water Logging in Cities, Urban Disasters.

The Measures Of Accessibility And Aspect Of Schooling With Reference To Puncha Block Of Purulia District, West Bengal.

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Movement of man and material across spaces is accomplished through some definite channels of transport network. These channels consist of nodes and routes connecting these nodes. On the efficiency and fluency of linkages between the places the advancement of a region depends upon. The present paper is an humble submission to explore the nodal accessibility and its linkage with schooling issues at Puncha Block of Purulia District, one of the backward Districts of West Bengal. The Study found Puncha and Kenda as high accessible zones. Most of the pockets of the Block represents a very disappointing figure in respect of accessibility measures. The areal network found to be branching. Accessibility aggrevates the problems of swelling and shrinking of enrolment. Good connectivity and accessibility ushers in the momentum of schooling. Good access make enrolment boost up. Accessibility is also a determining factor of catchment areas of schools.

Key Words: Linkages, nodal accessibility, enrolment, catchment area of schools.

Smart V/S General Infrastructure: Future Of Poor Migrant Of Smart Cities

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A **smart city** is an urban development vision to integrate multiple information and communication technology (ICT) and Internet solutions in a secure way to manage a city's need. The goal of building a smart city is to improve quality of life by using urban information and technology to improve the efficiency of services and meet residents' needs. In India by 2050, about 70 per cent of the population will be living in cities. With increasing urbanization and the load on rural land, the government has now realized the need for cities that can cope with the challenges of urban living and also be magnets for invest. There are 495 cities with population above 100,000 in 2011. There were 4,041 statutory towns and 3,894 census towns. Presently a huge number of migrants reside in these cities and sell their laborer in exchange of money. There services are much require for the smooth running of cities. Generally, either they commute or reside within the cities. The aim of smart city is highly ambitious with goal of eco friendly environment and sustainable development with smart services. Now, the question is this whether the smart technology will replace poor and generate unemployment. Secondly, what about the replacement of these laborers as smart building will take the place of ghettos? However, smart cities core infrastructure model claim for affordable housing for poor but the question is when governments are fail to provide houses to poor under general infrastructure then is it really possible for a smart city. This paper intensively raises other questions and tries to answer them.

Environmental Impacts Hydro Electric Projects of Uttarakhand: An Environmental Analysis

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Electricity is a key factor for development and improving the quality of life. Harnessing the untapped hydro potential of the Himalayan Rivers, India can open the avenue of growth. The state Uttarakhand is the main catchment area of mighty river Ganges and can contribute to the national power sector and economy. Though, in the early years after independence, the large hydro potential of this region was unexploited. But after the creation of the new state of Uttarakhand, the state Govt. has started to the emphasis on the generation of hydroelectricity. Nowadays, Uttarakhand has become the power house for National Capital Region (NCR). Several dams and reservoirs have already been commissioned and large numbers will be completed very soon. Presently the state economy of Uttarakhand is very much depended on the hydro power sector. But there are several environmental factors or issues of random hydro projects such as disturbance of river morphology, ecosystem, intensity of flash flood & seismicity etc. This paper deals with hydro potential, and present status hydro power generation of Uttarakhand State and different environmental issues related to it.

Keywords: Aquatic biodiversity, Environmental degradation, Hydro-electricity, Power potential, Uttarakhand.

Impact Of Urban Expansion On Agriculture Land Use : A Case Study On Tarakeswar Town In Hugli District, West Bengal

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Rapid urbanisation is one of the dynamic issues at present because any rapid and haphazard growth of cities causes environmental degradation. Expansion of urban landscape results in encroach of agricultural land and other related problems societal problems. The principal aim of this study is to assess the impact of urbanization on the surrounding agricultural land areas in Tarakeswar town in Hugli District of West Bengal. This work attempts to examine the pattern of urban encroachment upon the agricultural lands and changes that occurred in land use and land cover during 2001 - 2011 using modern techniques of remote sensing and GIS. The spatio-temporal study of agricultural land use is done using Google Images (2001 and 2011). It has been found that the agricultural land area adjacent to the Tarakeswar town has been decreased from 84.05 hectares (2001) to 82.26 hectare (2011). Growing population pressure causing the expansion of this urban centre has been responsible for serious degradation of the quality of life as a whole.

Key words: urbanization, environmental degradation, societal problems, urban encroachment, spatio-temporal

Rural Tourism In Bankura District: A New Facet Of Rural Development And Women Empowerment

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In India different development organizations are continuously translating issues of rural development into their practices seeking for more efficient strategies to achieve women empowerment and rural development. As the world is changing and making progress in this contemporary age of globalization, the disappointment is that women in rural areas throughout India are still leading a life of dependency that does not allow them to achieve positive economic and social status. Given this background, this study examines rural development and women empowerment through rural tourism in Bankura district, West Bengal, a new industry in rural Bengal. The concept or rural development and rural women empowerment through rural tourism is recent form of approach than that of research about women and tourism in general. In this regard the paper is an enquiry into the claim that rural tourism is an effective and financially viable alternative to the existing methods of alleviating poverty through building up of institutions, which have the capacity to generate employment opportunities for the rural poor and lead to economic growth and social development. Thus the aim of the paper is to find out the impact of rural tourism on the socio-economic transformation of the rural women in Shushunia hill area of Gandheswari watershed area of Chhatna block of Bankura district.

Key words: Rural tourism, rural development, women empowerment, socio-economic transformation.

Smart Maps For Smart Cities: Approaches, Adaptions & Innovations

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"A map is only as good as the benefits it provides its users" & "Smart Maps can redefine India's urban future" (DGDA, CII, 2015). Maps have come a long way from being a basic tool for identifying addresses and roads, they now shape myriad ways of understanding and communicating with our environment. A city is smart only if its citizens are at the heart of its design.In India, the quality and features of maps have improved significantly over the years. However, in a dynamically changing and complex landscape like India, continuous innovation is needed to drive locally-relevant and effective solutions. (DGDA, CII, 2015) "Smart Cities integrate and analyze massive amounts of data to anticipate, mitigate, and even prevent problems." (Clarke, 2013).Fundamentally, a Smart City is one that unifies data from a wide range of sources – embedded sensors, public services, citizen reports, telecom companies, and more – to inform decision-making by policymakers, businesses, and citizens.The three important aspects of Smart cities are Citizen Centric Approach, Dynamic Updating & Adaptation and Platform for Innovation. Citizen centric approaches are needed in smart cities to handlethe changes in the environmentand shifts in the lifestyle values of residents as Smart Cities are always evolving."(Hitachi, 2013). Dynamic Updating & Adaptationfor Cities is required to apply advanced IT, analytics and systems thinking to develop citizen-centric approaches." (IBM, 2010)andPlatform for Innovation, so that Smart Cities attract investments, experts, and professionals to offer economic opportunities to all their citizens." (MoUD, GoI, 2014). In this study, the author has analyzed and highlighted the various aspects of citizen centric approaches, application of information technology and smart innovations which would be required for future smart cities.

Key Words: Smart Maps, Smart Cities, Citizen Centric approaches, Dynamic Updating, Smart Innovations

A Huge Role Of Remote Sensing Technology In Modern Day: Disaster Management And Mitigation

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Disasters are unexpected events that we face anytime, anywhere, in our life whether it is natural hazards or through human factors. It is a collective term encompassing all aspects of planning and taking preventive measures for and responding to disaster including both pre and post disaster activities. According to the Red Cross and Red Crescent societies define disaster management as the organization and management of resources and responsibilities for dealing with all humanitarian aspects of emergencies, in particular preparedness, response and recovery in order to lessen the impact of disasters. These disasters also have far-reaching implications on sustainable development through social, economic and environmental impacts. It is highly imperative to develop effective tools for disaster management. Remote sensing systems have been playing a great role in disaster management in such areas as flooding, cyclones, droughts, earthquake and tsunami. Remote sensing- the science of acquiring information about the earth using remote instruments. Such as satellites- is inherently useful for disaster management. Satellite offer accurate, frequent and almost instantaneous data over large areas anywhere in the world. When a disaster strikes, remote sensing is often the only way to view what is happening on the grond. Remote sensing technology has been used in disaster management especially during the preparedness or warning and response or monitoring stages. Remote sensing data can be used very efficiently to assess severity and impact of damage due to these disasters. GIS and GPS are extremely useful in the disaster relief phase also. This paper deals with the modern day developments in the application of remote sensing in disaster management and mitigation.

Keywords: Disaster Management, Natural hazards, Satellite imagery, Sustainable development, GIS and GPS.

Role Of Remote Sensing, GIS, And GPS In Geographical Studies

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Geography, as a field of study is enriched by the contributions of number of disciplines encompassing physical, societal, biological and behavioural sciences. Becauseindividuals operating within time incited place-people-process framework act always as intervening variables to induce problems and prospects of geo-decisions. To maintain quality and precision in decision-making, geo-spatial analyses and syntheses strictly adhere to scientific methodology. To this end, Remote Sensing, GIS and GPS, as specific branches of knowledge, come with sharper possibilities and promises. Remote Sensing, with its computer and satellite based techniques, uses sensors to displaystandardisedapproaches of geo-information processing without any physical contacts, what so ever. On the other hand,based upon five key components, GIS nurtures both the geo-spatial and attributive data and covers a wide range of procedural manifestations i.e. database queries, overlay operations, geospatial measurements, network & surface analyses and geo-visualizations under man-machine system. DBMS and RDBMS as indispensible functional options of GIS explore interrelatedness between referenced and non-referenced datato provide an exclusive system–process approach under data based support system.The scientific modus operandi of GIS with all its reliable methods, thus, bestows a number of advantages save a few scanty limitations.GPS,more overenumerates positional identification of the objects or entities, through the courses of satellite-centric sensor-linked ground measurements. It put emphasis on three intertwined activities of its functional segments, namely space segment, ground segment and user segment, for the appraisal of three dimensional positional perceptions.This article makes a striving, here, to unearth the integrating mechanism that operates among Remote Sensing, GIS and GPS as a whole.

Key Words: Remote Sensing, GIS, GPS, RDBMS, Geospatial Analyses and syntheses

Analysis Of Intra Urban Disparity In Development: A Case Study Of Kalyani Municipal Area ,West Bengal

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Rural and urban dichotomy prevailing in India is a common phenomenon in this modern civilization.But sometimes dichotomy is also noticed within an urban area.Kalyaniis a planned township situated at 50 km away from Kolkata,comprising about 26km^2 planned area with middle and lower class dwellersin presently 20 wards.It is undergoing changes in it's morphological structure since last 15 years by the encroachment of slums and vertical extension through construction of flats all over the city.This township was built in late fiftieson the rural landscape.

The **objective** of this study is to assess the intra ward dichotomy and level of inequality in these wards of Kalyanimunicipal area.The database includes both primary and secondary one - satellite images,municipality maps with census data and data acquired from interview schedule with residents of selected wards.**Methodology**followed mainly the analysis of census data of 2011 for calculating **Z score and composite Z score** and other statistical techniquesas well as land use classification of images in RS_GIS softwares to detect intra-ward disparity in development. It has been observed that inequality reflects in caste composition,literacy,occupation,income,settlementpattern,health and education,land value and environmental condition in centrally planned and periphery wards hindering the overall development of the study area.Parameters are chosen combining both primary and secondary data and maps are prepared representing the level of backwardness. Suitable remedies have been suggested by the researcher for reducing the dichotomy and to develop the township as a true "Analytic Theme City"(Samridhdhi) in upcoming State Govt urban development project.

Analysis Of Urban Growth And Land Use –Land Cover Changeperi-Urban Area In Barrackpore I and II

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Urban growth is one of the most important topics in urban studies.It is a worldwide phenomenon but the rate of urbanization is very fast in developing country like India. Peri-urban areas usually are not homogenous but are dynamic areas.It is mainly driven by unorganized growth, increased immigration, rapidly increasing population in urban fringe area. In the present study, an attempt has been made to investigate the pattern of urban growth and Land use / Land cover change in rurban areas of Barrackpore C D Blocks in the year 1991, 2001and 2011. The task comprises of steps: delineation of urban area for consecutive years, comparison between urban areas, identification of the urban sprawl pattern, recognition of magnitude and direction of changing urban sprawl. The pattern of urban sprawl and land use-land cover changes are identified by applying Remote Sensing and GIS techniques. The Maximum Likelihood Algorithm of Supervised Classification has been used to generate land use and land cover maps. It was found that significant changes have occurred since 1981to 2011 and the same urban growth pattern will continue towards the eastern direction. The findings provide invaluable information for planners and decision makers in managing and planning urban growth. However, sustainable urban growth management and development planning need to take account of the dynamic process of temporal urban change.

Key Words: Urban Growth, Peri-urban, Remote Sensing and GIS, LULC, Supervised Classification.

Impact Of Geomorphology And Soil On The Agricultural Development In Gangajalghati Block Using Remote sensing And GIS Techniques

Dr. Sujit Das

For sustainable agricultural development in any region is primarily depends on the soil properties which are strongly influenced by the geomorphological factors. Identification, classification, distribution and mapping of various geomorphic units have great significance in agricultural development in Gangajalghati block, because each geomorphic unit have separate resource potentialities that human beings can uses at sustainable basis. The soil of the area under investigation is mainly lateritic, light in texture and acidic in nature. IRS P6 LISS III and LISS- IV data and other collateral data have been used for generating geomorphological, soil and other maps. As maximum area of this region belongs to hard rock terrain, ground water occurs in confined aquifer system in deep to medium water level condition and bore well yielding rate is low (30-50 LPM) to medium (50-100 LPM). Shallow soil depth, low organic content, moderately high pH (soil acidity) and low proportion of extractable bases (Ca, Mg, Na, K) are responsible for low agricultural productivity of different crops in the Gangajalghati block. The appropriate land management technique based on an understanding of the surrounding ecosystem in each geomorphic unit's is urgently necessary which helps to enhance the environmental quality as well as natural resources base upon which the agricultural economy depends.

Keywords: geomorphic unit, confined aquifer, soil acidity, land management techniques

The Eye Of The Eagle : A Study On Use Of GIS In Monitoring Urban Delinquency

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Urbanisation in third millenium has become a very complex scenario than what it was perceived in the previous one . Once a very technical term , a system of economic shift , a process of industrialization and value addition of the production , it has now become a very complicated and post modern concept including ever changing social dynamics and behavioral complexities in polycentric , polycultural and polyglot urban centers which are becoming more and more dystopian day by day. The urban authorities and urban residents are fighting day to day to handle these complexities that influence many facets urban governance . One of these factors are handling urban delinquencies that are finding new ways of manifesting them . In a very multi cultural society there is also the very potent fear of cultural clashes that devastate the social fabric. In this situation , there is a very real need of some potent tools which can be used to monitor and if needed control the emergency situations. Social fear mapping with the help of GIS is a simple and effective tool that can be employed for this purpose . This paper tries to demonstrate how can be used for a more active urban governance and social stability.

Key words : Urban governance , post modern , GIS , mental mapping

Climate Change And Spreading Of Vector Borne Diseases In India: A Geo-Spatial Analysis

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Vector-borne diseases are transmitted typically by the bite of an infected arthropod and continue to contribute significantly to the global burden of disease. Numerous climate change vulnerability assessments anticipate that rising global temperatures will increase the incidence of communicable diseases including vector-borne diseases (VBDs). Examination of several studies indicates that variability in temperature, precipitation, humidity and occurrence of extreme weather events is linked to transmission of vector borne diseases in various regions of India; even in the colder areas such as the Himalayan region, projected temperature rise can trigger the breeding of mosquitoes and the rate of transmission. This paper attempts to understand the likely influence of climate change on vector population dynamics and prevalent vector borne disease transmission in India and the expansion of geographical areas at risk. The study is based on secondary data sources. Malaria and Dengue fever are considered the most common and widely spread vector-borne diseases in India. The states of Karnataka, Telengana, Kerala, Tamilnadu, Delhi, Uttarakhand and Assam experienced surprise surge of dengue cases in recent years while Malaria is reported mostly from five states- Jharkhand, Madhyapradesh, Odisha, Uttarpradesh and Gujrat. With climate change it is expected that the diseases may spread to newer areas and therefore, some degree of preparedness is required. Well crafted and well managed developmental policies could result in enhanced resilience of population and lower health impacts due to climate change. It is important to improve surveillance, monitoring and integration of meteorological, environmental, geospatial, and health data while working in parallel to implement adaptation strategies.

Key words: Vector-borne disease, climate change, India, transmission

Changes In Riverine Morphology In The Southern Part Of Nadia District, West Bengal

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The Southern Part of Nadia District of West Bengal comprises the areas of six Community Development Blocks, viz., Santipur, Ranaghat – I & II, Chakdah, Kalyani and Haringhata having a total area of 1132.30 km^2. The entire study area lies within the moribund sector of the Ganga Delta where all the rivers viz. Hooghly, Churni, Ichamati, Anjana, Jamuna etc. are stagnated. The main objective of the present study has been to make an effort to discuss and analyse the nature and character of the rivers and the changes that have occurred in the riverine morphology in the area within the last hundred years. The present work is based on detailed analysis of topographical maps and satellite images of the last hundred years as well as intensive field study. The study reveals that the rivers have erratic water flow causing floods over large tracts spilling over the banks during torrential rains, but remaining practically flowless (even dry in stretches) during dry season. The changing courses of the rivers in this moribund deltaic tract form numerous interesting fluviomorphic features since the last hundred years. Therefore, the study area possesses a variety of morphological features like bils, ox-bow lakes, cut-offs, palaeochannels etc. and floodplain features like meander scrolls, natural levees, point bars, mid channel bars, crevasse splays etc. Not only natural but several anthropogenic factors have led to the changes in riverine morphology of the area. Besides this, the semi-consolidated to unconsolidated alluvium in the study area forms a rich store of ground water which is under threat for over-exploitation. On the basis of comparison, discussion and analysis, the striking features in terms of changes that have occurred in riverine characteristics in the study area have been identified.

Key words: moribund, bils**,** palaeochannels, fluviomorphic, alluvium

Livelihood Strategy Of Fishing Community In Some selected Mouzas Of Gosaba Block Of Sundarban: An Overview

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Most of the marginal people living in and around Sundarbans in a network of numerous small and big streams and creeks in the adverse bio climate of mangrove forests infested with fierce wild animals. Dire poverty urges the people of Sundarbans to frequent the forests in search of livelihood. The focus of this paper is to highlight livelihood problems of the fishing communities of some selected mouzas of Gosaba Block of Sundarban. These are river side villages where most of the people depend on fishing for their livelihood.A door to door Household survey (n= 150) has been conductedat five forest dependent villages like Bijoynagar,Birajnagar, Pathankhali,Pakhirala and Manmathanagarto identify the extent and intensity of the problem as well as socio economic conditions of the fishermen.Data were collected using questionnaires and informal interviews with key informants. Fishers usually take the risk for fishing and enter the forests braving the man-eating tigers and other fierce animals. On the other handfor entering Core Area at the time of catching fish Rs.5000 will be charged as fine from fishermen. For catching fish from forest fisherman should have Boat License Certificate (BLC) issued by forest Department.But shortage of Boat License Certificate (BLCs) and closed season for fishing ground causes serious problem for the poor fishermen as they solely depend on forest. Hence, parallel arrangements should be made forthe marginalized people of Sundarbanforbetterlivelihoods of themselves.

Keywords: Fishing, Boat-license certificate (BLC), Livelihood, Core Area, Forest

The Incidence Of Undernutrition Of The Children Of Ajodhya, Purulia

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The economic development of a nation depends on its people health. The attention on health must be given from very beginning of childhood. Health status of an individual mainly depends on nutritional condition. But the issue of malnutrition has been a serious threat to the world and for India also. Malnutrition refers to inadequate nutrients supply in body and poor physical condition is the result of it. The school age children are worst sufferer of it which is main contributor of child mortality. The prevalence of underweight and stunted children in India is highest in the world and an unsatisfactory image of malnourished children is recorded from rural India and West Bengal is one of the contributors. The present study was conceived to assess the Protein Energy Malnutrition (PEM) of school age children (5 to 10 years)of Ajodhya Gram Panchayat of Bagmundi block, Purulia. To evaluate the prevalence of PEM of children, we randomly selected 307 children in which 159 were male children and 148 were female children from 22 villages. The anthropometric techniques such as height-for-age (HAZ), weight-for-age (WAZ) and body mass index (BMI) for-age were used. Finally Z-score was calculated to evaluate the prevalence of stunting, wasting and underweight. Z-score value of <-2 refers to undernutrition and <-3 signifies severe undernutrition as per the recommendation of W.H.O. The study reveals that the prevalence of stunting, wasting and underweight is 27.69%, 36.81% and 44.62% respectively among the school age children. It is also found that male children are more in vulnerable condition in case of underweight and stunting compared to female children. In contrast female children experience awful situation in respect to wasting.

Keywords: Health, PEM, Children, Anthropometric Techniques,Vulnerable

The Quality Of Life And People Of Ajodhya

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The villages of Ajodhya Gram Panchayat of Purulia district are basically dominated by the rural tribal people and they still now experience a challenging life in this globalized 21st century for their livelihoods. With the passage of the time, the things on the hilly region of Ajodhya have changed and have left some imprints on their daily lives. We have carried out the study to perceive the socio-economic status of the concerned region and their quality of life has been assessed using Quality of Life Index (QLI) taking 557 households randomly as sample from 30 villages out of 32 and to do the same, we have taken ten parameters such as house structure and number of rooms, source of water, sanitation facility, health status, food intake, education status, usage of fuel, family asset, mode of transport use and monthly family income. The actual position of the j_{th} block in the ten dimensional Cartesian space may be plotted by the vector ($I_{1j}, I_{2j}, I_{3j,}I_{4j}, I_{5j}, I_{6j,}I_{7j}, I_{8j}, I_{9j,}I_{10j}$). The best situation, which is quality of life (QL), can be found in Cartesian space vector in terms of (1, 1, 1, 1, 1, 1, 1, 1, 1, 1). The worst QL is denoted by the vector (0, 0, 0, 0, 0, 0, 0, 0, 0, 0). At the end, QLI is computed measuring the normalized inverse Euclidian distance of the vector ($I_{1j}, I_{2j}, I_{3j,}I_{4j}, I_{5j}, I_{6j,}I_{7j}, I_{8j}, I_{9j,}I_{10j}$) from the worst condition (0, 0, 0, 0, 0, 0, 0, 0, 0, 0). This distance-based approach has an advantage over the UNDP methodology of measuring achievement or deprivation Index. To have the better understanding of QLI of each household, the value of QLI has been divided into five sub-ranges. The very good condition of QL is represented by $0.8<QLI\leq1.0$ and good condition of QL is indicated by $0.6<QLI\leq0.8$. The range $0.4<QLI\leq0.6$ indicates the moderate condition of QL and the poor condition is experienced by those households having the QLI range of $0.2<QLI\leq0.4$ and very poor condition is represented by the range of $0\leq QLI\leq0.2$. The study is completely based on primary database. Map and census data have been collected from 18th All

India Livestock Census, Agriculture Implements & Machinery, Fishery Statistics, Purulia, West Bengal, 2007 and District Statistical Handbook 2007 & 2012 of Purulia respectively. The study reveals that overall condition of QL of the people is moderate followed by poor and very poor and their respective percentages are 38.96, 31.05 and 21.36.

Keywords: Tribal people, socio-economic, Quality of life, Cartesian space

Role Of Sanitation And Health Care System On Population Case Study Of Wards 98,99, 101,102,110,111,112 Kolkata

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Health is a major concern of every society and every society and country. Sanitation is the hygienic means of promoting health through prevention of human content with the hazards of wastes as well as the treatment and proper disposal of sewage waste water. Borough no. 10, 11 of Kolkata Municipal Corporation is located in the south part of corporation area. Kolkata Corporation provides sanitation facilities to these selected wards. But in rainy season people are suffered from diseases like malaria, dengue etc. In modern time people suffers various diseases for their modern life style like fast food taking, smoking etc.

Key Words: health, hygienic, sanitation, sewage, waste water**.**

Role Of Tribal Women In Rural Development
A Comprehensive Analysis On Lalgarh, West Medinipur

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This is widely recognized that the one third of rural poor constituted by the indigenous-marginalized group of people. Extreme material poverty is the most important ornament of this group. Some recent research indicates that these indigenous people are being continuously displaced from their own land. And as a consequence they became more marginalized. Just like the other community, within indigenous communities also women are the most disadvantages category due to their lack of social and economic participation. This situation expressed as the Feminization of Poverty.But the rural women specially the indigenous women have been custodians with the knowledge of management of natural resources. With the help of some government and non-government institutional support tribal women are gradually becoming integrated into village organizations(Kaur and Sharma,1991).These indigenous people naturally adopted and accepted the norms to protect the earth by optimum use of resources through the local institution. This study shows that how the tribal women of Lalgarh, West Medinipur sustain the rural economy through their participation. As a methodology, the study follows FGD, Key Informen, and Questionnaire survey and to set the background knowledge Literature Review also carried out.Within the surveyed women 66% belongs to Lodha and rest of women from Santhal, Sabar and Munda. These women share much responsibilities to running family,attending the farm operations, tending the domestic animals and also engage themselves in rural artisan works. Recognition of such traditional assets is now widely taken account of as a legal right and leverage for future emancipation.

Key Words: Indigenous, Marginal, material, Feminization,Displace

Delineation Of Water Resource potentiality And Management In The Selected C. D. Blocks Of Purulia And Bankura Districts In The Upper Catchment Of Dwarakeswar River, West Bengal

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Water is the most essential factor of natural habitat and human civilization. In this paper we are trying to identify the levels and extent of water scarcity and surplus, determining the ways of water utilization and exploitation, and its influence on local livelihood and to suggest micro-level water management plan for human and regional development in the upper catchment of Dwarakeswar River, West Bengal. The methodology of this work includes estimation of the water poverty index, social water supply stress index, and Falkenmark water stress indicator. RS and GIS tools have opened new path in land-water studies. SOI toposheets, different imageries are used to prepare various thematic layers. The results depicts the ground water potential zones in the study area and is found to be helpful in better planning and management of groundwater resource.

Role Of Green And Ecological Technology For Creating Future Smart Cities In India

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Indian cities are the key elements of economic transformation and the challenge before the country is to make a drastic shift from an agriculture-based economy towards a manufacturing and service economy that can provide sustainable livelihoods for the Indian population. About 632 million Indians (52 percent of the total population) are below the age of 25, with 260 million (21 percent) being between the ages of 15 to 25. The pressure of this young and mobile population, which is no longer satisfied with inherited livelihoods and traditional occupations, is being felt in the entire urban sector, comprising 4,041 statutory towns and 3,894 census towns – to offer opportunities and improved quality of life. India has to leverage its cities despite the fact that an overwhelming majority of them are deficient in basic services, financially weak and lacking the capacity required to plan and implement change. Urban growth in India is far more exceeding the capacity of infrastructure and services, andinadequate environmental management measures have contributed to a significantdegradation of valuable natural resources, adversely affecting the quality of life of urbandwellers. Conventional urban planning and management tools have become barriers in theirdevelopment and in order for this growth to be sustainable; there is a desperate need for newpolicies and implementation strategies that can generate positive social, environmental andeconomic impact. The present paper highlights the importance of applying Green and Ecological approach which will integrate economic aims such as poverty reduction, job creation and social development, along with environmental goals such as sustainability, resource productivity, climate response, energy security, etc. The author has also tried to discuss about the different green and ecological sustainability initiatives taken by Indian government in formulating the future smart cities across the country.

Keywords: Urbanization, Urban Planning, Green and Ecological Technology, Sustainable Development, Future Smart Cities**.**

Application Of Frequency Ratio Model (FRM) And Spatial Prediction Of Landslide Susceptibility In The Balason River Basin, Darjeeling Himalaya: A RS & GIS Based Bivariate Statistical Approach

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Database preparation of landslide susceptibility mappingis a difficult task especially in mountainous areas of India. The present study aims to prepare landslide susceptibility map using frequency ratio (FR) model in the Balason river basin of Darjeeling Himalaya based on Geographic Information System (GIS) and Remote Sensing (RS). Landslide inventory map was prepared with a total of 295 landslide locations extracted from Google earth historical imageries (2000-2016) and which were carefully verified with field data. The chosen landslide conditioning factors were altitude, slope aspect, slope angle, slope curvature, geology, geomorphology, soil, land use/land cover (LULC), NDVI, drainage density, lineament density, distance from lineament, distance to drainage, SPI and TWI/ CTI.To estimate FR value for each class of all the landslide conditioning factors pixels affected by landslide (%) and total pixels (%) were taken into account. FR model was applied to integrate all the data layers on GIS platform. The derived susceptibility map was verified by area under curve (AUC) value of ROC curve and frequency ratio plot. The AUC value of ROC curve of FR model was .942 which represents that the prediction accuracy of the probability map was 94.2 % that is highly desirable and also the statistics of area under curve were statistically significant. Frequency ratio plot for five susceptibility classes of the FR model was validated our results.

Keywords Landslide susceptibility, Darjeeling Himalaya, Frequency Ratio (FR) model, ROC curve, Frequency ratio plot

Investigation Of Flood Events In An Interfluvial Region Within Arambag Sub-Division, West Bengal

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Flood is a natural phenomenon in the monsoon dominated humid tropical region. It causes heavy damages to the society. A part of Arambag Sub-Division mainly Arambag, Pursurah, Khanakul-I and II Blocks of Hugli District belongs from the Damodar-Dwarkeswar interfluvial region which is one of the flood prone areas of West Bengal (Annual Flood Report, Govt. of W.B., 2015). A huge area of these Blocks goes under water every year during the monsoon season. The Recurrence interval of floods for this region is very low. The frequency of extreme floods is increasing in recent times. Out of 38 years of observed data, moderate to heavy floods have occurred in 21 times and the Extreme Danger Level (E.D.L) has crossed 17 times. It has been observed that flood happens in this region when discharge crosses 2000 cumec. It has been figured out from the Gumbel's extreme value that discharge of 2175.3 cumec at Horinkhola Gauge station has a return period of 2.03 years and its probability of occurrence is 49.26%. So there is 50% chance of a flood in every year. Most of the people of this region are affected by floods which brings negative impact on the economy and food security. 327.8 km^2 of land (47% of total area) was inundated during the floods of 2015. If this trend continues, future flooding can be very disastrous. Geospatial technology helps us to reduce the damages and also in the evacuating the people. The use of GIS is becoming very important in the management of the natural hazards.

Keywords: Flood, Arambag, Interfluve, Gumbel, Horinkhola

Impact Of Urbanity On An Adjacent Rural Area: A Comparative Study

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Urban sprawl has an influence on surrounding rural areas. Shankarpurmouja, the study area, a suburb of Durgapur Steel Township, West Bengal, experienced a rapid growth of population as well as socio-economic development during last few decades.Shankarpur is located under a Grampanchayat (GP) but the socio-economic developmental pace of the area is healthier than the whole panchayat scenario. Because locationally this mouja touches the boundary of Durgapur Municipal Corporation (DMC), consequently impact of urbanity on this mouja is the prominent characters. In the present study a detailed analysis on demographic status, socio-economic condition of the people living in the study area transformation of land use from previous to present has been done clearly. The study found that over 95% workers of the mouja were engaged in secondary and tertiary activity and only 3% workers were involved in agricultural sector which is the contradictory picture of any purely rural area. The main aim of the study was to evaluate the impact of urbanity on neighbourhood rural area. Data were collected from primary field survey and different secondary sources. Microsoft Excel and QGIS 2.8 RS-GIS Software were applied for the study. It is recorded in the study that Land use pattern of the mouja also got affected by neighbourhood township. During the last few decades, the settlement area of the mouja expanded at the cost of agricultural land and forest land. A clear indication of unsustainable land use change is recorded in the study. In the concluding part, restriction against unsustainable land use change and abolition of socio-economic inequality among the inhabitants are recommended.

Key Word: DMC, Socio-economic inequality, Urban Sprawl

Status Of Maternal Risk Factors In Murarai-II C.D. Block, Birbhum District, West Bengal

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Maternal health is a human right not only involves mother but every single person of the nation. Each year, more than half a million women die from complications related to pregnancy and childbirth. Ages, Parity, Education, Standard of Living, Nutritional Status, Present Obstetric Status, Pregnancy Obstetric History, and Antenatal Service Utilisation Status of a pregnant mother are the governing factors behind a viable and healthy birth outcome. .

The broad objectives of this study is to- (i) identify the prevalence of different maternal risk factors amongst various socio-economic groups of cohort, (ii) assess the relationship between the socio-economic variability and the utilization of maternal healthcare services and (iii) find out the dominant maternal risk factors behind vulnerable maternal health outcome in the study area.

To conduct this investigation, 278 cohorts, who are matching some given criteria, have been interviewed with a pre-designed semi-structured questionnaire. The birth outcome status has been identified through Vulnerability Score in pregnancy outcome, Maternal Near Miss Cases and Risk Scoring System.

According to the empirical observation the utilization of maternal health care services is inadequate in Kushmore-I and II Gram Panchayats, which are showing lower socio-economic status, higher obstacle score and lesser accountability in the service provision. These are again situating in far from the Block Primary Healthcare Centre, and are lying in the alarming zone of vulnerability index as well. The work has been outlined according to the objectives to accomplish the pivotal concept of the study.

Key Words: Maternal Health, Antenatal Care, Pregnancy Obstetric History, Socio-economic Status, Maternal Risk Factors

Forest Ecosystem: A Study Of Buxa Hill Forest Of West Bengal

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Forestrefers to an areathatis dominated by the presence of trees and mainly by large woody stemand large woody root system. Forests can not only dominate by large plants but also with trees like bamboo or ferns. The size and longevity enables trees to control the major ecological processes, to determine the habitat for animals, microbes and other plant types, and to play a major role in determining the abundance of organisms in the forest. Ecology is the science that studies ecosystems. Forest ecology is the study of these tree-dominated landscape units. An ecosystem is any ecological system that exhibits five key attributes: structure, function, complexity, interactions between ecosystem componentsand change over time.A forest ecosystem is an area of the landscape, varying in size from few hectares or less to an entire continent, in which the structure, function, complexity, interactions and patterns of change over time are dominated by trees. Stand-level forest ecosystems are terrestrial ecosystems, but landscape-level forest ecosystems frequently include streams, rivers and lakes, and areas of non-forested terrestrial ecosystems. However, the overall character of these ecosystems is strongly influenced by their location in a tree-dominated landscape. Forests are known to be critically important habitats in terms of the biological diversity they contain and in terms of the ecological functions they serve. Forests regulate local and global climate, ameliorate weather events, regulate the hydro-logical cycle, protect watersheds, water flows and soils, and provide a vast store of genetic information much of which has yet to be uncovered.Forest ecosystems are continually changing. This change initiated by external disturbance factors and also by internal ecosystem processes. Buxahill forest is called ‘Queen of Duars’ by virtue of its exotic scenic beauty. The present study aimed at to evaluate the present status of forest ecosystem at Buxa hill forest.The methodologies that include in the present study are both primary and secondary data sources.The main objective of the present study ishow we can maintainlong-term sustainability of the Buxa hill forest ecosystem.

Key words: Ecosystem, Ecology, Forest Ecosystem, Forest Ecology, Sustainable Ecosystem.

Gender Disparity In Literacy In Kolkata Municipal Corporation: A Spatial And Decadal Analysis

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Literacy is considered as one of the key indicators of human resource development and one of the main component of human development index (HDI), as it has direct impact on the per capita income, level of living and ultimately on life expectancy and it influences and determines qualitatively and quantitatively not only the human resources but also other population attributes .
Literacy could be considered as both cause and effect of development. Various dimensions of socio-cultural change in any society can be understood in light of the level of literacy and education.

India has made considerable progress in reducing gender inequalities in education. But after 68 years of independence still a sharp variation persist at national, regional and local level. In primary education, the current enrolment ratio is 940 girls per 1000 boys and in higher education the enrolment ratio is very poor (388 girls per 1000 boys). The ratio in rural areas is just one-third of the urban areas,
According to 2011 Census of India, the overall rate of literacy is 73 per cent. But breaking up the national average reveals that while the rate of literacy for men is 80.9 per cent, for women it is 64.6 per cent. On the contrary In Kolkata the average literacy increased only 6% from 2001 to 2011 but female literacy rate increased 2% more than the male literacy from 2001-2011 But a closer examination, brings the Spatial disparities to light. A sharp ward wise variation persists due to some socio-economic reason.

The present study is thus concerned with the spatial and decadal analysis of gender disparity in literacy in Kolkata Municipal Corporation at ward level through some indexes.

Key words: Literacy Rate, Male-Female Literacy Rate, Gender Gap, Gender Disparity Index, co efficient of inequality

Decadal Analysis Of Urban Growth In India-Challenges And Solution

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Urbanization is an index of transformation from traditional rural economy to modern industrial one. It is an important contributor to the economy of the nations. In India the urban population is growing an average rate of around 3% per year. In terms of urbanization level, India is one of the leasturbanized countries in the world. But if the size of the population is considered, India has the second largesturban population in the world (37.7crore) in 2011. Significance of urbanization for India is about two-thirds of the urban population in India lives in urban agglomeration having a population more than a million. In case of metropolitan cities it has increase 35% in 2001 to 50% in 2011.Out of these eight cities having population of more than 5 million.About two-thirds or 65 % of urban population lived in class 1 cities in 1991. In 2001 it increased to 69% and reached 70 % in 2011. This trends of rapid urban growth in a metropolitan cities, contribute more than 60% of the national income.A new World Bank report on urban growth in India, launched recently in New Delhi, shows India's urban areas growing much faster than expected, adding 90 million new residents in the last 10 years. By 2030, its cities are projected to be home to another 250 million people Although two- thirds of the urban population in India lives in urban agglomeration but the sheer magnitude of the urban population, haphazard and unplanned growth of urban areas and a desperate lack of infrastructure are the cause serious socio economic crisis. This rapid growth of urbanization both natural and through migration has put heavy pressure on public utilities. This research is an attempt to analyze the nature of urban growth of India in last two decades as well as its associated problems.

Key words: urbanization, urban growth, cityscape, infrastructural lacuna, mitigation measures.

Relation BetweenSoil Texture And Selection Of Crops In Burdwan I C.D. Block, West Bengal: A Geospatial Analysis Using GIS

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Soil texture is coherently related with agricultural system, selection of crops and productivity of crops. Moisture retention, cation exchange capacity, pH, soil organic carbon content, nutrient holding and buffer capacity are determined by soil texture. But, on the basis of available irrigation facility (canal and submersible), farmers of Burdwan I C.D. Block cultivate mono crop (*aman* and *boro*) ignoring the texture of soil, water and nutrient retention capacity and demand of water of the crop.GPS has been used to collect soil samples (208) according to the pre-selected coordinates. In this study, higher water holding, organic carbon pool, SOC concentration and nitrogen content have been found in fine texture than coarse texture soil. Consequently, productivity of paddy is higher in fine texture than coarse one. In thiscircumstance, to maintain productivity of crops and sustainability of agriculture, selection of crops must be done according to the texture of the soil.

Key words: Soil Texture, Moisture Retention, Cation Exchange Capacity, pH, and Soil Organic Carbon

Role Of Tribal Women In Rural Development

A Comprehensive Analysis On Lalgarh, West Medinipur

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This is widely recognized that the one third of rural poor constituted by the indigenous-marginalized group of people. Extreme material poverty is the most important ornament of this group. Some recent research indicates that these indigenous people are being continuously displaced from their own land. And as a consequence they became more marginalized. Just like the other community, within indigenous communities also women are the most disadvantages category due to their lack of social and economic participation. This situation expressed as the Feminization of Poverty.But the rural women specially the indigenous women have been custodians with the knowledge of management of natural resources. With the help of some government and non-government institutional support tribal women are gradually becoming integrated into village organizations(Kaur and Sharma,1991).These indigenous people naturally adopted and accepted the norms to protect the earth by optimum use of resources through the local institution. This study shows that how the tribal women of Lalgarh, West Medinipur sustain the rural economy through their participation. As a methodology, the study follows FGD, Key Informen, and Questionnaire survey and to set the background knowledge Literature Review also carried out.Within the surveyed women 66% belongs to Lodha and rest of women from Santhal, Sabar and Munda. These women share much responsibilities to running family,attending the farm operations, tending the domestic animals and also engage themselves in rural artisan works. Recognition of such traditional assets is now widely taken account of as a legal right and leverage for future emancipation.

Key Words: Indigenous, Marginal, material, Feminization,Displace

Assessing The Imact Of Small Scale Industries On Rural Economy Naskarpur Gram Panchayat, South 24 Parganas – A Case Study

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In India, small scale industries (SSI) have now emerged as a vibrant and dynamic segment of secondary sector of economy .It plays a vital role in resource utilization, employment creation, income generation, and also in the development of rural people. This paper seeks to assess the impact of such small scale industries on the development of rural people of Naskarpur Gram Panchayat of South 24 Parganas and also to analyse the socio-economic disparity between the study area and its surroundings after the growth of SSI. Naskarpur Gram Panchayat is located in Budge -budge-II community Development Block of South 24 Parganas District; West Bengal. It is about 30 km From Kolkata. Satellite image (Resourcesat-2; LISS-3, band 4) is used to identify the location and various statistical methods are applied to assess the impact of small scale industries on the rural occupational pattern and its changing nature. In Naskarpur Gram Panchayat, production system of small scale industries are mainly home based where family members work together. These industries are labour oriented in nature. According to the study, in Naskarpur Gram Panchayat, small scale industries gain much more importance than agriculture or any other occupation. Almost 34 % people are engaged in small scale industrial sector. These industries help to bring about progress and wellbeing of people living here. It should be our prime concern to sustain this development of small scale industries through various government grants and the co-operation of non- governmental agencies.

Key Words: Development, SSI, Rural economy.

Wet Alluvial Fan Sedimentology: A Case Study of Chel-Mal Interfluve of Garubathan Area, Himalayan Foot Hill of North Bengal.

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All the alluvial fans which developed along the Himalayan foothill of north Bengal are wet alluvial fan. These fans are the outcome of neo-tectonic activity and climatic change.Sedimentary facieswhich exposed along the incised riverbed bears the history of alluvial fan development, indicating that the growth of alluvial fans primarily were controlled by tectonic exhumation of the Himalayan mountain belt and modified through time by the action of climate. Now the sedimentological analysis of the alluvial fan developed in the chel-Mal interfluve of Gorubathan area of Darjeeling district reveals thatinitial tectonic trough along the Himalayan mountain front was filled up by sediments of the Himalayan exhumation under a long period of warm and humid climate leading to deglaciation and high rate of precipitation. This initial deposits were experiencedseveral tectonic adjustment along with the adjacent Himalaya leading to the development of alluvial fan, propagation of fan to the downstream and reincisationof channels mainly near the debouching point of foot hill of the Himalaya. In this study of facies of the reincised channel suggest the main sedimentary processes involved in the formation of these foothill wet fans like mass flows, high and low-density sediment gravity flows, bed load transports and sheet floods etc.

Key Words : Alluvial Fan, Neotectonism, Sedimentary Facies, Sediment gravity flow, bed load transports.

Children Health And Nutritional Status Of Forest Dependent Communities: A Case Study Of Three Selected Villages Of Gosaba Block, Sundarban

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Health is a fundamental human right and central to the concept of quality of life. Health and nutrition are intimately and intricately connected.In this paper an attempt has been made to analyze the health and nutritional status of children (0-6 years) of forest dependent communities ofBijoynagar, Birajnagar and Pathankhali villages of Gosaba Block of Sundarban. To conduct this survey, 150 households with at least one child of 0-6 years have randomly chosen. The health and nutritional information of 202 children belonging to these households have collected. Child nutritional status have analyzed by z-score values according to the height-for-age, weight-for-age and weight-for-height with the help of reference data provided by National Centre for Health Statistics (NCHS). On the other hand, to identify children health status, types and frequencies of ailments, share of institutional delivery, immunization coverage, percentage of hospitalization and availability of treatment facilities have considered. Study have depicted that more than one-third of the children are chronically undernourished or stunted. A little less than half of the children in the age group of 13-36 months are stunted compared to only 22 percent of the children in 0-12 months. There is no apparent gender inequality; however, the girls of age 13-36 months are extremely vulnerable to chronic under nutrition (61%). Among 202 children, about two-thirds had suffered from at least one ailment in the last 30 days (before survey) and 6.5% were hospitalized within the last year. 83.6% of ailing children were treated by RMPs, who practice modern medicines without formal training or legal sanction, raising serious questions about the quality of curative care the children are receiving. Although coverage rates for vaccinations have significantly improved, a lot more needs to be done to protect children with all vaccinations.Public-private partnerships have to be needed to adopt viable policies and programs and take some immediate actions to make a healthy environment for children.

Key Words: nutritional status, stunted, ailments, immunization coverage, hospitalization

Endangered Species Of Sundarban And The Conservation Programmes

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The largest mangrove wetland of the world- SUNDARBAN. It stretches its one arms to Bangladesh and other to india. The Indian Sundarban occupies around 40% (4110 sq. km.) of total area (around 10000 sq. km.). This mangrove forest acts as a saviour for the coastal area from cyclone, storm surge, tidal waves etc. The sundarban forest is enriched with both floral and faunal diversity. Human beings get favour from the various kinds of plants and animals of this area. With the increasing development in man's life, these plants and animals face the problem of getting endangered and ultimately get extinct. Due to expansion of agricultural land, residential area, pasture land, humans are destroying the areas. It resultants the crisis of living places for both flora and fauna. Ultimately it causes the floral and faunal diversity to be endangered. Without proper conservation planning, it is almost impossible to recover the diversity again. Nevertheless, many conservation programmes have been taken to protect these rare plants and animals from the greed of human.

Key Words: MANGROVE, ENDANGERED, EXTINCT, CONSERVATION.

A Case Study On The Changing Climate Patterns In The City Of Kolkata

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Cities as home to over half of the world's population are at the forefront of the challenge of climate change. Climate change can lead to things such as desertification, more intense storms, melting of the polar ice capsand rising sea levels,changing the physical face of the earth and the pattern of our everyday lives. This poster assesses the changing climatic scenario of Kolkata, the capital city of West Bengal. Kolkata is a leading metro city in India with tropical hot and humid climate. Spread roughly north-south along the east bank of the Hooghly River,Kolkata sits within the lower Ganges delta of eastern India. Supporting a population of 15 million (Census of India, 2011) the city is going through brutal landuse and landcover change in the recent decades. The eastern part of the city is undergoing transformation of pervious surface to impervious surface where the wetlands are being built on continuously. This transformation is bound to have some impact on the micro climate especially temperature around the city. Kolkata has been displaying the signs of the Heat Island Syndrome. According to a study conducted by National Environment Engineering Research (NEER) in Kolkata, heat absorbed during the day cannot escape at night due to massive concretization, high rises sprouting in the city skyline and depleted green space. As per the survey there is a difference of 3 to 4 degree Celsius between the city centre and the peripheral areas. Many green measures can be taken to tackle the changing climatic situation such as social forestry, urban forestry, suitable building norms, maintenance of green areas in the city areas etc. Common people should be given awareness so that public participation together with government assistance can bring possible success to a great extent.

Keywords: Climate Change, Urban Heat Island, NEER.

A Study Of Crop Combination Of West Bengal

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The study of crop combination is an important aspect to understand the agricultural regionalization of an area. This research work is an attempt to show West Bengal`s agricultural regionalization through Doi`s Modified Minimum Deviation method. From this work it is in view that West Bengal is mainly mono crop region, only one district have fourth crop combination. Through this scenario it is in view that regions need agricultural development for farmer`s planning to cultivation. For the development of agricultural scenario organic farming can be used.

Key word: Crop combination, agricultural regionalization, mono crop, organic farming, minimum deviation method.

The Lost Of Saga In The Sundarban

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The Sundarban, convening about are one million area in the delta of the rivers Ganga, Brahmaputra and Meghna is shared between Bangladesh(60%) and India(40%) and it is the World's largest coastal wetland. Sundarban has a rich diversity of plant and animal species. The biodiversity includes about 350 species of vascular plants, 250 fishes and 300 birds, besides numerous species of phytoplankton, fungi, bacteria, zooplankton, benthic invertebrates, molluscus, reptiles, amphibians and mammals. Species composition and community structure vary east west, and along the hydrological and salinity gradient. Sundarban is the habitat and many rare and endangered animals like hog deer, panther tigris, jaavanrhino, wild buffalo, hog deer and banking deer are now extinct from the area. In recent year we observed that human wildlife conflict increases in this area. There are many causes of threats of biodiversity. To identify and rectify the problems of this area people can try to maintain the biodiversity and ecological balance of Sundarban. Due climate change the Sundarban faces several challenges and damaging its ecology and humanity. With rich of Sundarban submerging, there is an urgent need for global reduction of emission and replacement of fossil fuels, with renewable energy. In addition to general environmental protection causes, Govt. also need to promote plantation of local saline resistant seeds.

Endangered Species Of Sundarban And The Conservation Programmes

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The largest mangrove wetland of the world- SUNDARBAN. It stretches its one arms to Bangladesh and other to india. The Indian Sundarban occupies around 40% (4110 sq. km.) of total area (around 10000 sq. km.). This mangrove forest acts as a saviour for the coastal area from cyclone, storm surge, tidal waves etc. The sundarban forest is enriched with both floral and faunal diversity. Human beings get favour from the various kinds of plants and animals of this area. With the increasing development in man's life, these plants and animals face the problem of getting endangered and ultimately get extinct. Due to expansion of agricultural land, residential area, pasture land, humans are destroying the areas. It resultants the crisis of living places for both flora and fauna. Ultimately it causes the floral and faunal diversity to be endangered. Without proper conservation planning, it is almost impossible to recover the diversity again. Nevertheless, many conservation programmes have been taken to protect these rare plants and animals from the greed of human.

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