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Open and Participatory Mapping for Change and Socio-Economic Development in Nigeria
By
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This paper views open and participatory mapping as a tool to tackle social inequalities, environmental challenges, and resource associated conflicts in Nigeria. It calls attention to functional involvement of local communities in the mapping process. Sensitisation and citizens' engagement, creation of open and participatory mapping community, adoption of ingenious alternative approaches to mapping and participatory mapping research are considered as factors shaping open and participatory mapping implementation in Nigeria. Supply- and demand-sides stakeholders and global and local networks framework are also reviewed with a view to understand their impacts in participatory mapping. Open and participatory mapping has the potential for job creation, suggesting its capacity to support transformation and socio-economic development in Nigeria. It integrates local knowledge, empowers community and enhances collaboration and conflict resolution.

Keyword: Open Mapping, Participatory Mapping, Community Engagement, Socio-Economic Development, Geospatial Solutions

By
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Crime analysis is integral in urban management and public safety, especially in rapidly growing cities like Lagos State, Nigeria. The integration of advanced technologies such as remote sensing and Geographic Information Systems (GIS) has revolutionized the way crime patterns are studied and understood. The concept of crime and its detection has become a major menace; hence, combating this menace has been quite a challenge, the purpose for this research work. Exploring the spatial distribution and clustering of crime hotspots in Lagos State, Nigeria, through the application of remote sensing and Geographic Information Systems (GIS), there are clear lapses in leveraging the capabilities of remote sensing technologies. This research aims to investigate the potential of remote sensing technology to identify and analyze crime hotspots within urban environments. These features may include hotspots of crime events as well as heat maps of various crimes, population density, and socio-economic factors. Primary and secondary data were used to run the analysis as well as present several outputs as maps. Spatial technique, particularly kernel density estimation, was used to identify areas with high concentrations of criminal activity. By elucidating the spatial dynamics of crime in Lagos State, this research contributes to the broader understanding of urban crime patterns and supports the development of data-driven strategies for enhancing public safety and urban resilience.

Keywords: Spatial, crime, kidnapping, data, mapping, density, population density

Mapping of Fire Hazard Risk Zones Associated with Petrol Filling Stations in Parts of Enugu Metropolis using Geospatial Technologies.

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Filling stations pose a significant fire hazard, exacerbated by the lack of stringent oversight by regulatory bodies and noncompliance among fuel dealers with established rules and regulations. This lax control has resulted in the haphazard placement of fuel stations throughout urban areas in Nigeria. Particularly concerning is the encroachment of these stations into residential neighbourhoods within Nigerian urban centres. This study investigates the spatial distribution of filling stations, focusing on the Enugu metropolis in Nigeria. Using GPS technology, we collected the coordinates of fifty selected filling stations for analysis. Employing Nearest Neighbourhood Analysis, Buffering, and Euclidean analysis in ArcGIS 10.8, we assessed the spatial distribution of these stations against Department of Petroleum Resources (DPR) Guidelines. Our goal was to evaluate the level of compliance with these guidelines and uncover the implications of the filling stations' locations in Enugu metropolis. Our findings indicate that out of the fifty sampled fuel stations, only 16% adhered to setback regulations from roads, a mere 0.37% maintained appropriate distances from adjacent residential structures, and 8% complied with the recommended spacing between filling stations. The nearest neighbourhood index of 0.37 reveals a clustering trend among the stations, posing safety concerns due to this concentrated distribution. In light of these findings, this project proposes strategic measures tailored to different environments for the optimal siting of filling stations. These strategies aim to enhance the safety of lives and property not only in the Enugu metropolis but also in other Nigerian towns and cities.

Keywords: Fire Hazards, Petrol Stations,Residential Areas, Enugu ,Geospatial Technology

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Assessment of geotechnical properties of migmatite-derived lateritic soil from Ado-Ekiti South-western Nigeria was carried out to determine its suitability. The soil samples were subjected to important geotechnical parameters such as specific gravity, grain size distribution characteristics, plasticity index, linear shrinkage, compaction parameters California Bearing Ratio (CBR) and Unconfined Compressive strengths of the samples of migmatite-derived lateritic soils were determined. The field investigations included the study of the geological and geotechnical settings of the area and collection of four bulk samples within the study area. The engineering tests often employed in evaluating highway sub-grade material were conducted using British Procedure with some modification where necessary. Results of engineering tests revealed that the specific gravity of grains ranges from 2.624 to 2.635. The amount of fines in migmatite-derived lateritic soil samples range from 33% to 35%. The amounts of fines are very low in migmatite-derived lateritic soil samples and thus possess good engineering properties. The liquid limits for migmatite-derived soil samples range from 34.2% to 45.8%. The maximum dry density (MDD) values of the studied soil range from 1700.10 Kg/m3 to 1720 Kg/m3 for the standard proctor and 1950Kg/m3 to 2500.15Kg/m3 for the modified proctor. The optimum moisture content (OMC) values of the studied soil range from 5.0% to 7.2% at the two levels of compaction. Under soaked condition which is done to simulate actual field condition, the mean CBR values range from 11.02% to 8.53%. Under unsoaked condition, the mean CBR values for studied soil sample range from 11 .44% to 20.06%. California Bearing Ratio (CBR) of the migmatite-derived lateritic soils is higher than what is obtainable for residual lateritic soil. The obtained uncured strengths of the soils range from 122.5KN/m2 to 200KN/m2. The suncured strengths of the studied soil range from 510.0KN/m2 to 800KN/m2. It was observed from the data obtained that the suncured strengths at the two levels of compaction for all the four samples are in range of the 1034KN/m2 recommended by the Central Road Research Institute of India for road soils. In conclusion, the migmatite-derived lateritic soils have improved all the geotechnical properties of the studied soil. This investigation has thus confirmed that migmatite-derived lateritic soil is viable in the stabilization of the neighbouring lateritic soil.

Keywords: Soil, Geotechnical properties, Highway engineering, Grain size distribution, Subgrade material

This research paper is a review work focused on assessing the methods for measuring hydro-geomorphological hazard in the form of flooding, to improve practices and address environmental challenges. However, traditional field-based methods of measurement such as runoff analysis and remote sensing techniques often fail to capture the complexity of the interactions. Similarly, measurement techniques are constrained by inadequate spatial and temporal coverage, high data demands, computational complexity, and difficulties in representing subsurface connectivity. This paper reviews the literature on recent advances in measuring flooding and critiqued current management practices that prioritize isolated variables (e.g., streamflow, sediment transport) over system-wide strategies and emphasize the need for adaptive, connectivity-based approaches in measuring Hydro geomorphological hazards. Moving forward, we highlighted the importance of technological applications, real-time monitoring using GIS, integrated frameworks to foster and improve flooding analysis. This integrated approach sets the stage for transformative water resource management, fostering proactive policy development and stakeholder engagement.

Keywords: flooding, geomorphological mapping, hydrologic dynamics, environmental sustainability, ecosystem resilience.

GIS-BASED EVALUATION OF TERRAIN INFLUENCE ON FLOODING IN OWERRI METROPOLIS

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This research work focus on GIS-Based Evaluation of Terrain Influence on Flooding in Owerri Metropolis. Problem is that flood has been identified as regular hazard to life, property and economic activities. This study aimed at evaluating the terrain influence on flooding. Objective is to generate Digital Elevation Models (DEM) to detect the physical environmental contributions of terrain and calculate flood dimensions of focused flood sites to observe how elevation, slope gradient, slope direction, aspect, and stream order influence flooding in the study. This study adopts Geographical Information System (GIS) method in processing the satellite data. The methodological approach utilizes Digital Elevation Models (DEMs) to determine the terrain influence on flooding in the study. It aims at identifying flood causative factors that offers a cost-effective approach to flood analysis. This analysis aims at quantifying the role of elevation, slope gradient, slope characteristics, aspect, and stream order in shaping flood dynamic. The maximum slope degree gradient shows that flat areas have 0 – 40, gentle slope 41 - 600 and 610 and greater are higher. Aspect over layed by the flood inundated points, shows that, Flat, N (0-22.5) NE (22.5-67.5), E (67.5-112.5), SE (112.5-157.5), S (157.5-202.5), SW (202.5-247.5), W (247.5-292.5), NW (292.5-337.5) and N (337.5-360). Analysis of the classification reveals a relatively uniform distribution of slope aspects across the metropolis. These flood-prone locations include Egbu, Trans Egbu, Amakohia, and areas surrounding the Nworie and Otamiri Rivers. The overlay of flood-inundated points on the aspect map confirms that these low-lying areas are highly susceptible to water accumulation and flood hazards. The findings reveal that the most affected areas are predominantly low-lying floodplains, flat terrains, and regions susceptible to inundation. The study recommends that, the terrain of the area has to be put into consideration to avoid areas liable to flood for residential purposes.

Key words: Owerri Metropolis, Flooding, GIS mapping, Terrain and DEM

Health Effects of Social Media and Academic Stressors On The Mental Health of Students of University of Port Harcourt

By
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The rapid integration of social media into daily life and the increasing academic pressures faced by students are significant factors influencing mental health in contemporary society. Mental health is a basic human right that plays a crucial role in personal, societal, and economic development; its meaning is not restricted to the absence of mental disorders but spans a spectrum of complex experiences that vary among individuals. Academic stress is common among students, particularly in universities, and may be the single most dominant stress factor affecting their mental well-being. This study assessed the health effects of social media and academic stressors on the mental health of students in the University of Port Harcourt, Rivers State, Nigeria. The aim was to evaluate the health effects of social media and academic stressors on students' mental health and identify effective control measures. Specifically, the study sought to: (1) identify the most frequently used social media platform among undergraduate students; (2) determine the psychological effects of social media usage; (3) identify causes of stressors affecting mental health; and (4) identify effective coping strategies for managing social media and academic stressors. A cross-sectional descriptive study design was employed using a multistage sampling method. Data were collected through a self-administered standardized questionnaire comprising five subsections, and analysis was conducted using IBM SPSS v29.0.2, with a p-value <0.05 considered statistically significant. A total of 273 valid responses (100% completeness) were retrieved, of which 179 (65.6%) were females and 93 (34.1%) males, with the majority aged 21–25 years (183; 67.0%). The prevalence of social media usage was 100%, with WhatsApp being the most used platform (261; 95.6%). Most respondents spent less than 5 hours daily on social media (145; 53.1%). Excessive workload was identified as the most common source of academic stress (214; 78.4%), while sufficient sleep (204; 74.7%) was the most common factor contributing to mental well-being. Music therapy (179; 65.6%) emerged as the most helpful strategy for managing mental health. The study concludes that while social media provides numerous benefits, it also poses mental health risks. Academic workload and competition further exacerbate stress among students. Constructive use of social media can alleviate academic stress, whereas excessive use may worsen mental health outcomes.

Keywords: Health Effects, Social Media, Academic Stressors, Mental Health, Students, University of Port Harcourt

Enhancing Disaster response through community mapping in Ogoni Land LGAs,Rivers State

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Disaster management is an increasingly critical field of study and practice, especially in regions susceptible to natural hazards. In Nigeria, the Ogoni Local Government Areas (LGA) is particularly vulnerable to environmental changes due to its geographical positioning and socio-economic factors. This paper proposes to explore the profound impact of community mapping, facilitated by OpenStreetMap (OSM), in strengthening disaster response mechanisms within this region. The goal is to highlight how participatory mapping can not only enhance geographic information systems (GIS) for disaster management but also empower local communities and foster resilience. Community mapping is a participatory approach in which local residents collaborate to create and share geographical data about their environment. In regions like Ogoni, where local geographic knowledge is rich but underutilized, community mapping represents a shift in how disaster risks are assessed and managed. By integrating local perspectives and traditional knowledge into mapping initiatives, entities can develop more accurate risk profiles and better preparedness strategies. OpenStreetMap (OSM) is a collaborative mapping platform that allows anyone to contribute geographic data, making it a powerful tool for local communities. OSM's open-source and crowd-sourced nature enables the creation of a real-time mapping database that reflects the most current local conditions. In Ogoni, OSM can be instrumental in documenting critical infrastructure, vulnerable populations, and geographical features that may influence disaster dynamics. This paper will present a detailed case study of Ogoni LGA, outlining historical disaster events such as floods, oil spills, and erosion, and their impacts on local communities. Disasters loom as significant threats to human lives and livelihoods, particularly in regions with complex socio-environmental landscapes. In Nigeria, areas like Ogoni Local Government Area (LGA) are confronting high vulnerability to natural and anthropogenic disasters, exacerbated by ongoing environmental degradation, notably from oil exploration activities. Ogoni, located in the Niger Delta, suffers from chronic flooding, erosion, and pollution, posing considerable risks to its inhabitants. Traditional models have relied heavily on top-down approaches that frequently overlook local knowledge, cultural contexts, and the urgent realities faced by communities during disasters. This disconnect has resulted in inadequate responses that fail to address the unique needs of affected populations. Amid these challenges, community mapping emerges as a transformative approach to disaster management. Utilizing platforms like OpenStreetMap (OSM), communities can create and utilize detailed, real-time geographic data. OSM stands as a potential equalizer in the data landscape, allowing local voices and experiences to inform disaster preparedness efforts while enhancing local governance structures. Recognizing the vital role of local knowledge, this study aims to explore how community mapping in Ogoni can significantly improve disaster response outcomes and foster resilience against future catastrophes.

Keywords : OpenStreetMap, Community, Disaster, Risks, Data, Ogoni.

A RESEARCH PROPOSAL ON THE ASSESSMENT OF THE IMPACT OF AGROCHEMICALS ON SOIL QUALITY USING GIS TECHNIQUES IN OJU LOCAL GOVERNMENT AREA OF BENUE STATE.

By

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This paper presents a research proposal titled 'Assessment of the Impact of Agrochemicals on Soil Quality Using GIS Techniques in Oju Local Government Area of Benue State, Nigeria.' The study seeks to evaluate how the increasing use of fertilizers, herbicides, and pesticides influences soil quality and spatial soil health patterns across agricultural zones in Oju LGA. Over the years, intensive agrochemical use in Nigeria has contributed to declining soil fertility, contamination of soil ecosystems, and reduction in agricultural productivity. However, empirical evidence linking the extent of agrochemical application to soil degradation remains limited, especially at local spatial scales.The proposed study adopts a mixed-methods design, integrating field-based soil sampling, laboratory analysis, GIS, and remote sensing techniques. Soil samples will be collected systematically from selected farmlands using stratified random sampling, and key soil quality indicators (such as pH, organic carbon, nitrogen, phosphorus, cation exchange capacity, and heavy metal content) will be analyzed. Geographic Information System (GIS) tools will be employed to map spatial variations and identify agrochemical impact hotspots. Additionally, data on agrochemical use practices and farmers' perceptions will be gathered through structured questionnaires and interviews.The integration of spatial and perception data will enable the generation of soil quality degradation maps and reveal patterns of human-induced chemical stress on soil resources. The expected outcomes include improved understanding of agrochemical–soil interactions, a GIS-based soil quality database for Oju LGA, and policy recommendations for sustainable agrochemical management. This proposal thus provides a conceptual and methodological framework for assessing agrochemical impacts using geospatial tools and local insights to promote soil health and sustainable agricultural practices in Benue State.

Keywords: Agrochemicals, Soil Quality, CENTURY Model, Environmental Risk, GIS, Oju Local Government Area, Benue State, Nigeria.

GEOGRAPHIC INFORMATION SYSTEMS (GIS)-BASED SPATIAL MODELING OF CLIMATE CHANGE IMPACTS AND VULNERABILITIES IN THE MIDDLE SAVE VALLEY, ZIMBABWE.
By
Jesca Maregere

This study examines the spatial and temporal dynamics of climate change and its impacts on ecosystem services in the Middle Save Valley, Zimbabwe. Using a combination of geospatial analysis and multivariate statistical modeling, the research addresses three key objectives: (1) modeling temperature and rainfall trends; (2) mapping the spatial distribution of climate change vulnerability; and (3) assessing the effects of climate change on ecosystem services. Secondary climate and remote sensing datasets were analyzed in a GIS environment. Climate trends were evaluated using time series analysis, vulnerability hotspots were identified through Emerging Hot Spot Analysis (EHSA) and Getis–Ord Gi* statistics, and Geographically Weighted Regression (GWR) was applied to examine the spatially varying effects of Tmin, Tmax, precipitation, and actual evapotranspiration (AET) on Net Ecosystem Productivity (NEP) table 4.5 page 79 and annexure D page112. Results revealed significant warming trends, increasing rainfall variability, and temporal clustering of climatic extremes. Vulnerability hotspots were concentrated in the northeastern and southern lowland zones, where GWR indicated local impairment of ecosystem functioning under high climatic stress. These findings highlight that climate vulnerability is spatially uneven, shaped by agro-ecological variations and exposure to extremes, necessitating locally tailored adaptation strategies. The study introduces new spatial concepts in climate vulnerability mapping and ecosystem impact assessment, with potential applications in climate-resilient planning for semi-arid regions, while contributing to the achievement of Sustainable Development Goals (SDGs) including SDG Goal 2 (Zero Hunger), SDG Goal 13 (Climate Action), SDG Goal 15 (Life on Land).
Keywords: Climate change, vulnerability mapping, ecosystem services, Middle Save Valley, Zimbabwe

Mapping Water Resources and Sanitation Infrastructure for Sustainable Development in Nigeria:
A Geospatial Approach to Achieving SDG 6
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Access to clean water and sanitation remains one of Nigeria's most pressing challenges, particularly in rural and peri-urban communities where groundwater resources are poorly mapped and sanitation infrastructure is inadequate. This paper examines how open mapping technologies can be applied to support the achievement of Sustainable Development Goal 6 (Clean Water and Sanitation) through the integration of geological data, geospatial analysis, and community participation. Drawing insights from existing studies and open data repositories, the paper explores the potential of open-source platforms such as OpenStreetMap (OSM), Mapillary, and QGIS in identifying boreholes, wells, drainage systems, and sanitation facilities. It further discusses how geological and hydrological information can be incorporated into geospatial models to delineate groundwater recharge zones, contamination-prone areas, and underserved regions. The study proposes participatory mapping approaches where local communities, especially women and youth can be trained to capture and validate water-related data. Such community-driven initiatives, supported by open geospatial tools, promote transparency, accountability, and local ownership of water resources. Findings from reviewed cases demonstrate that open mapping enhances environmental data accessibility, encourages civic participation, and strengthens evidence-based decision-making for sustainable water management. This paper concludes that achieving SDG 6 in Nigeria requires a collaborative framework that combines geological insight, open mapping innovations, and community engagement to ensure equitable access to clean water and sanitation for all.

Keywords: SDG 6, Open Mapping, Water Resources, GIS

Mapping of Ecotourism Hotspots in Enugu state: A sustainable approach to Ecotourism Development in Nigeria
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This abstract provides a concise overview of a project titled "Mapping Ecotourism Hotspots in Enugu: A Sustainable Approach to Ecotourism Development." The project aimed to identify and map potential ecotourism hotspots within the Enugu region, with the goal of promoting sustainable tourism practices and supporting local conservation efforts. The research employed a combination of field surveys, geographic information system (GIS) analysis, and stakeholder consultations to explore the ecological, cultural, and economic characteristics of various tourism sites within Enugu. Factors such as biodiversity, scenic beauty, cultural heritage, accessibility, security, best and time of visit, and community involvement were considered to determine the suitability of each location for ecotourism development. The findings of the project revealed the existence of several ecotourism hotspots in Enugu, including unique natural landscapes, cultural heritage sites, and community-based initiatives. These data were combined with satellite imagery and other spatial data to create a comprehensive GIS-based map of the ecotourism hotspots in Enugu. The project's results emphasized the importance of strategic planning and collaboration among various stakeholders, including local communities, government agencies, non-profit organizations, and tourism operators. The mapped ecotourism hotspots served as a valuable tool for decision-makers and tourism planners to identify priority areas for investment, conservation, and sustainable tourism development in Enugu State.

keywords: GIS, Ecotourism, Cultural, hotspots, conservation

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About Us

Unique Mappers Network aims at providing, promoting and building capacity for Open Data Development, Mobile Data Collection, OpenStreetMap, Open Source Geospatial, Information Technology, Participatory Citizen Science, Research and Humanitarian Services.

Our Mission and Mandate

Unique Mappers Network (UniqueMappersTeam) or UMT is a Nigerian registered nonprofit organization with a mandate and mission for Humanitarian Response and Community Development through:

- Open Mapping using OpenStreetMap project in Nigeria
- Mobile Data Collection & Field Surveys for Open Data Development
- Open Source Geospatial Empowerment using GeoForAll Lab
- Flying Lab/Community Drone Mapping for Open Data Development
- Participatory Citizen Science Projects for community engagement
- Gender-Equality and Youth Empowerment using Open Data & Open Geospatial
- Community Inclusive Empowerment for Sustainable Development Actions

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