Application of Geospatial Techniques in Modeling and Analysis of Topographical Settings in Kogi State, Nigeria

Udo. A Emmanuel, Ojinnaka O. C, Chukwuocha A.C and C . N Baywood (Nigeria)

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SUMMARY

Mapping and visualization of topographic setting is paramount for the understanding and management of the physical environment. Based on this, state-of-the-arts techniques that produces accurate result must be adopted to ensure that the right decision is made during planning. The application of geospatial technologies (Remote sensing and GIS) in analysis and management of spatial information is gaining popularity in recent times due to its accurate and timely delivery of information needed for decision making. Base on this the aim of this study is to adopt geospatial techniques in modeling and analysis of topographical settings of Kogi State. Data used includes 3arc seconds (90m) resolution DEM created by SRTM, Landsat image with resolution 30m, 2012 flood remote sensing satellite imagery captured by moderate resolution imaging spectroradiometer (MODIS) and administrative map of the study area from which the administrative boundary of the study area was extracted. These datasets of the study region was entered into various GIS software for manipulation and extraction of terrain features. Progressively, vital topographic features were digitally extracted and these were used to build a GIS-assisted topographical database consisting of such Physical features as the stream network of the region, contour ,3-D models, DTM, slope, land use/land cover map, and Aspect etc. Result revealed that the study area is highly undulating and lies in a relief region of between 20m to 580m above mean sea level. The analysis further revealed that there are four land use/land cover types covering the following extents; Built up areas covers 1858.347km2 (6%), forest areas covers 8088.108km2 (28%), agricultural lands and water bodies covers 17892.850 km2 (62%) and 1096.870km2 (4%) respectively. Further analysis revealed that the study area has drainage density of 0.1533km-1with a total length of 4437km of rivers covering it. These digital derivatives are essential for the understanding of the region's landscape for the purpose of further investigation, planning and decision making.
