GIS-Remote Sensing Integrated Based Assessment and Mapping of Landslide Vulnerability Areas in South East, Nigeria

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Landslides are major hydro-geological and anthropogenic hazards that affect not only the mountains areas but also gullies, mining areas, plateau terrain, river banks, coastal areas, and offshore as undersea slides. Slides occur as a result of ground movement, rock falls, and failure of unstable slopes; sand and debris flow on slopes which can cause lots of damage with direct and indirect impacts on human settlements and physical infrastructures. The study used secondary data that consist of other literature from which the likely triggering factors – slope angle, land use land cover change (LULCC), aspect, soil texture and type, curvature, drainage density, elevation, lineament density, normalized difference vegetation index (NDVI), normalized difference moisture index (NDMI), geology, topographic wetness index (TWI), geomorphology, rainfall, temperature, wind speed, wind pressure, settlements, rivers and roads construction were extracted, and satellite imageries (SRTM and Landsat 8 OLI-TIRS) data obtained from USGS Earth Explorer, processed and mapped based on the triggering factors using ArcGIS v10.4 and validation visit was made to confirm results. Microsoft excel 2007 was used to compute and assigned weights to the factors while weighted overlay methods in spatial analyst tool of ArcGIS v10.4 were applied in mapping the landslide vulnerable areas in the study area. The study recommended the use of laws to secure and regulate land use activities in the vulnerable areas, educating inhabitants of such areas about the dangers associated with certain land use activities and the need to avoid them, providing alternative means of livelihood that will discourage mining, deforestation, forest fire, and overgrazing, and encourage sustainable resource use and management that will not expose the areas to the triggering factors of landslide.

Keywords: GIS-Remote Sensing, Assessment, Mapping, Landslide Vulnerability Areas, South East