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## Geospatial techniques in flood vulnerability assessment in Cross River Basin, southeastern Nigeria

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This paper is aimed at delineating flood prone areas within the approximately 32,000 km2 Cross River Basin in S E, Nigeria for flood risk management planning. The vulnerability of low terrains within Cross River Basin to flooding is investigated using hydrological, meteorological and geomorphological approaches. ASTER (Advanced Space borne Thermal Emission and Reflection Radiometer) and GDEMV2 (Global Digital Elevation Model Version 2, with a global resolution of 30 m) were used as basic source of spatial information of the Cross River basin. The derivatives of these analyses and mapping such as slope variability, topographic wetness index (TWI), flow direction and flow accumulation were generated in geographic information system environment. The data sets were projected to the Universal Transverse Mercator (UTM), projected system, Zone 32 North and Datum, World Geodetic System (WGS), 1984. This process was carried out in ArcGISTM environment. Landsat imagery and topographic maps of the basin were employed to generate a flow accumulation model and appropriate reclassification was done to identify areas of high, moderate and low flood vulnerability based on local relief. The study also conducted interviews with representative sample of residents of the flood prone areas within the Cross River Basin using systematic random sampling technique to identify elements at risk. This study has shown that remote sensing is imperative for flood management in developing countries like Nigeria.

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## GIS alive and working: National broadband telecommunications network+farm technology =SMART Farms: The Australian experience

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The role of internet in agriculture is fast approaching its 'third wave'; 'Wave 1' was connecting people to data via www (1990's); 'Wave 2' connecting people to people, viz, Facebook and Twitter (2000's); and 'Wave 3' will now connect people to 'things' (2010-present). Advances in wireless sensor networks coupled with in situ, low-cost plant, animal and asset sensors; the so-called 'internet of things', means our farms and field will become sources of high quality, local yet synoptic, real-time management data. The University of New England, Australia has transformed a 2,900 ha commercial farm into a SMART Farm (Sustainable Manageable Accessible Rural Technologies Farm). The SMART Farm showcases the latest, live GIS-enabled technologies aimed at improving productivity, environmental sustainability, safety, workflow and social/business support networks on Australian farms. With a $2 million SMART Farm Innovation Centre located in the middle of the farm, and linked to the outside world via fibre, fixed wireless and satellite national broadband network, the predominantly grazing SMART Farm is one of the largest farms of its kind, serving as an 'instrumented' research and teaching laboratory. Serving as a test-site for new technologies and farming practices, the SMART Farm is a connected GIS classroom where the community as well as students of all ages can access the latest data streaming in from a range of field, animal and machinery sensors.

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