

# Mapping the Spatial Distribution of Water Borehole Facilities in Rivers State Using GIS

Anwuri O. Okwere, Lawrence Hart and Kurotamuno P. Jackson (Nigeria)

**Key words:** Geoinformation/GI; GNSS/GPS; Land management; Spatial planning; Borehole; Geographical Information System; Mapping; ArcGIS

## SUMMARY

The challenge of urbanization heightens the issue of water supply in relation to available water quantity and quality. Consequently, there is an alarming gap between consumption and potentially available safe water resources. This has led to the multiplicity of water borehole facilities locations in the urban area of Rivers State of Nigeria without recourse to the environmental impact, land use, urban population growth, and land readjustment. This study is aimed at mapping the spatial distribution of water borehole facilities in Bori and part of Port Harcourt in Rivers State using Geographical Information System technologies. The spatial information of the water borehole facilities were determined using Garmin 76s hand-held GPS equipment in addition to their attribute data. The data generated was analysed using Geographic Information System Application ArcGIS 9.2 software. The study reveal that 197 borehole facilities was cited within an area of 8,033 square kilometers of Bori. Similarly, 1000 borehole facilities were located within an area 30,195 square kilometers of Woji town in Port Harcourt municipality. A database of the borehole facilities were created indicating spatial and attribute information. The buffering analysis in the Bori area indicated that 71 boreholes are located within 500 meters radius. In the same vein, 300 boreholes are located within the same radius of Woji town in Port Harcourt municipality. These results show how densely the facilities are within the study area without any geoinformation about their location. To this end, the absence of thematic map for borehole facilities and a corresponding database in the study area has necessitated the citing of these facilities without any development control hence, different households engaged in an uncoordinated approach for borehole location. This study provides a veritable tool of spatial information of boreholes in the study area. This will further guide an integrated approach to develop a geospatial information system which will form a basis for an effective development control system for these facilities and its related social and economic impacts on the environment.