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# A MULTI-CRITERIA SPATIAL DECISION SUPPORT SYSTEM FOR GENERIC APPLICATIONS IN LAND SUITABILITY ASSESSMENT FOR CROP CULTIVATION

## Abstract

Spatial Decision Support Systems (SDSS) are computer-based systems that are used to solve semi-structured spatial problems including those involving the geographical identification of the best land units for a particular land use. This use includes crop cultivation purposes which is the focus of this study. However, most SDSS implemented for land suitability assessment for crop cultivation are implemented within and dependent on a particular version of GIS software and becomes totally dysfunctional in upgraded versions of same GIS software. Others are not user-friendly, require the expert knowledge of programming to utilize them, and designed for a particular region and/or set of crops. With respect to this, this study aimed to develop an easy-to-use SDSS that can be generically utilized for land suitability assessment without depending on the Application Programming Interface of GIS software to work. The storage of spatial data in the shapefile vector model was analyzed to enable the direct binary processing of spatial information in the form of polygon land mapping units; a digital file format was developed to enable the efficient capture, documentation, and storage of information contained in land suitability models for crops; and software algorithms were developed to enable the direct processing of spatial information in polygon vector format and information in land suitability model for crops, and the computation of land suitability for each polygon land mapping units based on the criteria parameters stored in the models. The algorithms and file format developed were tested using maize as a test crop for a set of spatial data collected in a farmland in Afijio Local Government Area of Oyo-state, Nigeria. The results show that the developed SDSS (CropSDSS) is free of logic and runtime errors, and can be easily and generically applied for land suitability assessment without restriction for any geographical location and crop to be evaluated for suitability. The report generated by CropSDSS during the computation of land suitability for the polygon land mapping units provides useful information that can be used to improve the suitability/usability of mapped vector land units.