

## **Agriculture Land Suitability Evaluator (ALSE): a decision and planning support tool for tropical and subtropical crops.**

### ABSTRACT

Agricultural land suitability evaluation for crop production is a process that requires specialized geo-environmental information and the expertise of a computer scientist to analyze and interpret the information. This paper presents ALSE, an intelligent system for assessing land suitability for different types of crops in tropical and subtropical regions (e.g. mango, banana, papaya, citrus, and guava) based on geo-environmental factors that automates the process of evaluation and illustrates the results on an attribute table. Its main features include support of GIS capabilities on the digital map of an area with the FAO-SYS framework model with some necessary modifications to suit the local environmental conditions for land evaluation, and the support of expert knowledge through on spatial tools to derive criteria weights with their relative importance. A dynamic program for calculation of eigenvalues and eigenvectors of a weighting matrix is provided. Expertise and knowledge help ensure that ALSE databases represent realistic, practicable and functional systems. It is useful for decision makers to determine the quality of land for agricultural uses and is intended as a decision and planning support. Responsibility for any decisions based partly or wholly on the output of ALSE rests with the decision maker. ALSE ensures that the results are interpreted correctly within the relevant context, and contributes by maximizing land-use planning and decision support.

**Keyword:** Biophysical modeling; Expert system; GIS; Land evaluation; Land use planning; Multi-criteria analysis.