

GIS Based Prescriptive Model for Solving Optimal Land Allocation

Mohd Sanusi S. Ahamad and Mohamad Yusry Abu Bakar (Malaysia)

Key words: Geoinformation/GI; Land distribution; Land management;

SUMMARY

GIS prescriptive modelling incorporates mathematical optimization techniques with geographic information systems. This paper described an integration of GIS based suitability model with zero-one linear integer programming for prescriptive modelling of land use allocation. The objective is to identify optimal regions for new residential land that minimized total development cost. The decision variables are formulated using feasible regions that were derived from GIS based suitability model. The constraints are spatial attributes representing the area, number of regions, land suitability value, proximity, and heights. The optimal solution will be combination of zeros and ones of the decision variables for which the objective is optimized whilst maintaining feasibility in terms of the constraints. A series of test was performed using mixed integer branch and bound algorithm to evaluate the optimal feasible sites for the residential land. The sensitivity test conducted on the model properties through changes in the input variables indicates consistency on the model outputs. The model can be easily integrated with GIS based suitability model in finding the optimal solution for other specific land allocation problem.