

ABSTRACT

The Development of a Spatial Decision Support System for Agricultural Land Management

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Continuing decline in the quality and availability of agricultural lands and the need to satisfy the food requirement and socio-economic needs of the growing population has challenged the sustainability of land use. The polarisation of development planning and agricultural planning has provided the framework for strong competition among land users, often resulting in land use conflicts. The intricate link between food security and population poses a challenge to the sustainability of agricultural lands.

The thesis explores some of the underlying issues, terminologies and technologies relating to sustainable development. Through the development of a land management decision support system [LMDSS], a new method to advance the utilization of existing agricultural land use planning techniques for development control is presented. Complex biophysical data is simplified and presented in the LMDSS to support land use planning decisions.

A case study approach is utilized and the outputs are evaluated for their sustainability. An implementation plan which draws on best practices is developed and suggestions for future research are posited towards the end of the thesis.

The capacity of the LMDSS to identify agricultural lands from a spatial perspective by integrating the USDA Land Capability Classification System, the FAO-based crop suitability and AEZ, as well as trend in land use has demonstrated its capacity for improved decision-making within supporting policy framework. Site specific limitations to agricultural land quality and the demand for shelter will influence the sustainability of agricultural lands. Competition for irrigation water and domestic water from the same source may lead to land degradation due to salinity. Population projection is a useful tool in the allocation of land resource and sustainability assessment.

Keywords: Glynis Joyce P. Ford; Land management decision support system; sustainable land management; agricultural land zoning; development control; population growth, food security.