Foreword

Agriculture occupies about 70% of the world’s surface to satisfy the needs of human society. As one of the main human activities, agriculture is crucial since more than 60% of the global population are involved in farming activities. For example, agriculture has significant impacts on the environment. Without effective management and planning, agricultural activities may cause problems of land degradation, groundwater contamination, and surface water pollution. In the new century, the agricultural sector is facing more and more challenges in terms of shrinking land resources, increasing population, and accelerating food demand. These challenges may bring about concerns of environmental and economical sustainability in the agricultural sector. Consequently, in-depth investigation of various complexities in agricultural and environmental systems is crucial for achieving desired tradeoffs among multiple system objectives.

Agricultural and the environmental systems are composed of various interconnected components that exhibit more complexities than their individual parts. Besides, interactions existing among these components may lead to further complexities in generating desired decisions for agri-environmental management. Growing population, booming economy and changing climate are expected to exert significant effects on the agri-environmental systems. Decision support technologies are desired for supporting effective management of such systems. They provide ways for analyzing various complexities such as multifunctional, multiobjective, uncertain, interactive and dynamic features of the agri-environmental systems.

In this book, many papers in the development of decision support systems (DSS) for managing agricultural and the environmental systems are presented. They mainly focus on exposition of innovative methodologies as well as their applications. In detail, this book covers various systems analysis methodologies such as web-mobile system, MicroLEIS DSS, web-based spatial DSS, composite indicator, artificial intelligence and knowledge-based DSS. They are applied to cultivation planning, pest management, harvest scheduling, forest management, biomass-to-energy supply analysis, food production and land-use planning, agricultural sustainability study, livestock management, and food security investigation in many parts of the world.

Research works presented in this book will be useful from both research and industrial communities. Innovative technologies are developed for improving the efficiencies of agri-environmental management. The developed decision support systems are useful for generating desired agri-environmental policies. The advanced technologies can also be further extended to other areas such as production planning, supply chain management, water resources systems planning, and energy systems management.

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