

Preface

The transformation of the planet over the past century due to intense human activity has affected ecosystems more rapidly and decisively than any other comparable period of recorded history; the emerging environmental change is making the production of ‘good’ decisions a challenging issue as the stakes and the risks have increased for all involved parties. The severe exploitation of the natural environment has led to a significant reduction and degradation of natural resources, placing the concept of sustainable development as a global goal a common consensus of the international community. As a result, the sustainable use of natural resources is presently much more than a simple necessity; current international research focuses heavily on topics like sustainable development, regional planning, environmental decision making and implementation, climate change, biodiversity conservation plus a number of other relevant issues, especially at times of economic crisis as today. However, economic growth and environmental protection can go hand in hand, provided that decision makers develop and use tools and insights targeting in the implementation of successful and robust long term policies. Reversing unsustainable global trends will require considerable and time consuming efforts and an integration of environmental objectives across most policy areas, challenging Information Systems (IS) and Operational Research (OR) researchers to participate and offer solutions.

It is in this context that Decision Support Systems (DSS), a core subject area of the IS and OR disciplines, come in focus offering solutions. Building successful DSS is a highly complex procedure, involving a number of disciplines like informatics, operational research, knowledge management, business administration, behavioral studies, sociology and artificial intelligence, all of which constitute sources of information that concern the manner in which humans potentially behave at the treatment of information and the decision-making process. DSS can be flexible enough to be applied to various policy levels of the agricultural, food and environmental sectors, from the local and national levels, to the regional and international levels with organizations such as the EU and the UN. Operational research modeling techniques have been developed to reach scientifically justified and robust decisions, which will enhance the process to achieve the target of continuous and viable sustainability in the long run. The DSS can range from simple accounting-based systems to systems based on detailed deterministic, stochastic or simulation models. As agricultural production and environmental management involve high risk decisions, risk analysis and management tools have enjoyed increased popularity over the last years as well, by the time that food supply chain management, ecosystem governance, conservation of biodiversity and global climate change have among other issues hotly entered the agenda.

The original idea behind this volume lies in the experiences of the editors in this field and their involvement in various DSS projects. After much debate, we identified the need to let the latest relevant theoretical frameworks and empirical research findings to emerge; to produce a book written for profes-

sionals who want to improve their understanding of the strategic role of DSS at different levels of the decision making procedure; such a book can also serve as an excellent dissemination tool for highly specialized DSS like those on agriculture, food and the environment, especially as these results are often difficult to reach production or acquire broader acceptance. This proved to be a challenging task; we asked vigorous researchers to offer their feedback from the design and modeling phases of the DSS, to the final actual applications plus cases using them.

The target audience of this volume is composed of professionals and researchers working in the field of decision support systems and in the disciplines of agriculture, food and the environment. This includes operational research practitioners, academics, agricultural and environmental economists and engineers, geographers, agronomists, farming industry practitioners and policy makers in developing organizations, governance institutions and regional and management authorities. Moreover, the book provides insights and reference for scholars and PhD students concerned with the management science, operational research, information science and international development issues like sustainability of resources, ecosystem management, biodiversity conservation and climate change.

The book is divided in three parts; the first part concerns the DSS fundamentals, design and experiences and it spans through seven chapters highlighting the difficulties and complexities that are encountered during DSS development. The second part, from chapter eight to thirteen is about DSS modeling techniques and efficiency of design and implementation; the third and final part presents DSS applications and case studies in nine chapters. The case studies using certain DSS and proving their effectiveness under various scenarios, can well contribute to the overall objectives of the book; governance institutes and stakeholders of different levels can gain from practices and experiences applied by their counterparts in different parts of the world, thus improving their effectiveness. Successful DSS case studies are expected to arise the interest of many DSS practitioners and researchers; experiences can be transferred, views can be exchanged, ‘bad’ management concepts can be avoided and above all research in the many scientific fields addressed by the DSS technology can gain new momentum.

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