Editorial

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Operational research has been applied to solve agricultural and forest management problems over the decades. Assigning resources on farms, determining a diet to feed animals at minimum cost, or planning forest areas to be cut are examples. It is a highly interdisciplinary field of application involving researchers and practitioners across the fields of statistics, economics, agronomy, engineering, genetics, veterinary medicine, operations research, operations management, computer science, and information technology.

Changes in production structures and customers' attitudes towards healthier and sustainable activities are impacting agriculture and forestry, bringing new decisional problems where operational research is applied. Accordingly, the EURO Working Group on OR in Agriculture and Forest Management, i.e., ORAFM, (www.orafm.org) was created. ORAFM is an official Working Group supported by the European Association of Operational Research Societies, i.e., EURO (www.euro-online.org), but it is not restricted to European countries, as shown in the list of members. This Working Group is concerned with operational research methods and applications to agricultural science, defined in its broad meaning (i.e., including forest management and fisheries). Since 2003 the group has had regular meetings in Europe at approximately yearly intervals, usually within the EURO conferences. In parallel, the number of members has grown from the initial twenty-something to more than one hundred. At one of these regular meetings it was proposed to prepare a special volume devoted to the topics of interest to the group.

During recent years, participants in our meetings have presented more than 100 papers on many different topics involving operational research methods and applications in agriculture and forest management. Since interesting real-world decision-making situations arise

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from these fields, this special volume of the *Annals of Operations Research* focuses on the methods in the context of the problems they are intended to solve.

This volume has a double purpose. On the one hand, it contains a collection of interesting papers selected from an open call for papers on operational research topics in agriculture and forest management, and, on the other hand, it is an invitation to professionals and scientists to realize and reinforce the always important role of OR in agriculture and forestry. In the end, the volume comprises twenty-one high quality papers covering many aspects of operations research in agriculture and forest management, considering both theoretical issues and application results. Fourteen contributions deal with agriculture applications and seven are concerned with forestry applications. The papers on forestry are mainly devoted to planning, except for the paper by Fang et al., which approaches the problem of wood quality using hybrid models in an original way. Laureano Escudero et al. use Stochastic Integer Programming (SIP) for solving multistage mixed 0-1 programs of forestry management under uncertainty based on scenario analysis, branch-and-fix coordination, and Lagrangean relaxations. Zhang et al. use Integer Programming (IP) to model Forest Core Area; while the risk of wind damage in forestry is modeled with Markov Decision Processes (MDP) by Forsell et al. Also, multiobjective programming is present in the paper by R. Caballero et al. for forest planning with adjacency constraints, and a Mixed Integer Linear Programming Model (MILP) is proposed by Chauhan et al. for supply network planning in the forest supply chain. Finally, Mosquera et al. present stochastic programming in forestry planning as a tool for better design of insurance contracts without neglecting risk aversion of decision-makers.

The papers on agriculture start with a literature review of decision support models for specialty crops industry, by Zhang and Wilhelm. The paper by Alfandari et al. combines crop rotation planning and sustainable forest development in an MIP model. Lana Santos et al. also consider crop rotation, along with adjacency constraints. Related to crop rotation, Ortuño and Vitoriano develop a goal programming (GP) model for farm planning with resources dimensionality; while AitSahila et al. investigate the impact of ENSO-based climate forecasts on optimal planting schedules and financial yield-hedging strategies in a framework focused on downside risk. AHP and GP is applied by Moreno-Jimenez et al. for agricultural valuation, and Dubeau et al. optimize the diet problem in growing pigs by using a multiobjective function. Later, Ohlmann and Jones present an IP model for optimal delivering of pigs to slaughterhouses. A different kind of paper, by Nielsen et al., presents the formal embedding of a State Space Model into a Markov Decision Process and illustrates the procedure with a dairy herd model. The lack of information and risk analysis is dealt with by Lien et al., and a different approach is presented by Vizvári et al. to analyze structure and production of arable land. Production planning and distribution is the problem tackled by Ahumada and Villalobos; while the overview of supply chain models for small agricultural enterprises is the subject of Jang and Klein. Finally, water management is discussed by Crespo et al. to optimize crop irrigation.

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