Environ Syst Decis (2013) 33:1–2
DOI 10.1007/s10669-013-9434-9

EDITORIAL

Introduction to the inaugural issue of environment systems and decisions

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Published online: 12 February 2013

On behalf of the Editorial Board, we welcome readers to the inaugural issue of the Springer journal *Environment Systems and Decisions*. Updating the tradition of *The Environmentalist* (1981–2012), *Environment Systems and Decisions* will feature a revised scope focused on integrative decision making for environmental, social, technological, and economic systems.

While many decision-oriented journals continue to focus on particular theories or methods, *Environment Systems and Decisions* will have an applied, systems-wide orientation. The topics will span a variety of industry, government, and military application domains with the utilization of decision analysis, systems analysis, risk assessment, risk management, risk communication, resilience analysis, policy analysis, environmental analysis, economic analysis, engineering, and the social sciences.

The audience of *Environment Systems and Decisions* represent many application domains, as represented by the new name. For instance, *Environment* is intended to imply not only the natural environment, but also the environment in which a problem, decision, or innovation exists. By *Systems* we mean any type of systems, whether natural or manmade, technical or social, or concrete or abstract, or combinations thereof. Finally, *Decisions* emphasizes the behavioral and human elements of these subjects, and how the efforts featured in this journal can be leveraged to bring about significant positive changes to human welfare and the environment.

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Several upcoming special issues will explore themes relevant to our new scope. For instance, one upcoming issue will seek to capture the topic of *sustainability* from a quantitative, systems-based perspective. Another issue will investigate the topic of *cyber security*, which has traditionally focused on the development of technologies while largely ignoring the human aspects of the problem. Other topics to be explored in the future include *multi-scale decision making* and the *value of information*.

This inaugural issue focuses on *scenario analysis*. Uncertainty is a universal theme or concept, cutting across disciplines and playing out at different scales of time and location. Questions regarding what the future might hold have fascinated scholars for centuries, yet scenario analysis as a formal discipline of investigating and addressing future scenarios is relatively new. Differing schools of thought exist in the field of scenario analysis, and there is no consensus on how and when to conduct a scenario analysis. How do we elicit, formulate, and identify scenarios? How do we account for stakeholder biases? How can we manage the uncertainty? What are the best ways to mitigate future risks and maximize future opportunities? We seek to address these questions through this special issue and provide insights on how to effectively utilize theories, methods, and applications of scenario analysis to better negotiate the risks and benefits associated with emergent and future conditions.

The lineup of articles of this special issue is intentionally varied and crosscutting. We start with a comprehensive review of the scenario analysis literature from Tourki et al., who examine trends overtime in the nature of published articles. This serves as a jumping off point to explore the different methods and applications of the field.

In an article from McCreight, practical methods and best practices of scenario development are outlined and applied

to geopolitical wargaming, including a wargame as an illustrative example. These principles can serve as helpful guidelines for all scenario analysis practitioners, regardless of application.

Bjelland and Borg approach scenario analysis from a design perspective, discussing the implications of scenarios in fire safety engineering. They discuss challenges within current regulatory frameworks and outline principles for analytical, scenario-based fire safety design.

Masch approaches scenario analysis from a perspective of catastrophe avoidance and risk management. He outlines a multi-scenario optimization framework for screening alternative courses of action under radical uncertainty.

In a series of two articles, Ehlen and Vargas describe tools and methods for economic scenario analysis. First, they describe the general frameworks and processes of conducting multi-hazard, multi-infrastructure scenario assessments at the National Infrastructure Simulation and Analysis Center. They follow up by describing an analytical tool for determining economic consequences of scenarios based on input–output modeling. Both of these papers explore how these scenario-based methods can be utilized for security planning.

Hamilton et al. describe how scenario analysis can be used as a participatory approach to both identify robust infrastructure alternatives and policies and to identify what scenarios are the most influential from a decision standpoint. Four case studies related to infrastructure and resources are presented that illustrate how detailed scenario analysis can aid in adaptively managing these systems under uncertainty.

Turnquist and Vugrin approach infrastructure resilience by examining pre- and post-disruption activities after multiple disruption scenarios. They develop a novel stochastic optimization model and provide insights into the measurement and design for network resilience.

Using video-based scenarios, Rosoff et al. investigate the propensity of a population to migrate following a biological terrorist attack. By adjusting government intervention policies throughout the scenario, the authors are able to draw conclusions about decisions affecting migratory behavior.

From an organizational perspective, Sheppard and Crannell show how utilizing scenario analysis tools can build a robust, agile organization and foster competitive advantage. They outline a set of tools and best practices that can be leveraged throughout all phases of an organization's growth.

Related to climate change, Bickel explores the potential costs and benefits of emerging geoengineering technologies using decision analytical and economic modeling tools. Implications for research into policies and technologies for avoiding tipping points in the global climate are addressed.

Baum et al. explore the potential consequences of geoengineering technologies. They develop a scenario in which the global population is stricken with a natural or man-made catastrophe and unable to continue geoengineering processes, resulting in what the authors describe as a "double catastrophe."

The Editors-in-Chief and Managing Editors would like to thank everyone who was involved in this transition and process leading to the inaugural issue, especially the Springer staff who have worked diligently with us along every step of the process. We would like to thank our fellow members of the Editorial Board, the authors for their contributions to this special issue, and the reviewers who provided the authors with valuable editorial insights and improvements. We would furthermore like to thank the outgoing editors-in-chief, Dr. Trevors and Dr. Kevan, for their hard work on *The Environmentalist* over the years.

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