

# Decision Making under Deep Uncertainty

Vincent A. W. J. Marchau · Warren E. Walker ·  
Pieter J. T. M. Bloemen · Steven W. Popper  
Editors

# Decision Making under Deep Uncertainty

From Theory to Practice



**OPEN**

 Springer

*Editors*

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# Preface

Making plans for the future involves anticipating changes, especially when making long-term plans or planning for rare events. When these changes are characterized by a high degree of uncertainty, we consider the resulting situation to be “deeply uncertain”—a situation in which the experts do not know or the parties to a decision cannot agree upon “(1) the appropriate models to describe the interactions among a system’s variables, (2) the probability distributions to represent uncertainty about key variables and parameters in the models, and/or (3) how to value the desirability of alternative outcomes.”<sup>1</sup>

Several books have been written in the past that deal with different aspects of decisionmaking under uncertainty (in a broad sense). But, there are none that aim to integrate these aspects for the specific subset of decisionmaking under *deep* uncertainty. This book provides a unified and comprehensive treatment of the approaches and tools for developing policies under deep uncertainty, and their application. It elucidates the state of the art in both theory and practice associated with the approaches and tools for decisionmaking under deep uncertainty. It has been produced under the aegis of the Society for Decision Making under Deep Uncertainty (DMDU: <http://www.deepuncertainty.org>), whose members develop the approaches and tools supporting the design of courses of action or policies under deep uncertainty, and work to apply them in the real world.

The book is intended for use by a broad audience, including students, lecturers, and researchers in the field of decisionmaking under deep uncertainty for various domains, those who commission the application of DMDU approaches and consume the results in the government and the private sectors, and those who carry out such studies. It provides (1) guidance in identifying and applying appropriate approaches and tools to design policies and (2) advice on implementing these policies in the real world. For decisionmakers and practitioners, the book includes realistic examples and practical guidelines that explain what decisionmaking under

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<sup>1</sup>Lempert R. J., S. W. Popper, and S. C. Banks (2003) *Shaping the Next One Hundred Years: New Methods for Quantitative, Long-Term Policy Analysis*, MR-1626-RPC, RAND, Santa Monica, California, pp. 3–4.

deep uncertainty is and how it may be of assistance to them. The approaches and tools described and the problems addressed in the book have a cross-sectoral and cross-country applicability.

The book provides the first synthesis of the large body of work on designing policies under deep uncertainty, in both theory and practice. It broadens traditional approaches and tools to include the analysis of actors and networks related to the problem at hand. And it shows how lessons learned in the application process can be used to improve the approaches and tools used in the design process.

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