

Simonovic, Slobodan P., *Systems Approach to Management of Disasters: Methods and Applications*, Wiley, 2011.

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Humans have come a long way in their evolution, technological development and social organisation, but the might of Nature is still far beyond their control. A scrutiny of long-term records, especially after 1840s, shows a sharp increase in the number of disasters as well as their increasing consequences in the form of human and economic loss. As the methods of disaster management are evolving in the rapidly changing social and technological environment, they increasingly are also getting more complex and elaborate.

In *Systems Approach to Management of Disasters*, the author has taken up a subject in which he has vast experience and training. The erstwhile Yugoslavia, the country of his origin, faced a chronic problem of floods. Simonovic completed his M.Sc., which included training in formal systems theory, which appears to have ignited his interest in systems thinking for the management of disasters. His main area of interest is water systems management, but his experience and approach allow him to apply it to other areas as well. Simonovic wants:

...to contribute to the change of disaster management practice and respond to a clear need to redefining the education of disaster management professionals and increase their abilities to (a) work in an interdisciplinary environment; (b) develop a new framework for hazard mitigation, preparation, emergency/event/crisis management, and recovery that will take into consideration current complex socioeconomic conditions; and (c) provide the context for disaster management in conditions of uncertainty (p. xxviii).

The main objective of this book is to introduce the systems approach to the established theoretical framework of modern disaster management, and focus on three main aspects: simulation, optimisation, and multi-objective analyses (Ibid.).

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Simonovic is quite conscious that systems thinking is “in a less secure position in social sciences” (p. xxvii) than it was a few decades ago as it has been considered by many theorists to be a variant of structural functionalism that is unable to deal with the subtle organisational problems related to power and conflict. However, without discarding the earlier segregated disciplinary approaches to deal with disaster and its management he supports systems approach as a better approach for disaster management because it looks at the problem holistically, in which the disaster, the affected, and different institutions of society and the environment in which it occurs are taken to be various systems or subsystems with certain definite and some dynamic relationships with each other. Simonovic is concerned with the inherent integration of the way citizens, communities, governments, and businesses behave in relation to the environment they are situated in. The systems approach has “great potential for providing appropriate support for effective disaster management in this emerging context” (Ibid.). The approach is extremely important for the management of scarce resources while managing disasters and its integrative character is inherent in the simulation and optimisation management models (Ibid.).

This is more a textbook on disaster management, divided into four parts—management of disasters; systems analysis for integrated management of disasters; implementation of systems analysis for the management of disasters; and preparedness before the disaster strikes. In the first part, the author introduces the problem of disasters and their management by narrating his personal experiences during the “flood of the century” in 1997—the immense flood of the Red River in Manitoba, Canada. Before describing the four-phased disaster management cycle of mitigation, preparedness, response and recovery, Simonovic mentions two new emerging paradigms for the design and development of future tools for disaster management—the complexity paradigm and the uncertainty paradigm. The former includes the complexity of the decision-making process due to the extension of spatial and temporal spaces of disasters; computer technology that includes the data availability related with disaster and the variations in domain variable in time and space; and the latter includes the uncertainties caused by “inherent variability of the physical components of the system” and “the fundamental lack of knowledge”. He describes the concept, nature, tools, and techniques for integrated disaster management by relating them to the disaster management system in Canada. He also deals with the role of individual, organisational, and governmental decision-making in the entire process.

The second part deals with integrated disaster management from the prism of systems thinking. In Simonovic’s view, the description and narrative of the problem do not give as clear a picture as that obtained by mathematical modelling. It is more concise, makes the problem more comprehensible, and helps reveal important causal relationships, provided enough data is available. “A mathematical model

forms a bridge to the use of high-powered mathematical techniques and computers to analyse the problem” (p. 66.). He further introduces the reader to methods and tools like simulation, system dynamics simulation, optimisation, multi-objective analysis, disaster risk management, sources of uncertainty, conceptual risk definition, probabilistic approach, and a fuzzy set approach for a systems approach to management of disasters. The collection of accurate data for all these activities remains very important.

The third part of the book deals with the implementation of the methods and techniques for the management of disasters, with a detailed description and elaborate introduction of the tools used in the assessment, prediction, forecasting, and warning of disasters.

The fourth part contemplates the way ahead in the field of disaster management. An incomplete record of the disasters that occurred between the springs of 2009 and 2010 is cited to highlight the urgency and relevance of developing a robust system for disaster management, and the need for proper awareness and training of the masses to get involved in the system. Looking into the future, Simonovic underlines the issues of climate change, population growth, and migrations as dominating the discourse of disaster management. According to him, “successful management of disasters requires integration of systems view into the considerations of the daily activities of everyone who has an influence on future losses” (p. 292).

A sound elementary knowledge of mathematics is required to understand this book. A set of exercises after each chapter and ample use of graphs, charts, figures, diagrams, and equations make it a typical technical textbook, more appropriate for classrooms or training workshops. The author is aware that this book has not dealt with the tools for “disaster management under uncertainty” and expects it to come sometime in future as an extension of the work begun with this book. The effort of the author is a success as he has provided a set of relevant tools and has been able to reinstate the systems approach as an alternative approach to disaster management.

