

# Sustainable Water Resources Management



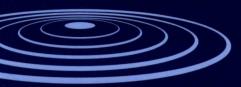
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Edited by

Chandra S. P. Ojha Rao Y. Surampalli András Bárdossy Tian C. Zhang Chih-Ming Kao



Sponsored by the Sustainable Water Resources Management Task Committee of the Environmental Council of the Environmental and Water Resources Institute of the American Society of Civil Engineers



Sustainable Water Resources
Management presents the most current
thinking on the environmental, social, and
political dimensions of sustainably managing
the water supply at local, regional, or basin
levels. The twin challenges of ensuring

an adequate water supply and the optimal allocation for different uses are compounded by changes in climate, land use, demographic patterns, and water availability.

Written by leading experts from around the world, the 33 chapters in this book provide comprehensive information about different aspects of sustainable water resources management. This book reviews various methods of data collection and describes available tools for hydrological modeling, with an emphasis on remote sensing and GIS. Chapters cover the assessment of atmospheric water, surface water, and groundwater. Other topics include urban water management, mitigation strategies for droughts and floods, the optimal use of irrigation water, and issues in water reuse. These innovative approaches are highlighted with case studies from California, India, Taiwan, and East Africa.

This collection of essays provides readers with comprehensive information on the principles of sustainable water resources management, as well as recent advances, directions for future research, and policy development for sustainable water resources management. As a reference, it will be of interest to students, scientists, engineers, government officials, and water resource managers.









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## **Preface**

Water is a precious natural resource. However, its uneven distribution coupled with uneven demand leads to water crisis. Many nations in the world are experiencing water crisis and are already under water stress or likely to experience it in future. Unless the water resources are managed properly, it will be extremely difficult to sustain future generation. Many water related conflicts are in existence and sharing of water resources among different states/nations has become a political issue.

Frequent occurrences of droughts and unprecedented floods have catastrophic effects on food and water security. Due to climate change, precipitation intensities have increased and this has led to flooding of many cities across the globe. This is the time when water resources management has to be looked from sustainability perspectives. While short-term measures are always welcome, long term measures must be planned so that the water needs of future generation is not compromised.

The present book deals with a variety of topics in the form of thirty-three chapters which are relevant towards sustainable water resources management. The book begins with data collection, and then describes a variety of modeling tools to achieve optimum utilization of water resources. While doing so, it lays emphasis on use of remote sensing and GIS tools. The assessment of atmospheric water, surface water and ground water are also dealt with. In addition, several case studies covering USA, India, China, Europe, etc are included to address a variety of issues relevant to sustainable water resources management.

As a reference, the book will provide readers in-depth understanding of and comprehensive information on the principles of sustainable water resources management, recent advances, directions toward future research and development of policy for sustainable water resources management. We hope that this book will be of interest to students, scientists, engineers, government officers, process managers and practicing professionals.

The editors gratefully acknowledge the hard work and patience of all the authors who have contributed to this book. The views or opinions expressed in each chapter of this book are those of the authors and should not be construed as opinions of the organizations they work for. Special thanks go to Mr. Pratyush Chaturvedi, GIEES, USA, for his thoughtful comments and invaluable support during the development of this book.

Chandra S. P. Ojha, Rao Y. Surampalli, András Bárdossy, Tian C. Zhang, and Chih-Ming Kao

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