

Water Management: A View from Multidisciplinary Perspectives

G. M. Tarekul Islam · Shampa ·
Ahmed Ishtiaque Amin Chowdhury
Editors

Water Management: A View from Multidisciplinary Perspectives

8th International Conference on Water
and Flood Management

 Springer

Editors

G. M. Tarekul Islam
Institute of Water and Flood Management
(IWFM)
Bangladesh University of Engineering
and Technology (BUET)
Dhaka, Bangladesh

Shampa
Institute of Water and Flood Management
(IWFM)
Bangladesh University of Engineering
and Technology (BUET)
Dhaka, Bangladesh

Ahmed Ishtiaque Amin Chowdhury
Institute of Water and Flood Management
(IWFM)
Bangladesh University of Engineering
and Technology (BUET)
Dhaka, Bangladesh

ISBN 978-3-030-95721-6

ISBN 978-3-030-95722-3 (eBook)

<https://doi.org/10.1007/978-3-030-95722-3>

© The Editor(s) (if applicable) and The Author(s), under exclusive license to Springer Nature Switzerland AG 2022

This work is subject to copyright. All rights are solely and exclusively licensed by the Publisher, whether the whole or part of the material is concerned, specifically the rights of translation, reprinting, reuse of illustrations, recitation, broadcasting, reproduction on microfilms or in any other physical way, and transmission or information storage and retrieval, electronic adaptation, computer software, or by similar or dissimilar methodology now known or hereafter developed.

The use of general descriptive names, registered names, trademarks, service marks, etc. in this publication does not imply, even in the absence of a specific statement, that such names are exempt from the relevant protective laws and regulations and therefore free for general use.

The publisher, the authors and the editors are safe to assume that the advice and information in this book are believed to be true and accurate at the date of publication. Neither the publisher nor the authors or the editors give a warranty, expressed or implied, with respect to the material contained herein or for any errors or omissions that may have been made. The publisher remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

This Springer imprint is published by the registered company Springer Nature Switzerland AG
The registered company address is: Gewerbestrasse 11, 6330 Cham, Switzerland

Preface

This book *Water Management: A View from Multidisciplinary Perspectives* presents the collection of selected papers from the 8th event of the International Conference on Water and Flood Management (ICWFM) held during March 29–31, 2021. This year, the conference added a new dimension not only because the program was held online due to the COVID-19 situation but because the pandemic taught us how to act when natural disasters and pandemic-like situations occur concurrently.

Said that, organizing the conference in virtual platform was less difficult compared to the challenges of selecting top articles from more than 200 scientific works presented in the conference. Thanks to the members of the Scientific Committee and Reviewers whose relentless effort has made this possible. It is gratifying to note that our initiative has brought together a multidisciplinary and global team of national and international academicians, researchers, experts, as well as practitioners contributing chapters to the book on the diverse physical, environmental, socio-economic, and institutional issues concerning Water Management. Our objective, and indeed, the driving force behind the book, has been to bring the current water management issues and knowledge throughout the world into the forefront of the scientific community and policymakers. We hope all this endeavor will prove valuable to academicians, policy planners, and development practitioners alike.

Finally, thanks to the Springer team for publishing this volume for two successive years. This particularly encourages early career researchers to contribute to the conference.

Dhaka, Bangladesh

Prof. G. M. Tarekul Islam
Shampa
Ahmed Ishtiaque Amin Chowdhury

Contents

Floods and Drainage

Causes and Management of Damaging Flood Incidences in Rapidly Urbanizing Areas of Kathmandu Valley: A Case Study of Flood Event in Bhaktapur District, Nepal	3
Purnima Acharya and Ashutosh Shukla	

Urban Drainage Study for Gopalganj Pourashava Considering Future Climate Change Impacts	23
Faruque Abdullah, A. K. M. Saiful Islam, Afsara Tasnia, G. M. Tarekul Islam, Sujit Kumar Bala, and Nahruma Mehzabeen Pieu	

Flood Propagation Processes in the Jamuna River Floodplain in Sirajganj	45
Ashik Iqbal, M. Shahjahan Mondal, M. Shah Alam Khan, Hans Hakvoort, and William Veerbeek	

Co-creation of Flood Mitigation Technologies in Bangladesh to Strengthen Community Resilience	69
Nadia Nowshin, M. Shah Alam Khan, Hans Hakvoort, William Veerbeek, and Chris Zevenbergen	

Urban Waterlogging Risk Profiling: The Case of Khatunganj Wholesale Commodity Market, Chattogram	93
Tasnim Alam Nishat, Dewan Salman Sunny, Rifat Talha Khan, Md.Reaz Akter Mullick, and Piyal Datta	

Hydrometeorological Hazards and Risk

A Remote Sensing-Based Approach for Analysis of Dry and Wet Periods of Bangladesh Based on Standardized Precipitation Index During 1981–2020	123
Saumik Mallik	

Indigenous Knowledge and Practices of the Small Ethnic Communities of Asia-Pacific Island Countries in Facing Hydro-Meteorological Hazards	143
Mahfuzul Haque	
Driving Factors of Destination Choices Due to Riverbank Erosion Along the Brahmaputra River	155
Sahika Ahmed and Sonia Binte Murshed	
Bivariate Drought Risk Estimation Using a Multivariate Standardized Drought Index in Marathwada Region, India	173
Rajarshi Datta and Manne Janga Reddy	
High-Quality Historical Flood Data Reconstruction in Bangladesh Using Hidden Markov Models	191
Max Mauerman, Elizabeth Tellman, Upmanu Lall, Marco Tedesco, Paolo Colosio, Mitchell Thomas, Daniel Osgood, and Arifuzzaman Bhuyan	
Rivers, Coasts and Estuaries	
Impact of Coriolis Force on the Flow Field and Sedimentation in Ideally Shaped Tidal Basins	213
Nazeat Ameen Iqra, Mohammad Asad Hussain, and M. Shah Alam Khan	
The Impact of Small Tributaries Flood in the Braided Plain of Large River	231
Md. Manjurul Hussain, Shampa, Juwel Islam, Md. Shibbir Ahmed, Md. Ashiqur Rahman, and Md. Munsur Rahman	
Water Infrastructure and Development	
Hybrid Coast Protection Approach in Bangladesh: A Case Study on Effectiveness of Small-Scale Forest in Reducing Surge Induced Inundation and Supporting Local Livelihoods	251
Mita Kazi Samsunnahar	
Assessing the Consequences of Large-Scale Stabilization of the Padma River on Its Flow Hydraulics Using a Combined 1D-2D Hydrodynamic Model	279
Subir Biswas and M. Shahjahan Mondal	
Water and Livelihood Security	
A Sustainability Index for Assessing Village Tank Cascade Systems (VTCs) in Sri Lanka	299
E. M. G. P. Hemachandra, N. D. K. Dayawansa, and Ranjith Premalal De Silva	

An Agent Based Model of Mangrove Social-Ecological System for Livelihood Security Assessment 319
Shamima Airin Sweety, M. Shah Alam Khan, Anisul Haque, and Mashfiqus Salehin

Drought Management by Integrated Approaches in T. Aman Rice Season to Escalate Rice Productivity in Drought Prone Regions of Bangladesh 351
Debjit Roy, Md. Belal Hossain, Mohammad Rezoan Bin Hafiz Pranto, and Md. Towfiqul Islam

Actual Evapotranspiration Estimation Using Remote Sensing: Comparison of Sebal and Metric Models 365
Sumit Kumar Saha, Rubel Ahmmed, and Nasreen Jahan