



# Advances in Chemical Pollution, Environmental Management and Protection

Book series

## Book Title

**Climate-Smart Water Resource Management: A Paradigm Shift from Ancient to Modern Practices with Integrated Technologies**

## Keywords

Artificial Intelligence (AI); Machine Learning (ML); Remote Sensing (RS); Geographical Information Systems (GIS); Large Language Models (LLMs); Natural Language Processing (NLP); Smart Networks; Innovative Infrastructure; Traditional Water Harvesting

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## Primary Audience

This book's most relevant target audience includes researchers, scientists, and professionals in water resource management, climate science, environmental science, artificial intelligence, machine learning, remote sensing, geographical information systems, large language models, and sustainability. Additionally, the book may appeal to policymakers, government officials, and students pursuing advanced studies in these areas.

## Background and Purpose

- This book comprehensively explores evolving water management strategies in the face of climate change. This book delves into the rich history of water resource management, tracing the shift from ancient practices to cutting-edge modern innovations. Bridging the realms of climate science, artificial intelligence, geospatial technologies, and large language models, it presents 18 chapters covering AI-ML applications, RS-GIS techniques, and the transformative role of LLMs. Tailored for professionals, researchers, and academics, this book provides a holistic guide to sustainable water management in the modern era.
- The purpose of writing this book is to address the pressing need for a comprehensive resource that aligns traditional water resource management practices with contemporary technologies in the context of climate change. The book aims to fill the existing gap in the literature by providing an in-depth exploration of the historical evolution of water management, offering insights into the challenges posed by climate change, and presenting innovative solutions through integrating AI-ML, RS-GIS techniques, and LLMs. This resource is a timely guide for professionals, researchers, and academics seeking a holistic understanding of climate-smart water resource management.
- This book addresses the critical problem of adapting water resource management to the challenges of climate change by integrating traditional practices with modern technologies. The unique selling point lies in the extensive coverage of LLMs, offering readers innovative insights into leveraging advanced language processing techniques for effective communication, stakeholder engagement, and future trends in climate-smart water governance. By providing a holistic approach that combines AI-ML, RS-GIS, and LLMs, the book equips readers with cutting-edge tools and strategies to navigate the evolving landscape of water resource management in a changing climate.

## Publishing Timeline

- Proposal Submission Deadline (title or abstract with author's affiliation): **June 30, 2024**
- Notification of Acceptance of Proposal: **July 15, 2024**
- Full Chapter Submission Deadline: **October 31, 2024**
- Submission Email: [rajib@civil.iitkgp.ac.in](mailto:rajib@civil.iitkgp.ac.in); [amansrivastava1397@kgpian.iitkgp.ac.in](mailto:amansrivastava1397@kgpian.iitkgp.ac.in)

## Author's Guidelines

- The original chapter must include: 1. Title; 2. Author(s) Name & Current Affiliation with Email and ORCID; 3. Abstract (<250 words); 4. Keywords (5-6 words); 5. Introduction; 6. Rationale of the Study (Optional); 7. Materials and Methods; 8. Results and Discussion; 9. Challenges/Limitations of the Study (Optional); 10. Recommendations (Optional); 11. Conclusions; 12. Acknowledgments (If any); and 13. References (APA Format).
- The word count of the full-length chapter may be around 10,000 words.
- Manuscripts should be submitted in Word.

## Table of Contents

(not limited to...)

- [Section A: Climate Change and Advancing Technologies: Evolution of Water Management Infrastructure](#)

**Chapter 01: Water Resource Management in a Changing Climate:** Exploring the impact of climate change on water resources and setting the stage for the need for innovative solutions.

**Chapter 02: Evolution of Water Resource Management: From Ancient Practices to Modern Innovations:** Tracing the historical evolution of water management practices, highlighting lessons from ancient wisdom.

**Chapter 03: Integrated Technologies: A New Frontier in Water Resource Management:** Examining the role of integrated technologies, including AI-ML, RS-GIS, and LLMs, in shaping the future of water resource management.

- [Section B: Smart Water Management through AI-ML Applications](#)

**Chapter 04: AI-ML Foundations for Climate-Smart Water Resource Management:** Establishing the foundational concepts of AI-ML and their applications in climate-smart water management.

**Chapter 05: Enhancing Water Quality Assessment through Machine Learning:** Exploring machine learning applications for accurate water quality assessment.

**Chapter 06: Predictive Modeling for Climate-Resilient Water Resource Planning:** Highlighting the use of predictive modeling to plan for climate-resilient water resources.

**Chapter 07: Optimizing Water Distribution Networks with Artificial Intelligence:** Discussing AI applications in optimizing water distribution networks for efficiency.

**Chapter 08: Towards Sustainable Water Use: AI-ML Solutions for Conservation:** Examining AI-ML solutions for promoting sustainable water use and conservation.

- [Section C: Remote Sensing and GIS Techniques for Water Resource Monitoring:](#)

**Chapter 09: Satellite-Based Monitoring of Water Bodies for Climate-Resilient Management:** Utilizing satellite-based technologies for climate-resilient monitoring of water bodies.

**Chapter 10: Geospatial Technologies in Watershed Management and Planning:** Exploring the applications of geospatial technologies in watershed management.

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**Chapter 11: Integration of Remote Sensing and GIS for Hydrological Modeling:** Examining the integration of remote sensing and GIS in hydrological modeling.

**Chapter 12: Monitoring Climate Change Impacts on Water Resources Using Remote Sensing:** Assessing the impact of climate change on water resources through remote sensing.

**Chapter 13: Advancements in LiDAR Technology for Precision Water Resource Management:** Discussing the advancements in LiDAR technology for the precision management of water resources.

- [Section D: Harnessing the Power of Large Language Models \(LLMs\) in Water Management](#)

**Chapter 14: Introduction to Large Language Models in Water Resource Management:** Introducing LLMs and their applications in water resource management.

**Chapter 15: Natural Language Processing for Water Quality Assessment:** Exploring natural language processing applications for assessing water quality.

**Chapter 16: Optimizing Water Resource Planning through Language Models:** Discussing the optimization of water resource planning using language models.

**Chapter 17: Enhancing Communication and Stakeholder Engagement with Language Models:** Highlighting the role of language models in improving communication and stakeholder engagement.

**Chapter 18: Future Trends: Integration of LLMs in Climate-Smart Water Governance:** Exploring future trends and the integration of LLMs in climate-smart water governance.

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