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For Integrated Water Resources
Management In Basins

A Handbook For Integrated Water Resources Management In Basins

Data on water quality and other environmental issues are being collected at an ever-increasing rate. In the past, however, the techniques used by scientists to interpret this data have not progressed as quickly. This is a book of modern statistical methods for analysis of practical problems in water quality and water resources. The last fifteen years have seen major advances in the fields of exploratory data analysis (EDA) and robust statistical methods. The 'real-life'

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characteristics of environmental data tend to drive analysis towards the use of these methods. These advances are presented in a practical and relevant format. Alternate methods are compared, highlighting the strengths and weaknesses of each as applied to environmental data. Techniques for trend analysis and dealing with water below the detection limit are topics covered, which are of great interest to consultants in water-quality and hydrology, scientists in state, provincial and federal water resources, and geological survey agencies. The practising water resources scientist will find the worked examples using actual field data from case studies of environmental problems, of real value. Exercises at the end of each chapter

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enable the mechanics of the methodological process to be fully understood, with data sets included on diskette for easy use. The result is a book that is both up-to-date and immediately relevant to ongoing work in the environmental and water sciences.

Design options and planning procedures must be critically examined to ensure that landscapes are created with sensitivity to water quality and management issues as well as overall ecological integrity. Handbook of Water Sensitive Planning and Design presents the history of water as a design and planning element in landscape architecture and describes new interpretations of water management. This text pushes the frontiers of standard water management in new directions,

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challenging readers into abandoning the comfortable safety of conducting business-as-usual within narrow disciplinary confines, and instead directing views outward to the exciting and incompletely mapped regions of true interdisciplinary water sensitive planning and design. With contributions from renowned practitioners, Part I provides seventeen chapters addressing the subject of site-specific water sensitive design and Part II presents another seventeen chapters focusing on issues relating to the water sensitive planning of riparian buffers and watersheds. In addition, Professor France has provided a "Response" to accompany each chapter, which succinctly underscores the salient features in more detail and emphasizes cross-linking to other

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chapters in the book. The "Overview" provides a brief road-map to navigate through the section. Finally, the discussion summaries at the end of each section elaborate on past problems, current challenges, and future directions. Handbook of Water Sensitive Planning and Design puts forward the very best of modern water sensitive planning and design and should be required reading for everyone involved in this dynamic and crucial field.

This handbook is currently in development, with individual articles publishing online in advance of print publication. At this time, we cannot add information about unpublished articles in this handbook, however the table of contents will continue to grow as additional articles pass through the

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review process and are added to the site. Please note that the online publication date for this handbook is the date that the first article in the title was published online. For more information, please read the site FAQs.

While most books examine only the classical aspects of hydrology, this three-volume set covers multiple aspects of hydrology, and includes contributions from experts from more than 30 countries. It examines new approaches, addresses growing concerns about hydrological and ecological connectivity, and considers the worldwide impact of climate change. It also provides updated material on hydrological science and engineering, discussing recent developments as well as classic approaches. Published in three books,

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Fundamentals and Applications;
Modeling, Climate Change, and
Variability; and Environmental
Hydrology and Water Management, the
entire set consists of 87 chapters, and
contains 29 chapters in each book.

Students, practitioners, policy makers,
consultants and researchers can benefit
from the use of this text.

Climate Change-Sensitive Water
Resources Management
Foreign Direct Investment and Food and
Water Security

An Introduction to Methods, Models,
and Applications

Interdisciplinary Methodologies and
Strategies in Practice

Handbook of Engineering Hydrology
(Three-Volume Set)

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For the past two decades, Integrated Water Resources Management (IWRM) has been the dominant paradigm in water resources. This book explores how ideas of IWRM are being translated and adapted in Mozambique, South Africa, Tanzania, Uganda and Zimbabwe. Grounded in social science theory and research, it highlights the importance of politics, history and culture in shaping water management practices and reform, and demonstrates how Africa has clearly been a laboratory for IWRM. While a new cadre of professionals made IWRM their mission, we show that poor women and men may not have always benefitted. In some cases IWRM has also offered a distraction from more critical issues such as water and land grabs, privatisation, the negative impacts of water permits, and

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a range of institutional ambiguities that prevent water allocations to small and poor water users. By critically examining the interpretations and challenges of IWRM, the book contributes to improving water policies and practices and making them more locally appropriate in Africa and beyond.

This comprehensive handbook provides an authoritative source of information on global water and health, suitable for interdisciplinary teaching for advanced undergraduate and postgraduate students. It covers both developing and developed country concerns. It is organized into sections covering: hazards (including disease, chemicals and other contaminants); exposure; interventions; intervention implementation; distal influences; policies and their implementation;

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investigative tools; and historic cases. It offers 71 analytical and engaging chapters, each representing a session of teaching or graduate seminar.

Written by a team of expert authors from around the world, many of whom are actively teaching the subject, the book provides a thorough and balanced overview of current knowledge, issues and relevant debates, integrating information from the environmental, health and social sciences.

Integrated Approaches to Sustainable Watershed Management in Xeric Environments: A Training Manual provides the reader with the tools they need to understand an integrated approach to watershed management. The book presents a conceptual framework of water management based on the authors' vast experience.

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Topics covered include a scientific background of watershed management and the integration of geohydraulic and socioeconomic factors. Key points are further enhanced with case studies, problem sets, Bayesian Networks and quizzes to educate watershed managers, industry professionals and agencies. Authored by a team of leaders in the field who are responsible for groundbreaking research in the area, this book draws on their experience synthesizing scientific, practical, on the ground expertise. This is an essential tool for researchers and professionals in environmental, water or natural resource management. Presents an integrated approach—combining different sciences—that allows for the improved design of watersheds through the integration of biophysical,

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*land use and socioeconomic analyses
Contains activities for self-evaluation
Includes case studies drawing from
field experiences, giving the reader
deeper insights into challenges faced,
practical problems and solutions
Water harvesting is gaining more and
more recognition as the sustainable
and resilient alternative to other water
supply options. It is economically
viable, socially compatible and
environmentally friendly. Water
harvesting has proven to be a robust
solution to overcome or reduce water
shortages all over the world. To apply
this in a sustainable and effective way,
it is important to understand exactly
where it can be applied to make full
use of its potential. The Handbook of
Water Harvesting and Conservation:
Case Studies and Application
Examples is the most comprehensive,*

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up-to-date and applied casebook on water harvesting and conservation yet published. The editors bring together the many perspectives into a synthesis that is both academically-based and practical in its potential applications. The Handbook of Water Harvesting and Conservation: Case Studies and Application Examples will be an important tool for education, research and technical works in the soil, water and watershed management area, and will be highly useful for drought strategy planning, flood management and adaptation to climate change in all urban, agricultural, forest, rangeland areas.

Handbook of Water Sensitive Planning and Design

Handbook of Land and Water Grabs in Africa

Routledge Handbook of the Resource

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*The Oxford Handbook of Water Politics
and Policy*

Flows and Practices

*Revisiting Integrated Water Resources
Management*

This open access textbook provides a concise introduction to economic approaches and mathematical methods for the study of water allocation and distribution problems.

Written in an accessible and straightforward style, it discusses and analyzes central issues in integrated water resource management, water tariffs, water markets, and transboundary water management. By illustrating the interplay

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between the hydrological cycle and the rules and institutions that govern today's water allocation policies, the authors develop a modern perspective on water management. Moreover, the book presents an in-depth assessment of the political and ethical dimensions of water management and its institutional embeddedness, by discussing distribution issues and issues of the enforceability of human rights in managing water resources. Given its scope, the book will appeal to advanced undergraduate and graduate students of economics and engineering,

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as well as practitioners in the water sector, seeking a deeper understanding of economic approaches to the study of water management. This volume presents a selection of the main contributions made to the international conference on Integrated Water Resources Management (IWRM) entitled 'Management of Water in a Changing World: Lessons Learnt and Innovative Perspectives' that was held from 12 to 13 October 2011 in Dresden, Germany. The book summarise the main messages issuing from the conference and contains selected papers which were presented during the

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conference, either as keynote lectures in plenary sessions or as submitted papers in one of the thematic sessions. The key themes of the book are: Water resources in changing environments Groundwater management Technologies and implementation Water management indicators at different scales Information and decision support systems Water governance: actors and institutions The book provides an overview on important issues concerning the conceptual framework of integrated water resources management (IWRM). All presentations and abstracts and the corresponding

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PowerPoint presentations as well as a video recording of the panel discussion are available at the conference website

<http://www.bmbf.iwrm2011.de>;

Readers are encouraged to complete their review of the conference and its messages by consulting this interesting on-line source of accompanying scientific material.

Water plays a key role in addressing the most pressing global challenges of our time, including climate change adaptation, food and energy security, environmental sustainability and the promotion of peace and stability. This

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comprehensive handbook explores the pivotal place of law and policy in efforts to ensure that water enables positive responses to these challenges and provides a basis for sound governance. The book reveals that significant progress has been made in recent decades to strengthen the governance of water resource management at different scales, including helping to address international and sub-national conflicts over transboundary water resources. It demonstrates that 'effective' laws and policies are fundamental drivers for the safe, equitable and sustainable

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utilization of water.

However, it is also shown that what might constitute an effective law or policy related to water resources management is still hotly debated. As such, the handbook provides an important and definitive reference text for all studying water governance and management.

According to estimates by the International Land Coalition based at the International Fund for Agricultural Development (IFAD), 57 million hectares of land have been leased to foreign investors since 2007. Current research has focused on human rights

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issues related to inward investment in land but has been ignorant of water resource issues and the challenges of managing scarce water. This handbook will be the first to address inward investment in land and its impact on water resources in Africa. The geographical scope of this book will be the African continent, where land has attracted the attention of risk-taking investors because much land is under-utilised marginalized land, with associated water resources and rapidly growing domestic food markets. The successful implementation of investment

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strategies in African agriculture could determine the future of more than one billion people. An important factor to note is that sub-Saharan Africa will, of all the continents, be hit hardest by climate change, population growth and food insecurity. Sensible investment in agriculture is therefore needed, however, at what costs and at whose expense? The book will also address the livelihoods theme and provide a holistic analysis of land and water grabbing in sub-Saharan Africa. Four other themes will be addressed: politics, economics, the environment and the history of land

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investments in sub-Saharan Africa. The editors have involved a highly diverse group of expert researchers, who will review the pro- and anti-investment arguments, geopolitics, the role of capitalist investors, the environmental contexts and the political implications of, and reasons for, leasing millions of hectares in sub-Saharan Africa. To date, there has been no attempt to review land investments through a suite of different lenses, thus this handbook will differ significantly from existing research and publication. The editors are Tony Allan, (Professor Emeritus, Department of

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Geography, School of
Oriental and African Studies
and King's College London);
Jeroen Warner (Assistant
Professor, Disaster Studies,
University of Wageningen);
Suvi Sojamo (PhD Researcher,
Water and Development
Research Group, Aalto
University); and Martin
Keulertz (PhD Researcher,
Department of Geography,
London Water Group, King's
College London).

Integrating Water Resources
Management

A Training Manual

Handbook for Developing
Watershed Plans to Restore
and Protect Our Waters
Integrated Approaches to
Sustainable Watershed

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Management in Xeric

Environments

a training manual

The Adaptive Water Resource

Management Handbook

The main focus of this book is sustainable management of water resources in a changing climate. The book also addresses the question of how to define and measure the sustainability of Integrated Water Resources Management (IWRM). The sustainability of IWRM is an important issue when planning and/or developing policies that consider the impact of climate change, water governance and ecohydrology in the context of a more holistic approach to ensure sustainable management of water resources. Sustainable IWRM is more about processes, and relatively little

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systematic or rigorous work has been done to articulate what components are the most essential to ensure the ongoing sustainability of IWRM efforts. The chapters cover topics including global prospective of IWRM; allocation of environmental flows in IWRM; echohydrology, water resources and environmental sustainability; climate change and IWRM; IWRM and water governance including social, economic, public health and cultural aspects; climate change resiliency actions related to water resources management sustainability and tools in support of sustainability for IWRM. This book will be of interest to researchers, practitioners, water resources managers, policy and decision makers, donors, international institutions, governmental and non-governmental

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organizations, educators, as well as graduate and undergraduate students. It is a useful reference for Integrated Water Resources Management (IWRM), ecohydrology, climate change impact and adaptations, water governance, environmental flows, geographic information system and modeling tools, water and energy nexus and related topics.

This volume includes over 30 chapters, written by experts from around the world. It examines the environmental aspects of drought such as groundwater and soil contamination, river low-flow, urban water quality, and desertification. It also examines the effects of climate change and variability on drought, and discusses the differences in groundwater, rainfall, and

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temperatures and their related effects. It presents analytical modeling for better understanding drought in uncertain and changing climates.

This book reviews the concept, contemporary research efforts and the implementation of Integrated Water Resources Management (IWRM). The IWRM concept was established as an international guiding water management paradigm in the early 1990ies and has become a vital approach to solving the problems associated with the topic of water. The book summarizes fourteen comprehensive IWRM research projects with worldwide coverage and analyses their motivations, settings, approaches and implementation of results. Aiming to be an up-to-date

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interdisciplinary scientific reference, this book provides a comprehensive theoretical and empirical analysis of contemporary IWRM research, examples of science based implementations and a synthesis of the lessons learnt. It concludes with some major future challenges, the solving of which will further strengthen the IWRM concept.

This book is open access under a CC BY-NC 4.0 license. This revised, updated textbook presents a systems approach to the planning, management, and operation of water resources infrastructure in the environment. Previously published in 2005 by UNESCO and Deltares (Delft Hydraulics at the time), this new edition, written again with contributions from Jery R. Stedinger, Jozef P. M. Dijkman, and Monique T.

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Villars, is aimed equally at students and professionals. It introduces readers to the concept of viewing issues involving water resources as a system of multiple interacting components and scales. It offers guidelines for initiating and carrying out water resource system planning and management projects. It introduces alternative optimization, simulation, and statistical methods useful for project identification, design, siting, operation and evaluation and for studying post-planning issues. The authors cover both basin-wide and urban water issues and present ways of identifying and evaluating alternatives for addressing multiple-purpose and multi-objective water quantity and quality management challenges. Reinforced with cases

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studies, exercises, and media supplements throughout, the text is ideal for upper-level undergraduate and graduate courses in water resource planning and management as well as for practicing planners and engineers in the field.

Routledge Handbook of Water Law and Policy

Water and Sanitation Services

Water Resource Systems Planning and Management

Water Governance, Climate and Ecohydrology

Statistical Methods in Water Resources

Integrated Water Management in Canada

The book provides an overview of climate change-sensitive water resources management with consideration of adaptation approaches, the assessment of

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climate change impacts, current contemporary management techniques, and ecological responses. Comprehensive assessments and studies from eight countries using innovative approaches that aid water management under evolving climates are documented. Topics ranging from hydrologic design to management and policy responses to climate change are discussed, which demonstrate updated theories that highlight methods, tools, and experiences on the topic of water resources under climate change. The generic approaches discussed, and their applications to different climate change-related problems, make this book appealing to a global readership. The practical and applied methodologies presented in the book and through insightful case studies discussed will provide readers worldwide with ready-to-use information to manage water resources sustainably under evolving climate. This book is ideally suited

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for water resource managers, scientists, professionals from water management agencies, graduate students, and national laboratory agencies responsible for water and environmental management.

The Handbook for Integrated Water Resources Management in Transboundary Basins of Rivers, Lakes and Aquifers
Integrated Water Resources Management: Concept, Research and Implementation
Springer

While the world's population continues to grow, the availability of water remains constant. Facing the looming water crisis, society needs to tackle strategic management issues as an integrated part of the solution toward water sustainability. The first volume in the two-volume set Sustainable Water Management and Technologies offers readers a practical and comprehensive look at such key water management topics as water resource planning and governance,

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water infrastructure planning and adaption, proper regulations, and water scarcity and inequality. It discusses best management practices for water resource allocation, ground water protection, and water quality assurance, especially for rural, arid, and underdeveloped regions of the world.

Timely topics such as drought, ecosystem sustainability, climate change, and water management for shale oil and gas development are presented. Discusses best practices for water resource allocation, ground water protection, and water quality assurance. Offers chapters on urban, rural, arid, and underdeveloped regions of the world. Describes timely topics such as drought, ecosystem sustainability, climate change, and water management for shale oil and gas development. Covers water resource planning and governance, water infrastructure planning and adaptation, proper regulations, and water scarcity and

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inequality Discusses water resource monitoring, efficiency, and quality management.

The book includes seventeen excellent researched and documented papers that reflect the diversity of thought, ideas and experiences related to IWRM. They draw from an extensive, inclusive and geographically representative range of theoretical propositions and practical examples. These include the implementation status of the IWRM concept at local, basin, regional and national levels; its appropriateness for the twenty-first century; main implementation gaps from the institutional, legal, policy, governance, management and technical viewpoints; the likelihood that IWRM's entrenchment in laws, regulations and policies has led to smoother implementation and the reasons why that has been the case; reflexions on whether the attention given to IWRM is

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pushing other alternatives to the policy periphery; and the new conceptual constructions that can be put forward for discussion in the international arena. For the development and water communities it is imperative to debate and reach towards more illustrative conclusions regarding whether the promotion of the IWRM concept and its actual implementation status have been beneficial for development and how the notion could evolve to achieve this end. In-depth objective and constructive discussions, arguments, proposals and ideas are put forward for analysis by all interested parties. The book has the objective of fostering scholarly exchange, encouraging intellectual debate and promoting the advancement of knowledge and understanding of IWRM as a concept, as a goal per se and as a strategy towards development goals. This book was published as a special issue of the International

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Journal of Water Resources Development.

Sustainable Water Resources Management

The Economics of Water

Climate Change and Water Resources

The Politics of Integrated Water Resources

Management in Eastern and Southern

Africa

From Concept to Implementation

Catalyzing Change

The book includes seventeen excellent researched and documented papers that reflect the diversity of thought, ideas and experiences related to IWRM. They draw from an extensive, inclusive and geographically representative range of theoretical propositions and practical examples. These include the implementation status of the IWRM concept at local, basin, regional and national levels; its appropriateness for the twenty-first

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Water is an increasingly critical issue at the forefront of global policy change, management and planning. There are growing

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concerns about water as a renewable resource, its availability for a wide range of users, aquatic ecosystem health, and global issues relating to climate change, water security, water trading and water ethics. This handbook provides the most comprehensive reference ever published on water resource issues. It brings together multiple disciplines to understand and help resolve problems of water quality and scarcity from a global perspective. Its case studies and 'foundation' chapters will be greatly valued by students, researchers and professionals involved in water resources, hydrology, governance and public policy, law, economics, geography and environmental studies.

Completely up-to-date coverage of

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water treatment facility design and operation This Second Edition of Susumu Kawamura's landmark volume offers comprehensive coverage of water treatment facility design, from the basic principles to the latest innovations. It covers a broad spectrum of water treatment process designs in detail and offers clear guidelines on how to choose the unit, process, and equipment that will maximize overall efficiency and minimize maintenance costs. This book also explores many important operational issues that affect today's plant operators and facility designers. This new edition introduces several new subjects, including value engineering, watershed management, dissolved air flotation process, filtered

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reservoir (clearwell) design, and electrical system design. It provides expanded and updated coverage of objectives for finished water quality, instrumentation and control, disinfection process, ozonation, disinfection by-product control, the GAC process, and the membrane filtration process. Other important features of this Second Edition include: * Practical guidance on the design of every water treatment plant component * New information on plant layout, cost estimation, sedimentation issues, and more * English and SI units throughout * Help in designing for compliance with water treatment-related government regulations Supplemented with hundreds of illustrations, charts, and

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tables, Integrated Design and Operation of Water Treatment Facilities, Second Edition is an indispensable, hands-on resource for civil engineers and managers, whether working on new facilities or redesigning and rebuilding existing facilities.

Growing scarcity of freshwater worldwide brings to light the need for sound water resource modeling and policy analysis. While a solid foundation has been established for many specific water management problems, combining those methods and principles in a unified framework remains an ongoing challenge. This Handbook aims to expand the scope of efficient water use to include allocation of sources and quantities across uses and time, as well as integrating demand-

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management with supply-side substitutes. Socially efficient water use does not generally coincide with private decisions in the real world, however. Examples of mechanisms designed to incentivize efficient behavior are drawn from agricultural water use, municipal water regulation, and externalities linked to water resources. Water management is further complicated when information is costly and/or imperfect. Standard optimization frameworks are extended to allow for coordination costs, games and cooperation, and risk allocation. When operating efficiently, water markets are often viewed as a desirable means of allocation because a market price incentivizes users to move resources from low

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to high value activities. However, early attempts at water trading have run into many obstacles. Case studies from the United States, Australia, Europe, and Canada highlight the successes and remaining challenges of establishing efficient water markets. Environmental Impacts and Analysis of Drought and Water Scarcity Handbook of Water Harvesting and Conservation From concept to implementation Integrated Water Resources Management: Concept, Research and Implementation Handbook of Water Use and Conservation Handbook of Catchment Management

This volume provides readers

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with an opportunity to learn from front line water managers of watershed-based agencies across Canada about integrated water management (or integrated water resource management). In common with practice in much of the world, the responsibility for implementing integrated watershed management in Canada is fragmented. Each province and territory in Canada has developed unique approaches or governance models to guide decision making in that regard. Thus, this edited volume enables readers from around the world to gain insight on the best practices in Canada for

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achieving success and addressing barriers to implement IWM. Although there remains non consensus about how to "best" approach river basin management, some of the main observations include: There is a need to balance a focus on "the big picture", with scoping the scale and scope of planning activities in order that feasible and effective solutions can be implemented Three types of integration are popular among the agencies included in the book: (i) among environment, economy and society, (ii) interactions between people and the environment and (iii) integration (or

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coordination) of administrative activities. Much more attention is required to achieving effective engagement from Indigenous communities The chapters were originally published in a special issue of the International Journal of Water Resources Development.

This book provides an overview of facts, theories and methods from hydrology, geology, geophysics, law, ethics, economics, ecology, engineering, sociology, diplomacy and many other disciplines with relevance for concepts and practice of water resources management. It provides comprehensive,

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but also critical reading material for all communities involved in the ongoing water discourses and debates. The book refers to case studies in the form of boxes, sections, or as entire chapters. They illustrate success stories, but also lessons to be remembered, to avoid repeating the same mistakes. Based on consolidated state-of-the-art knowledge, it has been conceived and written to attract a multidisciplinary audience. The aim of this handbook is to facilitate understanding between the participants of the international water discourse and multi-level

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decision making processes. Knowing more about water, but also about concepts, methods and aspirations of different professional, disciplinary communities and stakeholders professionalizes the debate and enhances the decision making.

This book is divided into four parts. The first part, Preliminaries, begins by introducing the basic theme of the book. It provides an overview of the current status of water resources utilization, the likely scenario of future demands, and advantages and disadvantages of systems techniques. An understanding

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of how the hydrological data are measured and processed is important before undertaking any analysis. The discussion is extended to emerging techniques, such as Remote Sensing, GIS, Artificial Neural Networks, and Expert Systems. The statistical tools for data analysis including commonly used probability distributions, parameter estimation, regression and correlation, frequency analysis, and time-series analysis are discussed in a separate chapter. Part 2 Decision Making, is a bouquet of techniques organized in 4 chapters. After discussing

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optimization and simulation, the techniques of economic analysis are covered. Recently, environmental and social aspects, and rehabilitation and resettlement of project-affected people have come to occupy a central stage in water resources management and any good book is incomplete unless these topics are adequately covered. The concept of rational decision making along with risk, reliability, and uncertainty aspects form subject matter of a chapter. With these analytical tools, the practitioner is well equipped to take a rational

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decision for water resources utilization. Part 3 deals with Water Resources Planning and Development. This part discusses the concepts of planning, the planning process, integrated planning, public involvement, and reservoir sizing. The last part focuses on Systems Operation and Management. After a resource is developed, it is essential to manage it in the best possible way. Many dams around the world are losing some storage capacity every year due to sedimentation and therefore, the assessment and management of reservoir sedimentation is described

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in details. No analysis of water resources systems is complete without consideration of water quality. A river basin is the natural unit in which water occurs. The final chapter discusses various issues related to holistic management of a river basin. 'I am most impressed by the range and profile of the topics and contributors. There is a growing awareness that solving water and sanitation problems involves more than pipes and valves - human behaviour and institutions are important components of the package'.
Sandy Cairncross London
School of Hygiene and

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Tropical Medicine UK 'This book will be very timely ... The emphasis of the book is absolutely correct linking the technologies to the sociocultural political economic and planning aspects of water and sanitation services'. Duncan Mara University of Leeds UK Substantially reducing the number.

Case Studies and Application
Examples

A Handbook for Developing
Integrated Water Resources
Management (IWRM) and Water
Efficiency Strategies
Handbook of Drought and
Water Scarcity
Integrated Water Resources
Management

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The Experience of Watershed
Agencies

Integrated Water Resources
Management in a Changing
World

This work provides those
involved in water
purification research and
administration with a
comprehensive resource of
methods for analyzing water
to assure its safety from
contaminants, both natural
and human caused. The book
first provides an overview
of major water-related
issues in developing and
developed countries,
followed by a review of
issues of sampling for water
analysis, regulatory
considerations and forensics

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in water quality and purity investigations. The subsequent chapters cover microbial as well chemical contaminations from inorganic compounds, radionuclides, volatile and semi-volatile compounds, disinfectants, herbicides, and pharmaceuticals, including endocrine disruptors, as well as potential terrorist-related contamination. The last chapter describes the Grainger prize-winning filter that can remove arsenic from water sources and sufficiently protect the health of a large number of people. - Covers the scope of water contamination

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problems on a worldwide scale - Provides a rich source of methods for analyzing water to assure its safety from natural and deliberate contaminants - Describes the filter that won the \$1 million Grainger prize and thereby highlighting an important approach to remediation

Covering the various aspects of water and climate change, *Climate Change and Water Resources* presents the principles of climate change science and its effects on earth's water supply. Utilizing the knowledge and expertise from well-known experts in the field, the text provides a broad

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outline of the many interrelated aspects of climate variations, 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. Provides estimated water savings, benefits and costs for measures. Includes tables, charts, photos, eight appendices, glossary, and index.

Public Policy and Management
Water Resources Systems
Planning and Management
Handbook of Water Purity and
Quality

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Rules and Institutions

Lessons Learnt and

Innovative Perspectives

Integrated Design and

Operation of Water Treatment

Facilities

The complexity of current water resource management poses many challenges. Water managers need to solve a range of interrelated water dilemmas, such as balancing water quantity and quality, flooding, drought, maintaining biodiversity and ecological functions and services, in a context where human beliefs, actions and values play a central role. Furthermore, the growing uncertainties of global climate change and the long term

implications of management actions make the problems even more difficult. This book, based on extensive collaborative research from the NeWater (New Approaches to Adaptive Water Management Under Uncertainty) project, explains the benefits, outcomes and lessons learned from adaptive water management (AWM). In essence AWM is a way of responding to uncertainty by designing policy measures which are provisional and incremental, subject to subsequent modification in response to environmental change and other variables. The book consists of 13 chapters, of which the first and last ones

summarise the main points made in favour of adaptive management. The first part provides an overview of the major challenges faced as a result of pressures such as climate change and demographic development. It also describes how these challenges have been dealt with in the past and why past practices are inadequate for the future. From this background, the concepts of Integrated Water Resource Management (IWRM) and AWM are explained, along with their theoretical origins and practical implementation. The second part describes water management tools and instruments and their

use in AWM. The last and largest part of the book consists of a description of cases and lessons learned in seven river basins from across Europe, West Asia and Africa: the Elbe, Rhine, Guadiana, Tisza, Orange, Nile and Amudarya. These illustrate the key challenges of adaptive water management, especially when rivers cross national boundaries, creating additional problems of governance.

This book investigates IWRM in the four selected t

HANDBOOK OF CATCHMENT MANAGEMENT In 2010, the first edition of the Handbook of Catchment Management provided a benchmark on how

our understanding and actions in water management within a catchment context had evolved in recent decades. Over ten years on, the catchment management concept is entering a new phase of development aligned to contemporary and future challenges. These include climate change uncertainty, further understanding in ecological functioning under change, the drive for a low-carbon, energy efficient and circular society, multiple uses of water, the emergence of new pollutants of concern, new approaches to valuation, finance and pricing mechanisms, stewardship and community

engagement, the integration of water across the Sustainable Development Goals (SDG) and the link between water, energy and food. These developments are framed within an increasingly data rich world where new analytics, sensor technology and processing power are informing increasingly real-time decision making. The challenge is also to increase cross-compliance and policy integration to meet multiple stakeholder objectives, and to link actions to achieve cost-effective outcomes. In addition, there are a number of new and exciting city, region and basin-scale real-world examples of contemporary and new

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catchment thinking; integrating science, technology, knowledge and governance to address multiple drivers and complex problems from across the globe. The time is now right, to capture the new challenges facing catchment management and water resources management globally. This revised and updated edition of the Handbook of Catchment Management features: Thoroughly rewritten chapters which provide an up-to-date view of catchment management issues and contexts New case study material highlighting multi-sectoral management in different globally significant basins and

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In recent years the concept of the resource "nexus" has been both hotly debated and widely adopted in research and policy circles. It is a powerful new way to understand and better govern the myriad complex relationships between multiple resources, actors and their security concerns. Particular attention has been paid to water, energy and food interactions, but land and materials emerge as critical

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too. This comprehensive handbook presents a detailed review of current knowledge about resource nexus-related frameworks, methods and governance, including a broad set of inter-disciplinary perspectives. Written by an international group of scholars and practitioners, the volume focuses on rigorous research, including tools, methods and modelling approaches to analyse resource use patterns across societies and scales from a "nexus perspective". It also provides numerous examples from political economy to demonstrate how resource

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nexus frameworks can illuminate issues such as land grabs, mining, renewable energy and the growing importance of economies such as China, as well as to propose lessons and outlooks for sound governance. The volume seeks to serve as an essential reference text, source book and state-of-the-art, science-based assessment of this increasingly important topic – the resource nexus – and its utility in efforts to enhance sustainability of many kinds and implement the United Nations Sustainable Development Goals in an era of environmental and geopolitical change.

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