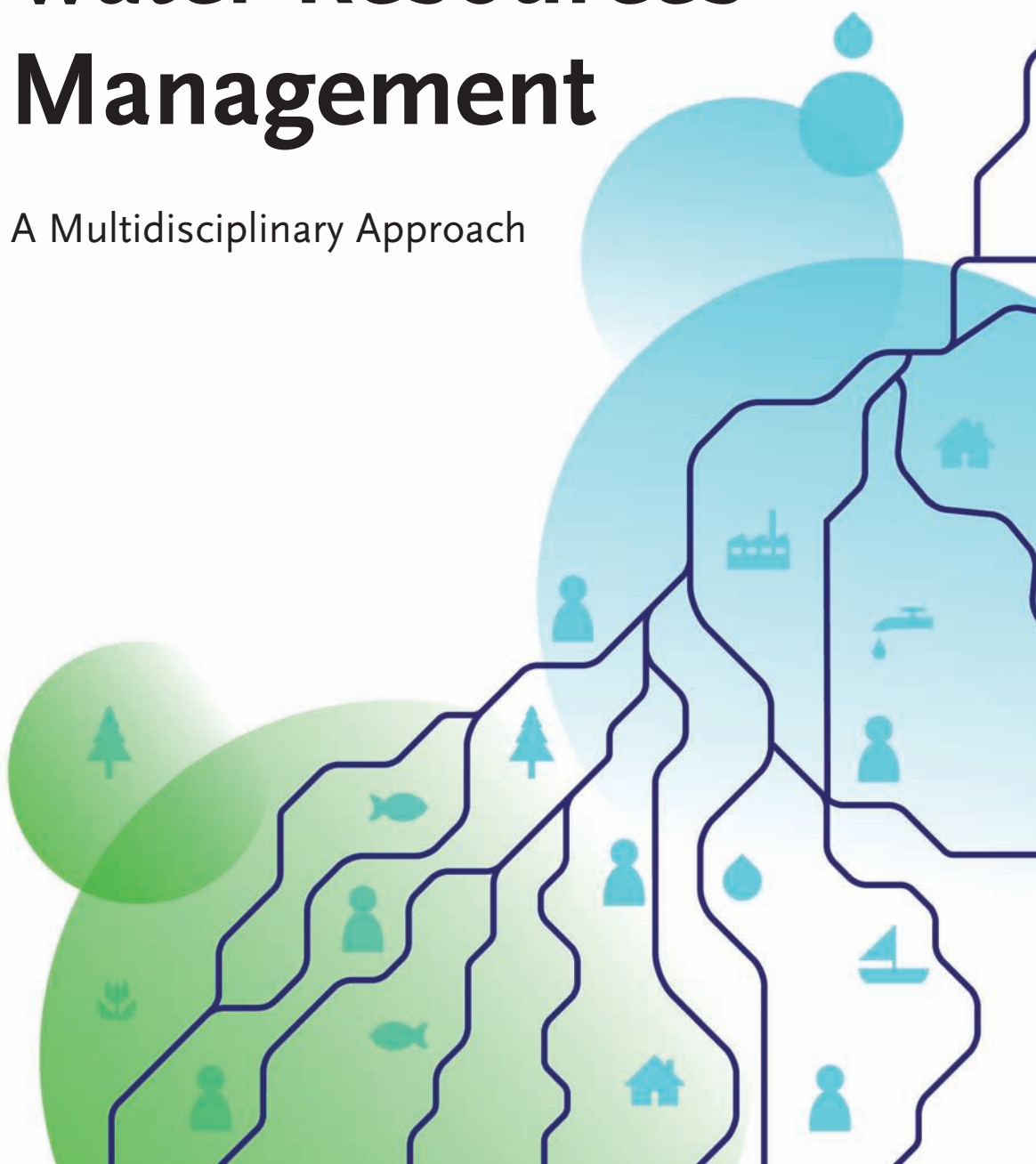


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Alice Aureli and Jean Fried

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A Multidisciplinary Approach



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Foreword: Transboundary Water Management A Multidisciplinary Approach

For centuries, political and strategic considerations have been *the* major drivers behind the delineation of boundaries across the globe. Mountains, rivers, lakes and entire ecosystems (not to mention human settlements) have been assigned to the jurisdiction of different states, provinces and other administrative entities with little regard to their environmental cycles or effective management. Yet natural resources, and freshwater in particular, know no man-made boundaries, and indeed require internationally coordinated actions to be sustainably and effectively managed. It is only in recent years that transboundary waters, both surface and groundwater, have taken centre stage in international dialogue, as issues of water and food security force policy makers to take a more holistic view. Climate and global change are rapidly placing added pressures on the world's water reserves and the time has come to strengthen cooperation and build peace amongst states.

UNESCO's mission to 'contribute to the building of peace, eradication of poverty, sustainable development and intercultural dialogue through education, the sciences, culture, communication and information' is achieved fully through its international water initiatives coordinated by the UNESCO International Hydrological Programme (IHP). UNESCO-IHP, established in 1975, is the only global scientific intergovernmental programme of the UN system devoted entirely to water resources, emphasizing the formulation of policy-relevant strategies for their sustainable management. Through its ISARM (Internationally Shared Aquifer Resources Management) and PCCP (From Potential Conflict to Cooperation Potential) programmes, UNESCO provides Member States with high level expertise and knowledge and assists them in the elaboration of policies for the sustainable management of transboundary waters.

Transboundary Water Management, edited by J. Ganoulis, A. Aureli and J. Fried, is the result of several years' of research in the field of international water resources. The UNESCO Chair that coordinates the International Network of Water-Environment Centres for the Balkans played an important role in organizing both the compilation of existing knowledge and the elaboration of sound policy recommendations. It is with great pleasure, therefore, that I welcome the publication of this title and commend it to Member States. A multidisciplinary approach to the

management of shared natural resources is indeed paramount to finding solutions to multi-faceted challenges and I trust that future water managers, policy-makers and academics will find pleasure in reading this publication as well as benefit from its findings.

Gretchen Kalonji
UNESCO Assistant Director-General
for Natural Sciences

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Preface

This book uses the term ‘transboundary waters’, as in Transboundary Waters Resources Management (TWRM), to mean waters crossing the borders of different riparian countries, which therefore are by definition countries sharing common surface and/or groundwater resources. The term is synonymous with ‘internationally shared waters’ and is in accordance with the terminology used by UNESCO in its international hydrological initiatives, such as the UNESCO/ISARM (Internationally Shared-Transboundary-Aquifer Resources Management) and the UNESCO/PC-CP (Potential Conflict-Cooperation Potential) programmes. It is considered to be a better choice than other similar expressions such as ‘international waters’, ‘multinational waters’ or ‘regional waters’, and avoids misunderstandings due to political sensitivities over national sovereignty in regions located near the borders.

‘Boundaries’ may also exist with different connotations between administrative regions or between cultural or ethnic entities located within the same country. In these cases both surface waters (rivers and lakes) and groundwaters (aquifers) may involve different administrations or various communities and their shared management should aim to resolve issues of potential regional or local conflicts in terms of water needs, water quality, environmental preservation or differences in legislation and economic issues. When the boundary is international and waters cross the borders of different riparian countries, then TWRM faces the major challenge of potential political conflicts and even war. The main issue in this case is how to convert these potential conflicts into collaborative actions. Such global TWRM challenges and general tools with which they may be addressed are explained in *Part I: A Global View*.

The book aims to serve as a practical guide for enhancing models of collaborative activities between riparian countries. In this context ‘collaboration’ means the active involvement of partners and institutions from both sides of the border, which includes exchange of information, interaction and dialogue between partners, in order to reach common decisions and find unified solutions to TWRM problems. In this sense, ‘collaboration’ is considered to be a more advanced stage of ‘cooperation’ or ‘coordination’. The first step in cooperation can be achieved by a simple exchange of information with no further interaction between partners; this may be called ‘passive cooperation’. A more advanced second step is engaging in dialogue and

developing a consultation process; this may be called 'coordinated cooperation' and is a prerequisite condition for the third step, which is 'active collaboration'. Only with active and effective collaboration can sustainable governance of transboundary water resources be achieved.

Since there is no single universal model for a collaborative approach to TWRM, this book presents an analysis of various effective models illustrated by case studies from around the world. Even though case studies are particular and not easily transferred to different situations, they are very helpful in showing relationships between different more or less independent variables, such as physical, hydrologic, hydrogeological, ecological, socio-economic conditions, institutional structures, stakeholders participation, legal agreements and political willingness. The main dependent variable that emerges from this process is the need for active collaboration and effective governance in TWRM.

Models of collaborative actions in TWRM depend on the approach used, for example, whether the model is developed by a particular scientific discipline, by a professional community or by different kinds of scientists.

For engineers, hydrologists, hydrogeologists or environmental professionals emphasis is placed on modelling the physical and ecological transboundary hydro-systems in terms of (i) delineating their natural borders (hydrologic basins for transboundary rivers and lakes or hydrogeological boundaries for groundwater aquifers), (ii) analysing relationships between physical and ecological variables such as precipitation, river flow, pollutant inputs, lake water quality, biodiversity or groundwater recharge and (iii) suggesting structural or non-structural measures in order to obtain solutions and improve TWRM. These models, conceptual or mathematical, are more or less accurate subject to data availability and precision and various assumptions and simplifications in modelling. They are useful for understanding how the physical and ecological transboundary systems behave under natural and anthropogenic inputs in terms of water quantity and environmental impacts. These kinds of models for transboundary aquifers, lakes and rivers are presented in *Part II: Physical, Environmental and Technical Approaches*.

For lawyers and social scientists (geographers, economists, sociologists) emphasis is placed on human factors, which can be very complex and difficult to analyse or predict, such as institutional cooperation, stakeholder participation and negotiation strategies. For lawyers the emphasis is on regulating provisions and duties of riparian countries in terms of access, utilization, protection, preservation and management of transboundary waters. The codification of such legal rules is very useful to the international community, even though this process may be somewhat general and unable to cover all specific cases. The main challenge is whether different national administrations will agree to implement international rules at the national level and at the same time coordinate their activities with riparian countries through bilateral or regional collaborative agreements. This challenge may be faced by raising public and stakeholders' awareness in participatory processes involving national institutions, academic partners and international organizations. All these approaches are presented in *Part III: Legal, Socio-Economic and Institutional Approaches*.

In the real world all the above issues and approaches coexist and are interrelated. To achieve effective TWRM these models, whether descriptive or prescriptive, should merge. In Chapter 8 of *Part IV: Bridging the Gaps*, two main strategies for achieving such integration are presented: (i) through effective capacity building and training in TWRM and (ii) by analysing a general framework of conflict resolution, based on how riparian countries may share benefits and risks. Both these strategies are supported by UNESCO's ISARM and PC-CP programmes.

The main contents of the book are based on updated papers first presented at the 'IV International Symposium on Transboundary Water Management', Thessaloniki, Greece, October 2008. Recommendations of this Conference on how to bridge the gaps are summarized in the 'Thessaloniki Statement', which is reported in Chapter 9 of *Part IV*.

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