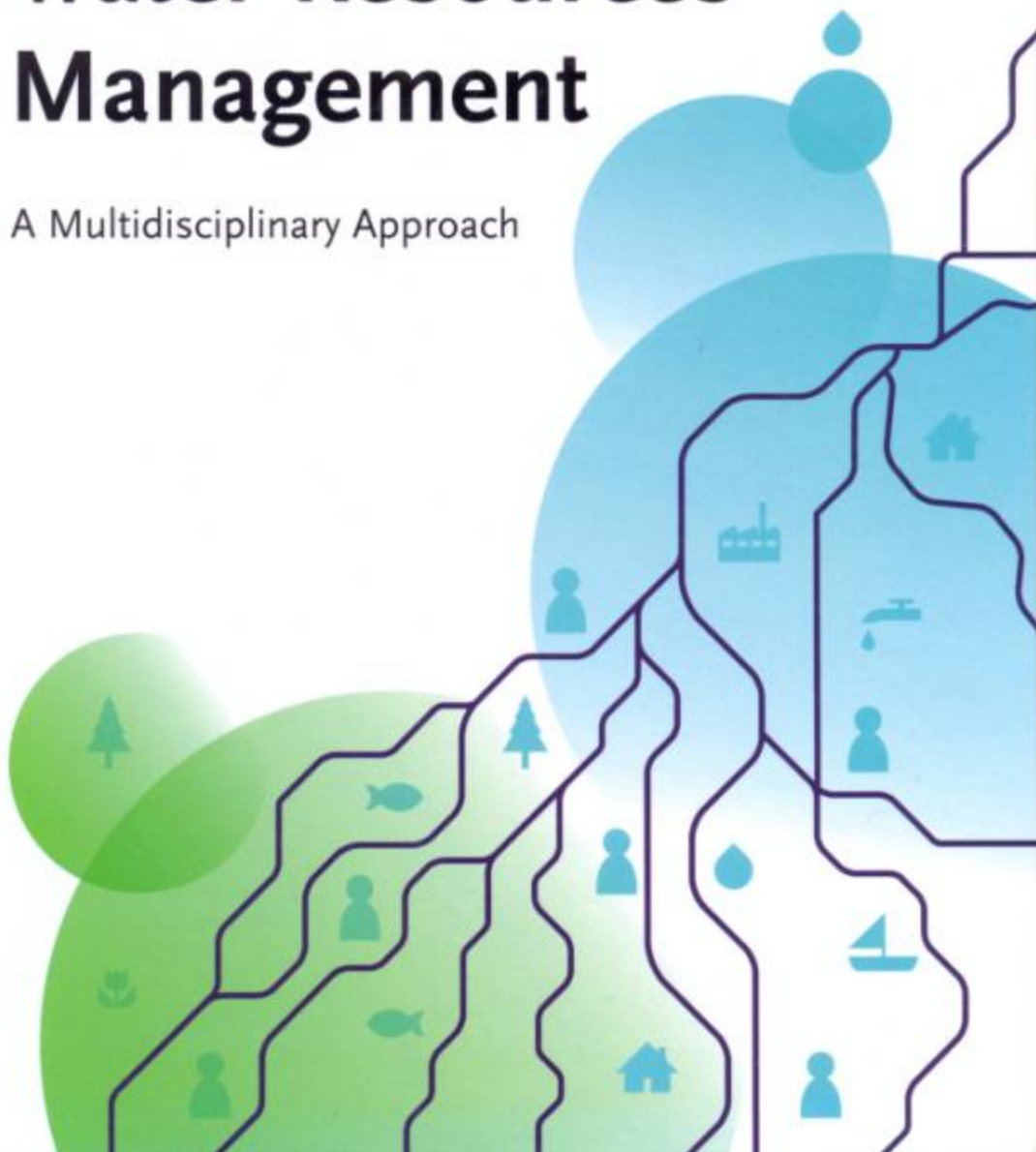


Edited by Jacques Ganoulis,
Alice Aureli and Jean Fried

 WILEY-VCH

Transboundary Water Resources Management

A Multidisciplinary Approach



Related Titles

Gupta, S. K.

Modern Hydrology and Sustainable Water Development

2011

ISBN: 978-1-4051-7124-3

Fung, F., Lopez, A., New, M. (eds.)

Modelling the Impact of Climate Change on Water Resources

2011

ISBN: 978-1-4051-9671-0

Sipes, J. L.

Sustainable Solutions for Water Resources

Policies, Planning, Design, and Implementation

2010

ISBN: 978-0-470-52962-1

Moksness, E., Dahl, E., Støttrup, J. G.

Integrated Coastal Zone Management

2009

ISBN: 978-1-4051-3950-2

Heathcote, I. W.

Integrated Coastal Zone Management

Principles and Practice

2009

ISBN: 978-0-470-37625-6

Hoekstra, A. Y., Chapagain, A. K.

Globalization of Water

Sharing the Planet's Freshwater Resources

2007

ISBN: 978-1-4051-6335-4

*Edited by
Jacques Ganoulis, Alice Aureli, and Jean Fried*

Transboundary Water Resources Management

A Multidisciplinary Approach



**WILEY-
VCH**

WILEY-VCH Verlag GmbH & Co. KGaA

The Editors

Prof. Dr. Jacques Ganoulis

UNESCO Chair and Network INWEB
Aristotle University of Thessaloniki
Department of Civil Engineering
Division of Hydraulics and Environmental
Engineering
54124 Thessaloniki
Greece

Dr. Alice Aureli

UNESCO
International Hydrological Programme
1, rue Miollis
75732 Paris
France

Prof. Dr. Jean Fried

University of California Irvine
School of Social Ecology
Irvine, CA 92697-7050
USA

All books published by Wiley-VCH are carefully produced. Nevertheless, authors, editors, and publisher do not warrant the information contained in these books, including this book, to be free of errors. Readers are advised to keep in mind that statements, data, illustrations, procedural details or other items may inadvertently be inaccurate.

Library of Congress Card No.: applied for

British Library Cataloguing-in-Publication Data

A catalogue record for this book is available from the British Library.

Bibliographic information published by the Deutsche Nationalbibliothek

The Deutsche Nationalbibliothek lists this publication in the Deutsche Nationalbibliografie; detailed bibliographic data are available on the Internet at <http://dnb.d-nb.de>.

© 2011 Wiley-VCH Verlag & Co. KGaA,
Boschstr. 12, 69469 Weinheim, Germany

All rights reserved (including those of translation into other languages). No part of this book may be reproduced in any form – by photoprinting, microfilm, or any other means – nor transmitted or translated into a machine language without written permission from the publishers. Registered names, trademarks, etc. used in this book, even when not specifically marked as such, are not to be considered unprotected by law.

Cover Design Adam Design, Weinheim

Typesetting Thomson Digital, Noida, India

Printing and Binding Fabulous Printers Pte Ltd

Printed in Singapore

Printed on acid-free paper

Print ISBN: 978-3-527-33014-0

ePDF ISBN: 978-3-527-63667-9

ePub ISBN: 978-3-527-63666-2

mobi ISBN: 978-3-527-63668-6

oBook ISBN: 978-3-527-63665-5

- 4.7 Natural Background Levels for Groundwater in the Upper Rhine Valley 131
Frank Wendland, Georg Berthold, Adriane Blum, Hans-Gerhard Fritsche, Ralf Kunkel and Rüdiger Wolter
- 4.7.1 Introduction 131
- 4.7.2 General Applicable Approach for Deriving NBLs and TVs 131
- 4.7.3 Application to the Case Study Area Upper Rhine Valley 132
- 4.7.4 Conclusion and Discussion 134
- References 135
- Further Reading 136
- 4.8 Hydrogeological Study of Somes-Szamos Transboundary Alluvial Aquifer 136
Radu Drobot, Peter Szucs, Serge Brouyere, Marin-Nelu Minciuna, László Lenart and Alain Dassargues
- 4.8.1 Introduction 136
- 4.8.2 Transboundary Project Activities to Achieve Sustainable Groundwater Management 137
- 4.8.3 Conclusion 142
- 4.8.4 Acknowledgments 142
- References 142
- 4.9 Towards Sustainable Management of Transboundary Hungarian–Serbian Aquifer 143
Zoran Stevanović, Péter Kozák, Milojko Lazić, János Szanyi, Dušan Polomčić, Balázs Kovács, József Török, Saša Milanović, Bojan Hajdin and Petar Papic
- 4.9.1 Introduction 143
- 4.9.2 Study Area 143
- 4.9.3 Groundwater Distribution and Use 145
- 4.9.4 Proposed Measures for Sustainable Utilization of the Aquifer Systems 146
- 4.9.5 Conclusion 148
- References 149
- 4.10 Transboundary Groundwater Resources Extending over Slovenian Territory 149
Petra Meglič and Joerg Prestor
- 4.10.1 Introduction 149
- 4.10.2 Transboundary Groundwater Resources 149
- 4.10.3 Conclusions 152
- References 153
- 5 Transboundary Lakes and Rivers 155**
- 5.1 Do We Have Comparable Hydrological Data for Transboundary Cooperation? 155
Zsuzsanna Buzás
- 5.1.1 Introduction 155
- 5.1.2 Institutional Background 155

4.9

Towards Sustainable Management of Transboundary Hungarian–Serbian Aquifer

Zoran Stevanović, Péter Kozák, Miloško Lazić, János Szanyi, Dušan Polomčić, Balázs Kovács, József Török, Saša Milanović, Bojan Hajdin and Petar Papic

4.9.1

Introduction

During the last decade there have been many activities aiming to improve water management amongst neighbouring countries [1, 2]. Many such projects have been initiated worldwide but, with the exception of the European Union (EU) territory, only very few have been successfully implemented or even started.

The project Sustainable Development of Hungarian–Serbian Transboundary Aquifer (SUDEHSTRA) was carried out from June 2007 till August 2008. It was one of the cross-border cooperation programmes funded by the European Union (ERDF/INTERREG IIIA/Community Initiative) whose objective and tasks were fully in line with the EU Water Framework Directive (WFD; EC 2000/60) and EU Groundwater Daughter Directive targets.

The benefits of this cross-border project are supposed to range from the national level to the very local one:

- 1) strengthening bilateral technical cooperation and enabling the exchange of information between the neighbouring countries;
- 2) improving national, regional and local water practice;
- 3) creating an ambience to facilitate the realization of the targets of the EU Water Framework Directives;
- 4) building local technical capacities;
- 5) increasing public awareness of the importance of water issues and of sustainable use of water and its protection from pollution;
- 6) developing tools for appropriate groundwater management and monitoring at all levels.

4.9.2

Study Area

The aquifer system under study is located between the Danube and Tisa (Tisza) rivers and extends to the vicinity of Kiskunfelegyhaza on the Hungarian side (north) and to Vrbas in Serbia (south). The main groundwater consumers are the cities and industries of Szeged, Kiskunhalas, Baja, Tompa, Hódmezővásárhely (Csongrád and Bács-Kiskun Counties in Hungary) and Subotica, Sombor, Bačka Topola, Vrbas, Kula (in total 16 municipalities in Serbia, Vojvodina province, Bačka region). The study area is populated by over 800 000 inhabitants, about 40% of whom are on the Hungarian side of the border.

The Pannonian basin (or the Great Hungarian Basin) represents a geographical and geological entity that spreads over the territory of several countries. The central