

Global Issues in Water Policy 6

Eiman Karar *Editor*

Freshwater Governance for the 21st Century



 Springer Open

Global Issues in Water Policy

Volume 6

Editor-in-chief

Ariel Dinar, Department of Environmental Sciences, University of California,
Riverside, California, USA

Series editors

José Albiac-Murillo, Zaragoz, Spain

Stefano Farolfi, CIRAD UMR G-EAU, Montpellier, France

Rathinasamy Maria Saleth, Chennai, India

More information about this series at <http://www.springer.com/series/8877>

Eiman Karar
Editor

Freshwater Governance for the 21st Century

 Springer Open



Editor

Eiman Karar
Water Research Commission (WRC)
Pretoria, South Africa



ISSN 2211-0631

Global Issues in Water Policy

ISBN 978-3-319-43348-6

DOI 10.1007/978-3-319-43350-9

ISSN 2211-0658 (electronic)

ISBN 978-3-319-43350-9 (eBook)

Library of Congress Control Number: 2016956569

© The Editor(s) (if applicable) and The Author(s) 2017. This book is published open access.

Open Access This book is distributed under the terms of the Creative Commons Attribution-Noncommercial 2.5 License (<http://creativecommons.org/licenses/by-nc/2.5/>) which permits any noncommercial use, distribution, and reproduction in any medium, provided the original author(s) and source are credited.

The images or other third party material in this book are included in the work's Creative Commons license, unless indicated otherwise in the credit line; if such material is not included in the work's Creative Commons license and the respective action is not permitted by statutory regulation, users will need to obtain permission from the license holder to duplicate, adapt or reproduce the material.

This work is subject to copyright. All commercial rights are reserved 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, express or implied, with respect to the material contained herein or for any errors or omissions that may have been made.

Printed on acid-free paper

This Springer imprint is published by Springer Nature
The registered company is Springer International Publishing AG Switzerland

Preface

This book on freshwater governance contains information that many practitioners in the water field will be looking for. The water-related challenges have reached a climax with an unoptimistic future expected to feature more competition between users. These stresses will be exacerbated by climate change which is likely to increase water demand while shrinking water supplies. Intense competition for water resources will be experienced not only by private users but will also affect the public sector; however, national plans repeatedly fail to show the ability to provide a coherent outlook for development in which water needs are adequately projected and resources smartly shared.

The list of contributors of this book (more than 30 authors from around the globe) reflects a wide range of expertise, and the themes covered will appeal to a broad spectrum of readers. These authors, while attempting to provide workable solutions, draw on their wealth of experience and in many instances share the lessons learnt from what has not worked to what has worked. The tools offered can also assist in furthering the thinking around water governance. Although the focus is on water, there are many synergies with the governance of many other natural resources.

The purpose of this book is to illustrate, in broad terms, the general matters of freshwater governance, mapping the spectrum of decision-making. The book aspires to contribute to the transitioning between techno-centric and eco-centric approaches, or a hybrid concept, to people-centric approaches. The set of book chapters presented in this volume will be based on the existing current knowledge as well as the authors' experience working in the water sector, using nontechnical jargon in order to reach a wider audience. The target audience of this volume will range from academics, technicians, decision-makers, and managers to students; the aim is to target not just academia but also policy-makers and deep thinkers. This book has been more than 2 years in the making, and for those who know the water sector, many changes will have occurred during these years. Some of the information contained in this book may therefore be dated as new information may have become available in the intervening years; nonetheless, I trust that the content will be of interest to the readers.

This book represents the tireless efforts of many dedicated individuals who devoted their time and resources to making it a reality. I thank them all, particularly our esteemed authors, as well as the reviewers who provided considered comments and valuable input to each chapter. This book was initiated and financially supported by the Water Research Commission of South Africa, which is hereby gratefully acknowledged.

Pretoria, South Africa

Eiman Karar

Acknowledgements

This book was contemplated in late 2012 after the International Conference on Fresh Water Governance which was held in South Africa. It was actively pursued after the then newly appointed WRC CEO Mr. Dhesigen Naidoo led the initial authors' workshop in Madrid. The premise was that freshwater governance indeed needed some serious reflection and collective wisdom to chart its way forward. This is how this book came about.

We thank each and every chapter author for investing time in preparing their chapters and helping us realise this book. We also wish to thank all the reviewers who are listed here by name for providing insightful comments that helped us shape the chapters the way they are presented now:

Mr. Brendan Bromwich (Independent Water and Environment Consultant)
(reviewed two chapters)

Dr. Synne Movik (Senior Researcher, Water and Society Division, Norwegian Institute for Water Research (NIVA), Oslo, Norway)

Dr. Larry Swatuk (Associate Professor, School of Environment, Enterprise and Development (SEED), Faculty of Environment, University of Waterloo, Ontario, Canada)

Dr. Chad Staddon (Professor in Resource Economics and Policy, Department of Geography and Environmental Management, Bristol Group for Water Research, University of the West of England, UK)

Dr. Vinothan Naidoo (Senior Lecturer at the Department of Political Studies at the University of Cape Town, South Africa)

Dr. Catherine Sutherland (Lecturer, School of Built Environment and Development Studies, University of KwaZulu-Natal, South Africa)

Dr. Stefano Burchi (Executive Chairman of the International Association for Water Law, Rome, Italy)

Dr. Richard Meissner (Senior Researcher: Water Governance, CSIR, Pretoria, South Africa)

Dr. Robert Varady (Deputy Director and Research Professor of Environmental Policy, Udall Center for Studies in Public Policy, The University of Arizona, Tucson, Arizona)

Dr. Shafick Adams (Executive Manager: Water-Linked Ecosystems, Water Research Commission, Pretoria, South Africa)

Mr. Steve Hedden (Researcher in the African Futures and Innovation Section, Institute for Security Studies (ISS), Pretoria, South Africa)

Contents

1	Introduction and Reflections	1
	Eiman Karar	
2	The Establishment of Catchment Management Agencies in South Africa with Reference to the <i>Flussgebietsgemeinschaft Elbe: Some Practical Considerations</i>	15
	Richard Meissner, Sabine Stuart-Hill, and Zakariya Nakhoda	
3	Towards Inclusive Water Governance: OECD Evidence and Key Principles of Stakeholder Engagement in the Water Sector	29
	Aziza Akhmouch and Delphine Clavreul	
4	Free-Market Economics and Developmental Statism as Political Paradigms: Implications for Water Governance Theory and Practice in Developing Countries	51
	Claudious Chikozho and Everisto Mapedza	
5	Urban Water Governance as a Function of the ‘Urban Hydrosocial Transition’	81
	Chad Staddon, Robert Sarkozi, and Sean Langberg	
6	Urban Water Governance for the Twenty-First Century: A Portfolio-Based Approach to Planning and Management	103
	Ganesh Keremane, Jennifer McKay, and Zhifang Wu	
7	Rights-Based Freshwater Governance for the Twenty-First Century: Beyond an Exclusionary Focus on Domestic Water Uses	129
	Barbara Van Koppen, Anne Hellum, Lyla Mehta, Bill Derman, and Barbara Schreiner	
8	Inclusive Transboundary Water Governance	145
	Anton Earle and Marian J. Neal	

9	Mechanisms for Inclusive Governance	159
	Raymond L. Ison and Philip J. Wallis	
10	Water Integrity: From Concept to Practice	187
	Håkan Tropp, Alejandro Jiménez, and Hélène Le Deunff	
11	Addressing the Groundwater Governance Challenge	205
	Marguerite de Chaisemartin, Robert G. Varady, Sharon B. Megdal, Kirstin I. Conti, Jac van der Gun, Andrea Merla, Geert-Jan Nijsten, and Friedemann Scheibler	
12	Water Governance Futures in South Asia and Southern Africa: Déjà Vu All Over Again?	229
	Douglas J. Merrey, Anjal Prakash, Larry Swatuk, Inga Jacobs, and Vishal Narain	

Contributors

Aziza Akhmouch Water Governance Programme, Organisation for Economic Co-operation and Development (OECD), Paris, France

Claudious Chikozho Africa Institute of South Africa, Human Sciences Research Council, Pretoria, South Africa

Delphine Clavreul Water Governance Programme, Organisation for Economic Co-operation and Development (OECD), Paris, France

Kirstin I. Conti International Groundwater Resources Assessment Centre (IGRAC), Delft, The Netherlands

Governance and Inclusive Development, Amsterdam Institute of Social Sciences Research (AISSR), University of Amsterdam, Amsterdam, The Netherlands

Marguerite de Chaisemartin UNESCO, International Hydrological Programme (IHP), Neuilly sur Seine, France

Bill Derman Department of International Environment and Development studies, Norwegian University of the Life Sciences, Aas, Norway

Anton Earle SIWI Africa Regional Centre, Stockholm International Water Institute (SIWI), South Africa

Anne Hellum Department of Public and International Law, University of Oslo, Oslo, Norway

Raymond L. Ison Applied Systems Thinking in Practice Group, Engineering & Innovation Department, The Open University (UK), Milton Keynes, UK

Inga Jacobs Council for Scientific and Industrial Research (CSIR), Pretoria, South Africa

Alejandro Jiménez Stockholm International Water Institute (SIWI), Stockholm, Sweden

- Eiman Karar** Water Research Commission (WRC), Pretoria, South Africa
- Ganesh Keremane** School of Law, UniSA Business School, University of South Australia, Adelaide, South Australia, Australia
- Sean Langberg** University of North Carolina, Chapel Hill, NC, USA
- Hélène Le Deunff** Stockholm International Water Institute (SIWI), Stockholm, Sweden
- Everisto Mapedza** International Water Management Institute, Pretoria, South Africa
- Jennifer McKay** School of Law, UniSA Business School, University of South Australia, Adelaide, South Australia, Australia
- Sharon B. Megdal** Water Resources Research Center, University of Arizona Tucson, AZ, USA
- Lyla Mehta** Institute of Development Studies, University of Sussex, Brighton, UK
Visiting Professor at Noragric, Norwegian University of Life Sciences, Aas, Norway
- Richard Meissner** Council for Scientific and Industrial Research, Pretoria, South Africa
Centre for Water Resources Research, University of KwaZulu-Natal, Scottsville, South Africa
- Andrea Merla** UNESCO, International Hydrological Programme (IHP), Paris, France
- Douglas J. Merrey** Independent Consultant, Gainesville, FL, USA
- Zakariya Nakhooda** Centre for Water Resources Research, University of KwaZulu-Natal, Scottsville, South Africa
- Vishal Narain** Management Development Institute (MDI), Gurgaon, India
- Marian J. Neal** SIWI Africa Regional Centre, Stockholm International Water Institute (SIWI), Pretoria, South Africa
- Geert-Jan Nijsten** International Groundwater Resources Assessment Centre (IGRAC), Delft, The Netherlands
- Anjal Prakash** International Centre for Integrated Mountain Development (ICIMOD), Kathmandu, Nepal
- Robert Sarkozi** University of the West of England, Bristol, Bristol, UK
- Friedemann Scheibler** International Groundwater Resources Assessment Centre (IGRAC), Delft, The Netherlands
- Barbara Schreiner** Pegasys Institute, Hatfield, Pretoria, South Africa

Chad Staddon University of the West of England, Bristol, Bristol, UK

Sabine Stuart-Hill Centre for Water Resources Research, University of KwaZulu-Natal, Scottsville, South Africa

Larry Swatuk University of Waterloo, Waterloo, ON, Canada

Håkan Tropp Stockholm International Water Institute (SIWI), Stockholm, Sweden

Jac van der Gun Van der Gun Hydro-Consulting, Schalkhaar, The Netherlands

Barbara Van Koppen International Water Management Institute, Southern Africa Regional Programme, Silverton, South Africa

Robert G. Varady Udall Center for Studies in Public Policy, University of Arizona, Tucson, AZ, USA

Philip J. Wallis Systemic Governance Research Program, Monash Sustainability Institute, Monash University, Clayton, VIC, Australia

Zhifang Wu School of Law, UniSA Business School, University of South Australia, Adelaide, South Australia, Australia

Author Biographies

Aziza Akhmouch

Dr. Aziza Akhmouch is the Head of the Water Governance Programme of the Organisation for Economic Co-operation and Development (OECD). Her responsibility is to develop tools to diagnose governance “gaps” in water policy and to provide policy guidance to decision-makers at different levels through evidence-based assessment, benchmarks, international peer-review and country policy dialogue. She is the author of several OECD reports providing recommendations to governments in support of better governance in the water sector. She also created and coordinates the *OECD Water Governance Initiative*, a multi-stakeholder network of around 100 delegates from public, private and not-for-profit sectors gathering at the OECD twice a year in a Policy Forum. Aziza Akhmouch dedicated her Ph.D. in geopolitics to the conflicts over private water management in Argentina and also holds an M.S. Degree in International Business from the University of Paris-Dauphine.

Claudious Chikozho

Dr. Claudious Chikozho is a Social Scientist with over 16 years of experience in applied research in Africa. Over the years, he has acquired knowledge, experience and a keen interest in integrated water resource management; rural and urban development planning; programme planning, monitoring and evaluation; public service delivery; and sustainable development processes. He is currently working as a Research Director at the Gauteng City-Region Observatory, Wits University, Johannesburg, South Africa. His previous assignments include working as the Program Director for the EXXARO Chair in Business & Biodiversity Leadership at the University of Pretoria; Science Uptake Coordinator at the International Water Management Institute in Accra, Ghana; Senior Researcher at the Council for Scientific and Industrial Research in Pretoria, South Africa; and Research Fellow and Lecturer at the University of Zimbabwe. Over the years, he has carried out several research and consultancy assignments and in the process has published more than 20 peer-reviewed academic papers and book chapters. His current

research areas of special interest include public and private sector leadership and service delivery, sustainable development priorities and technology transfer processes.

Delphine Clavreul

Delphine Clavreul is a Policy Analyst at the Water Governance Programme of the Organisation for Economic Co-operation and Development (OECD). Her field of expertise covers a range of governance topics including multilevel governance, stakeholder engagement and water integrity. She also supports the co-ordination of the OECD Water Governance Initiative, an international multi-stakeholder network sharing good practices in support of better governance in the water. She has contributed to several OECD water governance (country and cross-country) reports. Delphine Clavreul holds an M.S. Degree in Geopolitics.

Kirstin I. Conti

Ms Kirstin I. Conti is a PhD Research Fellow with International Groundwater Resources Assessment Centre (IGRAC) and the Amsterdam Institute of Social Science Research (AISSR) at the University of Amsterdam. She has background in environmental science, technology and policy and a Master of Laws in Water Governance and Conflict Resolution (LL.M.). Recently, she has used her interdisciplinary training to study and work in the area of international groundwater policy and governance. Consequently, her PhD research focuses on legal aspects of groundwater governance across multiple geographic levels. In addition to her studies, Kirstin has 3 years of experience working with the state environmental protection policy in California. She has also completed extensive leadership training which included an emphasis on facilitation, mediation, and conflict resolution.

Marguerite de Chaisemartin

An international water law, hydro-diplomacy and transboundary water cooperation processes expert, with a particular focus on groundwater resources, Ms Marguerite de Chaisemartin has been working for several years with UNESCO's International Hydrological Programme (IHP) on its transboundary water management projects and initiatives. She was previously based at the International Center for Biosaline Agriculture (ICBA) in Dubai, United Arab Emirates, working as project manager on a Sida-funded water cooperation project in the Euphrates and Tigris region. Marguerite de Chaisemartin graduated from Panthéon-Assas Law University, and holds an LL.M. from University College London (UCL) and Master's degree in international and comparative environmental law from Limoges University's CRIDEAU Interdisciplinary Research Centre.

Bill Derman

Bill Derman (Ph.D.) is an anthropologist with long-standing interests in the social science of water including research on river basin development, freshwater fishing, the impacts of water law and water governance. He has edited *Citizenship and*

Identity: Conflicts over Land and Water in Contemporary Africa, edited with Rie Odgaard and Espen Sjaastad; *Worlds of Human Rights: The Ambiguities of Rights Claiming in Africa*, edited with Anne Hellum and Kristin Sandvik, Leiden and Boston: Brill 2013; and *In the Shadow of a Conflict: Crisis in Zimbabwe and Its Effects in Mozambique, South Africa and Zambia*, edited with Randi Kaarhus, Harare: Weaver Press, 2013. In addition he has published several articles on water governance and the right to water. He is a Professor Emeritus at Michigan State University and currently teaches at the Department of International Environment and Development Studies at the Norwegian University of Life Sciences.

Anton Earle

A geographer with an academic background in environmental management, Anton Earle specialises in transboundary integrated water resource management, facilitating the interaction between governments, basin organisations and other stakeholders in international river and lake basins. He is experienced in institutional capacity development and policy formation for water resource management at the interstate level in the Southern and East African regions, the Middle-East and internationally. In 2010 he was the lead editor for the Earthscan book, entitled *Transboundary Water Management: Principles and Practice* – aimed at practitioners and advanced students in that field. Currently he is leading the production of another Earthscan book, entitled *Transboundary Water Management and the Climate Change Debate: Adapt, Resist, Subvert*. Mr Earle is the Director of the SIWI Africa Regional Centre based in Pretoria, South Africa. Prior to holding this position, he was Director of SIWI's Capacity Building Programmes where over a 6-year period, he was responsible for a range of long-term and short-term courses on various topics related to water resource management in Africa and internationally.

Anne Hellum

Anne Hellum (Dr. Juris) is a lawyer and anthropologist holding a Juris Doctor Degree from the University of Oslo. She is professor at the Department of Public and International Law at the University of Oslo and Director of the Institute of Women's Law, Child Law and Discrimination Law and visiting professor at the Southern and Eastern African Regional Centre for Women's Law (SEARCWL) at the University of Zimbabwe. She has published widely on human rights, gender and legal pluralism with focus on the right to land and water. Among her most recent publications are *Paths are Made by Walking: Human Rights, Gendered Realities and Plural Legalities* with Julie Stewart et al. (Weaver Press 2007), *Worlds of Human Rights: Ambiguities of Rights Claiming in Africa* with Bill Derman and Kristin Sandvik (Brill 2013), *Women's Human Rights: CEDAW in International, Regional and National Law* with Henriette Sinding Aasen (Cambridge University Press 2013) and *Water Is Life: Women's Human Rights in National and Local Water Governance in Southern and Eastern Africa* with Patricia Kameri-Mbote and Barbara Van Koppen (Weaver Press 2015).

Raymond L. Ison

Ray Ison is Professor of Systems in the Engineering and Innovation Department, The Open University, UK. From 2008 to 2015, he was also Professor at the Monash Sustainability Institute, Monash University, Australia, where he developed and led the Systemic Governance Research Program, an interdisciplinary, systems-based research programme focusing on water governance, climate change adaptation and social learning. At the Open University, he is a key member of the Applied Systems Thinking in Practice Group, contributing also to the taught masters in Systems Thinking in Practice. Through various commissioned projects and initiatives, his collaborative research demonstrates how social learning can be employed as an alternative governance mechanism for managing in complex situations such as water governance, programme and project governance, climate change adaptation, food security research, social learning, systems thinking and the purposeful creation of communities of practice.

Inga Jacobs

Dr. Inga Jacobs is the Executive Manager for Business Development, Marketing and Communication at the Water Research Commission (WRC), Pretoria, South Africa. Dr. Jacobs works on strategic monitoring of research trends, both in South Africa and globally, to ensure that the WRC's research is in line with these trends and also that there is policy uptake and impact in terms of knowledge dissemination to the public. She is a political scientist with qualifications in international relations. Her Ph.D. focused on multilevel water governance in transboundary rivers in Southern and East Africa. Her research interests and experiences lie in regional environmental security in African river basins and water harmonisation, focusing on the principles of cooperation between countries, the multi-actor landscape, how states negotiate cooperative management strategies as well as the normative frameworks that determine their behaviour and underpin the institutional landscape.

Alejandro Jiménez

Alejandro Jiménez (Ph.D.) works at the Water Governance team of the Stockholm International Water Institute. Alejandro has almost 15 years of working experience in the water and sanitation sector in developing countries, including direct work with service provision at local level, applied research, advisory services and capacity building. He has published several articles and book chapters, especially in the areas of rural water and sanitation governance, the definition of monitoring indicators for rural services, the role of local governments in the provision of services and the implementation of the human right to water and sanitation.

Eiman Karar

Eiman Karar has approximately 20 years' experience in water resource management, mostly in southern Africa, but she is also very familiar with North African water management. She has an M.Sc. in Environmental Sciences and a Project Management Diploma and is currently registered for the Master of Laws (LLM) degree. She is currently an Executive Director for Management of Water Resources

at the Water Research Commission (WRC) of South Africa, responsible for generating, disseminating and uptake of water resource knowledge by policy-makers, water managers and academics. Previously, she was the Director in the Department of Water Affairs of South Africa, responsible for developing policies pertaining to all decentralised Water Management Institutions and their related governance arrangements. She was a Commissioner on the Limpopo Commission (LIMCOM). She has also authored numerous chapters and papers mainly dealing with water governance and the management of public property resources at local community level to regional and international levels. She was the co-chair of the River Basin Working Group in GEF International Waters project (IW Science). She is a registered professional natural scientist with the South African Association of Natural Scientists and is a member of the Water Institute of Southern Africa and Chair of the WISA Law subcommittee of the Management Division. She is a Technical Advisory Group (TAG) Member of the Southern African Regional branch of the Global Water Partnership (GWP) and their regional Gender Focal Point. She is a board member on the International Water Security Network (IWSN) and the Chair of the IIASA National NRF Committee. She is actively involved with the International and African Academies of Sciences and is the advisor to the South African Academy of Science Water Programme. She is an advisory board member on Monash University, South Africa, Water Node, and an external examiner for the University of KwaZulu-Natal IWRM related courses. She is a member of WaterNet.

Ganesh Keremane

Dr. Ganesh Keremane is a Research Fellow at the School of Law, University of South Australia. He completed his Ph.D. at the University of South Australia for which he received the 2008 CRC Irrigation Futures Director's Award. He also has a master's degree in Agricultural Economics from the University of Agricultural Sciences, India. After completing his Ph.D., Dr. Keremane continued at the CCWPL and is currently working with his colleagues on different research projects at the centre including institutional analysis of implementing desalination projects and an integrated urban water management strategy. Dr. Keremane's research interests lie in the field of natural resource management with an emphasis on institutional and policy analysis of surface and groundwater management. He is also interested in assessing community attitudes and perceptions towards alternative water sources and has published several peer-reviewed international journal papers and book chapters related to these topics.

Sean Langberg

Sean Langberg attended the University of North Carolina at Chapel Hill and earned degrees in Global Studies and Geography. He completed an Honours thesis about the nexus of geographies of power and complexity theory in the Second Congo War. His current interests include conflict prevention, early warning systems, human rights theory and war psychology. He now works at the Friends Committee on National Legislation in Washington, DC, and focuses on peace building in Africa.

Hélène Ahlberger Le Deunff

Hélène Le Deunff works for the Water Governance team of the Stockholm International Water Institute. She has over 12 years of experience in the management of international development projects within several international, intergovernmental and national organisations. Hélène's career spans a number of fields, including governance, institutional perspectives, participation processes, human rights and mobilisation of private sector resources and energy to contribute to the achievement of development objectives.

Everisto Mapedza

Dr. Everisto Mapedza is a Senior Social and Institutional Scientist at the International Water Management Institute in Pretoria, South Africa. He has more than 18 years of work experience in the applied social science sector. His previous positions include working as a Research Fellow on forestry resources governance at the University of Zimbabwe and Postdoctoral Fellow at the University of Edinburgh, UK. He has published over 20 peer-reviewed journal articles and book chapters and is currently serving as a managing editor for a special issue of the journal *Water International* on "Water commons: Devising diverse solutions". He co-supervises Ph.D. and M.Sc. students in the IWMI Southern Africa office. Everisto successfully led the design and implementation of the Water Governance Project under the CGIAR Challenge Program on Water and Food (CPWF) in Southern Africa. He has also been leading applied research projects on irrigation schemes in Zimbabwe to provide input into the development of the national Irrigation Policy. He also leads the Southern Africa component of two CGIAR Research Programs, namely, Aquatic Agricultural Systems, centred on the Barotse Floodplain in Zambia, and dryland systems, focusing on Malawi, Mozambique and Zambia.

Jennifer Mckay

Prof. Jennifer McKay has conducted empirical research on Australian, Indian and US water laws and policies for the past 20 years and published over 160 articles and supervised 13 Ph.D. students. Her work has been funded by the Australian Research Council, three Cooperative Research Centres, International Water Management Institute, ACIAR and private industry and two Centres of Excellence Groundwater and Desalination and the Goyder Institute for Water Research. She is the foundation director of the Centre for Comparative Water Policies and Laws in the School of Law, University of South Australia, and had Fulbright Senior Fellowship to Berkeley Boalt School of Law in 2008–2009.

Sharon B. Megdal

Dr. Sharon B. Megdal is Director of the University of Arizona Water Resources Research Center and Professor, Department of Soil, Water and Environmental Science. She is C.W. and Modene Neely Endowed Professor and Distinguished Outreach Professor. Her work focuses on water management and policy, with projects including transboundary aquifer assessment, comparative policy analysis, and groundwater management and governance. Sharon Megdal holds a PhD in

Economics from Princeton University. She is an elected member of the Board of Directors for the Central Arizona Project, which delivers Colorado River water to Central Arizona.

Lyla Mehta

Lyla Mehta (Ph.D.) is a Professorial Research Fellow at the Institute of Development Studies, UK, and a Visiting Professor at Noragric, Norwegian University of Life Sciences. Her work uses the case of water and sanitation to explore conceptual and empirical questions concerning scarcity, power, politics, uncertainty, rights and access to resources, the contested nature of the 'public' and 'private' and the cultural politics of development.

Richard Meissner

Dr. Richard Meissner is a Senior Researcher in the Natural Resources and Environment Unit at the CSIR. He holds a doctoral degree in international politics from the University of Pretoria. Richard specialises in the analysis of transboundary river basins focusing on the complexities and interactions between and among non-state actors (individuals, interest groups, businesses and non-governmental organisations, stakeholder involvement and public participation), international organisations and state/government organs. Richard is currently the project manager of the CSIR's water security project. For this project, the research team is investigating stakeholders' understanding of the meaning of water security in the eThekweni Metropolitan Municipality and the Greater Sekhukhune District Municipality. Richard is also involved in a Water Research Commission project investigating the lessons from South Africa's catchment management agency establishment process. Prior to joining the CSIR, Richard has worked in the academic, non-governmental, private and public sectors while researching various domestic and international political actors and phenomena. These include the role and involvement of interest groups in Southern African transboundary river basins, Southern African regional integration initiatives, political risk and opportunities, strategic issues management and the issues that affect the banking industry as well as various research projects at provincial and local governmental level. Dr. Meissner has published widely on these and other subjects with over 80 publications to his name. These include scientific articles in peer-reviewed journals, popular articles, book chapters, technical reports and chapters in UNESCO's *Encyclopedia of Life Support Systems* (EOLSS) as well as co-authored articles and book chapters. Dr. Meissner has also presented papers at numerous local and international conferences, workshops and lectures including papers on virtual water, interest groups and their involvement in international river basin projects, cooperation, and conflict in transboundary rivers and lectures at Middlesex and Oxford Universities in the UK on transnational water politics.

Andrea Merla

Dr. Andrea Merla, an Italian national, has obtained degrees in Earth Sciences at the Universities of Florence, Italy, and Princeton, New Jersey. He has acquired a wide

professional experience in the management of cooperation-development programs, especially, but not exclusively, in the fields of energy, environment and natural resources. It was gained through extensive work, in over 35 countries worldwide, within the framework of both industrial projects and programs of technical assistance to developing countries. He has been for 16 years General Manager of a private consulting firm acting world-wide in the field of environmental protection and natural resources management. Previously he was Associate Researcher at the Universities of Firenze (Italy) and Princeton (N.J.), oil exploration geologist with Gulf Oil Corporation (USA), manager of the environmental divisions of several ENI Group companies (Italy) and Regional Programme Coordinator of the Latin American Energy Organisation (Ecuador). Since 1993 he has been consulting for the World Bank, the European Union, the United Nations and several Italian Public Agencies. From 1998 to 2007 has been Senior Environmental Specialist at the Global Environment Facility Secretariat in Washington DC, where he managed the project portfolios related to International Waters and to Persistent Toxic Substances. He is presently consulting for several international organizations and development banks in the field of water resources.

Douglas J. Merrey

Dr. Douglas Merrey is an independent consultant on natural resource policies and institutions. Doug Merrey holds a Ph.D. in social anthropology. He has worked his entire career on water resource management with a special focus on institutional and policies related to agricultural water management and river basin management in Asia and Africa. He spent 20 years working at the International Water Management Institute (IWMI) where he held several senior management positions including Director for Africa. An American citizen, he has lived in India, Pakistan, Sri Lanka, Indonesia, Egypt and South Africa and worked on a short-term basis in many other countries. He has published numerous papers and book chapters as well as authoring several books. He was appointed to the Board of the Water Research Commission of South Africa for three terms. He currently resides in North Carolina, USA, and continues to be active as a consultant.

Zakariya Nakhooda

Zakariya Nakhooda is a master's degree candidate at the University of KwaZulu-Natal with a specific focus on hydrology. At an undergraduate level, he has majored in the fields of hydrology and geography and completed his Honour's degree in hydrology. Zakariya's research focus is on integrated water resource management (IWRM) and approaches to achieving water resource management in a sustainable manner. The current project he is working on entails an assessment of catchment management agencies (CMAs) in South Africa. This encapsulates the various aspects surrounding these institutions, such as stakeholder relations, capacity of the institution and also relationships with the Department of Water and Sanitation (DWS). The project aims at determining shortcomings and also the advantages with regard to the CMA establishment in South Africa.

Vishal Narain

Vishal Narain holds a Ph.D. from Wageningen University, the Netherlands. His research and teaching interests are in the analysis of public policy processes and institutions, water governance and peri-urban issues. He is the author of *Institutions, Technology and Water Control: Water Users' Associations and Irrigation Management Reform in Two Large Scale Systems in India* (Orient Longman, 2003) and was lead editor for *Globalization of Water Governance in South Asia* (Routledge, 2014). His research is published in several international journals. He was a lead author for a chapter on human vulnerability to environmental change for GEO (Global Environment Outlook-4), a flagship publication of the United Nations Environment Programme (UNEP).

Marian J. Neal

Dr. Marian J. Neal is the Transboundary Water Programme Manager for the Stockholm International Water Institute. She has an interdisciplinary research background in wetland/landscape ecology, water governance, transboundary water management and social and environmental justice. She has worked in the fields of water allocation decision-making and complex social-ecological systems and examined how the issue of scale impacts on the management of shared water resources. Dr. Patrick has over 15 years of experience in transboundary water management and is currently the manager of the UNESCO Cat II Centre on Water Cooperation in Sweden.

Geert-Jan Nijsten

Mr Geert-Jan Nijsten is a senior researcher at the International Groundwater Resources Assessment Centre (IGRAC) which is based in Delft – the Netherlands. He has a MSc degree in Hydrogeology from the Free University of Amsterdam and has 20 years of working experience in water management and mainly in groundwater related projects. Before joining IGRAC in 2012 he worked in research, consultancy and as a policy advisor, with working experience in the Netherlands and Africa. At IGRAC Geert-Jan is mainly involved in groundwater assessment and governance.

Anjal Prakash

Before joining ICIMOD, Dr. Prakash led the South Asia Consortium for Interdisciplinary Water Resources Studies (SaciWATERs) that worked in six countries of South Asia. He holds a Ph.D. in social/environmental sciences from Wageningen University, the Netherlands. Dr. Prakash has been working in the areas of policy research, advocacy, capacity building, knowledge management, networking and implementation of large-scale and multi-country environmental development projects in South Asia. He is the author of *The Dark Zone: Groundwater Irrigation, Politics and Social Power in North Gujarat* (Orient Longman, 2005). His recent co-edited books are *Interlacing Water and Health: Case Studies from South Asia* (Sage, 2012) and *Water Resources Policies in South Asia* (2013), *Globalization of Water Governance in South Asia* (2013) and *Informing Water Policies in South*

Asia (2014), all published by Routledge. He is presently co-editing two books on gender, water supply and sanitation issues in India and peri-urban water security issues in South Asia to be published by Sage and Oxford University Press, respectively.

Robert Sarkozi

Robert Sarkozi has a First Class BA in Geography from the University of the West of England. His Honours thesis produced pioneering research into resource management, applying game theory models of overfishing as vehicles for environmental education. Robert is now studying for his M.Sc. Environmental Management at UWE, focusing particularly on water management and sustainable development. He also works as an Associate for Sustain Limited providing energy and carbon reduction solutions to the public and private sector of the UK.

Friedemann Scheibler

Mr Friedemann Scheibler is a researcher at the International Groundwater Resources Assessment Centre (IGRAC). He received his BSc degree in Geography from Friedrich-Schiller University Jena (Germany) and his MSc degree in Hydrology, Hydrogeology and Water Resources from Stockholm University (Sweden). Before joining IGRAC in 2013, Friedemann worked for over 3 years on groundwater and surface water related projects in Germany, South Africa, USA and Sweden, both in research and consultancy. At IGRAC, Friedemann mainly holds responsibilities regarding Managed Aquifer Recharge, Geo Information Systems and Remote Sensing.

Barbara Schreiner

Barbara Schreiner is Executive Director of the Pegasys Institute and a Director of Pegasys Consulting. She has over 20 years of work experience in the water sector in South Africa and internationally. She has considerable expertise in research, policy, strategy, regulation and financial and institutional issues, particularly in the public sector. She is a member of the Board of the International Water Management Institution, a member of the Programme Oversight Panel of the Aquatic Agricultural Systems research programme of the Consultative Group on International Agricultural Research (CGIAR) and an ex-Board member of the CGIAR Challenge Programme on Water and Food. She has an M.Phil. in Environmental Science (with distinction) from the University of Cape Town. She has authored a number of papers on water issues and is the co-editor of *Transforming Water Management in South Africa: Designing a New Policy Framework*, published by Springer (2012).

Chad Staddon

Professor Chad Staddon is the Director of the International Water Security Network based at the University of the West of England in Bristol. He is also Research Professor jointly with the School of Geography and Development and Biosphere 2 at the University of Arizona and holds a Research Fellowship at the Global Research Institute of the University of North Carolina, Chapel Hill. He has over four dozen

publications on issues related to natural resource management and policy and political ecology particularly with respect to water and forests issues. His current research focuses on the complex relations between cities and water services, articulated through the “urban hydrosocial transition” concept.

Sabine Stuart-Hill

Dr. Sabine Stuart-Hill is a lecturer at the University of KwaZulu-Natal and a member of the Centre of Water Resources Research. She holds a doctoral degree in hydrology from the University of KwaZulu-Natal. Sabine specialises in adaptive water management and water governance of South Africa. A specific focus of her Ph.D. research was mainstreaming climate change and adaptation into decision-making processes. Furthermore, she is involved in the Governance Think Tank of the Water Research Commission, a member of the WISA Management and Institutional Affairs Division committee championing the governance theme and since March 2013 a member of the Interim Steering Committee for the re-establishment of the South African Country Water Partnership of the Global Water Partnership. She is leading multi-institutional research projects with national and international funding and is an often-invited speaker to national dialogues and international conferences.

Participatory processes are a strong focus of her research, and besides designing, organising and facilitating workshops, involvements with the Catchment Management Fora of the Msunduzi and the Upper Mgeni in KwaZulu-Natal are a given. Being on the Reference Group for the establishment of the Catchment Management Agency for KwaZulu-Natal has opened a window of opportunity to bring science directly into the water policy and management field. She has and is also being included in many of the policy design processes of the country related to the water sector. Sabine has an applied and transdisciplinary research approach which in the South African context has brought a strong emphasis on current and emerging vulnerabilities into her work.

Larry A. Swatuk

Dr. Swatuk has a 30-year association with Africa, having first lived and worked in Lesotho in 1984. Among other things, he has been a Ford Foundation Fellow at the University of the Western Cape, South Africa; a Visiting Research Fellow at Rhodes University, South Africa; Senior Research Fellow at the African Centre for Development and Strategic Studies, Ijebu Ode, Nigeria; and a lecturer and associate professor at the University of Botswana. Trained in political science and international relations, Dr. Swatuk first began researching and writing on the politics of the environment and natural resources in the early 1990s. Among his recent publications is a co-edited collection (with Matthew A. Schnurr), entitled *Natural Resources and Social Conflict: Towards Critical Environmental Security* (London: Macmillan, 2012).

Håkan Tropp

Håkan Tropp works with the Stockholm International Water Institute as a Managing Director. He heads the organisation’s thematic work on research, policy and capacity

development. He has written extensively on water governance and other water-related topics and worked in several capacities as policy advisor and developer and implementer of several water governance programmes. He was the Director for Water Governance Facility, 2005–2013, and is also a founding member of the Water Integrity Network. He holds a Ph.D. from Linköping University, Sweden, where he also worked as lecturer.

Jac van der Gun

Jac van der Gun is a groundwater hydrologist, graduated at Wageningen University. During most of his career he was employed by the Institute of Applied Geoscience of the R&D organization TNO in The Netherlands, initially participating in and directing the Groundwater Reconnaissance of The Netherlands, later involved in numerous international water resources assessment and management projects and consultancies. He has also lectured on groundwater at the UNESCO Institute for Water Education (UNESCO-IHE) for more than 30 years. He was actively involved in establishing the International Groundwater Resources Assessment Centre (IGRAC) and in 2003 became its first director. After retirement, he remained active in several groundwater-related projects of international organisations and in 2013 he co-authored with Jean Margat the book '*Groundwater around the World: A Geographic Synopsis*'.

Barbara Van Koppen

Barbara Van Koppen (Ph.D.) is the Principal Researcher on Poverty, Gender, and Water at the International Water Management Institute. Her research focuses on institutional and legal dimensions of pro-poor and gender-equitable water development and management for multiple uses, primarily in sub-Saharan Africa and Asia. She is a lead editor of five books and (co-)author of over 120 international publications. In addition to capacity building of post-docs, Ph.D. and M.Sc. students, she advises in national and global policy dialogue.

Robert G. Varady

Robert Varady is Deputy Director and Research Professor of Environmental Policy at the Udall Center for Studies in Public Policy at The University of Arizona. He is also a research professor of arid lands studies in the School of Natural Resources and the Environment, and adjunct professor of hydrology and water resources. Varady obtained his PhD in 1981 in modern history from The University of Arizona, and holds BS and MS degrees in mathematics from the City College of New York and the Polytechnic Institute of NYU, respectively. At the Udall Center since 1989, Varady has examined environmental and water-management policy in arid regions—with a transboundary emphasis—especially in the U.S.-Mexico border area.

Philip Wallis

Dr. Philip Wallis is a Research Fellow at the Monash Sustainability Institute, Monash University, Australia, and is a member of the Systemic Governance Research Program. His current research focuses on the governance of

social-ecological systems, particularly in the areas of water resources, Australia's Murray-Darling Basin, climate change adaptation, catchment management and water-sensitive cities. This research is mainly transdisciplinary in nature, drawing on social, political and technical inquiry into complex situations. His previous Ph.D. research was in green chemistry, looking at the role of modified clay minerals as catalysts for organic synthesis and as models of soil carbon sequestration. He was awarded as a Fellow of the Peter Cullen Trust in 2010.

Zhifang Wu

Dr. Zhifang Wu is currently a Research Fellow at the Centre for Comparative Water Policies and Laws (CCWPL), University of South Australia. She received her undergraduate in Economics at Changchun Taxation Institute in China. After completing her Ph.D. degree at the University of South Australia, Dr. Wu was employed by the CCWPL and working on research projects with the colleagues in the centre. Her research interests lie in the field of exploring community attitudes and perceptions regarding using non-conventional water sources, such as stormwater, reclaimed water, etc. Dr. Wu also has interests in water governance and in particular institutional and policy analysis in relation to diversifying sustainable water supply portfolio.

Chapter 1

Introduction and Reflections

Eiman Karar

This book explores the challenges most countries face in dealing with governance issues and highlights the advantages and disadvantages of various approaches to achieve effective freshwater governance for the twenty-first century. The idea for writing this book was triggered by the successful hosting of the International Conference on Fresh Water Governance for Sustainable Development, 5–7 November 2012, at the Champagne Sports Resort, Drakensberg, KZN, South Africa. At that conference, the need to bring together the research communities from different disciplines and practitioners at different levels of jurisdictions from around the world was tangible. The exchange of experiences and the interrogation of frameworks, policies and perceptions around best practice were invigorating. This book is not a direct result of that conference, but the exchange of experiences provided the impetus to embark on this undertaking.

The intention of this book is to pool some salient ideas around the thinking of water and its governance, tackling it from a global view to a local reality, from within and outside the numerous watersheds that fall under various administrative agencies to end users, the private sector and civil society. It can also identify sovereign boundaries and regional or transnational boundaries. As fluid as water is, so is the concept of its governance. A striking feature is that the term “governance” means different things to different people. The aim of this volume is not to provide a universal definition of governance; instead, each chapter will frame its own meaning in the context of the specific topic covered.

But first, one might ask why freshwater governance is of such importance and what is so special about the twenty-first century governance to warrant writing a book about it.

In his closing address at the Fresh Water Governance Conference on 7 November 2012, the CEO of the WRC, **Dhesigen Naidoo**, highlighted the fact that the global

E. Karar (✉)
Water Research Commission (WRC), Pretoria, South Africa
e-mail: eimankarar3@gmail.com

dialogue on water is generally unanimous that we are moving into a very difficult water future, on the back of factors including unprecedented population growth combined with rapid levels of economic movement, particularly in the developing world. The latter has resulted in growing middle classes with the resultant change in consumption patterns. This in many ways is starting to define the new Malthusian challenge of the twenty-first century. At the same time, years, decades and indeed centuries of environmentally insensitive and water-wasteful mining and industrial practices have come back to haunt us. This, combined with the newer challenges of global climate change, has defined the “water challenge” of the twenty-first century. We are also clear that developments in water sciences and engineering alone have not delivered adequately to engage this challenge, and there is a strong need to consider the social dynamics, culture and heritage issues towards more holistic and complete solutions. In fact, we have for a while in our individual corners been lamenting the lack of a reasonable dialogue on this very important matter of water governance.

The challenge of both water quantity and quality has become a sharp focus of our time. The global water conversation has taken a new turn on the back of increased information access and the world reaching a point where it is now impossible to ignore the scarcity of the resource. It is also important that the dialogue now includes business partners as the World Economic Forum recognises the availability of good quality water as a principal business risk globally. Those countries that have relatively larger successes in meeting the water challenge have done it on the back of four principal pillars. Firstly, the water management in these more successful areas is informed by high levels of science, technology and innovation. The decision-making is highly informed, and water is a critical upfront consideration in any development plan. The second is good, well-maintained infrastructure. The third is the development and availability of large pools of skilled talent to plan, develop, operate and maintain the water management system at all levels. The fourth and in many cases differentiating factor in most systems is water-use behaviours across the spectrum from large industry and agriculture to the individual at household level. It is easy to see that each of these elements and the quartet as a whole depend fundamentally on levels of water literacy and consciousness and the model of water governance.

Freshwater governance, as it has been discussed in the realm of peer-reviewed papers and equivalent conferences, has been seized with models of institutional arrangements and the critique of the hierarchies of laws. This has certainly been the obsession in democratic South Africa over the past 19 years. The most important learning in the frustration of insufficient implementation of what has been deemed the best national water law in the world, the South African National Water Act of 1998, is that a smartly conceived internationally leading model law is not enough. That while such a law represents the apex summary of the governance basket, its effective roll-out depends on the building of the various governance building blocks using the blueprint of the law as both the design eventuality and an indicative roadmap. Water governance is seen as a multisectoral, dynamic process, a complex socioecological system involving continuous learning and the capacity to adapt

effectively to unpredictable outcomes, where the results of system interventions are not predictable.

Three main messages have emerged from the discussions and analyses that are summarised in the pages that follow. First, old forms of governance in both the public and private sectors are becoming increasingly ineffective. Second, the new forms of governance that are likely to be needed over the next few decades will involve a much broader range of active players. Third, and perhaps most importantly, two of the primary attributes of today's governance systems – the usually fixed and permanent allocations of power that are engraved in the structures and constitutions of many organisations and the tendency to vest initiative exclusively in the hands of those in senior positions in the hierarchy – look set to undergo fundamental changes.

The objective of this book is to illustrate, in broad terms, the general matters of freshwater governance, mapping the spectrum of decision-making, from a techno-centric and ecocentric approach, or a hybrid concept, to a people-centric approach, mapping the transition. The challenges to water governance models will be considered as well as examining the multilevel provisions, the integration challenge, the hierarchy for decision-making, the emergence of water-sensitive designs in urban as well as rural settings, the interdependencies between the stakeholders, the power play in inclusive participation and the issue of geographic scales and boundaries. This information will be presented in an integrated and a comprehensive way building on some detailed case studies from around the world. The set of book chapters presented in this volume will be based on the existing current knowledge as well as the authors' experience working in the water sector, using non-technical jargon in order to reach a wider audience. The target audience of this volume will range from academics, technicians, decision-makers and managers to students; the aim is to target not just academia but also policy-makers and deep thinkers.

There are 12 chapters in this book; in Chaps. 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12 the lead authors and their contributing authors share their experiences and introduce some novel approaches to freshwater governance, articulated as related issues in three main baskets: the first basket includes the framing of water governance issues from a water security dimension, a multilevel dimension, the transboundary dimension, a water integrity dimension and a regional/national dimension; the second basket offers some regulatory aspects such as market forces and regulation of achieving equity, development and sustainability; while the third basket is around governance mechanisms for portfolio-based urban planning and management, for inclusive governance, groundwater governance and governance futures in South Asia and Africa.

The main water governance issues are shared by **Chad Staddon**; the development and extension of water services infrastructure has been a key foundational element of industrialisation and urbanisation since at least the “Great Sanitary Awakening” of the mid-nineteenth century. As urban areas became both larger and more densely inhabited, the collective need for better water services (drinking water and sanitation in particular) became overwhelming. Cities simply could not grow beyond a certain relatively modest size without the simultaneous articulation of an

integrated water services infrastructure to replace the piecemeal local arrangements then in place. The mid-twentieth century completion (in Europe, North America and parts of Australasia) of the resulting “project” of mass provision of standardised water supply and sanitation services, explored elsewhere and called “hydromodernism”, was then followed by several waves of restructuring in the water services value chain, based particularly on new ideas about the respective roles of the public and private sectors, new technologies and water needs of the natural environment. Of course, in much of the developing world, even “hydromodernism” is as yet unattained and perhaps unattainable. In addition, rapid urbanisation in many developing nations has gone hand in hand with the growth of what are called “peri-urban” areas that combine “urban” and “rural” characteristics and present new challenges to water (and other) services provision.

Fortunately, they claim, there is a way of easily presenting the historical progression from a low to a higher level of water services provision. More to the point, it is possible to indicate the key drivers of water services development or, conversely, the key impediments to same. Cities around the world can be understood from the point of view of their location within the “urban hydrosocial transition (UHT)”, a historical geographical framework that sees cities as manifestations of successive “hydrosocial contracts” between agents of economic, political, cultural and technological change. This concept builds on work undertaken by Brown et al. (2011) on “water-sensitive cities”, Lundquist (2001) on the “hydrosocial contract”, Swyngedouw (2005) on “urban metabolism” and Thapa, Varady and Scott (2014) on “water security indices”. A key innovation offered here is the simplified three-part historical geographical schema based on a limited number of readily available key indicators and associated drivers. Brief case studies from around the world are presented by way of illustration.

Aziza Akhmouch offers an analytical framework to assess the impact of stakeholder engagement on water-related decision-making and policy implementation based on interdependent components. Citizens increasingly demand to be more engaged in how public policy decisions are made. In this environment, stakeholder engagement has emerged as a principle of good water governance. However, despite extensive research and case studies on the topic in recent years, the lack of evidence-based assessment on how effective engagement processes have proven to be in reaching intended objectives of water governance is striking. This chapter presents the key findings of an OECD study, which relies mainly on empirical data from a survey carried out across 215 stakeholders, within and outside the water sector and derived from 69 case studies collected worldwide. It suggests an analytical framework to assess the impact of stakeholder engagement in water-related decision-making and policy implementation, based on interdependent components, i.e. drivers, obstacles, mechanisms, impacts, costs and benefits.

Results highlight the need for better understanding of the pressing and emerging issues related to stakeholder engagement. These include the external and internal drivers that trigger the engagement processes, arrival of new entrants that ought to be considered, innovative tools that have emerged to manage the interface between multiple players and types of costs and benefits incurred by engagement at policy

and project levels. This chapter concludes with policy guidance to decision-makers and practitioners in the form of overarching principles on how to set up the appropriate framework conditions for inclusive water governance.

Evidence presented in this chapter demonstrates that decision-makers who adopt a systemic, inclusive approach to water governance are likely to get a better return on the time and resources they invest. They will also be better equipped to handle stakeholder issues and risks more effectively.

For engagement processes to be relevant, a careful balance is required between what they try to achieve, the resources they require and whether they succeed in reaching the intended objectives. Decision-makers at all levels have a critical role to play in establishing the enabling environment for result-oriented, effective and impactful stakeholder engagement. Although engagement processes cannot be easily replicated from one context to another, the OECD proposes six principles for creating the necessary conditions for inclusive water governance.

Anton Earle defines transboundary watercourses, including rivers, lakes and aquifers (confined and unconfined), shared between two or more countries that are home to over 70 % of the world's population and supply water for roughly 60 % of the global food production. It is no surprise that the management of these watercourses has been entrusted to national states, which have the power to make sovereign decisions over their management, use and conservation. State sovereignty is mitigated through the existence of a global institutional framework comprised of customary international water law (the norms dictating how states behave), global and regional conventions, basin-level agreements and basin management organisations. The good news is that there is a large body of joint institutions between countries with transboundary watercourses, the UN estimating that around 3 600 exist. This in part explains the relative lack of military interstate conflicts. Less good news is that despite the existence of international and basin-level agreements and basin organisations, the benefits to be expected from international cooperation around transboundary watercourses have in most cases not materialised. Acute, persistent and seemingly intractable problems persist, with ecosystem degradation not being reversed, joint investments in water infrastructure not materialising and joint management organisations failing to attract significant long-term support from the respective basin states. Despite at least two decades of concerted support by the international development community, the impacts of enhanced interstate cooperation are noticeable through their absence.

This chapter investigates why this may be so and introduces a starting point which moves beyond the state-centric approach to transboundary water management. In doing so it does not challenge the sovereign right of states to manage their watercourses; instead it shows how a range of non-state actors do in fact influence state practice through a variety of mechanisms. As these mechanisms are frequently covert, it becomes difficult to assess the integrity of the relationships between actors, in turn making public engagement and participation difficult. Needed is a governance paradigm which opens the decision-making arena to non-state actors all in support of the national governments and their respective mandates. This chapter ends with an indication of what such a governance arrangement might look like

across the four success factors identified in the introduction of this book, namely, science-informed decision-making, investments in appropriate infrastructure, development of skills and talent and the water-use behaviour of stakeholders.

Richard Meissner argues that the establishment of a governance institution like a river basin organisation is not only a governmental activity. Neither does its establishment only revolve around the stipulations contained in regulatory mechanisms and policies. Establishing a river basin organisation, like a Catchment Management Agency (CMA), involves a number of actors or stakeholders from both the governmental and non-governmental spheres. There are practices involved in their establishment that go beyond regulatory mechanisms and often bring in personal experiences and the overall political landscape as well as administrative development trajectories. He and his contributing authors reflect on some of the administrative processes as a way to discern noticeable practices in the establishment of CMAs. The case study material is South Africa's CMA establishment process to date. Some of the practices that come out strongly are human resource issues and financial accounting practices that practitioners need to consider when establishing such a river basin organisation. This chapter is based on research conducted for South Africa's Water Research Commission between 2014 and 2016. The process of establishing the *Flussgebietsgemeinschaft Elbe* in Germany is also outlined to illustrate the similarities and differences in the experience of establishing a river basin organisation in a developed and developing country.

Multilevel governance is at the order of the day when considering the case of South Africa's CMA establishment process. The establishment process is not only about pitfalls and challenges; there are also opportunities to take advantage of. One such opportunity is the knowledge of public administrative processes held by DWS officials. Such knowledge can be a defining resource between a successful and stalled establishment process. The identified practices and conclusions drawn should not be seen as a set of recommendations for policy-makers and stakeholders involved in CMA establishment processes only but also for scientists researching the process. Scientists are, after all, also stakeholders when they research CMAs and may also be involved in some of the CMAs currently being established. The research has shown a strong link between the successes or challenges of the establishment process and the way in which CMAs operate. This is an area where further research is needed as the process of establishing the other seven CMAs progresses.

In his chapter, **Håkan Tropp** contends that in most countries, water crises are not primarily driven by resource scarcity but by governance failures. A fundamental argument put forth is that the water sector is prone to corruption that leads to very dire consequences for sustainable, efficient and equitable water use, access and allocation. It has contributed to severe limitations in water reform implementation, where processes of decentralisation and privatisation sometimes rather have opened up for new groups to exploit the system, despite that arguments of better transparency and accountability were used to institute such changes in the first place.

This chapter outlines that lack of water-related integrity incurs huge cost for societies, in lives lost, stalling growth, wasted talent and degraded resources. For

example, corruption fuels unfair distributions of costs and benefits between different user groups or completely excludes certain groups of a particular water use. It can also be a strong driver to falling groundwater tables and diminishing ecosystem services due to unaccounted water withdrawals of lakes and rivers. It increases transaction costs and implies very high investment risks for both public and private investors. In sum, increased sustainability, equity and efficiency of water resources and services allocation; access; and use will in many places be very hard to come by – or attained at a much higher cost – without improving integrity.

Water integrity is defined as the adherence of water stakeholders and institutions to governance principles of transparency, accountability and participation, based on core values of honesty, equity and professionalism. In a more practical sense, integrity can refer to how well governance regimes or systems adhere to the rule of law, predictability in decision-making procedures and outcomes and if decisions hold up for public scrutiny and to what extent they can withstand different types of vested interests and corrupt practices. Corruption in water is used as a particular case to highlight issues of water integrity. Integrity is strongly manifested in water decision-making, and the level of integrity plays a critical role in deciding the outcomes of decision-making, that is, who gets what water, when and how.

Based on country examples, this chapter identifies corruption hot spots in the water sector such as the initial phases of procurement processes, kickbacks in awarding contracts or delivering water services (irrigation and drinking water supply) and political capture of administrative processes. It also identifies and synthesises country-based examples of transparency and accountability measures to improve integrity. They argue that it is much overdue to start to speak about the politically sensitive and unspoken drivers and consequences of corruption in the water sector and above all to make a systematic and coherent effort to improve water integrity. This chapter points towards a need to strongly include integrity- and corruption-related issues in the analysis of and policy responses to water crises. Not only is there a need for changed behaviours among public and private water decision-makers and users but also high time for setting in place a strong research agenda to assess impacts of corruption in water and to contextualise policy responses and interventions to improve water integrity.

Claudious Chikozho submits that key actors in various developing countries are often confronted by difficult choices when it comes to the selection and deployment of appropriate water governance regimes taking into account national socio-economic and political realities. Indeed, scholars and practitioners alike continue to grapple with the need to create the optimum water supply and allocation decision-making space applicable to specific developing countries. This chapter uses case studies to explore the utility of developmental statism and free-market economics as two major paradigms that have emerged in the face of enduring questions regarding how best to govern water supply systems in developing countries. Increasing pressure on available natural resources may have rendered obsolete some of the water supply systems and governance regimes that have served human societies very well for many decades. It is clear that national water supply governance paradigms tend to change in tandem with emerging national development theoretical

frameworks and priorities. Each nation feels compelled to adopt a particular framework to fulfil its unique needs. While many developing countries have adopted water policy prescriptions from the international arena, national and local socio-economic and political realities ultimately determine what works and what does not work on the ground. Thus, the choice between free-market approaches and developmental state-oriented approaches is never simple. Indeed, the majority of countries rely on a mix of market economics and developmental statism to make their water governance regimes more realistic and workable on the ground.

The authors conclude by stating that it is always important to remember that in water governance, context matters. National water supply governance paradigms tend to change in tandem with emerging national development theoretical frameworks and priorities. Each nation feels compelled to adopt a particular framework to fulfil its needs. In practice, more and more water utilities and planning agencies have been shifting their focus towards exploration of water supply system efficiency improvement possibilities, implementation of options for WDM within the confines of IWRM, equitable reallocation of water among competing users and uses to reduce consumption and meet future water demand. While many developing countries have adopted water policy prescriptions from the international arena, national and local socio-economic and political realities ultimately determine what works and what does not work on the ground. Thus, the choice between free-market approaches and developmental state-oriented approaches is never simple. Experiences across the globe indicate that careful analysis of local socio-economic and political conditions is crucial before deploying specific water supply governance frameworks. Application of the principles of sustainability and equity will help bridge the gap between diverse and competing interests and unleash the potential for more innovation in water supply governance.

In her chapter, **Barbara van Koppen** explores rights-based freshwater governance. The UN recognition of a human right to water for drinking, personal and other domestic uses and sanitation in 2010 was a political breakthrough in states' commitments to adopt a human rights framework in carrying out part of their mandate. This chapter explores other domains of freshwater governance in which human rights frameworks provide a robust and widely accepted set of normative values to such governance. The basis is General Comment No. 15 of the Committee of Economic, Social and Cultural Rights (CESCR) in 2002, which states that water is needed to realise a range of indivisible human rights to nonstarvation, food, health, work and an adequate standard of living, and also procedural rights to participation and information in water interventions. On that basis, this chapter explores concrete implications of the Comment for states' broader infrastructure-based water services implied in the recognised need to access to infrastructure, rights to non-discrimination in public service delivery and respect of people's own prioritisation. This implies a right to water for livelihoods with core minimum service levels for water to homesteads that meet both domestic and small-scale productive uses, so at least 50–100 l per capita per day. Turning to the state's mandates and authority in allocating water resources, this chapter identifies three forms of unfair treatment of small-scale users in current licence systems. As illustrated by the case of South Africa, the legal tool

of “Priority General Authorisations” is proposed. This prioritises water allocation to small-scale water users while targeting and enforcing regulatory licences to the few high-impact users.

The authors discuss how international human rights instruments in general and the CESCR General Comment No. 15 on the human right to water in particular provide a robust normative system that is well able to address end goals of human well-being across the key mandates of the water sector, namely, infrastructure development and water resource allocation. While the recognition of a justiciable and enforceable right to water for drinking, personal and other domestic uses and sanitation has been an important milestone in closing the disconnection between the state as duty-bearer for human rights and the state as investor in water infrastructure and regulator, the authors argue that this has only been a very partial interpretation of the underpinning General Comment No. 15 of the Committee on Economic, Social and Cultural Rights. The same Comment also indicates priorities in other freshwater governance domains to realise the substantive rights to livelihoods, food, health and an adequate standard of living. This has concrete implications for the state’s infrastructure-based water services. Poor people’s productive water needs should be fully recognised and met in a non-discriminatory manner. The definition of a core minimum should not be assumed to be for domestic uses only but should include water for small-scale productive uses at and around homesteads as well. This priority for multiple basic uses is already a widespread practice, but often still seen as “illegal” by sectoral professionals who design single-use infrastructure. An inclusive people-driven planning process for infrastructure services will spontaneously identify such multiple priorities.

The identification of these further implications of General Comment No. 15 underlines this chapter’s premise that human rights frameworks provide the indispensable normative framework for the twenty-first century freshwater governance.

Raymond Ison explains how mechanisms for inclusive governance are built on the framing choices that are made about governance and that which is being governed. His chapter unpacks how governance can be understood and considers different historical and contemporary framings of water governance. A framing of “governance as praxis” is developed as a central element in this chapter. What makes governance inclusive is explored, drawing on theoretical, practical and institutional aspects before elucidating some of the different mechanisms currently used or proposed for creating inclusive water governance (though we argue against praxis based on simple mechanism). Finally, the factors that either constrain or enable inclusive water governance are explored with a focus on systemic concepts of learning and feedback.

An inclusive, systemic approach to freshwater governance begins by making the distinction between situation and system; no one governance situation is the same so contextual design and application are needed even if some of the principles and practices employed are held in common across contexts. In this chapter the authors have given considerable attention to framing issues and the role of language. All metaphors bring forth an associated system; in other words language precedes system. In fact, the choice to see a freshwater river as a system is a framing choice – the

system does not precede the choices that different actors make. In this chapter the authors have presented a narrative that supports their normative position – that it makes sense to see freshwater systems as coupled social-biophysical systems so that, in a human-induced climate change world, the relational dynamic between and within the social and biophysical will benefit from moving towards forms of inclusive, systemic governance.

Jennifer McKay presents a portfolio-based approach to planning and management and argues that rapid urbanisation, growing urban populations, environmental issues and climate change all present significant challenges for water resource management, the delivery of essential water and sanitation services and environmental protection. As a result, traditional approaches that have relied heavily on large-scale infrastructure development are making way for new approaches such as the portfolio-based approach to planning and management. In an urban context this includes integration of all components of the urban water cycle, and most state governments in Australia have embarked on implementing this integrated approach by having a mix of water supply sources including demand management and conservation measures. However, effective implementation of this approach depends on policies and regulations and encounters various impediments. Accordingly, this chapter focuses on the City of Adelaide in South Australia and explores the legal and policy challenges for implementing an integrated urban water management plan in Metropolitan Adelaide. Drawing on the results of governance studies carried out in Australia that included a literature review and stakeholder and community surveys, this chapter attempts to better understand the barriers to transitioning Adelaide to a water-sensitive city.

With regard to implementing an integrated urban water management strategy in Australia, there is no “one size fits all” structural arrangement. Although there is growing support for implementing a portfolio of water supply sources, it is also true that there are impediments to implementing this approach. The authors caution that achieving (cultural) transformations to encourage institutional change for implementation of an integrated urban water management approach may take several years, and therefore planners and policy-makers must have a long-term framework for addressing these issues. Looking ahead, there is scope for further research to explore the intergovernmental issues and provide models to enable this transition and hence be a model for the world in portfolio approaches.

Marguerite de Chaisemartin provides an overview and thus contributes to a better understanding of the world’s groundwater resource, its distinctiveness and its governance – describing the principal elements of and key instruments employed in groundwater governance. To this end, the authors introduce several case studies from across the globe and offer some corresponding lessons learnt. In particular, this chapter presents an analysis of the role of monitoring and assessment in groundwater governance, showcasing the example of the Netherlands. A global diagnostic of the current state of groundwater governance is provided, based on information from a set of commissioned thematic papers and the outcomes of five subsequent regional consultations carried out within the framework of a GEF-supported project on Global Groundwater Governance. It includes insight into some of the findings of

that project as regards the four main components of groundwater governance: actors, national legal frameworks, policies and information and knowledge. In addition, the authors address the issue of governance of transboundary groundwater resources and the relevant existing international legal frameworks. In conclusion, through a Global Vision for 2030, this chapter presents a way forwards to govern groundwater and a framework for action to achieve good governance, formulated by the Groundwater Governance Project jointly implemented by UNESCO, FAO, World Bank and IAH.

To achieve the goals of the Shared Vision 2030, a Framework for Action has been developed. It describes the main steps to be taken, provides guidance on planning and prioritising actions and is an urgent call for action to all who can make a difference: national and local governments, international organisations, the private sector, civil society, media, educational institutions and professional organisations – but also well owners, groundwater users and concerned citizens everywhere. The main steps elaborated in the Framework for Action are understanding the context, creating a basis for governance, building effective institutions, making essential linkages, redirecting finances and establishing a process of planning and management.

The Shared Global Vision for Groundwater Governance 2030 and the Global Framework for Action to achieve the vision on Groundwater Governance call for strengthening groundwater governance. This call for action urges countries, districts, communities, companies, organisations and individuals to safeguard the groundwater resource that is essential to meet their common future objectives and Sustainable Development Goals. This Framework for Action is designed to set in place the groundwater governance arrangements that will achieve this vision.

Doug Merrey explores the likely trends and outcomes in water governance with a particular focus on cooperation and conflict over the management of water resources in two regions: South Asia and Southern Africa. With its extremely large-scale shared river basins inhabited by nearly a billion mostly poor people, South Asia has struggled to find ways to co-manage water resources to benefit everyone equitably in a context where there is much potential benefit to be achieved. Southern Africa is considered an example of relative success in developing ways to cooperate – but implementation is incredibly complex in systems more water scarce than South Asia, though not as large. They examine the prospects for developing governance arrangements in the two regions through three “lenses” which they characterise as “beyond disciplines”, “beyond scales” and “beyond ‘institutional’ hardware to ‘human’ software”. Even those who have advocated for the role of institutions above, individuals have conceded, as noted for South Asia, that the behaviour of individuals within organisations determines the outcomes. More research needs to be conducted on the role of the individual in actively addressing complex water-related challenges, in redefining how multiple sectors cooperate around these issues and ultimately influencing socio-economic development at the regional level.

At present, governance structures, organised nationally and transnationally on a basin scale in both regions, presume that “stakeholders” can adequately represent themselves in formal settings where allocation, use and management decisions are

taken. This is problematic in at least three ways, namely, where rural areas are divided in terms of large-scale, cash crop producers and small-scale producers (Southern Africa) or in terms of wealthy expanding urban centres and small-scale producers (South Asia); in urban areas divided between the rich few and the many poor and where dominant narratives and framing concepts such as “climate change-induced scarcity” and “closed basins”, to name but two, reinforce path dependencies, as the “haves” aim to hold onto what they have and to extend their water “rights” where possible. The authors argue that, if left unattended, these three factors will not only reinforce social inequity, economic inefficiency and ecological unsustainability, they also heighten the likelihood of conflict among “stakeholders” at a wide variety of scales: within the state, within the city, across the countryside and across state borders.

The authors conclude that the prospects seem good in Southern Africa, if the countries can move from talking to investing and creating a more integrated regional economy. The potential is great but prospects are less rosy in South Asia with its growing challenges in providing water and power services. Without stronger regional networks, partnerships and institutions supported by external facilitators, South Asia may fail to take full advantage of its water resources to achieve better lives for its people by 2030.

1.1 Reflections

We believe that this book goes beyond what is already known and explores largely unknown territory. The issues and arguments presented here are discussed clearly and convincingly. Our hope is that readers will be persuaded, enriched and inspired by the discussions of the issues.

When under pressure, water can carve new paths to flow; the same can be said for its governance. However, the water governance evolutionary path is non-linear, and hence it is very difficult to predict what it might look like in the future. However, in this book, we hope the reader will be able to identify with some signals or flags that point to the progress made in understanding and executing the governance of freshwater. As many of the authors have pointed out, it is always important to remember that in freshwater governance, context matters.

While the book has avoided providing a universal definition for water governance, I would venture to define it as a process through which society and the economy are prodded in a vector towards common goals for the benefit of society as a whole. It can be produced through and in different modes of hierarchy, through markets or through networks that emphasise the interactive nature of making decisions to deal with wicked problems. A combination of the different modes would exist depending on the framing of the water problems.

In the past, decisions around freshwater governance were made by central administrations that initially focused on the provision of services to the elite through engineering solutions. This has evolved into acknowledging a number of facts: that

all users have a stake and can potentially benefit the governance of water by taking part in decisions relating to managing water at local, national or regional levels; that access to water cannot be coupled with the ability to pay for services and that the building of large dams as a solution to water supply problems needs to be coupled with alternative solutions, such as more sustainable and efficient use of local resources.

The ability to pay for water services is no longer a differentiator for who gets access to the resource. There is recognition of the fact that access to a certain essential amount of water is a fundamental human right and that provision needs to be made for nature to sustain its ecosystems and biodiversity (South Africa is one of a few countries in the world to make legal provision for a water allocation to the environment). Green growth offers a broad range of social, environmental and economic benefits: societies benefit through increased stability of water supply, improved water quality, reduced health risks and potentially fewer water restrictions; environmentally, the benefits include improved water quantity and quality to meet ecological reserve requirements and improved ecosystem service provisioning, encouraging water reuse and recycling, as well as reducing the ecological footprint; and economically, benefits are derived by reducing the economic losses due to environmental degradation, improved environmental accounting, well-timed infrastructure investments and the creation of green jobs in areas such as ecotourism and sustainable fisheries.

The implications of climate change uncertainties, mainly rainfall in its spatial and temporal distribution, are hampering the traditional approach of building dams as a solution to lack of water in certain locations. There are more successful examples of local water technologies that point to the building of more water-sensitive structures that imitate nature in ways able to enhance adaptation and mitigation of climate changes and allowing for greener solutions.

An important dimension which is not covered adequately in this book is the pricing of water. In a development context, the adoption of the green growth approach could be regarded as supporting a strategy of decoupling economic growth and jobs from resource exploitation and climate damage, to sustain economic growth and alleviate poverty. Well-managed water systems can be an important driver for economic growth, particularly in water-scarce countries that experience suppressed demand. Efficient water pricing, specifically calculating a price that reflects the true value of water, has a large part to play in this endeavour, as it helps to overcome certain barriers that include market constraints and distortions that can reduce the overall benefits that accrue to society. Incorporating The Economics of Ecosystems and Biodiversity (TEEB) concept adds an economic dimension and could guide the choice and design of policy instruments for the pricing of natural resources, particularly where natural resources are scarce and under pressure. One can argue that it is often the poor who are most exposed and most vulnerable to ecological damage, and thus internalising TEEB in water pricing systems can become a powerful water equity policy instrument.

Another aspect that is not adequately covered is data governance. There are some fundamental advances around unstructured and structured data that point to a future

where data governance is more converged and transparent. Data sources are currently more divergent and scattered than ever before. With more interest of users in protecting water resources and the advances in mobile mapping and remote sensing technologies, availability of data is diverse and variant. Today it is likely that (younger) employees are using texting, Twitter and even WhatsApp, tied to Facebook, to share information in a work context. With data stored in ever more increasing locations, how do we distinguish between work and personal data and select quality data for long-term storage and retrieval? And, given the increasing levels of stakeholder involvement and the growing number of interdisciplinary dialogues, how is non-text data saved and analysed, and what are the rules and regulations that could govern that? Perhaps the solution lies in providing access to real-life data that has the ability to secure stakeholder confidence levels, process adherence levels and enhance overall participation levels capable of responding to eminent changes and disasters.

In the uncertain global economic future, there are forces at play between the current capitalist dominance and the eroded socialist doctrines. For all people to benefit, the freedom to make choices remains the secret of true development through being afforded development options and the ability to make those choices. Until we reach this empowerment level, water will remain an important topic for its professionals and the stakeholders who benefit. The governance of water needs to go beyond disciplines, beyond scales and beyond the institutional hardware to the human software. The future of water governance is about the promotion of the human software as embedded within a broader political system.

When defining the governance mechanisms, there is a need for framing the theoretical, practical and institutional tool boxes afforded in the specific contexts. Framing governance requires documenting good practices and is very important for learning which needs to happen not only within water management institutions but also by all stakeholders at the various levels. Localised successes of good water management face the challenge of amplified implementation and upscaling mainly due to contextual variation. While leapfrogging can help in identifying workable solutions, there is a need for context-specific tool boxes that can be helpful in the implementation of good water governance.

Open Access This chapter is distributed under the terms of the Creative Commons Attribution-Noncommercial 2.5 License (<http://creativecommons.org/licenses/by-nc/2.5/>) which permits any noncommercial use, distribution, and reproduction in any medium, provided the original author(s) and source are credited.

The images or other third party material in this chapter are included in the work's Creative Commons license, unless indicated otherwise in the credit line; if such material is not included in the work's Creative Commons license and the respective action is not permitted by statutory regulation, users will need to obtain permission from the license holder to duplicate, adapt or reproduce the material.



Chapter 2

The Establishment of Catchment Management Agencies in South Africa with Reference to the *Flussgebietsgemeinschaft Elbe*: Some Practical Considerations

Richard Meissner, Sabine Stuart-Hill, and Zakariya Nakhooda

Abstract The establishment of catchment management agencies goes beyond the involvement of governmental entities or the stipulations contained in regulatory structures and policies. A number of actors or stakeholders from both the governmental and non-governmental spheres are involved in establishing a CMA. Practices that are associated with CMA establishment often relate to personal experiences and the overall political landscape as well as administrative development trajectories. These are also context specific to the respective catchment. We reflect on some of the administrative processes as a way to discern noticeable practices in the establishment of CMAs. Our case study material is the South African CMA establishment process to date. Some of the practices that come out strongly are human resource issues and financial accounting practices that decision-makers need to consider when establishing CMAs. An appreciative relationship with key stakeholders, meeting them personally, is also crucial. The chapter is based on research commissioned and funded by South Africa's Water Research Commission between 2014 and 2016. The process of establishing the *Flussgebietsgemeinschaft Elbe* in Germany is also outlined to illustrate the similarities and differences in the experience of establishing a river basin organisation in a developed and developing country.

Keywords Catchment management agency • Administrative process • Breede-Gouritz CMA • Inkomati-Usutu CMA • Lessons learnt

R. Meissner (✉)

Council for Scientific and Industrial Research, PO Box 395, Pretoria 0001, South Africa

Centre for Water Resources Research, University of KwaZulu-Natal,

Private bag X01, Scottsville 3209, South Africa

e-mail: Rmeissner@csir.co.za

S. Stuart-Hill • Z. Nakhooda

Centre for Water Resources Research, University of KwaZulu-Natal,

Private bag X01, Scottsville 3209, South Africa

© The Author(s) 2017

E. Karar (ed.), *Freshwater Governance for the 21st Century*, Global Issues in Water Policy 6, DOI 10.1007/978-3-319-43350-9_2

2.1 Introduction

The establishment of a river basin organisation like a catchment management agency (CMA) might seem like a straightforward process where structures of rule, such as government acts and policies, stipulate how and why such organisations need to be established. A perception like this can be deceiving, especially when one considers the role and involvement of various actors in the establishment process. The difficulty does not always arise in the interpretation of an act, but starts when one defines what governance and its purpose is, especially beyond management interventions and enforcement of law. For us governance is not only about government and legislation or the linear cause and effect constituted by causal mechanisms such as the drafting and promulgation of legislation. Governance is more complex and involves various feedback loops (e.g. Meissner and Jacobs 2014) in any governance endeavour. Governance takes place at multiple levels in society and through multiple processes. The multilevel pathways of governance are influenced by both institutionalised governance mechanisms, like regulations, and non-institutionalised mechanisms such as norms and principles (Meissner and Jacobs 2014). We define governance as (often non-harmonious) interactive socioeconomic and political forms of governing (Rhodes 1996; Meissner et al. 2013) between various non-state and state actors, including individuals, to create opportunities and solve problems (Kooiman et al. 2008) in society. To reiterate, during this governance process, both institutionalised and non-institutionalised mechanisms are at play.

We argue that multilevel governance is at the order of the day when considering the case of South Africa's CMA establishment process. The CMA establishment process dates back to the late 1990s when South Africa embarked on a reform process of its water legislation. Based on the participatory and open process of writing the White Paper on a National Water Policy for South Africa, the government designed and promulgated the National Water Act (No. 36 of 1998) in 1998. The act is explicit on the CMA establishment process, stating in exact terms how a CMA should be established, who should play what role and how the governing board of the organisation needs to be constituted (RSA 1998). Furthermore, the Guide to the National Water Act (DWAF n.d.) and the public document Water Management Institutions Overview (de la Harpe et al. n.d.) give more detailed definitions and guidelines that could assist the establishment process. Considering that governance is more than the activities emanating from government structures and legislative requirements, establishing an organisation like a CMA involves more than just government officials and the governing board of the CMA. Especially in the case of South Africa abolishing the old Water Act of 1956 (Union of South Africa 1956) and replacing it with a "new" act that embraces the right to water and well-being as laid out in the country's constitution and emphasises the elements of integrated water resource management (IWRM) in various ways (Stuart-Hill and Schulze 2010), the CMAs strongly represent social equity and transformation. Both these aspects are high on the political agenda in post-apartheid South Africa and by implication are linked to high expectations from water users.

This chapter reflects on some of the institutional and non-institutional aspects of governance in establishing the country's CMAs. The first section of the chapter deals with the CMA establishment process thus far. In this section we briefly examine the process since the idea of CMAs was first mooted in the late 1990s. We then reflect on the practices that we had identified during the face-to-face interviews and stakeholder meetings we attended for the research project. We end with a discussion and conclusion in which we make a number of recommendations of key aspects for successful CMA establishment.

2.2 Methodology

This chapter draws on the results of a 2-year research project we are currently conducting for the Water Research Commission, entitled *Lessons Learnt from the Establishment of Catchment Management Agencies* (K5/2320). The research team has been working with the CMAs and in their respective water management areas for a number of years. Thus the results presented here are drawn not only from the current investigation and conversations but also from past experience and data gathered for other research endeavours (e.g. Meissner and Funke 2014; Stuart-Hill and Schulze 2015). The approach we followed for the *Lessons Learnt* project was to conduct face-to-face structured interviews with various stakeholders or role players involved in the establishment process or those that had been part of the process in the past. To date we have conducted interviews with 27 individuals and attended three stakeholder meetings in the Breede-Gouritz and the Inkomati-Usutu CMAs,¹ as well as an interview with representatives of the *Flussgebietsgemeinschaft Elbe* (FGG Elbe) in Magdeburg, Germany.² We conducted this interview to investigate the process followed by a developed country in establishing a river basin organisation. The inclusion of the FGG Elbe interview may seem ad hoc; however, the comparison with FGG Elbe identifies the similarities and differences in the experience of establishing a river basin organisation elsewhere in the world. There are important ontological differences between the South African CMAs and the FGG Elbe that could enable decision-makers in both realities to learn from one another's experiences. Some observers might be tempted to argue against the inclusion of the FGG Elbe in that we are comparing "apples with oranges", so to speak. Nevertheless, as pointed out by Lijphart (1971), John Stuart Mill developed a method of comparing differences. In this case, we used deliberate randomisation to select the cases we

¹These CMAs were previously called the Breede-Overberg Catchment Management Agency and the Inkomati Catchment Management Agency. Their names have now changed, and we will refer to them by their new names throughout the text, unless we are looking at a significant process before their renaming.

²In July 2015 the lead author travelled to Hamburg, Germany, for a month-long research visit to investigate water security in Hamburg. This visit afforded the lead author the opportunity to visit the FGG Elbe, since Hamburg is a harbour city situated on the banks of the Elbe river.

would like to compare, namely, the South African CMAs with the FGG Elbe, in that the river basin organisations are alike “...with a very high degree of probability, but not with absolute certainty” (Lijphart 1971: 684) since they are all river basin organisations in different geographical and socio-political settings. The inclusion of the information gathered during the interview with the FGG Elbe representatives is not an end in itself, but an aid in the comparative method (Lijphart 1971) we are utilising to investigate the practical considerations in establishing CMAs in South Africa. Our argument is that this could provide a better understanding of the establishment of a river basin organisation in other parts of the world. The intention of the FGG Elbe interview was not to identify so-called best practices, but to gain a deeper understanding of motivations and context in establishing river basin organisations.

For the face-to-face interviews in South Africa, not only did we target individuals from the two existing CMAs, we also conducted interviews with government officials that are closely involved in the establishment of the remaining seven CMAs in South Africa, most notably, the Vaal CMA and Pongola-Umzimkulu CMA. The latter includes a lived experience from the current establishment phase through attendance of the steering committee meetings. During the interviews we asked stakeholders to reflect on the establishment process thus far. We also made a number of observations during the three stakeholder meetings. Through these observations we identified a number of processes that were deemed important by the interviewees for consideration in establishing the remaining CMAs. We then grouped the issues identified in the interviews into five categories, namely, structures of rule, not including stakeholders, finances and public administrative processes, the difference between the main and trading accounts of DWS and the management of stakeholder relations. Before discussing these practices, we will give a rendition, by way of a historical account, of the CMA establishment process to date.

2.3 The CMA Establishment Process

South Africa’s existing CMAs were established in terms of section 78(1) of the National Water Act (Act No. 36 of 1998) (RSA 1998). One of the main principles of the National Water Act is its focus on decentralisation. Decentralisation places an emphasis on public participation in water management and related decision-making processes. Decentralisation also rests on the subsidiary principle, which is encapsulated in the South African Constitution (RSA 1996). Subsidiarity means that those functions that can be more effectively and efficiently carried out by lower levels of government should be delegated to the lowest appropriate level (Funke et al. 2007; Meissner and Funke 2014). In this regard, the National Water Act and the Constitution are two structures of rule that are constitutive in the establishment of CMAs. Nevertheless, they are not the only causal mechanisms in establishing CMAs.

In October 1999, the government of South Africa established 19 water management areas (WMAs). The boundaries of these areas are along catchment divides and

do not coincide with the administrative boundaries of local and provincial government spheres. At that time, the government contemplated the establishment of 19 CMAs (Meissner and Funke 2014), one in each WMA. Since the promulgation of the National Water Act in 1998, the implementation of the legislation has been slow and problematic (Funke et al. 2007; Meissner and Funke 2014). These implementation problems also translated in the slow implementation of the envisaged 19 CMAs (Hattingh et al. 2004; Meissner and Funke 2014), with only two CMAs implemented to date, namely, the Breede-Gouritz and the Inkomati-Usutu CMAs. In 2012, the Department of Water and Sanitation (DWS) decided to reduce the 19 planned CMAs to nine; the minister approved the establishment of nine CMAs in the newly delineated nine WMAs. This move was due to a reconsideration of the management model and viability assessments related to water resource management, funding, capacity, skills and expertise in regulation and oversight. The decision was also an attempt to improve integrated water resource management. The nine CMAs are Limpopo, Olifants (Mpumalanga Province), Inkomati-Usutu, Pongola-Umzimkulu, Vaal, Orange, Mzimvubu-Tsitsikamma, Breede-Gouritz and Berg-Olifants (Western Cape) (DWA 2013). Currently and apart from the Breede-Gouritz and Inkomati-Usutu CMAs, the remaining seven CMAs are considered the so-called proto-CMAs since they are in the process of being established. Those proto-CMAs are managed by the respective regional offices of the DWS.

Thus, prior to the establishment of the Breede-Gouritz and Inkomati-Usutu CMAs, management of the water resources of the two catchments was the responsibility of the DWS regional offices in the Western Cape and Mpumalanga Provinces, respectively. Water management took place through the water management area's internal strategic perspective (DWAF 2004). In the case of the FGG Elbe, it was established to coordinate the implementation of the European Union's Water Framework Directive of 2000 and the Floods Directive of 2007 for Germany's federal states sharing the Elbe river basin. Prior to the establishment of the FGG Elbe, the German federal states sharing the Elbe river managed it in terms of Germany's national legislative framework.³

The CMAs will perform certain water management functions and are required to cooperate and seek agreement on water-related matters amongst various stakeholders and interested parties. In essence, CMAs are service delivery agencies and are listed in the Public Finance Management Act, 1999 (Act No. 1 of 1999). The CMAs are also linked to Treasury Regulations to ensure financial viability and good governance (DWA 2013). Catchment management agencies also have a mandate to develop a catchment management strategy. This strategy is a plan to "realise the protection, use, development, conservation, management and control of water resources in [a CMA's] respective WMA" (Meissner and Funke 2014: 185; DWAF 2004; Funke et al. 2007). The catchment management strategy therefore gives effect to the role and functions of a CMA. Various stakeholders were involved in the establishment of both the above-mentioned South African CMAs and followed a negotiation process guided by the regional offices of the Department of Water and Sanitation

³Personal communication, Sandra Naumann, FGG Elbe, 10 July 2015

(DWS)⁴ (McConkey et al. 2005). In the case of the Breede-Gouritz and Inkomati-Usutu CMAs, a reference group was established, consisting of representatives from various sectors, such as agriculture, local government, emerging farmers and the tourism industry. The DWS was the most notable stakeholder assisted by private consultants⁵ (Meissner and Funke 2014). These consultants assisted in the preparation of discussion documents and facilitation of meetings and focused on the interaction with role players around concerns and suggestions of stakeholders in their specific regions (MBB Consulting 2001). In the case of the FGG Elbe, ten German federal states were involved in its establishment. These federal states all share the Elbe river basin. Germany's Federal Ministry of the Environment was also involved in the establishment process. There is a similarity between the CMA's catchment management strategies and the FGG Elbe river basin management plan, in that in both cases the organisations had to develop their own river basin management plans.⁶

The original impetus for the establishment of the FGG Elbe was government or supranational (European Union) structures of rule or two European Union directives. It would appear that in the South African cases, the process, after government direction, viz. South Africa's National Water Act, was more decentralised with the involvement of various stakeholders from society and government. This was in line with the decentralisation vision set by the South African government in the post-1994 political dispensation, which favoured more involvement of organisations at grassroots level as opposed to the command-and-control vision of pre-1994 governments. From this discussion on the history of the CMAs and the FGG Elbe's establishment process, it is clear that governments or supra-governmental entities drove the process. When observing the history of CMA establishment from a macro-perspective (i.e. a process conducted and directed by government), hidden causal mechanisms at play can easily be ignored by observers. These hidden variables came to the fore during the interviews we conducted with the various stakeholders in South Africa and to a certain extent in Germany. The next section reports on these practices at play.

2.4 Stakeholders' Discernible Practices

Alluding to the brief description of the river basin organisations' establishment process, we can identify a number of practices. The first of these relates to the structures of rule mentioned above. The National Water Act is central to the CMAs in

⁴Between 1994 and 2009, this department was known as the Department of Water Affairs and Forestry (DWAFF) and between 2009 and May 2014 as the Department of Water Affairs (DWA). It is currently referred to as the Department of Water and Sanitation (DWS) (Meissner and Funke 2014).

⁵Personal communication, Derek Weston, Pegasys Consulting, 12 September 2012

⁶Personal communication, Sandra Naumann, FGG Elbe, 10 July 2015

that it gives the Minister of Water and Sanitation a strong influence to appoint the CMA's governing board. The governing board is to be the representative of all stakeholders within the WMA. Even so, the CMAs are at the same time quite autonomous and have mechanisms of democratic control, e.g. the establishment of relationships with similar organisations in other countries. The required CMS for each WMA and CMA also sets principles for water allocation and considers issues related to water resource protection, use, development, conservation, management and control. In the case of South Africa, these measures must be in line with the National Water Resource Strategy (Meissner and Funke 2014). However, a CMS is yet to be drafted for either of the established CMAs. This is largely due to the incorporation of other WMAs with the current CMAs.^{7,8} For instance, the Breede-Overberg WMA had been amalgamated with the Gouritz WMA. In the case of the Gouritz CMA, establishment of the CMA was put on hold until the amalgamation of the WMAs was completed. When the FGG Elbe implemented the Water Framework Directive, significant water management issues had been derived by the federal states at a river basin level such as river continuity, nutrient loads and chemical pollution, pollution from old industrial areas in the former German Democratic Republic (GDR), climate change and geomorphology in the river basin. These issues make the management of the Elbe river a constant challenge confirmed by representative from the FGG Elbe.⁹ This is something that South Africa's CMAs should expect when their strategies are implemented even when they are well established and functioning; everything could be a constant challenge because of pressures from various sectors and the CMAs will have to manage a complex natural resource system with the aim of socio-economic development.

Secondly, when it comes to the involvement of various stakeholders, the results of previous research studies conducted on the Breede-Overberg CMA have indicated that it is not always feasible to include all stakeholders in a water management area in the development of the CMS. This is one of the major hidden variables in the establishment of a CMA. The sheer number of people that want to attend meetings can draw out the process unnecessarily and make it time-consuming¹⁰ (Meissner and Funke 2014). The same applies to the Inkomati-Usutu CMA, where a series of five stakeholder meetings and workshops were held by the CMA over the period of a year (2010), specifically around the development of a CMS (Nyakane-Maluka and Jackson 2010). This has had a direct impact on the financial and human resource costs of establishing the agency. The question of involving a large number of stakeholders was an issue that also came up during interviews at the FGG Elbe. In this case, the officials explained that due to the involvement of ten different federal gov-

⁷ Personal communication, Johann Boshoff, Inkomati-Usuthu Catchment Management Agency, 23 June 2015

⁸ Personal communication, Phakamani Buthelezi, Breede-Gouritz Catchment Management Agency, 24 August 2015

⁹ Personal communication, Sandra Naumann, FGG Elbe, 10 July 2015

¹⁰ Personal communication, Derek Weston, Pegasys Consulting, 12 September 2012

ernments, assortment of economic and political interests and aims in the management of the Elbe river came to the fore and had to be negotiated. They also had different structures of rule influencing, for instance, the monitoring of river health. This can lead to a long and time-consuming process to reach agreement on certain issues.¹¹

In terms of financial and human resources, establishing a CMA can be a demanding and taxing process from a public administrative perspective. This is the third practice that has emerged from the interviews. Regarding human resources, for instance, the process can require a large number of consultations with employees from the government department that need to be transferred to the CMA once it has been established. One issue that needs consideration is that the offices of the CMA might not be located near the regional or national offices of the DWS. This means that employees that had been travelling to the regional and/or national office(s) now might need to relocate to a different town so they can be closer to their place of employment. This is the case with the Vaal proto-CMA currently being established, which might be situated near Rand Water's head office to the south of Johannesburg. To transfer employees from the DWS offices in Pretoria will further involve labour relation matters.¹² Some employees might feel that they do not want to be transferred because of personal reasons. This will involve the negotiation of transfer policies not only at individual level, but labour unions also need to be involved. It is likely that this may lead to resistance from employees and low morale because they are uncertain about the implications of such human resource practices. This process therefore needs careful management and will have to be conducted in a thoroughly transparent manner.

On a separate note, transfer agreements will involve matters such as employees' pension funds, medical aid, salaries and salary levels, systems for salary payments, labour union representation, leave management and so on. In addition to the administrative processes involved regarding human resources, employees' perceptions around uncertainties regarding employment security must also be taken into account.¹³ Change management therefore becomes an important process in the establishment of a CMA.

Fourthly, the difference between a trading entity and the main account of the DWS needs to be considered. This is a distinctly South African matter. A trading entity is funded from water users that pay for the water they consume, like irrigation boards. Department staff members of such trading entities are paid salaries from the trading account. The main account is the funding or budget that the DWS receives from National Treasury. The challenge with this difference is that corporate management of the DWS, excluding finance, has been servicing both accounts and the accounts of the staff members that might be transferred had also been serviced from both accounts. One way of getting around this administrative issue is by seconding people to the CMA once it has been established; that will give added support to the CMA when it is operating sustainably. Another challenge is that hydrometry

¹¹ Personal communication, Sandra Naumann, FGG Elbe, 10 July 2015

¹² Personal communication, Sydney Nevhorwa, Department of Water and Sanitation, 10 June 2015

¹³ Personal communication, Sydney Nevhorwa, Department of Water and Sanitation, 10 June 2015

services might also move to the CMA from the main to the trading account. This will also be the case for water use and regulation where budgets need to be transferred in the same way. The issue with this is that the functions of these units are linked to the type of account and moving the units will have human resource implications. For instance, service-level agreements need to be in place between the CMA and the regional and national offices so that the services to be supplied by the DWS and/or CMA need to be well defined and stipulated.¹⁴

Effective management of stakeholder relations is another important component of CMAs, and this is the fifth practice identified by the authors. We also observed this practice when interviewing the representatives of the FGG Elbe. For the FGG Elbe, stakeholder relations are not only an important communication endeavour (e.g. keeping stakeholders abreast of what is happening in the river basin and flood warning) but also necessary in the daily functions like river health monitoring.¹⁵ We argue that without good stakeholder relations, decentralisation cannot be adequately achieved since decentralisation involves the interface (e.g. communication) between authorities and stakeholders at grassroots level. In this regard, both established CMAs have relatively close and remarkably good relationships with stakeholders. These relationships, as with any relationship, had to be built from the onset. For instance, initially, stakeholders were reluctant to engage with the Breede-Gouritz CMA owing largely to challenging experiences with the regional/national DWS offices. For instance, some individuals in stakeholder groupings have been waiting on DWS for numerous years with regard to licencing applications.¹⁶ Because of this matter, stakeholders wanted to know whether the CMA would be any different from the way in which DWS carries out water-related activities and tasks. In other words, there is an expectation from stakeholders that the CMA will, in certain instances, do a “better job” than the DWS. The onus was on CMA staff attending the meetings to persuade the stakeholders firstly to participate in stakeholder meetings and explain the benefits of these meetings and secondly to give members the assurance that the past is the past and that the CMA would have other options at hand to assist stakeholders with their needs.¹⁷

2.5 Conclusion and Recommendations

The establishment of a CMA does not happen overnight. There are a number of issues that need to be considered by policy-makers and stakeholders involved in the establishment process. Structures of rule are important constitutive aspects in the

¹⁴ Personal communication, Sydney Nevhorwa, Department of Water and Sanitation, 10 June 2015

¹⁵ Personal communication, Sandra Naumann, FGG Elbe, 10 July 2015

¹⁶ Attendance of a stakeholder meeting with the Breede-Gouritz Catchment Management Agency staff, 20 August 2015

¹⁷ Attendance of a stakeholder meeting with the Breede-Gouritz Catchment Management Agency staff, 20 August 2015

establishment of a river basin organisation. We have seen this in the case of South Africa's CMAs and the FGG Elbe. Nevertheless, structures of rule are not enough. There are other variables also at play in the establishment of river basin organisations and their subsequent governance. Variables that are important in this regard are the involvement of stakeholders during the pre-establishment phase and stakeholder relations after establishment. These are important aspects which require careful management in order for the CMAs to achieve their objectives of decentralised, participatory, sustainable water resource management.

The sheer number of stakeholders involved during the pre-establishment phase was an issue not only for South Africa's CMAs but also for the FGG Elbe. It became a complex affair in both cases because stakeholders bring with them their own issues, perceptions, expectations and interests. With regard to the financial aspects of CMAs' operations, there are no issues currently, but for future development of the CMA, this may be a constraint. The DWS should continue to provide financial support to the CMA even after the CMA starts receiving water tariffs. This would not only highlight the support of the DWS of a decentralised approach to water resource management, but will also enhance staff morale and give the CMA the ability to carry out an even wider range of tasks in developing water resources sustainably. There is also a need for participatory management as well as implementing the vision of equity in water resource management and the achievement of water security, which would further enable the CMA to play its role as catchment steward. The DWS could also consider phasing out such financial support; at this stage it is impossible to reach a definite conclusion as to what the results of this action might be, since there is no past experience of this in South Africa. It would therefore be premature to say that it could jeopardise the financial viability of the CMAs.

Currently, stakeholder relations between the CMA and members within the WMA are relatively good in the two established and operational CMAs. This is also the case with the FGG Elbe where they keep stakeholders abreast of current affairs in the Elbe river basin. It would appear that the CMAs and the FGG Elbe have put a high premium on stakeholder relations. This is something that will stand these organisations in good stead for their future governance endeavours. However, in the case of CMAs, there is room for improvement when it comes to perceptions regarding the involvement of DWS in the establishment process. Trustworthy and constructive stakeholder relationships are central to the effective and efficient management of water resources and to an extent the success of CMAs. From current observations of several stakeholder meetings, we observed that DWS officials often arrive late for these meetings and failed to cater to the needs of attendees, therefore adding to the negative perceptions of the DWS. What is more, language can be a barrier since people, especially those in the rural areas, are more comfortable getting and delivering messages in their native language. This is something the CMAs also need to consider.

Furthermore, currently the CMAs have an adequate staff complement. Nevertheless, adequate does not mean that there are no shortages. Certain areas, such as water quality monitoring, require sufficient technical staff. This seems to be an issue at the Inkomati-Usutu CMA as they outsource the testing of their water

samples. Sample testing has a very long turnaround time due to issues with the laboratory. If the CMA had its own functioning laboratory, test results would be obtained a lot faster, and more water samples could be tested. However, the establishment and operation of a laboratory have its own logistical challenges, one of which is accreditation from applicable regulatory bodies like the South African National Accreditation System (SANAS); these factors should be carefully considered before making a decision regarding an independent laboratory.

Within the establishment phase of CMAs, DWS could provide more resources and guidelines with regard to the initial functions of CMAs. This could enable the CMAs to begin operations fully understanding their roles and responsibilities. A comprehensive list of initial functions, including processes and tools, beyond what is mentioned in the National Water Act of 1998 and possibly in the National Water Resource Strategy (DWA 2013), needs to be produced so that staff have an understanding and adequate guidance as to what is required of them. It would be advisable to include a staff member with a legislative background in the establishment and operational process. In order for the CMA to provide adequate monitoring and enforcement, individuals with an understanding of environmental law should be included as the CMA receives its full delegation. This was lacking with regard to the Inkomati-Usutu CMA as well as the Breede-Gouritz CMA.¹⁸ The establishment of a proto-CMA within DWS regional offices may be a good option. This would allow the CMA to “hit the ground running” as opposed to taking time to find its feet. However, this also has the risk of “copying and pasting” activities and decision-making processes from the regional DWS office. As alluded to above, this is not adequate to fulfil functions and establish relationships with stakeholders.

A clear direction between national strategic initiatives, structures of rule and the management of the river basin at WMA and basin levels assists policy-makers involved in the establishment process on what needs to be done and gives a clear direction on how to initiate the process. This includes clarity on functions, roles and responsibilities. There seems to be very little space for ambiguity, and uncertainty has a significant impact on the success of the establishment phase, which can carry through into the operational phase. Not only is there uncertainty during the establishment phase. In the case of the FGG Elbe, the representatives said that they are constantly being challenged by issues such as pollution and nutrient loads. This is likely to also be the case with South Africa’s CMAs since they are also, like the FGG Elbe, managing a complex natural resource with multiple stakeholders.

Moreover, officials need to plan the establishment process very carefully, especially regarding the allocation of financial and human resources. Careful planning would enable policy-makers to ascertain where to draw the line when involving a certain number of stakeholders and can assist them in striking a balance between involving too few or too many stakeholders. With regard to financial resources, both CMAs currently receive sufficient funding from DWS. However, as the CMAs have now become large spatial units with numerous catchments and sub-catchments,

¹⁸ Personal communication, J Boshoff, Inkomati-Usutu Catchment Management Agency, 23 June 2015

with further delegations, the allocation of financial resources may become a future issue. Also, it is envisaged that CMAs will become self-sufficient, thereby attaining funds through receiving tariffs paid by water users. This could prove to be a major financial constraint as the CMA would receive approximately 70% of its expected budget through these tariffs. There are still questions with regard to the remaining 30%.¹⁹ Planning the financial viability and security of the CMA becomes a key variable here, and sufficient finances need to be allocated to enable the CMAs to ensure their ability to be responsive to the administrative and stakeholder demands.

Regarding human resource processes, it is recommended that labour unions be involved from the outset so that uncertainties can be minimised and employees can take ownership of their transfers. Another issue with regard to the employment of staff is that there is no task-specific training of individuals. All conversations, interviews and engagements have shown that the CMA environment requires a different set of skills compared to the known job profiles of regional or the national DWS officials. This means that the majority of the tasks carried out by the CMA require staff to learn as they grow within the CMA environment.^{20,21} Such learning needs an adaptive, responsive organisational set-up and a leadership that trusts its employees and vice versa. It is not our intention to impose adaptive management principles on the organisation. However, it should be clearly stated that the learning environment of the organisation should not be restricted to a set of lawlike principles; the organisation's leadership needs to decide how it will apply learning practices. Should adaptive management principles be imposed on an organisation, it would mean that command and control had moved from an old centralised government authority to an unaccountable and centralised "epistemic authority". The employees should be given the space and possible training to enable engagement and learning in a continuous and inclusive manner.

What is more, future CMAs would have to take note of stakeholder expectations, and those expectations should be partially defining in establishing a relationship between the CMA and its stakeholders. These issues or practices might not be major constraints, but could influence the operations of a CMA and thus its successes significantly.

Policy-makers should also bear in mind that the establishment process is not only about pitfalls and challenges. There are also opportunities to take advantage of. One such opportunity is the knowledge of public administrative processes held by DWS officials. Such knowledge can be a defining resource between a successful and stalled establishment process. In this regard, the knowledge of public administrators should not be viewed by stakeholders, scientists included, as another burden on the establishment process. Scientists have a tendency to not include public administrative

¹⁹ Personal communication, Jan van Staden, Breede-Gouritz Catchment Management Agency, 25 August 2015

²⁰ Personal communication, Johann Boshoff, Inkomati-Usutu Catchment Management Agency, 23 June 2015

²¹ Personal communication, Phakamani Buthelezi, Breede-Gouritz Catchment Management Agency, 24 August 2015

processes in their research endeavours when analysing CMAs. They would rather look at the streamlining of the establishment process, technical skills and possibly political issues. The identified practices and conclusions drawn should therefore not be seen as a set of recommendations for policy-makers and stakeholders involved in CMA establishment processes only, but also for scientists researching the process. Scientists are, after all, also stakeholders when they research CMAs and may also be involved in some of the CMAs currently being established. The research has shown a strong link between the successes or challenges of the establishment process and the way in which CMAs operate. This is an area where further research is needed as the process of establishing the other seven CMAs progresses.

References

- De la Harpe, J., Ferreira, J. -A., & Potter, A. (n.d.) Water management institutions overview. Pretoria: Department of Water Affairs and Forestry.
- Department of Water Affairs (DWA). (2013). *National water resource strategy, June 2013* (NWRS 2nd ed.). Pretoria: Department of Water Affairs.
- Department of Water Affairs and Forestry (DWAF). (n.d.) Guide to the National Water Act. Pretoria: Department of Water Affairs and Forestry.
- Department of Water Affairs and Forestry (DWAF). (2004). *National water resource strategy*. Pretoria: Department of Water Affairs and Forestry.
- Funke, N., Nortje, K., Findlater, K., Burns, M., Turton, A., Weaver, A., & Hattingh, H. (2007). Redressing inequality: South Africa's new water policy. *Environment*, 49(3), 10–23.
- Hattingh, J., Maree, G., Oelofse, G., Turton, S., & Van Wyk, E. (2004). Environmental governance and equity in a democratic South Africa. Conference paper presented at the AWRA/IWLRI International Conference on Water Law Governance in Dundee, Scotland.
- Kooiman, J., Bavinck, M., Chuenpagdee, R., Mahon, R., & Pullin, R. (2008). Interactive governance and governability: An introduction. *Journal of Transdisciplinary Environmental Studies*, 7(1), 1–11.
- Lijphart, A. (1971). Comparative politics and the comparative method. *The American Political Science Review*, 65(3), 682–693.
- MBB Consulting Engineers. (2001). Proposal for the establishment of a catchment management agency for the Inkomati Basin. Prepared on behalf of the Inkomati catchment management agency reference group. Department of Water Affairs and Forestry, Nelspruit, South Africa.
- McConkey, G. E., Enright, W. D., Roberts, J. A., & Khan, R. (2005). *The development of a catchment management agency for the Breede River, Western Cape, South Africa*. Cape Town: Department of Water Affairs and Forestry.
- Meissner, R., & Funke, N. (2014). The politics of establishing catchment management agencies in South Africa: The case of the Breede-Overberg Catchment Management Agency. In D. Huitema & S. Meijerink (Eds.), *The politics of river basin organisations: Coalitions, institutional design choices and consequences*. Cheltenham: Edward Elgar Publishing.
- Meissner, R., & Jacobs, I. (2014). Theorising complex water governance in Africa: The case of the proposed Epupa Dam on the Kunene River. *International Environmental Agreements: P*, 14(2), 1–28.
- Meissner, R., Funke, N., Nienaber, S., & Ntombela, C. (2013). The status quo of research on South Africa's water resources management institutions. *Water SA*, 39(5), 721–731.
- Nyakane-Maluka, N., & Jackson, B. (2010). The 2011/12 to 2013/14 strategic plan for the Inkomati Catchment Management Agency. Presentation to the Parliamentary Portfolio Committee, 8 June 2010, Cape Town.

- Republic of South Africa (RSA). (1996). Constitution of the Republic of South Africa (Act No. 108). Government Printer, Pretoria.
- Republic of South Africa (RSA). (1998). National Water Act (Act No. 36). Government Printer, Pretoria.
- Rhodes, R. A. W. (1996). The new governance: Governing without government. *Political Studies*, XLIV, 652–667.
- Stuart-Hill, S. I., & Schulze, R. (2010). Does South Africa's water law and policy allow for climate change adaptation? *Climate and Development*, 2, 128–144.
- Stuart-Hill, S. I., & Schulze, R. (Eds.). (2015). *Developing water related climate change adaptation options to support implementation of policy and strategies for 'Water for Growth and Development'* (WRC report no. 1965/1/15). Pretoria: Water Research Commission.
- Union of South Africa. (1956). Water Act No. 54 of 1956. Government Printer, Pretoria.

Open Access This chapter is distributed under the terms of the Creative Commons Attribution-Noncommercial 2.5 License (<http://creativecommons.org/licenses/by-nc/2.5/>) which permits any noncommercial use, distribution, and reproduction in any medium, provided the original author(s) and source are credited.

The images or other third party material in this chapter are included in the work's Creative Commons license, unless indicated otherwise in the credit line; if such material is not included in the work's Creative Commons license and the respective action is not permitted by statutory regulation, users will need to obtain permission from the license holder to duplicate, adapt or reproduce the material.



Chapter 3

Towards Inclusive Water Governance: OECD Evidence and Key Principles of Stakeholder Engagement in the Water Sector

Aziza Akhmouch and Delphine Clavreul

Abstract Citizens increasingly demand to be more engaged in how public policy decisions are made. In this environment, stakeholder engagement has emerged as a principle of good water governance. However, despite extensive research and case studies on the topic in recent years, the lack of evidence-based assessment on how effective engagement processes have proven to be in reaching intended objectives of water governance is striking. Most participatory evaluation exercises fail to provide decision-makers with the evidence they need to inform future engagement processes.

This chapter presents the key findings of an OECD study, which relies mainly on empirical data from a survey carried out across 215 stakeholders, within and outside the water sector, and derived from 69 case studies collected worldwide. It suggests an analytical framework to assess the impact of stakeholder engagement in water-related decision-making and policy implementation, based on interdependent components, i.e. drivers, obstacles, mechanisms, impacts, costs and benefits.

Results highlight the need for better understanding of the pressing and emerging issues related to stakeholder engagement. These include the external and internal drivers that trigger the engagement processes, the arrival of new entrants that ought to be considered, innovative tools that have emerged to manage the interface between multiple players and types of costs and benefits incurred by engagement at policy and project levels. The chapter concludes with policy guidance to decision-makers and practitioners in the form of necessary conditions on how to set up the enabling environment for inclusive water governance.

Keywords Governance • Stakeholder engagement • Water policy • Water management • Inclusive

A. Akhmouch (✉) • D. Clavreul

Water Governance Programme, Organisation for Economic Co-operation and Development (OECD), 2 rue André Pascal, 75775 Cedex 16 Paris, France
e-mail: Aziza.Akhmouch@oecd.org; Delphine.Clavreul@oecd.org

© The Author(s) 2017

E. Karar (ed.), *Freshwater Governance for the 21st Century*, Global Issues in Water Policy 6, DOI 10.1007/978-3-319-43350-9_3

29

3.1 Introduction: A Call for More Inclusive Water Governance

Growing attention to inclusive water governance is motivated to a large extent by increasing pressure on water resources in many parts of the world. Future projections related to water are sobering: by the middle of this century, the world population will reach nine billion, four billion of which will live in severely water-stressed basins, whilst demand for water is expected to increase by 55% globally (OECD 2012). The challenges are huge, but they can be turned into opportunities. A number of water crises around the globe are primarily governance crises. In many circumstances, the problem goes beyond hydrology, infrastructure and financing; it is about who does what, at which scale, how and why. In a word, with the right *governance* approach, water could be a harbinger of progress.

Water governance is the ‘the range of political, institutional and administrative rules, practices and (formal and informal) processes through which and how decisions are taken and implemented; decision-makers are held accountable in the development and management of water resources and the delivery of water services; and, last but not least, stakeholders articulate their interests and have their concerns considered’ (OECD 2011).

Over the coming decade, decision-makers throughout the world will be forced to make tough choices about how to manage water in ways that are efficient, equitable and environmentally sound. Whether their efforts succeed may depend, in large part, on providing the broad range of stakeholders with a voice in water-related decisions that affect them. Stakeholder engagement holds the promise of improving acceptance and trust in water governance and reducing the potential for conflict over water issues.

Despite extensive research and case studies in recent years on the topic of stakeholder engagement, there is a lack of evidence-based assessment on how effective engagement processes have proven to be in reaching intended objectives of water governance. Most evaluations carried out on stakeholder engagement fail to provide decision-makers with the evidence they need to inform future engagement processes, rather calling for caution against generalising beyond the context of specific case studies (Abelson and Gauvin 2006). In that context, better evidence needs to be produced and policy guidance is required to encourage decision-makers and practitioners to engage with all stakeholders in the early stages of decision-making in order to secure support for water reforms, to raise awareness about water risks and costs, to increase water users’ willingness to pay and to deal with conflicts.

This chapter presents key OECD evidence and messages on the main trends, drivers, obstacles, mechanisms, effectiveness, costs and benefits of stakeholder engagement practices in the water sector. It concludes by providing a set of principles for creating the enabling environment for inclusive water governance¹.

¹ This chapter draws heavily on the OECD (2015a) report: ‘Stakeholder engagement for inclusive water governance’, OECD Publishing, Paris (OECD 2015a).

Public acceptance and trust in water governance rely on inclusiveness and the capacity to accommodate a broad range of (often conflicting) interests across the water chain and policy cycle. A critical test of trustworthy and legitimate water governance is not just whether stakeholders are engaged but also whether they are actively playing their part. To guide public action in that direction, the OECD adopted Principles on Water Governance that set standards for more effective, efficient and inclusive design and implementation of water policies and which include a building block of stakeholder engagement (OECD 2015b).

3.2 An Overview of Key Terms and Trends in Inclusive Water Governance

Governments and public governance are becoming increasingly open. As countries are still coping with the consequences of the financial crisis, the public sector is facing acute challenges in terms of fiscal pressure with increased demands from citizens to be more engaged in how public policy decisions are taken. The general move from a 'top-down, hierarchical model' exerting sovereign control over the people and groups making up civil society to gradual involvement of public, non-state actors such as private and not-for-profit organisations and sectors at different levels has characterised public policy since the 1990s.

Developing a common language represents one of the primary challenges to analysing the contribution of stakeholder engagement in the water sector. According to Smith (1983), public participation is defined as a range of procedures and methods designed to consult, involve and inform local communities and citizens (i.e. the 'public'). It typically refers to the involvement of individuals and groups in the design, implementation and evaluation of a project or plan (Brown and Wyckoff-Baird 1992; Yee 2010). However, the process of involving stakeholders has changed and is progressively moving away from mere 'participation'. It is no longer restricted only to 'civil society' and project-based approaches but attempts to address a broader range of actors in a more systematic way. This evolution should be taken into account in the existing variety of concepts and vocabulary associated with stakeholder engagement.

Herein, stakeholder engagement is defined as the process by which any person or group who has an interest or stake in a water-related topic is involved in the related activities and decision-making and implementation processes. The person or group may be directly or indirectly affected by water policy and/or have the ability to influence the outcome positively or negatively (OECD 2015a).

Various degrees of engagement and different typologies of engagement and participation have been discussed in the literature. A well-known categorisation is the 'ladder of citizen participation' developed by Arnstein (1969) which identifies eight levels or 'rungs', ranging from manipulation (the lowest in the group of nonparticipation steps) to citizen control (the highest step and highest degree of citizen power).

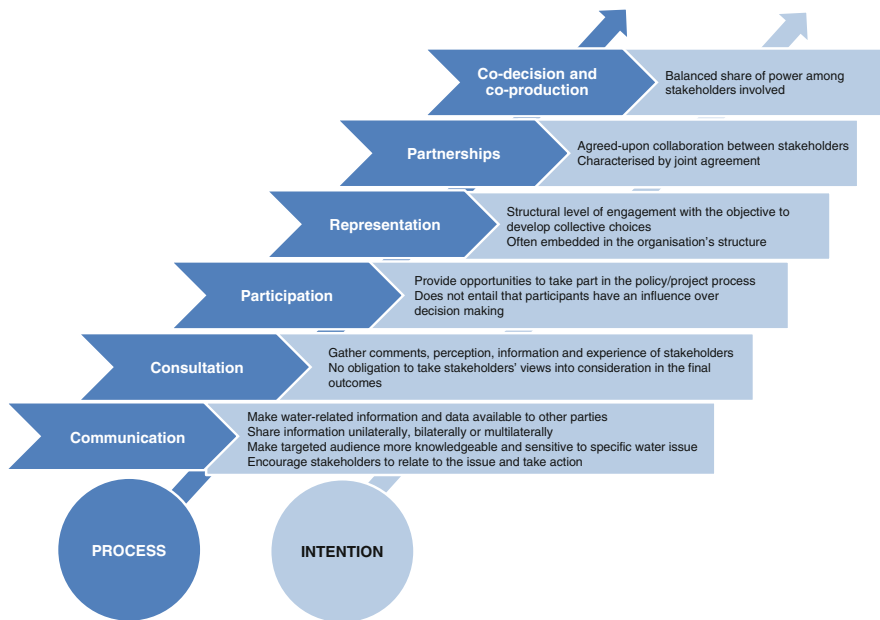


Fig. 3.1 OECD typology of levels of stakeholder engagement (Source: OECD (2015a))

This range shows that there is a significant gradation of citizens' participation. Arnstein's work has now been deemed obsolete and debatable because it considered participation as an end in itself rather than as a means (Wehn et al. 2014). Other typologies have emerged: Pretty (1995) 'typologies of participation'; Fung (2006) 'democracy cube'; and UNDP Water Governance Facility, Stockholm International Water Institute, Water Integrity Network (2013) 'levels of engagement'. This chapter distinguishes six levels of stakeholder engagement, depending on the process and the intentions being pursued (Fig. 3.1).

Overall, stakeholder engagement has been more institutionalised for water *resources* management than water *service* delivery. Legislation on surface water and groundwater quality and quantity and principles, such as integrated water resource management, has encouraged the creation of river basin organisations and their fora and the contribution of stakeholders to decisions related to planning. Engagement has been less systematic for water services and often consisting of handling customers' complaints despite the existence of consultation (rather ad hoc without consideration of the wider application) via shareholding, governing boards, regulatory policy and partnerships with citizens and users.

For a long period, stakeholder engagement in water governance remained mostly incidental, apart from some noticeable exceptions (e.g. the Polder approach in the Netherlands to build consensus (OECD 2014)). The flexibility associated with project- or issue-based stakeholder engagement has made it a preferred option for many decision-makers rather than engaging in more systematic inclusive approaches. It

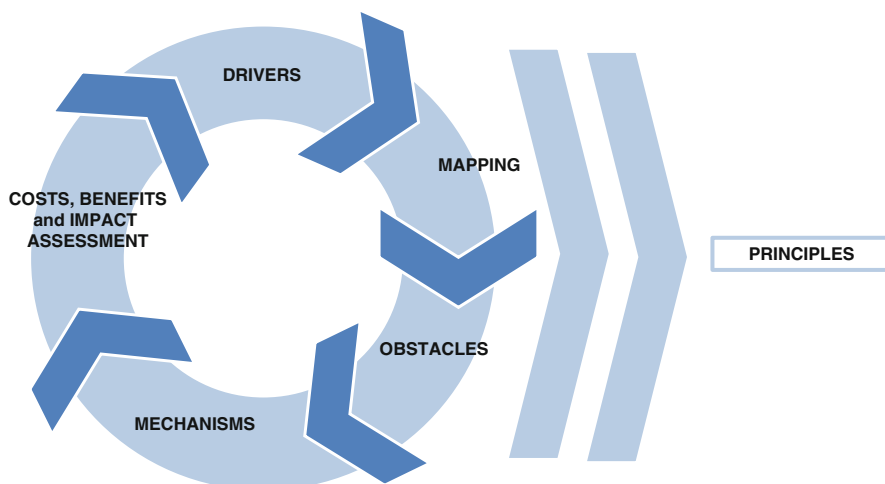


Fig. 3.2 OECD analytical framework of stakeholder engagement in water governance (Source: Based on OECD (2015a))

consists in setting up ad hoc mechanisms such as workshops, hearings, panels or campaigns to gather stakeholders around a specific issue. However, these engagement processes are often time bound, limited in scope and end conjunctly with the implementation or evaluation of the given project or policy. Stakeholder engagement processes have also been reactive rather than proactive. They tend to be a response to a need or an obligation, such as to comply with regulatory frameworks on the topic, or during crises and emergencies (droughts, floods, economic crisis, etc.) rather than being carried out on a voluntary basis.

Environmental, institutional and social trends within and outside the water sector have called for more inclusive governance and have spurred greater stakeholder engagement in water-related decision-making. On paper (*de jure*), regulations such as the Aarhus Convention, the EU Water Framework Directive and the EU Flood Directive mandate public engagement; however, in practice (*de facto*), the importance given to engagement and the extent of its implementation vary from one situation to another. This underscores the need to consider the effects of inclusive approaches on policy decisions.

The analytical framework suggested hereafter is organised around five mutually dependent components to look at stakeholder engagement holistically: (i) detecting drivers to understand the forces and levers for actions; (ii) mapping stakeholders in terms of their roles, responsibilities, influence, motivations, level of connectivity and scale; (iii) diagnosing obstacles and mitigating related risks to integrity, accountability and sustainability; (iv) identifying mechanisms that are fit-for-purpose; and (v) fostering evaluation to point out areas in need of improvements and trade-offs (Fig. 3.2). This framework can be used as a reading template to develop a comprehensive approach to engagement efforts and to decipher the actual contribution of stakeholder engagement to better water governance.

To ground this analysis in sound evidence, a survey of stakeholder engagement in water governance was conducted in 2014 across 215 stakeholders with various levels of interest and experience in stakeholder engagement. Whilst the results of the survey provide valuable insights into and feedback on the reality of stakeholder engagement practices, they do not intend to be statistically comprehensive or reflect the multitude of views, arrangements and players in the field of water². A compendium of 69 case studies was also collected worldwide to provide insight into practical experiences.

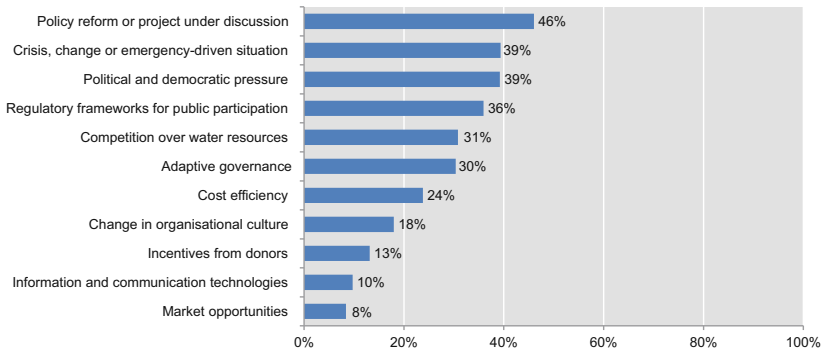
3.3 Why Engage Stakeholders: The Driving Forces Behind Inclusive Water Governance

The water outlook is not optimistic, and future economic, social, climate, urban and technological trends challenge water governance and the capacity of governments to address them, often calling for multi-stakeholder solutions. Pressure points over water allocation, infrastructure financing and disaster management require doing better with less money, less water and with more people willing to get on board. The daunting picture for the water sector in the future has prompted renewed emphasis on the role of stakeholder engagement across the public, private and non-profit sectors combined with structural and conjunctural drivers that have pushed stakeholder engagement to develop along different rationales.

A range of long-term structural drivers has resulted in a paradigm shift in water governance to better cope with future challenges. They can be clustered into four broad categories: climate change will affect water availability and resilience of water infrastructures, with different levels of impacts across the world; economic and demographic trends will drive water demand, in particular in cities, and affect the capacity of governments to respond (i.e. their ability to mobilise public funds); sociopolitical trends, such as the concept of IWRM, recent developments in European water-related policies, the United Nations Sustainable Development Goals will set new standards, regulations and aspirational goals paying greater attention to adaptive governance; and innovation and technologies will stimulate greater connectivity and new relationships, in particular related to web-based communication avenues.

Stakeholder engagement has also been triggered by conjunctural drivers and is greatly influenced by changing circumstances and situations (Fig. 3.3). Debates around water-related policy reforms and projects are primary drivers of stakeholder engagement. Stakeholders are more likely to take part in discussions when it concerns new policies they will have to uphold, whilst decision-makers look to consult and involve stakeholders likely to be impacted to ensure acceptability and sustainability of the policies to be implemented.

²Details of the survey's sample of respondents and methodology are provided in OECD (2015a).



Note: The figure considers the drivers ranked from 1 to 3 on a scale from 1 to 11.

Source: OECD Survey on Stakeholder Engagement for Effective Water Governance (2014).

Fig. 3.3 Recently identified drivers for stakeholder engagement in the water sector (215 respondents)

Survey results show that crises, change or emergency-driven situations, such as floods and droughts, are the second most important driver of stakeholder engagement. The community engagement initiative ‘Rebuild by Design’, for instance, was founded as a response to the devastation caused by Hurricane Sandy in the United States. Legal requirements on water-related stakeholder engagement have emerged in the past decade and boosted stakeholder engagement. In Japan, for example, the Japan Water Agency Law requires mandatory stakeholder mapping and engagement in all the activities of water agencies. Competition over water resources is considered the fourth driver. Engaging all actors impacted can support continuing dialogue on competing needs to be balanced and necessary trade-offs. In France, Électricité de France (EDF) signed a Water Saving Convention with major irrigators in the Durance Valley to improve water efficiency and allocation through improved local stakeholder engagement, which has led to a reduction in agricultural water consumption from 325 million to 235 million cubic metres.

Successful stakeholder engagement comes from a real understanding of the rationale that underlies it. It points to the reasons why engagement should or need to take place, for what outcomes and with which categories of stakeholders. In turn, decision-makers can define realistic and forward-looking policy objectives for stakeholder engagement and ensure that the processes are outcome-oriented.

3.4 Who to Engage: Stakeholders, Their Motivations and Their Interactions at Different Scales

A first step in the process of effective stakeholder engagement is to identify who they are and to determine what motivates them. Knowing who is responsible for what and at which level is an essential starting point and can help identify

redundancies and gaps in the institutional framework that affect policy coherence and sector performance. Stakeholder mapping can be used to identify the core stakeholder functions in the sector and to assess how effectively they are carried out. Such mapping also highlights the interaction with, and the impact of stakeholders on, other areas that influence the water sector.

Beyond the ‘traditional’ actors, new players have gained interest and influence in water governance (Fig. 3.4). Whilst the role of the private sector has been inclined to focus on companies delivering water supply and sanitation, businesses have paid increasing attention to water governance in their strategies, especially to cope with regulatory risks and to secure water allocation. In parallel, citizens and water user associations have gained increasing influence over political decisions on water. As risks of floods intensify, property developers are also gaining influence, as spatial development generates long-term liabilities and financial implications in terms of water management, such as compensation for the loss of green areas and water amenities. They can play an important role in harnessing new sources of finance and contributing to the development of nontechnical solutions to manage floods. Institutional investors (e.g. pension funds, insurance companies, mutual funds) have also begun to factor environmental, social and governance issues into their decision-making process, and they are investing more and more in water infrastructure and utilities.

Some stakeholder categories are frequently excluded from the process. These include women (as the primary users of water in many parts of the world, for domestic consumption, subsistence agriculture and health), youth (as the future generation that will need to solve issues related to water), the rural and urban poor (as the main consumers in informal urban and rural settlements) and indigenous and aboriginal

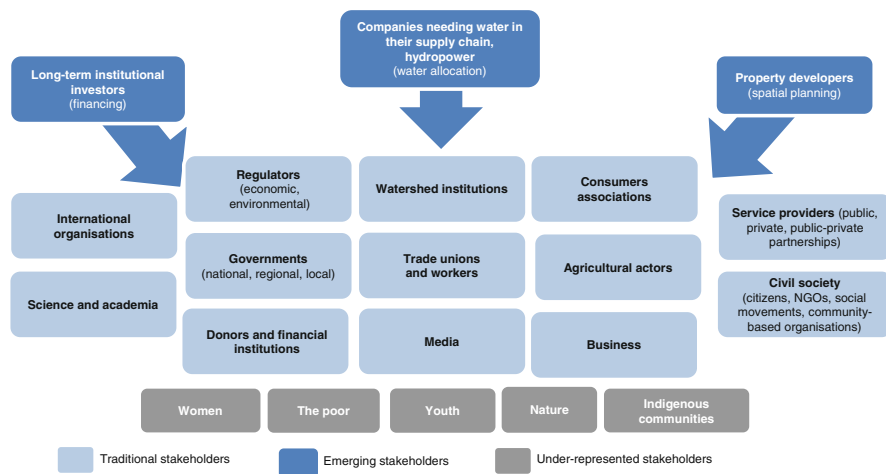


Fig. 3.4 Traditional, new and underrepresented stakeholders in the water sector (Source: OECD (2015a))

communities. Nature and other nonconsumptive users are also often absent from engagement processes. Greater efforts to encourage innovation are called for to connect and engage with these groups or individuals, who do not always come forward on their own. In order to gain a more balanced picture, it is very important to include these minority or 'less-vocal' stakeholders beyond formal engagement channels. In New Zealand, the Canterbury Regional Council launched an engagement process with district councils and the Māori tribal authority to develop and implement the new Canterbury Water Management Strategy based on a collaborative governance framework whereby 'local people plan locally'. It led to positive outcomes in terms of sustainability and resilience of water management in the region and to better community understanding of indigenous cultural values.

Stakeholders have different motivations, needs and interests. They aspire to different goals in water governance, whether these relate to water resource management – a primary concern mainly for national governments, businesses and international organisations; the supply of water and sanitation – mostly in the case of regulators and civil society; water disaster management; or environmental protection. Based on their core motivations, and often their mandate, stakeholders have different governance concerns that affect their willingness to contribute to water-related policies and projects as well as their degree of engagement.

The way they interact can also vary from place to place. Depending on their responsibilities and interest, stakeholders interact more or less with one another. Interactions amongst stakeholders tend to take place in silos, relying essentially on peer-to-peer exchanges, as is the case, for instance, for governments, river basin organisations, civil society, businesses and academics (Fig. 3.5). Understanding these dynamics is crucial to assessing the level of stakeholders' influence and engagement and to clarifying issues related to communication, trust, consensus-building and solidarity. For example, sociometric network analysis of American water utility professionals was carried out to shed light on the importance of exchange channels, amongst peers and opinion leaders, for innovation diffusion and knowledge-sharing in the municipal water industry.

Water is a field particularly sensitive to issues of scale. Water issues and hydrological boundaries cut across administrative frontiers. Water governance and water resource management take place at various spatial scales, both in their ecological and political dimensions. First, the hydrological system with its different levels from small catchments to large river basins plays a prominent role from the individual water body to the global climate. Second, competencies of political interventions have shifted both towards the national and supranational levels in the form of international agreements or the growing influence of the European Union; and towards the regional and local levels, in the form of decentralisation of water decision-making and implementation involving a diversity of local non-state actors.

Engagement processes range from local watershed groups negotiating over allocation practices to national committees debating priorities or international meetings seeking consensus about the management of transboundary basins between sovereign states. The issue of scale also relates to questions of democratic legitimacy. The higher the level of decision-making, the lower the possibilities for comprehen-

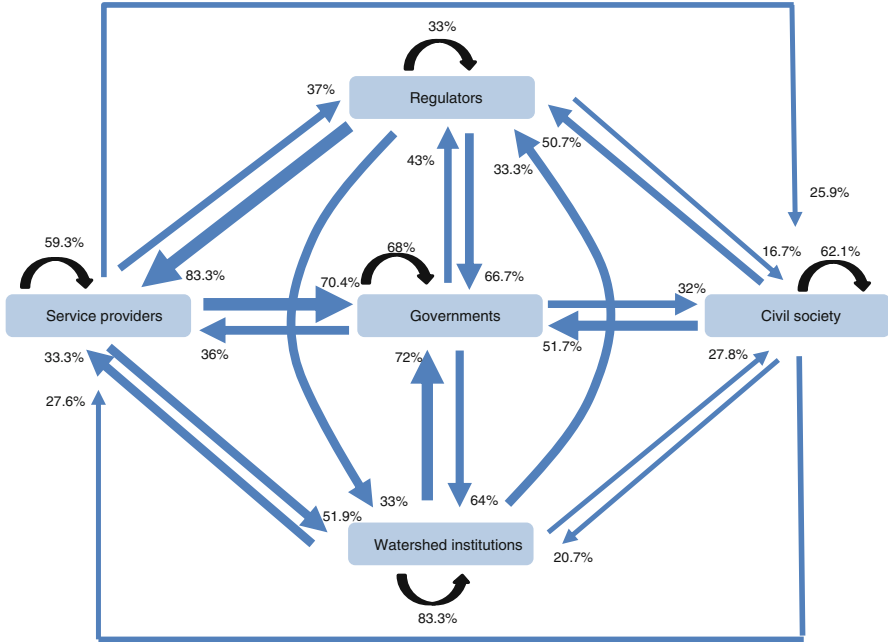


Fig. 3.5 Most frequent interactions across stakeholders in the water sector (Note: The figure shows the interactions across governments (national, regional, local), service providers, watershed institutions, regulators and civil society considered as ‘very frequent’. The blue arrows represent interactions between the categories of stakeholders and the black arrows represent interactions within each category of stakeholders) (Source: OECD Survey on Stakeholder Engagement for Effective Water Governance (2014))

sive participation of all relevant constituencies and thus the higher the likelihood that conflicts may arise. Inversely, the lower the level of government, the more difficult it is to effectively address water governance problems, in particular those that are not strictly local, without having the big picture.

Stakeholder engagement can provide platforms to address the mismatch between administrative and hydrological scales. Water-related projects and policies can be driven by local livelihoods tied to local ecosystems or by energy producers making long-term production and investment choices at the national level. Thus, some stakeholders promote hydrological scales that correspond to manageable units in which they operate (e.g. river basin organisations). Others promote conventional administrative levels, arguing that this is where capacity, accountability and legitimacy already exist. In the Great Lakes region of North America, multilevel engagement processes on water resource management between the province of Ontario, municipalities, local NGOs and First Nation communities led to the formulation of common policy directions and long-term strategies for water protection. Fitting stakeholder engagement to place-based needs can help reconcile decisions within and across spatial scales.

3.5 Overcoming the Barriers to Inclusive Water Governance

Engagement processes vary across places and stakeholders, but common barriers can be identified. Decision-makers need to carefully anticipate these bottlenecks and mitigate related risks (Fig. 3.6).

Respondents to the survey highlighted several major obstacles:

- First, the lack of political will and leadership: stakeholder engagement implies a shift in the balance of power including towards actors that may not share the same intentions, perspectives and interests.
- Second, the lack of clarity on the use of stakeholder inputs: if stakeholders with interest or influence do not understand how their input will contribute to decision-making, they may feel misled or manipulated by the process and will therefore lose interest. Satisfying all stakeholders' interests is a daunting task and implies the willingness to support the outcomes of the engagement process, even when they fail to coincide with one's vested and partisan interests. Clarifying the engagement process is one way to secure support and buy-in.
- Third, institutional fragmentation: responsibilities scattered across a multitude of actors create fissures in water governance with subareas administered independently and limited coordination incentives leading to poor consultation and weak accountability. The impact of institutional fragmentation is therefore often played out at the subnational level, with inadequate consultation on the needs of other related sectors, or subnational levels and overlapping responsibility. Fragmentation precludes the efficiencies and synergies that can be obtained through cooperation across authorities, water-related sectors and scales, and this can lead to policy outcomes focused on a specific issue or territorial area with little spill-over effect that can benefit the broader water sector.
- Fourth, the lack of funding: insufficient or unstable revenues to sustain the engagement process, logistical expenses related to meeting venues or support material and the lack of competent and dedicated staff are common bottlenecks, especially when government funding has been slashed in times of economic and financial crisis.

In addition, consultation 'fatigue' is a risk to avoid, and it helps to be clear and forthright about how people's input will actually be used. Engagement with broad groups helps to ignite the political will and the leadership required to deal with typical shortcomings, such as staff and funding, legal issues and inertia. Decision-making processes can also be hindered by conflicts of interest or consultation 'capture', especially when certain groups of actors and lobbies are better organised to voice their concerns. For instance, in some EU countries, farmers overrode engagement initiatives related to the implementation of the Water Framework Directive, leaving insufficient water for the environment (OECD 2014).

Decision-makers need to carefully anticipate bottlenecks to the integration of stakeholder engagement in water policy and projects and mitigate related risks. Different tools and procedures can help to achieve this. Translating existing stan-

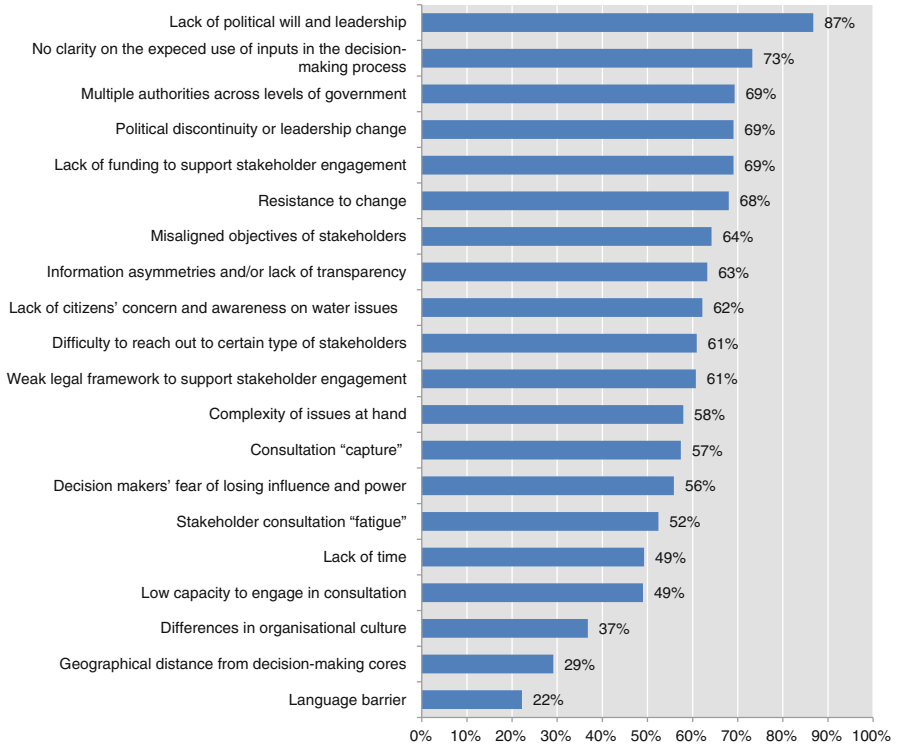


Fig. 3.6 Major obstacles to stakeholder engagement in the water sector (215 respondents) (Note: The graph considers the average response from the perspective of both targets and promoters for obstacles diagnosed as ‘critical’ and ‘important’ on a range from ‘critical’ to ‘important’, ‘some-what important’ and ‘not important’, to the question ‘which obstacles does your organisation face when taking part in or promoting stakeholder engagement?’) (Source: OECD Survey on Stakeholder Engagement for Effective Water Governance (2014))

dards for inclusive decision-making into legislative frameworks can provide incentives to support the integration of stakeholder engagement. Defining strategies that make clear how stakeholder contributions will influence the final outcome can prevent frustration with regard to the influence stakeholders have over the process. Setting up information water systems and securing funds will also be critical to sustaining engagement processes in the long run. Engagement efforts should be allocated the same staffing and budget as other components of a water policy and project development process. Mechanisms designed to prevent the risk of undue access and influence by powerful, better organised influence groups are needed in tandem. Together with openness and engagement, solid integrity frameworks for policy-making can help ensure that final policy decisions reflect the views of the many and not just the few. Tools such as ‘integrity pacts’ and ‘social witnesses’ can also help to reduce the likelihood of conflict of interest and consultation capture, whilst ex post surveys on motivations can investigate levels of interest on specific water issues to set up the right incentives.

3.6 How to Engage Stakeholders: A Range of Formal and Informal Mechanisms

There is a wide variety of mechanisms for engaging stakeholders, but they work differently according to place, time and objectives. Navigating this diversity and selecting the right mechanism(s) for engagement can be a daunting task for decision-makers. The survey helped identify 24 mechanisms that can be classified into 2 types: formal mechanisms (tools that have institutional or legal ground and often stem from an official agreement, a contract between parties or charters with clear operating rules and priorities) and informal mechanisms (not institutionalised but rather can be implemented at the discretion of the convener of the engagement process).

Stakeholders use some mechanisms more often than others. Meetings, workshops and expert panels were identified as the most often used mechanisms in the survey, followed by water associations and networks, stakeholder consultation as part of regulatory processes and river basin organisations (Fig. 3.7).

Innovative mechanisms and decision tools are gaining traction because of technological advances as well as greater skill and openness in applying the tools to discussion. The practical deployment of new information and communication technologies (ICT) has become a driving force of customised Internet platforms and

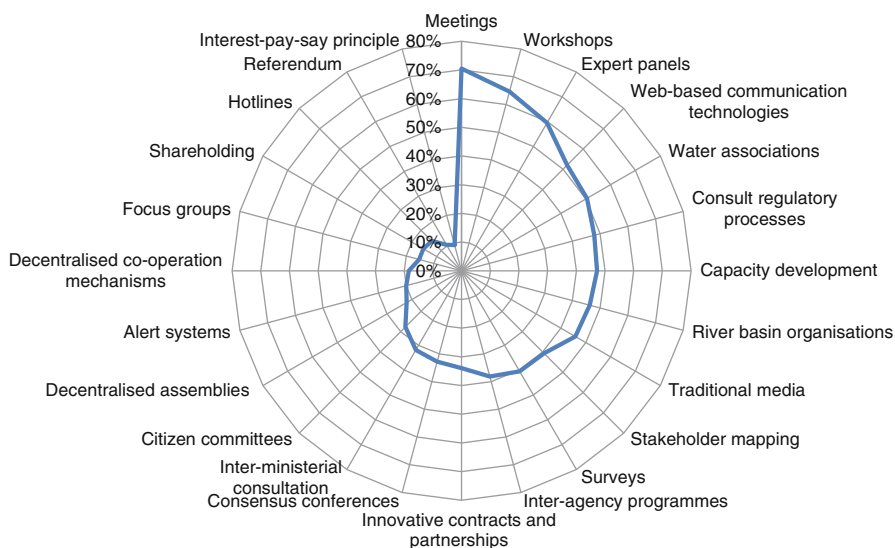


Fig. 3.7 Use of stakeholder engagement mechanisms in the water sector (215 respondents) (Note: The figure considers the average of 'yes' responses provided from the perspective of both targets and promoters to the question 'Which stakeholder engagement mechanisms does your organisation use or take part in?') (Source: OECD Survey on Stakeholder Engagement for Effective Water Governance (2014))

applications (Guimarães-Pereira et al. 2003), and the function of ICT platforms has taken new and varied dimensions as virtual meetings, and Internet-based platforms (social media, chat rooms, online fora) are used more frequently. E-participation has been used, for instance, to set up citizen observatories for flood risk management in the Netherlands and the United Kingdom where citizen participation was composed of a variety of citizen groups (volunteers, elected citizens, citizen scientists and communities) and rested on a range of communication modes from listening as a spectator to expressing and developing preferences on specific issues (Wehn and Evers 2014).

Efforts are still required to generalise digital tools in water decision-making and policy/project implementation, but in their various multilateral forms, ICTs are increasingly being used by decision-makers to help stakeholders better understand what they do. For instance, in Portugal the Water and Waste Services Regulation Authority (ERSAR) has developed a mobile app that provides relevant information to users on the quality of service provision across 278 municipalities.

These different mechanisms have their strengths and weaknesses (Fig. 3.8). Moreover, engagement modalities vary in terms of the amount of time they take, the number of stakeholders they involve and the amount of resources they require. Similarly, different policy tools may be applied to the different steps of the policy cycle (i.e. design, implementation or evaluation) or to different categories of actors.

It is crucial for decision-makers to carefully align tools with the level of engagement targeted and the context in which the engagement takes place. The effectiveness of mechanisms also relies on the capacities and resources needed for stakeholders to use them effectively, including knowledge, know-how and funding (travel expenses to attend a meeting, necessary technological settings). Also, new methods are being continually developed and require new skills and capacities. Thus, there is no one single optimal mechanism for stakeholder engagement but a menu of options for which the pros and cons need to be weighed up very carefully.

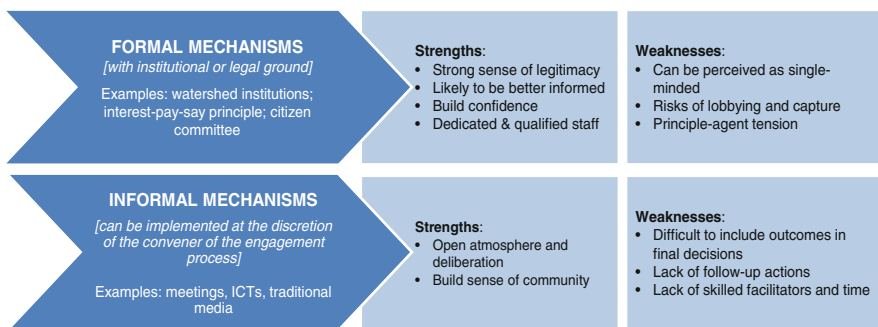


Fig. 3.8 Strengths and weaknesses of engagement mechanisms (Source: Based on OECD (2015a))

3.7 Assessing Stakeholder Engagement: Effectiveness, Costs and Benefits

There has been little evaluation of the effectiveness, costs and benefits of stakeholder engagement in the water sector, because this type of analyses is relatively new to the public sector. Evaluation has generally remained on an ad hoc basis, potentially because stakeholder engagement has often been carried out as an ‘add-on’ to conventional processes, or a tick-the-box approach is frequently being used to comply with existing legislation and rules.

Assessing stakeholder engagement should not be considered as an end in itself but should serve a broader purpose of improving the process and its outcomes. It can:

- Strengthen the accountability of decision-makers, by measuring whether public and institutional resources, including stakeholders’ time and effort, are effectively utilised
- Assist in determining whether the engagement process was successful and in drawing up an inventory of the lessons learnt towards future improvement
- Map out the potential challenges that may be encountered (e.g. divergent perspectives regarding flood defence measures between land planners, property owners and government authorities or regarding water resource allocation between farmers, industries and environmentalists)

Some difficulties may be experienced when evaluating stakeholder engagement. First, there is a lack of comprehensive frameworks of agreed-upon evaluation methods and reliable measurement tools. Second, there is a wide variety in the design and goals of engagement processes; therefore, evaluation frameworks should be general enough to apply across different types of processes, yet specific enough to have value for learning and practice. Third, stakeholder engagement is an inherently complex and value-laden concept; hence there are no widely held criteria for judging the success and failure of engagement efforts both in terms of process and outcomes.

Evaluation tools are increasingly being used to measure the success of engagement efforts. Multi-stakeholder meetings help to collect feedback on the level of performance of engagement processes; evaluation reports record the process (successes, failures, lessons learnt) and allow for analysis to improve future engagement processes. When publicly disclosed, these reports can shed light on how stakeholders’ inputs were used and whether engagement was worthwhile. Other tools such as polls and surveys can provide information for assessing the engagement process, such as levels of satisfaction. Some stakeholder categories (e.g. civil society) use evaluation mechanisms more often than others. There may be a perception that customer feedback on a given stakeholder engagement process, particularly in terms of complaints, should be avoided. However, complaints can be useful warning signs that the process can be improved.

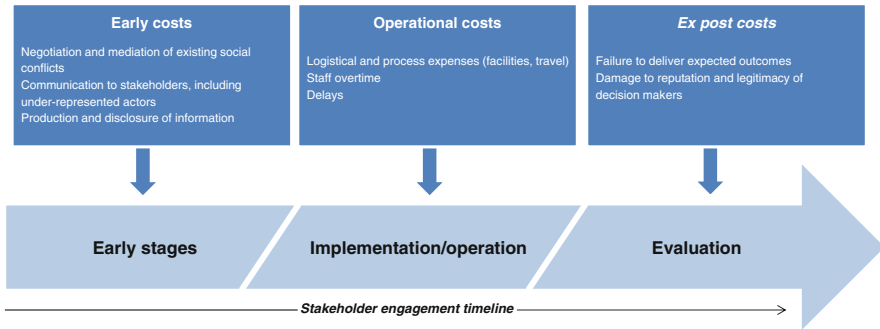


Fig. 3.9 Categories of costs in stakeholder engagement (Source: OECD (2015a))

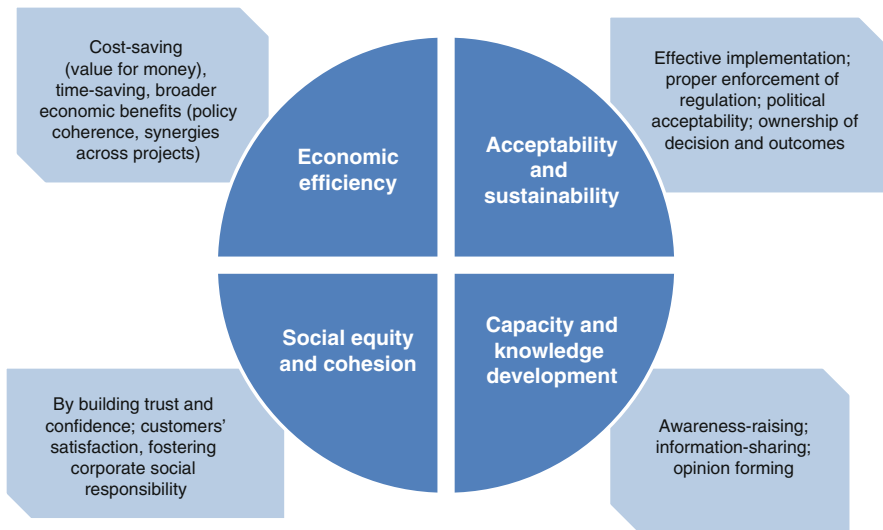


Fig. 3.10 Four types of long-term benefits of stakeholder engagement (Source: OECD (2015a))

Evidence from the survey and case studies highlights the fact that stakeholder engagement is an investment. Decision-makers are inclined to conduct discussions, consultations and exchange of opinions that can inflate some costs, be they direct, indirect, monetary or nonmonetary (Fig. 3.9). These costs relate to delays in the decision-making process, operational expenses (facilities, travel, staff, overtime, etc.) and the production and disclosure of the required information.

The process of engaging stakeholders may be more costly than the absence of consultation. However, dialogue and cooperation amongst stakeholders allows testing and refining of policies and projects and thus can yield short- and long-term benefits (Fig. 3.10). Short-term benefits relate to the outcomes of engagement such as better quality decision-making, increased willingness of stakeholders to collabo-

rate to solve common water problems or greater support for the implementation of a water project or policy.

Long-term benefits relate to improved understanding and awareness of flood risks, more confidence in governments' decisions or capacity building. Overall, benefits can be clustered into four types:

- *Acceptability and sustainability*, in terms of effective implementation of water policy and projects, proper enforcement of regulation, political acceptability and ownership of decision and outcomes
- *Social equity and cohesion*, which is related to trust, confidence and customer satisfaction, as well as corporate social responsibility
- *Capacity and knowledge development*, which emanates from raising greater awareness, sharing information and forming opinions
- *Economic efficiency*, as it can assist in optimising cost saving, value for money and time saving, as well as broader economic benefits related to greater policy coherence and synergies across sectors and projects.

Conducting evaluations on the costs and benefits of stakeholder engagement can provide the evidence to effectively guide decision-making and policy/project implementation with tangible data and analyses. Different costs and benefits accrue to different stakeholder groups at different times and require managing trade-offs to ensure successful engagement processes and outcomes. There is a dearth of knowledge on the distributional impacts of stakeholder engagement. The danger is the potentially inequitable distribution of the benefits of engagement.

The sustainability of stakeholder engagement will not only depend on the net difference between aggregate costs and benefits, but also on how they are distributed between stakeholders and on stakeholders' willingness to bear them. Also, water policy reforms and large projects can induce important adjustment costs, especially in the short term, whilst the benefits of such initiatives may only become visible in the long term. It is crucial to critically reflect upon the ratio of costs and benefits during engagement processes and determine the appropriate trade-offs related to this dual temporality.

3.8 Conclusion: OECD Necessary Conditions for Inclusive Water Governance

Evidence presented in this chapter demonstrates that decision-makers who adopt a systemic, inclusive approach to water governance are likely to get a better return on the time and resources they invest. They will also be better equipped to handle stakeholder issues and risks more effectively.

For engagement processes to be relevant, a careful balance is required between what they try to achieve, the resources they require and whether they succeed in reaching the intended objectives. Decision-makers at all levels have a critical role to play in establishing the enabling environment for result-oriented, effective and

impactful stakeholder engagement. Although engagement processes cannot be easily replicated from one context to another, the OECD proposes the following conditions for creating the enabling environment for inclusive water governance:

- 1. Map all stakeholders who have a stake in the outcome or who are likely to be affected, as well as their responsibility, core motivations and interactions.** Stakeholder mapping should be done in relation to a specific issue and be updated on a regular basis. Such mapping should pay attention to newcomers, players outside the water sector and traditionally underrepresented groups. This is critical to ensure that all stakeholders are identified and properly involved throughout the policy/project cycle. Finding the right balance between inclusiveness and empowerment of stakeholders is also important. Engagement processes (and related mechanisms) need to accommodate the needs of stakeholders with varying levels of interests and resources to ensure inclusivity and accessibility. Risks related to consultation capture from overrepresented categories to the detriment of unheard voices, as well as risks of prejudice against a particular category of stakeholders deserve careful consideration. Equity between present and future generations in a perspective of sustainability should be promoted. Thus, disaggregated data on gender, age economic status and the level of impact of proposed policies and measures are crucial.
- 2. Define the ultimate line of decision-making, the objectives of stakeholder engagement and the expected use of inputs.** Clarifying the goals and reasons for engagement is the key to building mutual understanding and trust of how stakeholders may be involved in the process and for informed stakeholders to provide quality contributions in line with expectations. In an engagement process with carefully set objectives, stakeholder engagement can make a meaningful contribution to the formulation of river basin plans at the watershed level, service delivery, awareness-raising (e.g. on water costs, risks, future trends), auditing, risk mapping, as well as performance monitoring. Similarly, the authority responsible for taking decisions, and its willingness to take stakeholders' ideas on board in doing so, should be clearly identified to enhance confidence in the value of the process. Transparency and accountability in how the engagement process is designed and implemented (e.g. stakeholder mapping methods, use of stakeholders' inputs) are crucial to improve credibility and legitimacy and to build trust amongst the stakeholders involved. Diligent work is necessary to ensure that the engagement process is fair and equitable and to reliably engage stakeholders.
- 3. Allocate proper financial and human resources and share requisite information for result-oriented stakeholder engagement.** Improving the overall contribution to substantive discussions and decision-making requires access to timely and understandable information (be it cultural, scientific, traditional, etc.), technical expertise, experience sharing and funding in the right format and in good time (planning) to realistically and effectively participate. Supporting two-way information-sharing through consistent and appropriate communication channels, including web-based technologies when feasible, is key. The

financial affordability of the engagement process is also important to ensure the effective engagement of all those that have a stake; convey accurate, trusted and accessible information to diverse sectors; foster opinion-forming within and across stakeholder groups; and build support to the process. In order to interpret and apply these resources and the information gathered, competences and capabilities need to be developed at all levels to enable sustainable stakeholder engagement (e.g. skills, social learning).

4. **Regularly assess the process and outcomes of stakeholder engagement to learn, adjust and improve accordingly.** Such evaluation and monitoring can resort to fact-based and perception-based tools and indicators and be carried out by targets, promoters and/or third parties. Results should be disclosed to increase accountability, provide insight into the success of the engagement process in reaching its intended objectives and learn from experience to improve practice in the future. Evaluation should not be limited to *ex ante* and *ex post* assessment but remain an ongoing process throughout the policy/project cycle. Stakeholder engagement can yield benefits in terms of resilience, sustainability, cohesion, acceptability, capacity and efficiency. However, it can also delay decision-making and implementation and generate different types of material (monetary and nonmonetary), process, reputational and social costs. Assessing the costs and benefits of engagement processes can assist in ensuring that all interests, including those of underrepresented stakeholders, are respected regarding the distribution of impacts, compensation and benefits. Mitigation measures are required to reduce costs and to set the right incentives whilst managing the dual short-term/long-term temporality.
5. **Embed engagement processes in clear legal and policy frameworks, organisational structures/principles and responsible authorities.** There is no water governance without governance at large. Similarly, there can be no effective stakeholder engagement without proper incentives for bottom-up and inclusive policy-making. A clear set of rules, platforms and vehicles for doing so is critical to move from reactive to proactive and systematic stakeholder engagement in the water sector. However, institutionalisation increases the risk of engagement ‘fatigue’ and/or ‘capture’ from overrepresented categories to the detriment of unheard voices. It should be flexible to take into consideration place-based needs and changing circumstances whilst fostering a change in the ‘mindset’, daily practices, professional skills and culture of decision-making. Provisions for stakeholder engagement should be aligned coherently and holistically across the water chain and policy domains related to water.
6. **Customise the type and level of engagement to the needs and keep the process flexible to changing circumstances.** Stakeholder engagement tools and mechanisms work differently across places, times, objectives and stages of the policy/project cycle. They should be tailored to each context (geographic, socio-economic, cultural), type of stakeholder concerned, policy goal targeted and place-based needs to accommodate varying levels of interest and resources from stakeholders and consider other options as needs arise. Water governance systems are complex and in a state of constant flux, where change is dynamic and

often unpredictable. Engagement processes therefore need to enable multiple stakeholders to respond and adapt to uncertainty and should remain flexible to manage risks and resilient to adapt to changing environments. Lessons can be learnt from failure in engagement approaches in terms of management of complexity and how to bring about fundamental change.

References

- Abelson, J., & Gauvin, F. P. (2006). *Assessing the impacts of public participation: Concepts, evidence and policy implications* (Research report P/06). Ottawa: Canadian Policy Research Networks.
- Arnstein, S. R. (1969). A ladder of citizen participation. *Journal of the American Institute of Planners*, 35(4), 216–224.
- Brown, M., & Wyckoff-Baird, B. (1992). *Designing integrated conservation and development projects*. Washington, DC: Biodiversity Support Program.
- Fung, A. (2006). Varieties of participation in complex governance. *Public Administration Review*, 66(Supplement S1), 66–75. <http://dx.doi.org/10.1111/j.1540-6210.2006.00667.x>
- Guimarães-Pereira, A., Rinaudo, J. D., Jeffrey, P., Blasques, J., Corral-Quintana, S. A., Courtois, N., Funtowicz, S., & Petit, V. (2003). ICT tools to support public participation in water resources governance and planning: Experiences from the design and testing of a multi-media platform. *Journal of Environmental Assessment Policy and Management*, 5(3), 395–420. <http://dx.doi.org/10.1142/S1464333203001383>
- OECD. (2011). *Water governance in OECD countries: A multi-level approach* (OECD studies on water). Paris: OECD Publishing. <http://dx.doi.org/10.1787/9789264119284-en>
- OECD. (2012). *OECD environmental outlook to 2050: The consequences of inaction*. Paris: OECD Publishing. <http://dx.doi.org/10.1787/9789264122246-en>
- OECD. (2014). *Water governance in the Netherlands: Fit for the future?* (OECD studies on water). Paris: OECD Publishing. <http://dx.doi.org/10.1787/9789264102637-en>
- OECD. (2015a). *Stakeholder engagement for inclusive water governance*. Paris: OECD Publishing. <http://dx.doi.org/10.1787/9789264231122-en>
- OECD. (2015b). *OECD Principles on water governance*. Paris: OECD Publishing. <http://www.oecd.org/governance/oecd-principles-on-water-governance.htm>
- Pretty, J. (1995). Participatory learning for sustainable agriculture. *World Development*, 23(8), 1247–1263.
- Smith, D. H. (1983). Synanthrometrics: On progress in the development of a general theory of voluntary action and citizen participation. In D. H. Smith & J. Van Til (Eds.), *International perspectives on voluntary action research*. Washington, DC: University Press of America.
- United Nations Development Programme (UNDP) Water Governance Facility, Stockholm International Water Institute, & Water Integrity Network. (2013). *User's guide on assessing water governance*. Denmark: United Nations Development Programme.
- Wehn, U., & Evers, J. (2014). Citizen observatories of water: Social innovation via eParticipation? In Proceedings of the ICT4 Sustainability conference (ICT4S), Stockholm, 24–27 August 2014, nominated for best paper award.
- Wehn, U., Rusca, M., & Evers, J. (2014). Participation in flood risk management and the potential of citizen observatories: A governance analysis. In Abstracts of the international conference on flood management, 16–18 September, Sao Paulo, Brazil.
- Yee, S. (2010). Stakeholder engagement and public participation in environmental flows and river health assessment. Australia-China Environment Development Partnership, Project code P0018, May 2010.

Open Access This chapter is distributed under the terms of the Creative Commons Attribution-Noncommercial 2.5 License (<http://creativecommons.org/licenses/by-nc/2.5/>) which permits any noncommercial use, distribution, and reproduction in any medium, provided the original author(s) and source are credited.

The images or other third party material in this chapter are included in the work's Creative Commons license, unless indicated otherwise in the credit line; if such material is not included in the work's Creative Commons license and the respective action is not permitted by statutory regulation, users will need to obtain permission from the license holder to duplicate, adapt or reproduce the material.



Chapter 4

Free-Market Economics and Developmental Statism as Political Paradigms: Implications for Water Governance Theory and Practice in Developing Countries

Claudious Chikozho and Everisto Mapedza

Abstract Key actors in various developing countries are often confronted by difficult choices when it comes to the selection and deployment of appropriate water governance regimes taking into account national socio-economic and political realities. Indeed, scholars and practitioners alike continue to grapple with the need to create the optimum water-supply and allocation decision-making space applicable to specific developing countries. This chapter uses case studies to explore the utility of free-market economics and developmental statism as two major paradigms that have emerged in the face of enduring questions about how best to govern water-supply systems in developing countries. The chapter establishes that increasing pressure on available natural resources may have already rendered obsolete some of the water-supply systems and governance regimes that have served human societies very well for many decades. It is also clear that national water-supply governance paradigms tend to change in tandem with emerging national development theoretical frameworks and priorities. Each nation or local government feels compelled to adopt a particular framework to fulfil its needs taking into account the broader global water policy context. While many developing countries have adopted water policy prescriptions from the international arena, national and local socio-economic and political realities ultimately determine what works and what does not work on the ground. Local realities have also helped to inform how nation-states domesticate global concepts for their local purposes. Thus, the choice between free-market approaches and developmental state-oriented approaches is never simple, and hybrid models are often deployed. Indeed, the majority of countries and municipalities rely on a mix of market economics and developmental statism to make their water governance regimes more realistic and workable on the ground.

C. Chikozho (✉)
Africa Institute of South Africa, Human Sciences Research Council,
Private Bag X41, Pretoria 0001, South Africa
e-mail: c.chikozho@gmail.com

E. Mapedza
International Water Management Institute, Pretoria, South Africa

Keywords Water supply • Governance • Policy • Developmental state • Free markets • Municipalities

4.1 Introduction and Background

The past six decades of changing development paradigms have seen alternating national and international water policies emphasise the state, user groups or markets as essential for solving water resource governance challenges. Closer analysis reveals that each of these solutions has worked in some places but failed in others, especially when attempts were made to pilot the solutions across many countries and diverse socio-economic situations (Meinzen-Dick 2007). But since the early 1990s, integrated water resource management (IWRM) has emerged as the dominant framework for guiding decision-making and planning in the water sectors of developing countries. With the observed and anticipated worsening of water scarcity due to climate change and various anthropogenic factors that increase water demand, the push for IWRM has never been greater.

It is within this context that discourses on the importance of the “political paradigm” for water governance in developing countries are usually framed. In these discourses, scholars and practitioners alike grapple with the need to create the optimum water-supply and allocation decision-making framework applicable to a developing country, especially in Africa. The enduring question is no longer whether or not water should be managed purely as a social or economic good. Instead, it is now more about how best a particular country and its service delivery agencies can manage freshwater-supply systems taking into account the state’s developmental role while at the same time addressing the free-market economy imperatives evident in and promoted by advocates of IWRM approaches. At the same time, implementation is often constrained by resource limitations, structural adjustment programmes and poverty reduction strategies.

Analytical papers by several scholars indicate that traditional approaches for meeting increasing demand for water relied almost exclusively on centralised infrastructure and decision-making characterised by big dams and reservoirs, pipelines and treatment plants, water departments and agencies (see Gleick 2002; Chikozho 2008; GWP 2012). These approaches, dominated by a supply orientation and reliance on technical solutions to water problems, have since been discarded in favour of a governance regime that embraces user involvement in decision-making and more efficient resource management. In effect, IWRM explicitly challenges traditional water development and governance systems. It starts with the recognition that top-down, supply-led, technically based and sectoral approaches to water governance and management impose unsustainably high economic, social and ecological

costs on human societies and on the natural environment. The water governance paradigm that has now emerged is underpinned by neoliberal approaches that emphasise, *inter alia*, a “rolling back of the state from the frontiers of development planning” and treating water-supply services as “economic” products that need to be paid for. It is a way of thinking that emphasises decentralised management structures, use of efficient technologies and deployment of water pricing structures that act as both incentives and disincentives for “irresponsible” water use.

This chapter addresses two major paradigms that have emerged in the face of enduring questions regarding how to govern water-supply systems in a developmental state or in a free-market economy. We present the main discourses attributable to each of these perspectives and their implications in a developing country context. We acknowledge that the increasing scarcity and demand for freshwater has serious implications for how water is allocated and protected. We argue that in the face of new pressures on the resource, water-supply systems, models and governance regimes that have served human societies for a long time may now fail to cope. Therefore, this chapter brings attention and sharper focus on the need to deploy alternative tools and approaches to water-supply governance and management in order to protect and sustainably allocate this resource. The chapter also brings to the fore the fact that despite the dichotomy between free-market economy and developmental-state paradigms, in practice, elements of both paradigms tend to be combined, albeit in different proportions.

Well-known scholarship that addresses water institutions includes Rosegrant and Binswanger (1994), Barnekov et al. (1989), Saleth and Dinar (2005), Meinzen-Dick (2007), Briscoe (2011), Beveridge and Monsees (2012) and Horne (2013). Most of these scholars partly focus on the benefits or disadvantages of water markets and provide insights about their utility in specific contexts as well as guidance on how they may be improved. Typically, most of them use economic efficiency and equity perspectives as the point of departure in their analyses. Our goal in this chapter is more modest, that is, to show how developing countries may or may not deploy market mechanisms in their water-supply systems and what this implies in terms of efficiency, equity and sustainability. We do not necessarily provide specific recommendations about how to improve water markets; neither do we discuss best practice in terms of water institutions (see Saleth and Dinar 2005). Instead, we provide an overview of the key debates and major institutional underpinnings of water-supply sectors in developing countries and their potential performance under market or developmental state-oriented planning conditions. This chapter is intended to inform practitioners, policymakers and theorists who grapple continuously with the challenge of crafting effective water governance systems in a rapidly altering environment in developing countries. Section 3.1 focuses on key discourses, concepts and expectations relevant to the management of water in a free-market economy. Section 3.2 explores the major discourses, concepts and expectations relevant to the management of water in a developmental state.

4.1.1 Managing Water in a Free-Market Economy: A Brief Historical Trajectory

While understanding around the vulnerability and finite nature of water in the face of rapidly growing demand for the resource has a long history, it was highlighted together with the concept of the “right to water” in much clearer terms than ever before during the United Nations (UN) Conference on Water, 1977 at Mar del Plata. Since then, debates on water governance in developing countries have mainly revolved around the need to discard the long-held belief that water is a social good to be provided by the state, either free of charge or at very low cost. To proponents of this approach, developing and delivering new water-supply systems and suppressing water prices appear much more politically expedient than focusing on charging higher prices and improving the efficiency of existing supply systems. This approach was buttressed by the widely held belief that water was always going to be in abundance (Molle 2009). Inefficiencies in water use were either not detected at all or simply ignored. Thus, the failure to recognise the economic value of water led to wasteful and environmentally damaging uses of the resource (Kevinsen et al. 2014). As Smith and Wang (2008) point out, solely searching for water supply-side remedies may mask overconsumptive or unsustainable behaviours that are acknowledged during the critical self-examination that inevitably occurs when a water conservation approach is adopted.

Both the 1987 Report of the World Commission on Environment and Development (Brundtland Commission) entitled “Our Common Future” and the Dublin Principles of 1992 heralded a significant shift in perceptions about how water and other natural resources should be governed and managed, giving rise to the acceptance of the integrated approach embodied in IWRM. Guided by the Dublin Principles, governments, water management agencies, international organisations, civil society agencies and others have engaged in a long-term change process to improve management of water resources (see FAO 1995; GWP 2003; Chikozho 2010). A product of the UN Conference on Environment and Development held in Rio de Janeiro, Brazil, in 1992, Agenda 21, Principle No. 4, declared that “Water has an economic value in all its competing uses and should be recognized as an economic good” (United Nations 1992). In 1993, the World Bank issued a comprehensive policy paper that basically reiterated that water should be viewed as a limited resource to be managed in an integrated manner to meet national objectives – economic, social, security and environmental rather than as an input into specific sectors (World Bank 1993a). Attention significantly shifted from technical solutions to solutions of a managerial and institutional nature in the early 1990s (Schwartz 2008). This shift should also be understood within the context of a broader neoliberal agenda led by the World Bank and the IMF during the same period that advocated reduction of the role of the state in development planning.

In effect, IWRM has been promoted in many developing countries by various international players such as the Global Water Partnership (GWP), the World Water Council, the World Bank and the UN, as well as national governments, as a key

means of improving access to safe water supply and sanitation and, more generally, alleviating poverty and improving peoples' lives. In the process, "water as an economic good" has evolved to take precedence over the IWRM principles of social and environmental equity (see Mukhtarov 2006; Mollinga 2008; Beveridge and Monsees 2012). Most of the key international water-policy players have either directly supported or advocated institutional reforms in developing countries whose backbone is the IWRM framework. In countries that have adopted the "water-as-an-economic-good" principle, the reforms that ensue have tended to drastically alter the relationships between the state, civil society and private sector players active in water supply and sanitation. The "water-as-an-economic-good" principle has come to be viewed as an important way of achieving efficient and equitable water use as well as encouraging better protection of the resource (Chikozho 2010). The World Bank in particular came to play a central role in developing and promoting water management policies and reforms consistent with its interpretation of water as an economic good (Budds 2004). It embraced the principles of water privatisation, in terms of both private-sector participation in urban water utilities and the definition of private property rights over water resources, as a means of addressing the dual concerns of increased water-supply coverage and efficient water resource management.

4.1.1.1 Theoretical Underpinnings of a Free-Market Economy

A free-market economy basically refers to an economic system in which economic decisions and the pricing of goods and services are guided solely by the aggregate interactions of a country's citizens and businesses. There is little government intervention or central planning except as a guarantor of the transactional environment through development and enforcement of the regulatory environment (Coates 2000; Hall and Soskice 2001). In other words, goods and services are produced and sold with very limited interference from the state. Trading relations exist mainly between and among the producers of raw materials, producers of processed goods and services, retailers and consumers. The laws of demand and supply determine the direction and speed with which goods and services move on the market (Jessop 2002; Perkins et al. 2012). Consumers express their choices through the decisions they make when allocating their finances to enable specific transactions to occur. A free-market economy is therefore, the opposite of a centrally planned economy, in which government decisions determine the direction that most aspects of a country's economic activity take.

Free-market economies are based on the assumption that market forces, such as supply and demand, are the best determinants of what is right for a nation's well-being, and these are based on rational decisions made by consumers seeking to optimise or maximise their benefits from various transactions. While most developed nations today could be classified as having mixed economies, they are often said to have market economies because they allow market forces to drive most of their activities, typically engaging in government intervention only to the extent that

it is needed to provide stability (Jessop 2002). In essence, proponents of free markets and privatisation assume that the private sector is inherently dynamic, productive and dependable. They also hold the belief that private institutions are intrinsically superior to public institutions for the delivery of goods and services. They have the confidence that market efficiency is the appropriate criterion of social performance in virtually all spheres of community activity (see Barnekov et al. 1989; Castro 2007). Although the market economy is clearly the system of choice in today's global marketplace, there is significant debate regarding the amount of government intervention considered optimal for efficient economic operations in developing countries.

Debates surrounding the applicability of free-market principles in developing countries intensified in the past few decades, especially with the failure of the socialist path to development in the late 1980s and the rise to prominence of neoliberalism as promoted by the World Bank, the International Finance Corporation and their development partners (the so-called Washington Consensus). The major ideology behind neoliberalism is that economic, political and social relations are best organised through formally free choices of free and rational actors who seek to advance their own material or ideal interests in an institutional framework that, by design, maximises the scope for free choice (Coates 2000; Jessop 1997; Perkins et al. 2012). Economically, it promotes the expansion of the market economy and monetisation of exchange in as many social practices as possible. From a political perspective, it implies that decision-making should involve a state that has limited substantive powers of economic and social intervention and commits itself to maximising the freedom of actors in the economy to engage in economic transactions that they consider beneficial to their welfare (Jessop 2002).

In most free-market economies, calls for the liberalisation and deregulation of economic transactions within national borders and beyond have prevailed to the point where even formerly social democratic political parties decline to challenge them. This has also entailed privatisation of state-owned enterprises and public services and application of market proxies in the public sector (see Hodgson 1992; Jessop 2002). Hoskisson et al. (2000) argue that as a political project, free-market economics seeks to actively promote rolling back of the state from its traditional and routine forms of intervention associated with the mixed economy and the welfare-oriented national state. It also involves a deliberate shift in public policy that leads to the roll-out of new forms of governance such as decentralised national planning and service delivery, privatisation and commercialisation of public services such as water and electricity supply.

Presumably, these new forms of governance are more suitable for a thriving market-driven national economy (Stein 1994). This typically involves the selective transfer of state capacities upwards, downwards and sideways, as intervention is rescaled in the hope of securing conditions for a smoothly operating world market and to promote supply-side competitiveness on various scales above and below the national level (Jessop 1997). A shift also occurs from government to market forces and public-private partnerships. This shift reflects the neoliberal belief in the probability, if not inevitability, of state failure and the need to involve relevant

stakeholders in supply-side policies (ibid). If the state cannot deliver something as basic as water and sanitation, the argument goes that is a strong indication of a general failure of public-sector capacity (see Anderson and Snyder 1997). Therefore, water scarcity becomes simultaneously indicative of a problem of poverty, of modernisation and of governance, and reforms are required to correct state failure (Goldman 2007). The extent to which the reforms and new forms of governance are applicable to a sector such as water supply remains debatable, particularly given the orthodox categorisation of water as a *public good* in mainstream public management discourses for many decades.¹

4.1.1.2 Implications for Water Governance and Management

While very few countries in the developing world use the free-market economy principles to solely determine water allocation and distribution among various social groups, many public water utilities in Africa have been grappling with extensive reforms as part of the implementation of IWRM. Such reforms have also been implemented in the context of broader public-sector reforms aimed at improving public service delivery across various government departments.² A key defining feature of these reforms is the introduction of management principles and practices associated with typical private-sector commercialisation processes (Schwartz 2008). These include using the laws of supply and demand to determine prices for water and strict commitments to making profits. The implications of these reforms on water-supply system efficiency and equity are likely to be far reaching.

Implementation of the reforms on the ground has been characterised by two main approaches. The first one is a situation where management of the water utilities in urban areas is delegated to the private sector through concession contracts or other contractual arrangements. The second is a strategy that retains management of the water utility in a public agency, but concentrates on introducing management practices associated with the private sector for both urban areas and irrigated agriculture (ibid). Introduction of private-sector management approaches usually results in changes to the water rights or licensing regime. The expectation is that water licences or rights can be eventually traded on the open market based on demand and supply while progressively “depoliticising” the water governance regime (see Hernández-Mora et al. 2015). According to Brown et al. (2009), many international

¹Gravelle and Rees (1981) state that “The defining characteristic of a public good is that consumption of it by one individual does not actually or potentially reduce the amount available to be consumed by another individual”. Thus, individuals cannot be effectively excluded from using or consuming those goods, and the use by one individual does not reduce availability to others, e.g. fresh air, forests, fisheries, water, etc.

²Schwartz (2008) states that the origins of this form of reform, often referred to as the *New Public Management*, lie in New Zealand and the United Kingdom where it was initiated in the early 1980s. These “reforms are a significant part of the *new public management* discourses that have been promoted by a broad coalition of sector professionals, donors and international development agencies”.

and bilateral donors and lending agencies have supported privatisation of water-supply systems believing that private-sector involvement is a means of removing politics from the sector and also a reliable source of investment capital. However, the extent to which such assumptions are realised in reality differs from place to place.

A major thrust of reforms in developing countries has been towards implementing changes in arrangements within the public sector by increasing the autonomy of state-owned utilities and requiring them to manage resources such as water on a more commercial basis (Schwartz 2008). Broadly, new public management (NPM) reforms in the water-supply and sanitation sector share characteristics such as increasing the level of autonomy of the utility, separating regulatory tasks from service provision, creating quasi-competition in the water sector in terms of service provision, increasing tariffs to cost recovering levels and increasing customer orientation and increasing accountability for the results produced by the water utility (Herrera and Post 2014). To ensure that the utility is actually producing the services that it is supposed to be producing, an accompanying regulatory framework is often developed and implemented which provides incentives for the utility to improve service provision. Consumers are expected to obtain access to water by obtaining formal water rights or licences. The state agencies and autonomous utilities supplying water benefit directly through increased revenues raised from water licences and permits.

In the long run, an expected offshoot of water privatisation and commercialisation is the emergence of water trading among users with formal rights to water. Briscoe (2011) points out that once users have clear, transferable property rights to water, they automatically consider whether they wish to forego a particular use of water in exchange for compensation from another user who may place a higher value on the water. Reallocating water then becomes a matter of voluntary and mutually beneficial agreements between willing buyers and willing sellers and not a matter of confiscation or an endless search for new sources of supply by state agencies. Throughout the arid Western United States, for example, and in the Murray-Darling basin in Australia, water rights are considered as legal property and, under different rules in different states, allow for approved transfers between willing buyers and willing sellers (see Grafton et al. 2011; NWC 2011). Chile and Mexico are the other well-known examples of countries where formal water markets have been introduced (Horne 2013). It has also become an issue for debate in the UK as part of the UK's reconsideration of abstraction management. However, in most developing countries, water markets mainly consist of informal agreements between neighbouring farmers about how to share supplied or extracted water for their mutual benefit. Typically, this involves one farmer allowing access to water to another user in exchange for a financial or nonfinancial payment (Briscoe 2011; Nikolakis et al. 2013).

Where the free-market economy is fully functional and an appropriate regulatory environment for water markets is created, efficiency gains are noticeable. For example, Horne (2013) states that the operation of water markets in the Murray-Darling basin provides an important example of the potential benefits of water trading for

irrigators, communities and the environment. Generally, water markets in this basin account for over 80 % of both the water entitlement trade and the trade in seasonal allocations (or trade in actual water) nationally. Tradability of water and water assets follows complex rules, and for the most part, trading in surface water entitlements occurs only in relation to regulated water flows within and between valleys, provided there are no hydrological reasons inhibiting trade (NWC 2012; National Water Market 2012).

In the face of increasing water stress, it is possible that more countries will turn towards legal, formally managed water markets which enable them to shift water from low-value to high-value uses (Briscoe 2011). One would also imagine that once the free-market economy approach is deployed, policy and legislation governing water allocation and supply systems inevitably treat water as an economic good. The “user-pays” and “polluter-pays” principles are then applied to enhance water governance efficiency.³ Application of these principles also implies running the water sector on a cost-recovery basis so that it becomes self-financing instead of relying on government budgetary allocations and subsidies. It also means charging higher prices for water than before in order to recover all costs of supplying the water to users (see Herrera and Post 2014). In such a case, companies and individuals whose activities cause water pollution have to obtain water pollution permits. They are then charged certain prices (penalties) according to the level of pollution they cause. The money raised is intended to be used to correct any environmental damage caused by the pollution.

Another common feature of managing water in a free-market economy (and indeed an important one) is the emphasis on water conservation and demand management (WDM). This is perhaps best showcased in urban areas where human population continues to be more concentrated and also in irrigated agriculture which tends to be a major water-use sector in most countries (see Gleick 2002). In developing country urban water-supply systems, unaccounted-for water often averages between 40 % and 60 % resulting from old infrastructure and burst or leaking pipes. Efforts to address such water losses through conservation measures and WDM often bear impressive results (Brandes and Ferguson 2004; Schwartz 2008; Da-ping et al. 2011). As Gumbo (2004) points out, the argument for WDM is sound and convincing: if there is a shortage of water for urban supplies, do not limit the solution to supply options only, but also consider demand-side options, such as minimising water losses and influencing demand to more desirable levels through structural measures such as retrofitting of water appliances, recycling and reuse, active or reactive leak detection and repair.

Useful nonstructural measures would include education and awareness campaigns, restrictions on water use, water tariff structure policy changes and innovative presentation of utility bills. In essence, WDM has evolved into long-term

³ Correljé et al. (2007) state that the polluter-pays and the user-pays principles are both related to who should bear the costs of environmental degradation. Those who cause pollution should meet the costs to which it gives rise, and users of a natural resource must bear the cost of running down natural capital.

municipal planning that helps to avoid costly capital infrastructural expansions (Vickers 2001; Brooks 2006; Kevinsen et al. 2014). A study by Gumbo (2004) focusing on eight cities in Southern Africa concluded that cities such as Bulawayo in Zimbabwe, Windhoek in Namibia and Hermanus in South Africa, which have invested in WDM, significantly reduced water losses (by at least 20%). The same study also concluded that cities performing well in terms of WDM have higher water-supply coverage figures, with at least 90% of the population having individual or household water connections, while cities that did not implement WDM approaches could not account for more than half of the water supplied.

Economic incentives and water pricing policy strategies are today's powerful WDM tools, making this option more environmentally friendly and, at the same time, an economically effective alternative solution to balance supply and demand (Kolokytha et al. 2002). Pricing through metering allows water users to become more aware of local consumption and is a prerequisite for the implementation of volume-based water pricing mechanisms (Kevinsen et al. 2014). Switching from a flat or fixed water rate to a metered system and increasing tariffs have been shown to reduce water demand (Da-ping et al. 2011). The goals most often cited in discussions of water pricing and tariff structures include efficiency, equity and sustainability (see Kanakoudis et al. 2011; Wichelns 2013). If set at the right levels, prices increase the possibility that consumers will better understand the prevailing pertinent costs and water scarcity conditions, and in the process, they will be encouraged to choose water volumes that reflect an efficient allocation of water between competing uses over time. In Beijing, China, a new pricing system that linked the cost of water to the amount of water used significantly encouraged conservation (Gleick 2000). A similar pricing system decreased average monthly residential water use by nearly 30% in Bogor, Indonesia (Postel 2000). Regional water providers in South Africa managed to delay the construction of new water-supply systems by imposing higher rates, distributing water conservation equipment and educating the public (Gumbo 2004).

4.1.1.3 Challenges of Managing Water Using Free-Market Approaches

It is, however, important to note that within the context of equity and pursuing national objectives of redressing historical imbalances in access to water, the free-market approach (particularly pricing) usually becomes a hotly contested subject. The notion that all members of a community must have access to an affordable supply of water for domestic uses and livelihood activities is widely accepted in most parts of the world. Thus, equity becomes particularly prevalent in discussions of water tariff structures, given that water is essential and that in many settings, a purely market-based allocation of water between competing users would deprive poor residents of their access to a safe and reliable supply (Wichelns 2013). From a theoretical perspective, one option for simultaneously addressing both equity and efficiency through pricing is to deploy increasing block-rate tariffs. This is a pricing structure that provides some amount of water to poor residents at very low prices,

while requiring wealthier residents to pay higher prices. Increasing block-rate tariffs have been implemented in many countries, as they enable water agencies to establish a very low price for the volume of water required for subsistence, while charging much higher prices for water deliveries in excess of minimal requirements (see Evans et al. 2002; Madhoo 2011).

However, the use of block-rate tariffs has had mixed results in various countries and cannot, therefore, be considered as the automatic panacea to water pricing controversies. For example, in several cases the incremental prices of water have been too low to motivate wise use on the part of wealthier consumers, and as a result, cost-recovery efforts have tended to fall short of initial estimates while the notion of sustainability remains unfulfilled. In other cases, water-supply connection rates have not improved at all even after block-rate tariffs have been introduced (see Keener et al. 2010). This suggests that block-rate tariffs are not necessarily the silver bullet for addressing water pricing challenges. Even the best-designed tariff structure cannot provide benefits to poor households that are not connected to the supply network (Angel-Urdinola and Wodon 2012). Water is not a typical or an ordinary economic good, and because of its specific characteristics, it is difficult to apply economic theory to it (Lamoree and Van Steenberg 2006; Anokye and Gupta 2012). In any case, water has no substitute, and if water for basic needs is treated as an economic commodity, it is likely to have serious consequences, particularly for the poor who often do not have alternative sources or substitutes (Grimble 1999). To this end, water utilities in developing countries should still consider increasing their investments in expanding water-supply service delivery in order to increase access for the poor.

From the foregoing, it is increasingly clear that the establishment of water markets is neither simple nor a readily available panacea. Experience has shown that the establishment of water markets is considerably more complex and nuanced than is often assumed and that it is not enough to just extol the virtues of pricing (Briscoe 2011). For starters, ordinary water users understand a price as a payment for a service rendered. In most developing countries where the supplier is usually a monopoly (and prices are set outside of the market), this means that the legitimate price in the eyes of users is that which it costs an efficient producer (usually a public utility) to produce the service (Nickson 1997; Schwartz 2008). However, it is common for the supplier in Africa to be inefficient, and users are unwilling to pay for these services under those conditions (Briscoe 2011). In addition, even under the most advantageous of settings, users will vigorously resist the notion that they should pay for *sunk costs* which, in their eyes, have already been paid for by taxes or other assessments (Nickson 1997).⁴ Pressure to increase cost recovery without addressing these fundamental accountability questions is a major part of the reason why cost recovery has been so poor in many countries (Briscoe 2011).

⁴In economics and business decision-making, sunk costs are retrospective (past) costs that have already been incurred and cannot be recovered. They are independent of any event that may occur in the future. As such, once committed, sunk costs no longer constitute a portion of the cost of production (see Baumol and Willig 1981; Sherman 2008).

A typical example is water privatisation in Bolivia in the early 1990s that occurred with total disregard for the concerns of the citizenry. It resulted in water tariffs that were beyond many citizens' ability to pay, such that it became a very controversial issue and source of conflict in Latin America, leading to a series of political debates, protests and even riots (see Castro 2007; Hailu et al. 2012). The concession was terminated in March 2000 as a result of massive public mobilisations that led to the withdrawal of the entire federal cabinet. The concessionaire's subsequent attempts to seek redress in international courts failed dismally. An examination of the performance of the private sector with respect to water-supply connections for poor households in Jakarta, Indonesia, concluded that the Jakarta private-sector partnership contract had not been pro-poor, and the expected trickle-down effect did not materialise (Bakker 2007). New connections were preferentially targeted at middle- and upper-income households over the period 1998–2005, and the numbers of new connections had been lower than the original targets. The failure to connect the poor is not solely attributable to the private operators and identifies disincentives to provide individual network connections to poor households on the part of the municipality, the private concessionaires and poor households (ibid).

In 1981, Chile reformed its Water Code in line with neoliberal principles, based on private water rights that could be freely traded with few restrictions and minimal state regulation. International financial institutions have embraced the Chilean model, claiming that it results in more efficient water use, and potentially fosters social and environmental benefits (Budds 2004). However, the free-market Water Code has been the focus of a lengthy and heated debate, and attempts to modify it have been debated in congress for over ten years. Moreover, its implementation has been problematic, both in terms of failing to foster active water markets and the growing evidence of social as well as environmental conflicts (Hearne and Easter 1997; Bauer 2004). None of the purported benefits of water markets for peasant farmers in Chile have been observed in practice; indeed, the present mode of water management has had negative socio-environmental implications for peasants in terms of reduced formal access to water and increased vulnerability to drought (Budds 2004).

In other parts of the world where the water "marketisation" agenda has been vigorously promoted, various studies have highlighted the common use of non-institutional forms of resistance by citizens. These include violent and non-violent protests, vandalism, illegal reconnections and other forms of collective action. In Lima, Peru, for instance, citizens resisted attempts by the water utility to closely monitor household water usage by stealing and vandalising water meters with much greater frequency. For example, whereas 32 256 meters were stolen or vandalised in 2000, this number increased to 85 176 by 2007 (see Ioris 2012; Herrera and Post 2014). In a number of South African cities, activists protested the installation of water meters, leading to arrests and criminal charges (see Conca 2006; Harvey 2005). In Durban and Tygerberg, for instance, citizens reconnected themselves to the water-supply system following service cut-offs for non-payment (Morgan 2011). High rates of service cut-offs for non-payment in Tygerberg and Cape Town actu-

ally “sparked township revolts, making these areas periodically ungovernable” (Smith 2004:389). Protestors also boycotted payment in Pretoria while in Durban, large crowds rallied in the water utility offices, holding 10-rand notes to symbolise the maximum amount they could afford to pay per month (Bakker 2010; Morgan 2011). In Lusaka, Zambia, price increases that doubled tariffs for middle-class users and more than quadrupled tariffs for low-income users became politically untenable when people protested, and the tariffs were soon reduced significantly (Dagdeviren 2008).

Overall, the available evidence indicates that market-based approaches to water-supply governance that may have worked in some developed countries do not necessarily apply in developing country contexts. This suggests that sensitivity to the socio-economic, institutional and political dimensions of water management is fundamental to successful implementation of IWRM (see Chikozho 2010; Beveridge and Monsees 2012). Closer analysis of the IWRM framework also reveals the negative effects of policy standardisation and formulation at the international level and promotion of policy transfer from the top downwards (Mukhtarov 2006). In this model, a network of international agencies, water experts and professionals have colluded to redefine the water resource management agenda in ways that promote transfer of neoliberal-oriented water policy prescriptions across the world. As a result, much of the IWRM decision-making prescriptions tend to ignore the social, cultural and political context, as well as the historical aspects within which these are embedded (Ashton 2007).

When a state adopts a free-market approach to water governance in a developing country, immediate questions arise regarding the extent to which the approach takes into account these institutional and political sensitivities (Bruns et al. 2005). This becomes a hotly contested terrain in countries such as South Africa and Zimbabwe where deep-seated historical inequities in access to water have prevailed for a long time. It may be viewed as excluding previously disadvantaged groups from accessing the resource since pricing structures determined on the basis of economic efficiency and cost recovery would be predominant (Bouchaud 2008). That is perhaps why scholars such as Mukhtarov (2006) and Butterworth et al. (2010) have argued strongly that IWRM was never a “people-centred” concept, having emerged from practitioners’ ecological concerns over the then-dominant utilitarian use of water supply and discharge. The approach runs the risk of legitimising existing power and access rights inequalities as well as oversimplifying the diversity of needs and interests of local actors (see Molle 2008; Saravanan et al. 2009).

Another controversial feature of the market economy approach is that it urges government to retreat from the frontiers of development planning by reducing the size and costs of its activities in the water sector, deliberately shifting from a supply-orientation to a demand-driven approach, based on the user-pays principle (see Nhira and Derman 1997; Schreiner and Van Koppen 2001). Policies and legislation are subsequently revised to suit the emerging water governance regime. Bithas (2008) carried out an elementary microeconomic analysis, which demonstrated that even in cases where private water companies are given the mandate to supply water, constant state intervention is necessary to correct market failures and approach

social full-cost pricing. Goldman (2007) argues that the key word is “affordable”, as many of these water-supply services have been provided in developing countries but have now been shut off because people cannot afford to pay for them. In this chapter, our position is that, although there is an increasing recognition, at least rhetorically, that neoliberal water-supply policies have failed to achieve the expected results; the marketisation forces set in motion since the advent of IWRM will continue to shape institutional reforms and policy decisions that may deepen rather than reduce inequities in developing countries’ water sectors. These processes require careful analysis and reconfiguration before they can work in developing countries.

4.1.2 Managing Water in a Developmental State

The idea of a “developmental state” has proved to be one of the most attractive concepts in development theory and practice for several decades. Shortcomings evident in market-oriented approaches to the management of water and national economies at large have led to the emergence of a strong counter-narrative about macroeconomic policy and water-supply planning. This counter-narrative is based on the conviction that the state still has a developmental role to play even in cases where the free-market economy agenda is given priority (Dassah 2011). As Radice (2008) points out, in the 1980s and 1990s, the concept played two roles in developmental debates. First, it provided a coherent counter to the dominant neoliberal narrative that portrayed the market as the master institution underlying both growth and welfare such that by 1990, the developmental state had become the major ideological rallying point for those who wished to contest the appropriateness of neoliberalism and the Washington Consensus as a framework for effective governance and economic development in the global south. Sindzingre (2004) argues that the concept of the developmental state continues to be the most fertile conceptual issue in development economics more than a decade after its formulation, for it has explained the exceptional growth performances of East Asian countries as resulting from a combination of economic, political and institutional structural changes.

By the turn of the millennium, the application of the concept had spread beyond these origins, but it is still useful to recall its beginnings (Evans 2012). According to Radice (2008), the developmental state remains one of the chief points of reference, both analytical and political, for those who reject the current neoliberal global order. Proponents of the developmental state strongly believe that since there are so many imperfections in developing country market economies, it remains the responsibility of the state to step in and lead national planning and implement specific policies, plans, programmes and projects to drive the national development agenda (see Dassah 2011; Deen 2011; Routley 2014). The concept of the developmental state itself was popularised in 1982 by Chalmers Johnson. It has since been written about extensively and critically analysed in tandem with empirical experiences of its application (Aye 2013).

The successful developmental state experiences of several countries in Asia such as South Korea, Malaysia, Singapore, Japan, China, India and Taiwan have been repeatedly used to demonstrate how and why the rest of the developing world can and should move swiftly towards rapid economic growth (Edigheji 2005; UNECA 2013b). Even with reference to Africa, there are scholars who strongly believe that the developmental state model of national economic planning is the way to go. For example, Taylor (2002) argues that of those countries in Africa that have recorded respectable levels of economic development, it is precisely the developmental states of Botswana and Mauritius that have performed well. It is therefore important to articulate the concept's theoretical underpinnings and empirical application in order to generate relevant lessons for the rest of the developing world.

4.1.2.1 Theoretical Underpinnings of a Developmental State

As an analytical concept, the “developmental state” has been described variously as one that places economic development at the top of government policy priorities and which is able to design effective instruments to promote such a goal (see Mkandawire 2001; UNECA 2013a). Some of the instruments often referred to include the establishment of well-functioning formal institutions, weaving of formal and informal networks of collaboration among citizens and government officials and the utilisation of new opportunities for trade and profitable production (see Fakir 2007; UNECA 2013b). According to Radice (2008), in contrast to the conventionally polar models of liberal free-market capitalism and the state-socialist planned economy, the developmental state is seen as a distinctive political economy that combines elements of market and plan, linking a mixed economy to a political-ideological approach that combines authoritarian technocracy with a relatively egalitarian distribution of income and wealth.

The developmental state has also been characterised as a state that promotes macroeconomic stability, as well as establishing an institutional framework that provides law and order, effective administration of justice and peaceful resolution of conflicts, ensuring property rights and appropriate infrastructure investments and advancing human development (Dadzie 2013; Aye 2013). It is seen as a state that is determined to influence the direction and pace of economic development by directly intervening in the national development process, rather than relying on the uncoordinated influence of market forces to allocate economic resources (Johnson 1982; Taylor 2002). Elsewhere, the developmental state has been described as one that authoritatively, credibly, legitimately and in a binding manner, is able to formulate and implement its policies and programmes. In other words, it is a state that is capable of deploying the requisite institutional architecture and mobilising society towards realisation of its developmentalist project (Edigheji 2010; UNECA 2013a).

UNCTAD (2007) points out that the literature on developmental states has focused their characterisation on two major features, namely, a developmental ideology and a structure pertaining to the requisite institutions, norms and standards that can support the development process. Therefore, their *raison d'être* is building

the political, administrative and technical capacity to support development, in what has been summed up as constituting the “software and the hardware” of developmental states (see Kim 2007; Weiss 2010; Dadzie 2013). In short, the developmental state is understood, at one level, to be a unitary actor vis-à-vis markets, social forces and international pressures. It is also conceptualised as a set of institutions that structure the behaviour, preferences and strategies of all political actors, inside and outside of the actual state apparatus (Wong 2004). Ultimately, robust state-intervention measures determine the nature and pace of socio-economic progress (Routley 2014). The implications of this state-centric paradigm, both as an empirical reality to be studied and a theoretical construct to be debated, are far reaching, particularly when one considers governance of a resource sector such as water and sanitation.

It is also important for scholars to understand that in East Asia where the concept was successfully tried out and popularised, government development policies were neither socialist in design, nor did they promote completely unfettered markets (Fakir 2007). The East Asian experience, and the role of the state in facilitating post-war growth, confounded existing capitalism–socialism and North–South debates (Johnson 1999). When understood against this ideologically charged context, it becomes easier to understand how the examples of Japan, Taiwan and South Korea are often regarded as the living prototypes of developmentalism. Kriekhaus (2002) states that many East Asian countries have obtained economic growth rates unparalleled in human history, with per capita income roughly doubling every decade over the past 30 years. Therefore, they were post-war anomalies whose experiences still demand explanation (Leftwich 2005).

Some of the key factors that have been identified as necessary ingredients for the emergence and sustenance of developmental states include the establishment of production-oriented private sectors and performance-oriented governance generally, which essentially refers to fully functional and effective institutions (Meyns and Musamba 2010). Beyond merely identifying and stressing the importance of these factors in the emergence of developmental states, the literature has also extensively examined the processes by which they can and should be put in place. For example, the developmental states in Japan, South Korea and Taiwan used public policy instruments to allocate productive resources rather than relying solely on the market (Bagchi 2000; Kim 2007). They also targeted certain industrial sectors in their allocation of resources, sometimes playing a leadership role in prospecting potentially lucrative industrial sectors and at other times playing a followership role in strengthening pre-existing private-sector initiatives (Wade 2004).

Through the creation of tariff barriers, the subsidisation of research and infrastructural development, the use of export incentives and centralised control over the financial system, the developmental state demonstrated how “getting the prices wrong” through government intervention into the market was an effective strategy to compensate for East Asia’s relative economic backwardness and to jump-start the region’s catch-up development (Meyns and Musamba 2010; Mkandawire 2012). The distributive consequences of economic growth were less important to the developmental state, provided that social inequality was never too severe and that the

trickle-down effects of aggregate growth continued to be felt (Haggard 2004; Shaw 2012). The developmental state was also defined by its ability to balance strategic linkages with, and relative autonomy from, different societal forces thereby avoiding the threat of elite capture. As Fakir (2007) points out, undergirding all these is the autonomy of the state from social forces so that it can use its capacities to devise long-term economic policies unencumbered by claims of myopic private interests.

One can infer from the foregoing discussion that the developmental state is able to craft a vision that it will relentlessly pursue in search of a solid economic development path. It is prepared to do whatever it takes to realise that vision and hence the deployment of both market-oriented approaches and state-led development strategies, practices and projects. It is able to assess its capacity and identify the public and private-sector ingredients it needs to deliver that vision. We propose in this chapter that key attributes of a developmental state will include dosages of pragmatism, authoritarianism, economic expediency, entrepreneurship and innovation. The developmental state is also able to rise above and sidestep elite capture tendencies and ensure the emergence of a more egalitarian society.

4.1.2.2 Implications for Water Governance and Management

The “Asian miracle” has already demonstrated that it is possible for countries in the developing world to apply the developmental state model and achieve rapid socio-economic development. From a water and sanitation supply perspective, the developmental state would essentially focus on the effective delivery of services using various instruments. In any case, availability of water in sufficient quantities and quality is crucial to the achievement of socio-economic development in any country. The developmental state is expected to provide the essential water infrastructure and services necessary to help catalyse economic development and improve the livelihoods of all communities. Fakir (2007) states that the state does this primarily by regulating, administering, executing, mediating, investing and delivering the construction, operations, maintenance and servicing of water service delivery infrastructure.

In a developmental state, the public service not only focuses on specific infrastructural outputs but is also acutely aware of the “soft” (policy and institutional) issues critical to sustainable governance of the sector. It strives to deliver water services in ways that are efficient and effective and to maintain the dignity of citizens by ensuring that even poorer sections of society have access to a basic level of water supply and sanitation. The developmental state will use its agencies to provide water and sanitation services but will also embrace the potential contribution and competitive advantage of the private sector. As Bagchi (2000) points out, one important feature of a successful developmental state is its ability to switch gears from market-directed to state-directed growth, or vice versa depending on geopolitical circumstances, as well as combining both market and state direction in a synergistic manner, when opportunity beckons. In other words, when managing water in a developmental state, the government is likely to facilitate the emergence of a

mixed economy in which the arm most suitable to provide water services at a particular point in time and place will be given the opportunity to do so. The use of public–private partnerships becomes a readily accepted practice. Therefore, the specific competencies, skills and values required in the water sector of a democratic developmental state are defined by its development context, priorities and challenges as well as the specific institutional conditions that exist or may need to be created to enable realisation of a specific vision.

4.1.2.3 Challenges of Managing Water in a Developmental State

A key aspect raised in most of the criticism on the notion of a developmental state is that the effectiveness of the developmental state is severely restricted in contemporary times. National and global ideological, economic and political changes have resulted in its formation and operationalisation becoming an impossibility. Thus, even the Asian developmental states would find it difficult to replicate their performances in contemporary times (see Meyns and Musamba 2010; Deen 2011). For instance, key actors in the water sectors of developing countries now have to deal with new challenges and pressures that were non-existent in the past. These include increasing water demand, climate change, increasing demands for better democratic dispensations and declining financial resources for water infrastructure. These challenges require new forms of governance and planning that may not be sufficiently addressed by one model of development planning.

Another challenge that arises when managing water in a developmental state is that the state itself is conceptualised as normative and better, particularly in terms of its capacity. It is this which underpins the debate about whether a state is strong or weak. However, we already know that many developing countries do not have the capacity to deliver on public services (water included). As Gainsborough (2009) points out, the trouble with the “developmental state” literature is that discussion of the state is underpinned by a series of assumptions about what the state is which are not universally valid. Thus, while one can analyse developing countries in terms of whether they measure up to Weberian notions of state capacity, it seems much more sensible to try and understand that they are non-Weberian in the majority of cases and do not necessarily have the capacity required to assume the role of a developmental state. For non-Weberian states, politics is much more about patronage and much less about delivering “public goods” such as water-supply development (*ibid*). As a result, water governance is negatively affected by limitations in state capacity.

Historically, many developmental states have been based on various forms of nondemocratic political regimes (see Fritz and Menocal 2007). However, the fact that it is possible to name a good number of authoritarian developmental states does not settle the issue. It certainly does not imply that all authoritarian regimes are developmental. It also does not mean that states need to be authoritarian in order to be developmental (*ibid*). Unfortunately, there are many examples of “anti-” or non-

developmental authoritarian states in Africa, Asia and Latin America. Managing water in such contexts will always be difficult, and deployment of the developmental state model in the water sector may prove fruitless. This point resonates well with Gainsborough (2009) when he states that state capacities generally cannot increase if a developmental commitment among the state elite is missing or insufficiently resolute. This may be the main reason why so many donor-sponsored capacity-building initiatives have proven ineffective in various parts of the developing world.

There is also little doubt that building developmental states in a democratic context does bring with it particular challenges which, for the most part, Asian and other historic success stories did not face. The dominance of the IWRM framework today, with its emphasis on decentralised water-supply and governance systems, makes application of the typical developmental state model almost impossible in developing countries. For one thing, democracy has an inherent tendency to disperse power and slow down decision-making processes, and it also makes the state less autonomous and less insulated from societal demands (see Fritz and Menocal 2007). A majority of developing countries that have experienced a democratisation process since the 1980s find themselves stuck in an unfinished transition. In these “hybrid” regimes (combining traits of authoritarianism and democracy), political leaders confront increasing pressures to deliver, but state capacity remains limited and accountability mechanisms weak or even non-existent while development goals remain elusive (see Fritz and Menocal 2006; Rakner et al. 2007). These conditions have remained prevalent in many developing countries thereby limiting the possibilities of establishing a developmental state. Water governance has so far been affected by the complexities arising from state incapacity.

4.1.3 Discussion

It is clear that the level of state intervention that the developmental state paradigm requires contradicts neoliberal theory. However, discourses about the developmental state would not have been topical still today had it not been for the failure of neoliberal policies to bring about sustained development, particularly in Africa. Sindzingre (2004) points out that the Asian financial crisis of 1997-1998 has been interpreted by mainstream analyses as a confirmation of the irrelevance of the developmental state concept as well as the fragility and limited developmental character of its ingredients. We argue that this concept remains seminal and important for understanding the determinants of the economic failures of other developing countries, as well as the possible exportability of its ingredients to other historical and economic contexts, such as sub-Saharan Africa. The economic stagnation of sub-Saharan Africa and the failure to develop effective water governance systems may indeed be interpreted as a consequence of common characteristics and constraints of its states, in terms of history, economy, global integration and political economy rather than failure of the developmental state model.

At the same time, there are key characteristic features of water supply and sanitation that one cannot ignore even in a free-market economy. Due to the nature of water as a basic need, debates about water-supply governance are now increasingly framed within a human rights framework whose principles indicate that it is vital for all human beings to have access to clean water and sanitation at an affordable price. Realisation of this human right seems more possible in a developmental state. Free-market approaches do not sufficiently address these requirements. Dassah (2011: 588) expresses this more aptly when he points out that “although not all state-led developmental efforts succeed, hardly any state has ever been successfully transformed through market mechanisms only”. There is also sufficient evidence from the Asian Tigers’ experiences demonstrating that national transformation processes can succeed with full involvement of the state (Castells 1992; World Bank 1993b).⁵

From the discourses presented in this paper and evidence from the published literature, it is clear that water is a location-specific resource which is usually mostly non-tradable, because markets for water may be subject to imperfection. That is why water pricing has rarely been efficient and equitable whenever it is introduced. As Shah et al. (2005) point out, the physical, social, institutional and economic conditions characterising developing countries are totally different from those in the rich temperate zone countries, and the objectives are usually also completely different. Analysts often overlook the fact that it took several centuries for the Western world’s water management to be where it is today. Therefore, the “one-size-fits-all” model of IWRM needs to be revisited so that it can be adjusted to suit country-specific socio-economic contexts. This suggests that deployment of free-market forces in the water sector may not be appropriate in developing countries. In its Economic Report on the continent in 2011, the United Nations Economic Commission for Africa (UNECA) abandoned inherited market liberalisation in favour of a “developmental state approach” in which burgeoning growth would be advanced through sustained infrastructural, institutional and social development based on lessons from East Asia (Shaw 2012). This suggests that UNECA appreciated the need for the developmental state model of governance to regain its visibility in Africa. Its application in the water sector will therefore be quite timely.

The irrationality of neoliberal policy prescriptions which underlie the official water reform processes in sub-Saharan Africa, for instance, is typified by the sidelining of localised understandings of water resource management when most users at the local levels generally do not treat water as an economic commodity. Therefore, flexibility is required for developing countries to adjust the reform model to their own specific conditions. In addition, the reduction of the state’s role in development planning and resource management seems untimely. The state cannot afford to remain a passive actor in a world in which forces of globalisation threaten to erode the basis for that role. It needs to recapture its critical role and ensure that the

⁵These countries were far from paragons of laissez-faireism and, instead, were highly dynamic economies in which the state played an active role to ensure high levels of accumulation, technology absorption and conquest of foreign markets (see Mkandawire 2001; Stiglitz 2002 for more details).

nation's policy and water governance institutional structures are sufficiently adapted to local conditions and emerging global resource governance discourses. This point resonates strongly with the conclusion by Chabal and Daloz (1999) that even neoliberal frameworks are tamed locally to meet the context under which implementation is taking place, especially in the context of Africa. The public protests against water privatisation and pricing in various countries briefly mentioned in this paper demonstrate the importance of understanding the local situation sufficiently.

While traditional water-supply schemes were mainly comprised of large, centralised infrastructure, emerging approaches are characterised by integration of water infrastructure with biophysical systems, taking into consideration the social, economic, environmental and political factors that determine provision of water for ecological and human uses and a long-term sustainability perspective (see Brown and Keath 2008; Van de Meene et al. 2011). We argue that this more comprehensive approach to water governance is more easily attained in the context of a developmental state. Precepts guiding the free-market paradigm produce a very narrow perspective that is not geared to address this comprehensive list of priorities.

We are also acutely aware that over the past few decades, dominant public policy discourses have frequently attempted to paint the distinction between public and private agency as quite sharp and clear, to the extent that one can make the sweeping generalisation that the world's water problems are either due to the public or the private sector. However, most conventional successful water projects show that this distinction is largely artificial and that the public-private distinction has always been blurred. Participation of both private and public agencies in most of the world's largest water projects may actually be the norm rather than the exception. Scholars such as Hill and Hupe (2002), Meuleman (2008) and Pierre and Peters (2000) argue that in reality different, and sometimes ideal, water governance approaches will rarely be deployed in isolation, but rather mixed or hybrid forms will be detected in practice due to the complexity of real-world situations. Indeed, environmental governance scholars such as Kooiman and Jentoft (2009), Lemos and Agrawal (2006) and Pahl-Wostl (2009) contend that hybrid governance approaches are likely to deliver more sustainable outcomes. This suggests that a mix of developmental state and free-market approaches stands a better chance of attaining optimum levels of service provision while ensuring sustainability of the water sector.

Several scholars have already identified numerous systemic and interrelated social and institutional barriers impeding implementation of sustainable water governance (see Farrelly and Brown 2011; Harremoes 2002; Mitchell 2006). Some of the barriers include institutional fragmentation, poor political leadership, unproductive intergovernmental relations, limited long-term strategic planning and inadequate community participation (see Brown 2005; Brown and Farrelly 2009). In this paper, our position is that only a strong and committed developmental state will be able to overcome these barriers. From our assessment, the implications for water-supply governance practitioners are also very clear. If free-market approaches are deployed, the key is an institutional framework that promotes efficient and accountable water service provision, with users being able to observe that their payments are actually used to improve the quality and coverage of water-supply services.

Without this, water users will not feel the obligation to pay. The design of water pricing policies is often complicated by the need to balance financial sustainability of the service provider with the water users' ability to pay. Historically, water has been significantly underpriced, and therefore, sudden and steep price hikes can quickly escalate into a political challenge. Conversely, if tariff structures are not designed taking into account the broader social implications, price increases may disproportionately affect poorer households.

It is also important to acknowledge that the global financial crises and recession experienced in recent years might have left champions of free-market capitalism facing an increasingly sceptical international audience. In this chapter, we argue that the failure of free-market approaches on the ground in other spheres beyond water is likely to leave scholars more sceptical about its applicability to the water sector. We further argue that there is already limited historical evidence to support the claim that free-market economic principles could be the main driver for successful water-supply governance in Africa and other parts of the developing world. On the contrary, the historical evidence shows that profit-oriented market approaches tend to produce highly exclusionary and elitist outcomes which are unlikely to benefit the poor. Chances of achieving universal coverage for water supply and sanitation will be possible when nation-states adopt policy principles that give priority to the basic human right to water instead of market interests. It is our considered belief that such policies and principles are likely to be easier to deploy within the context of a strong and capable developmental state.

In essence, despite the attractiveness of the free-market economy, the debate about the role of the state in economic development planning and water governance has come full circle. With the onset of the global financial and economic crisis in 2007, many developed countries, led by the United States, undertook radical state-led financial and economic intervention measures to rescue their economies from collapse. This has further broadened and strengthened the case for an active role of the state in economic development, particularly in the developing world. The concept of the developmental state has therefore risen to the top of development discourses once again, and its application in the water sector would be very timely.

4.1.4 Conclusion

This chapter has explored in detail the implications of managing water in a free-market economy and in a developmental state. From the exploration, it is clear that national water-supply governance paradigms tend to change in tandem with emerging national development theoretical frameworks and priorities. Each nation feels compelled to adopt a particular framework to fulfil its needs. In practice, more and more water utilities and planning agencies have been shifting their focus towards exploration of water-supply system efficiency improvement possibilities, implementation of options for WDM within the confines of IWRM and equitable reallocation of water among competing users and uses to reduce consumption and meet

future water demand. While many developing countries have adopted water policy prescriptions from the international arena, national and local socio-economic and political realities ultimately determine what works and what does not work on the ground. Thus, the choice between free-market approaches and developmental state-oriented approaches is never simple. Experiences across the globe indicate that careful analysis of local socio-economic and political conditions is crucial before deploying specific water-supply governance frameworks. The calls for the costs and benefits of water infrastructure developments to be distributed in a more equitable manner and for unmet basic human needs to be addressed urgently are most likely to continue growing in Africa and beyond. In this regard, more concerted efforts will be required to better understand and meet the diverse interests and needs of all affected stakeholders in the water sector. Application of the principles of sustainability and equity will help bridge the gap between diverse and competing interests and unleash the potential for more innovation in water-supply governance. It is always important to remember that in water governance, context matters.

References

- Anderson, T. L., & Snyder, P. (1997). *Water markets: Priming the invisible pump*. Washington, DC: Cato Institute.
- Angel-Urdinola, D. F., & Wodon, Q. (2012). Does increasing access to infrastructure services improve the targeting performance of water subsidies? *Journal of International Development*, 24, 88–101.
- Anokye, N. A., & Gupta, J. (2012). Reconciling IWRM and water delivery in Ghana – The potential and the challenges. *Physics and Chemistry of the Earth*, 47–48, 33–45.
- Ashton, P. J. (2007). The role of good governance in sustainable development: Implications for integrated water resource management in Southern Africa. In A. R. Turton, H. J. Hatting, G. A. Maree, D. J. Roux, M. Claassen, & W. F. Strydom (Eds.), *Governance as a dialogue: Government-society-science in transition*. Heidelberg: Springer.
- Ayee, J. R. A. (2013). The developmental state experiment in Africa: The experiences of Ghana and South Africa. *The Commonwealth Journal of International Affairs*, 102(3), 259–280.
- Bagchi, A. K. (2000). The past and the future of the developmental state. *Journal of World-Systems Research*, 6(2), 398–442.
- Bakker, K. (2007). Trickle down? Private sector participation and the pro-poor water supply debate in Jakarta, Indonesia. *Geoforum*, 38, 855–868.
- Bakker, K. (2010). *Privatizing water: Governance failure and the world's urban water crisis*. New York: Cornell University Press.
- Barnekov, T., Boyle, R., & Rich, D. (1989). *Privatism and urban policy in Britain and the United States*. Oxford: Oxford University Press.
- Bauer, C. J. (2004). Results of Chilean water markets: Empirical research since 1990. *Water Resources Research*, 40, 1–11.
- Baumol, W. J., & Willig, R. D. (1981). Fixed costs, sunk costs, entry barriers, and sustainability of monopoly. *The Quarterly Journal of Economics*, 96(3), 405–431.
- Beveridge, R., & Monsees, J. (2012). Bridging parallel discourses of integrated water resources management (IWRM): Institutional and political challenges in developing and developed countries. *Water International*, 37(7), 727–743.

- Bithas, K. (2008). The European policy on water use at the urban level in the context of the water framework directive: Effectiveness, appropriateness and efficiency. *European Planning Studies*, 16(9), 1293–1311.
- Bouchaud, J. P. (2008). Economics needs a scientific revolution. *Science and Finance*, 1, 1–3.
- Brandes, O. M., & Ferguson, K. (2004). *The future in every drop: The benefits, barriers, and practice of urban water demand management in Canada*. Victoria: University of Victoria POLIS Project on Ecological Governance.
- Briscoe, J. (2011). *Water as an economic good: Old and new concepts and implications for analysis and implementation*. Cambridge, MA: Harvard University.
- Brooks, D. (2006). An operational definition of water demand management. *International Journal of Water Resource Development*, 22(4), 521–528.
- Brown, R. R. (2005). Impediments to integrated urban storm water management: The need for institutional reform. *Environmental Management*, 36, 455–468.
- Brown, R. R., & Farrelly, M. A. (2009). Delivering sustainable urban water management: A review of the hurdles we face. *Water Science and Technology*, 59, 839–846.
- Brown, R. R., & Keath, N. A. (2008). Drawing on social theory for transitioning to sustainable urban water management: Turning the institutional super-tanker. *Australian Journal of Water Resources*, 12, 73–83.
- Brown, J. D., Earle, J. S., & Gehlbach, S. (2009). Helping hand or grabbing hand? State bureaucracy and privatization effectiveness source. *The American Political Science Review*, 103(2), 264–283.
- Bruns, B. R., Ringler, C., & Meinzen-Dick, R. S. (Eds.). (2005). *Water rights reform: Lessons for institutional design*. Washington, DC: IFPRI.
- Budds, J. (2004). Power, nature and neoliberalism: The political ecology of water in Chile. *Singapore Journal of Tropical Geography*, 25(3), 322–342.
- Butterworth, J., Warner, J., Moriarty, P., Smits, S., & Batchelor, C. (2010). Finding practical approaches to integrated water resources management. *Water Alternatives*, 3(1), 68–81.
- Castells, M. (1992). Four Asian tigers with a dragon head: A comparative analysis of state, economy and society in the Asian Pacific Rim. In R. P. Applebaum & J. Henderson (Eds.), *State and development in the Asian Pacific*. Newbury Park: Sage.
- Castro, J. E. (2007). Poverty and citizenship: Sociological perspectives on water services and public–private participation. *Geoforum*, 38, 756–771.
- Chabal, P., & Daloz, J. (1999). *Africa works: Disorder as political instrument*. Oxford: James Currey.
- Chikozho, C. (2008). Globalizing integrated water resources management: A complicated option in Southern Africa. *Water Resources Management*, 22, 1241–1257.
- Chikozho, C. (2010). *The realities and challenges of reforming the water sector in Zimbabwe*. Berlin: VDM Verlag Publishers. ISBN 978-3-639-25585-0.
- Coates, D. (2000). *Models of capitalism: Growth and stagnation in the modern era*. Cambridge: Polity Press.
- Conca, K. (2006). *Governing water: Contentious transnational politics and global institution building*. Cambridge, MA: MIT Press.
- Correljé, A., François, D., & Verbeke, T. (2007). Integrating water management and principles of policy: Towards an EU framework? *Journal of Cleaner Production*, 15(16), 1499–1506.
- Dadzie, R. B. (2013). Economic development and the developmental state: Assessing the development experiences of Ghana and Malaysia since independence. *Journal of Developing Societies*, 29(20), 123–154.
- Dagdeviren, H. (2008). Waiting for miracles: The commercialization of urban water services in Zambia. *Development and Change*, 39(1), 101–121.
- Da-ping, X., Hong-yu, G., & Dan, H. (2011). Discussion on the demand management of water resources. *Procedia Environmental Sciences*, 10, 1173–1176.
- Dassah, M. O. (2011). Developmental state as a model for Africa's development: Is its emergence imminent? *Journal of Public Administration*, 46(1), 588–607.

- Deen, E. S. (2011). The developmental state: An illusion in contemporary times. *African Journal of Political Science and International Relations*, 5(9), 424–436.
- Edigheji, O. (2005). *A democratic developmental state in Africa? A concept paper*. Centre for Policy Studies Research Report No. 105, May 2005, Johannesburg.
- Edigheji, O. (2010). *Constructing a democratic developmental state in South Africa*. Cape Town: HSRC Press.
- Evans, P. (2012). What will the 21st century developmental state look like? Implications of contemporary development theory for the state's role. In S. W. Chiu & S. L. Wong (Eds.), *Repositioning the Hong Kong government: Social foundations and political challenges*. Hong Kong: Hong Kong University Press.
- Evans, B. E., Brocklehurst, C., & Kariuki, R. M. (2002). *New designs for water and sanitation transactions: Making private sector participation work for the poor*. Washington, DC: WSP/PPIAF.
- Fakir, E. (2007). Public service delivery in a democratic, developmental state. *Policy: Issues and Actors*, 20(3), 1–11.
- Farrelly, M. A., & Brown, R. R. (2011). Rethinking urban water management: Experimentation as a way forward. *Global Environmental Change*, 21(2), 721–732.
- Food and Agriculture Organization (FAO). (1995). *Reforming water resources policy - A guide to methods, processes and practices* (FAO irrigation and drainage paper 52). Rome: FAO.
- Fritz, V., & Menocal, A. R. (2006). *(Re)building developmental states: From theory to practice* (ODI working paper no. 274). London: Overseas Development Institute.
- Fritz, V., & Menocal, A. R. (2007). Developmental states in the new millennium: Concepts and challenges for a new aid agenda. *Development Policy Review*, 25(5), 531–552.
- Gainsborough, M. (2009). The (neglected) statist bias and the developmental state: The case of Singapore and Vietnam. *Third World Quarterly*, 30(7), 1317–1328.
- Gleick, P. (2000). A look at twenty-first century water resources development. *Water International*, 25(1), 127–138.
- Gleick, P. (2002). *The world's water: The biennial report on freshwater resources*. Washington, DC: Island Press.
- Global Water Partnership (GWP). (2003). *Sharing knowledge for equitable, efficient and sustainable water resources management*. Stockholm: GWP.
- Global Water Partnership (GWP). (2012). *The handbook for integrated water resources management in transboundary basins of rivers, lakes and aquifers*. Geneva: GWP.
- Goldman, M. (2007). How “water for all!” policy became hegemonic: The power of the World Bank and its transnational policy networks. *Geoforum*, 38, 786–800.
- Grafton, R. Q., Libecap, G., Edwards, E. C., O'Brien, R., & Landry, C. (2011). Comparative assessment of water markets: Insights from the Murray-Darling basin, Australia and the Western USA. *Water Policy*, 14, 175–193.
- Gravelle, H., & Rees, R. (1981). *Microeconomics*. London: Longman.
- Grimble, R. J. (1999). Economic instruments for improving water use efficiency: Theory and practice. *Agricultural Water Management*, 40, 77–82.
- Gumbo, B. (2004). The status of water demand management in selected cities of Southern Africa. *Physics and Chemistry of the Earth*, 29, 1225–1231.
- Haggard, S. (2004). Institutions and growth in East Asia. *Studies in Comparative International Development*, 38(4), 53–81.
- Hailu, D., Osorio, R., & Tsukada, R. (2012). Privatization and renationalization: What went wrong in Bolivia's water sector? *World Development*, 40(12), 2564–2577.
- Hall, P. A., & Soskice, D. (Eds.). (2001). *Varieties of capitalism: The institutional foundations of comparative advantage*. Oxford: Oxford University Press.
- Harremoës, P. (2002). Integrated urban drainage, status and perspectives. *Water Science and Technology*, 45, 1–10.

- Harvey, E. (2005). Managing the poor by remote control: Johannesburg's experiments with pre-paid water meters. In D. A. McDonald & G. Ruiters (Eds.), *The age of commodity: Water privatization in Southern Africa* (pp. 120–127). London: Earthscan.
- Hearne, R. R., & Easter, K. W. (1997). The economic and financial gains from water markets in Chile. *Agricultural Economics*, 15, 187–199.
- Hernández-Mora, N., Cabello, V., De Stefano, L., & Del Moral, L. (2015). Networked water citizen organisations in Spain: Potential for transformation of existing power structures in water management. *Water Alternatives*, 8(2), 99–124.
- Herrera, V., & Post, A. E. (2014). Can developing countries both decentralize and depoliticize urban water services? Evaluating the legacy of the 1990s reform wave. *World Development*, 64, 621–641.
- Hill, M., & Hupe, P. (2002). *Implementing public policy*. London: Sage.
- Hodgson, G. (1992). The reconstruction of economics: Is there still a place for neoclassical theory? *Journal of Economic Issues*, 26(3), 749–767.
- Horne, J. (2013). Economic approaches to water management in Australia. *International Journal of Water Resources Development*, 29(4), 526–543.
- Hoskisson, R. E., Eden, L., Lau, C. M., & Wright, M. (2000). Strategy in emerging economies. *Academy of Management Journal*, 43(3), 249–267.
- Oris, A. (2012). The neoliberalization of water in Lima, Peru. *Political Geography*, 31(5), 266–278.
- Jessop, B. (1997). The governance of complexity and the complexity of governance: Preliminary remarks on some problems and limits of economic governance. In A. Amin & J. Hausner (Eds.), *Beyond market and hierarchy: Interactive governance and social complexity*. Cheltenham: Edward Elgar.
- Jessop, B. (2002). Liberalism, neoliberalism, and urban governance: A state-theoretical perspective. *International Journal of Urban and Regional Research*, 24, 273–310.
- Johnson, C. (1982). *MITI and the Japanese miracle: The growth of industrial policy; 1925-1975*. Stanford: Stanford University Press.
- Johnson, C. (1999). The developmental state: Odyssey of a concept. In M. Woo-Cumings (Ed.), *The developmental state*. Ithaca: Cornell University Press.
- Kanakoudis, V., Gonelas, K., & Tolikas, D. (2011). Basic principles for urban water value assessment and price setting towards its full cost recovery: Pinpointing the role of the water losses. *Journal of Water Supply: Research and Technology – AQUA*, 60, 27–39.
- Keener, S., Luengo, M., & Banerjee, S. (2010). *Provision of water to the poor in Africa: Experience with water standposts and the informal water sector*. World Bank Policy Research Working Paper No. 5387. <http://econ.worldbank.org>. Accessed 20 April 2014.
- Keivinsen, J., Patrick, R., & Bharadwaj, L. A. (2014). A framework for assessing effective urban water management: Lessons from the Canadian prairie. *Water International*, 39(1), 113–127.
- Kim, Y. T. (2007). The transformation of the East Asian states: From the developmental state to the market-oriented state. *Korean Social Science Journal*, XXXIV(1), 49–78.
- Kolokytha, G., Mylopoulos, Y. A., & Mentis, A. K. (2002). Evaluating demand management aspects of urban water policy – A field survey in the city of Thessaloniki, Greece. *Urban Water*, 4, 391–400.
- Kooiman, J., & Jentoft, S. (2009). Meta-governance: Values, norms and principles, and the making of hard choices. *Public Admin*, 87, 818–836.
- Kriekhaus, J. (2002). Reconceptualising the developmental state: Public savings and economic growth. *World Development*, 30(10), 1697–1712.
- Lamoree, B., & Van Steenberg, F. (2006). From value to finance: Making IWRM work. *Journal of Contemporary Water Research & Education*, 135, 100–106.
- Leftwich, A. (2005). Democracy and development: Is there institutional compatibility? *Democratization*, 12(5), 686–703.
- Lemos, M. C., & Agrawal, A. (2006). Environmental governance. *Annual Review of Environmental and Science*, 31, 297–325.

- Madhoo, Y. N. (2011). Redistributive impact of increasing block residential water rates: Some Empirical evidence from Mauritius. *Water Policy*, 13(4), 471–489.
- Meinen-Dick, R. (2007). Beyond panaceas in water institutions. *Proceedings of the National Academy of Sciences of the United States of America*, 104(39), 15200–15205.
- Meuleman, L. (2008). *Public management and the metagovernance of hierarchies, networks, and markets: The feasibility of designing and managing governance style combinations*. Heidelberg: Physica-Verlag.
- Meyns, P., & Musamba, C. (2010). *The developmental state in Africa: Problems and prospects*. Duisburg: Institute for Development and Peace, University of Duisburg-Essen.
- Mitchell, V. G. (2006). Applying integrated urban water management concepts: A review of Australian experience. *Environment Management*, 37, 589–605.
- Mkandawire, T. (2001). Thinking about developmental states in Africa. *Cambridge Journal of Economics*, 25, 289–313.
- Mkandawire, T. (2012). *Building the African state in the age of globalisation: The role of social compacts and lessons for South Africa*. Inaugural annual lecture paper presented at the Mapungubwe Institute for Strategic Reflection (MISTRA), March 2012.
- Molle, F. (2008). Nirvana concepts, narratives and policy models: Insights from the water sector. *Water Alternatives*, 1(1), 131–156.
- Molle, F. (2009). River basin planning and management: The social life of a concept. *Geoforum*, 40, 484–494.
- Mollinga, P. P. (2008). Water, politics and development: Framing a political sociology of water resources management. *Water Alternatives*, 1(1), 7–23.
- Morgan, B. (2011). *Water on tap: Rights and regulation in the transnational governance of urban water services*. Cambridge: Cambridge Studies in Law and Society.
- Mukhtarov, F. G. (2006). *Integrated water resources management from a policy transfer perspective*. Budapest: Department of Environmental Sciences and Policy, Central European University.
- National Water Commission (NWC). (2011). *Water markets in Australia: A short history*, NWC, Canberra. http://nwc.gov.au/_data/assets/pdf_file/0004/18958/Water-markets-in-Australia-a-short-history.pdf. Accessed 10 March 2014.
- National Water Commission (NWC). (2012). *Impacts of water trading in the Southern Murray-Darling basin between 2006–07 and 2010–11*. Canberra. http://www.nwc.gov.au/data/assets/pdf_file/0009/21996/NWC_7019_WTR_Full.pdf. Accessed 10 March 2014.
- National Water Market. (2012). *Trading in your state or territory*. <http://www.nationalwatermarket.gov.au/how-to-trade/your-state.html>. Accessed 11 March 2014.
- Nhira, C., & Derman, B. (1997). *Towards reforming the institutional and legal basis of the water sector in Zimbabwe*. Harare: CASS.
- Nickson, A. (1997). The public-private mix in urban water supply. *International Review of Administrative Sciences*, 63, 165–186.
- Nikolakis, W. D., Grafton, Q. R., & Hang, T. (2013). Indigenous values and water markets: Survey insights from Northern Australia. *Journal of Hydrology*, 500, 12–20.
- Pahl-Wostl, C. (2009). A conceptual framework for analysing adaptive capacity and multi-level learning processes in resource governance regimes. *Global Environmental Change*, 19, 354–365.
- Perkins, D. H., Radelet, S., Lindauer, D. L., & Block, S. A. (2012). *Economics of development*. Washington, DC: Norton & Company.
- Pierre, J., & Peters, B. G. (2000). *Governance, politics and the state*. Hampshire: Macmillan.
- Postel, S. (2000). Entering an era of water scarcity: The challenges ahead. *Ecology Applications*, 10(4), 941–948.
- Radice, H. (2008). The developmental state under global neoliberalism. *Third World Quarterly*, 29(6), 1153–1174.
- Rakner, L., Menocal, A. R., & Fritz, V. (2007). *Democratisation's third wave and the challenges of democratic deepening: Assessing international democracy assistance and lessons learned. Report prepared for Irish Aid*. London: Overseas Development Institute.

- Rosegrant, M., & Binswanger, H. (1994). Markets in tradable water rights: Potential for efficiency gains in developing country water resource allocation. *World Development*, 22(11), 1613–1625.
- Routley, L. (2014). Developmental states in Africa? A review of ongoing debates and buzzwords. *Development Policy Review*, 32(2), 159–177.
- Saleth, R. M., & Dinar, A. (2005). Water institutional reforms: Theory and practice. *Water Policy*, 7(1), 1–19.
- Saravanan, V. S., McDonald, G. T., & Mollinga, P. P. (2009). Critical review of integrated water resources management: Moving beyond polarised discourse. *Natural Resources Forum*, 33, 76–86.
- Schreiner, B., & Van Koppen, B. (2001). *Catchment management agencies for poverty eradication in South Africa*. Paper prepared for the 2nd WARFSA/WaterNet symposium on integrated water resources management: theory, practice, cases, Cape Town, 30-31 October 2001.
- Schwartz, K. (2008). The new public management: The future for reforms in the African water supply and sanitation sector? *Utilities Policy*, 16, 49–58.
- Shah, T., Makin, I., & Sakthivadivel, R. (2005). Limits to leapfrogging: Issues in transposing successful river basin management institutions in the developing world. In M. Svendsen (Ed.), *Irrigation and river basin management: Options for governance and institutions*. Colombo: IWMI.
- Shaw, T. M. (2012). Africa's quest for developmental states: 'Renaissance' for whom? *Third World Quarterly*, 33(5), 837–851.
- Sherman, R. (2008). *Market regulation*. Boston: Pearson/Addison Wesley.
- Sindzingre, A. N. (2004). *Bringing the developmental state back in: Contrasting development trajectories in sub-Saharan Africa and East Asia*. Paper presented at the Society for the Advancement of Socio-Economics (SASE) 16th Annual Meeting, George Washington University, Washington DC, 9-11 July 2004.
- Smith, L. (2004). The murky waters of the second wave of neoliberalism: Corporatization as a service delivery model in Cape Town. *Geoforum*, 35(3), 375–393.
- Smith, W. J., & Wang, Y. (2008). Conservation rates: The best 'new' source of urban water during drought. *Water Environment Journal*, 22, 100–116.
- Stein, H. (1994). The World Bank and the application of Asian industrial policy to Africa: Theoretical considerations. *Journal of International Development*, 6(3), 287–305.
- Stiglitz, J. E. (2002). *Towards a new paradigm for development: Strategies, policies, and processes*. The 1998 Prebisch Lecture at UNCTAD, Geneva, 19 October 1998.
- Taylor, I. (2002). *Botswana's "developmental state" and the politics of legitimacy*. Paper presented at the international conference: Towards a new political economy of development: Globalisation and Governance, University of Sheffield, United Kingdom, 4-6 July 2002.
- United Nations. (1992). *The United Nations Earth Summit '92: The UN Conference on Environment and Development, Rio de Janeiro*. London: Regency Press.
- United Nations Conference on Trade and Development (UNCTAD). (2007). *Economic development in Africa - Reclaiming policy space: Domestic resource mobilization and developmental states*. Geneva: UNCTAD.
- United Nations Economic Commission for Africa (UNECA). (2013a). Economic report on Africa 2011: Governing development in Africa - The role of the state in economic transformation. UNECA, Addis Ababa.
- United Nations Economic Commission for Africa (UNECA). (2013b). The developmental state: What options for Africa? UNECA issue paper discussed at the third meeting of the committee on governance and popular participation, Addis Ababa, Ethiopia, 2021 February 2013.
- Van de Meene, S. J., Brown, R. R., & Farrelly, M. A. (2011). Towards understanding governance for sustainable urban water management. *Global Environmental Change*, 21, 1117–1127.
- Vickers, A. (2001). *Handbook of water use and conservation*. Amherst: WaterPlow Press.
- Wade, R. (2004). *Governing the market: Theory and the role of government in East Asia*. Princeton: Princeton University Press.

- Weiss, L. (2010). The state in the economy: Neoliberal or neo-activist? In J. Campbell, C. Crouch, P. H. Kristensen, G. Morgan, O. K. Pedersen, & R. Whitley (Eds.), *Oxford handbook of comparative institutional analysis*. Oxford: Oxford University Press.
- Wichelns, D. (2013). Enhancing the performance of water prices and tariff structures in achieving socially desirable outcomes. *International Journal of Water Resources Development*, 29(3), 310–326.
- Wong, J. (2004). The adaptive developmental state in East Asia. *Journal of East Asian Studies*, 4, 345–362.
- World Bank. (1993a). *Water resources management*. Washington, DC: World Bank.
- World Bank. (1993b). *East Asian miracle: Economic growth and public policy*. New York: Oxford University Press.

Open Access This chapter is distributed under the terms of the Creative Commons Attribution-Noncommercial 2.5 License (<http://creativecommons.org/licenses/by-nc/2.5/>) which permits any noncommercial use, distribution, and reproduction in any medium, provided the original author(s) and source are credited.

The images or other third party material in this chapter are included in the work's Creative Commons license, unless indicated otherwise in the credit line; if such material is not included in the work's Creative Commons license and the respective action is not permitted by statutory regulation, users will need to obtain permission from the license holder to duplicate, adapt or reproduce the material.



Chapter 5

Urban Water Governance as a Function of the ‘Urban Hydrosocial Transition’

Chad Staddon, Robert Sarkozi, and Sean Langberg

Abstract Urban governance is as much about infrastructure as it is about people and processes. In particular, the history of urban governance is closely intertwined with the history of urban water services. Historically, as urban areas became larger and more densely inhabited, the collective need for better water services (drinking water, sanitation and flood protection in particular) became overwhelming. Cities simply could not grow beyond a certain relatively modest size without the simultaneous articulation of an integrated water services infrastructure to replace the piecemeal local arrangements previously in place. This necessarily implied new and more complex governance arrangements, in this case the institutionalisation of water services management in functional departmental structures, linked to political decision-making, finance, quality assurance and related functions. Whilst other papers have presented case studies of the urban hydrosocial transition (UHT) in terms of the physical extension of water services (e.g. water supply, sanitation and surface water management), this chapter focuses specifically on urban governance of water. We argue that the progressive breakdown of Fordist neo-corporatism in water services has opened up the field to a proliferation of ‘glocal’ (to use Swyngedouw’s useful neologism) governance arrangements. Whilst integrated water resource management (IWRM) principles imply a supra-urban scale of governance, the fact that urbanisation brings with it local concentration of water-related impacts means that there is an ineluctable local and urban dimension to water governance. It is therefore not surprising that cities around the world are asserting themselves as central players in water governance. Brief case studies from around the world are presented by way of illustration.

Keywords Cities • Water services • Urban hydrosocial transition • Governance

C. Staddon (✉) • R. Sarkozi
University of the West of England, Bristol, Bristol, UK
e-mail: chad.staddon@uwe.ac.uk

S. Langberg
University of North Carolina, Chapel Hill, NC, USA

5.1 Introduction

The development and extension of water services infrastructure has been a key foundational element of industrialisation and urbanisation since at least the ‘Great Sanitary Awakening’ of the mid-nineteenth century. As urban areas became both larger and more densely inhabited, the collective need for better water services (drinking water, sanitation and flood protection in particular) became overwhelming. Cities simply could not grow beyond a certain relatively modest size without the simultaneous articulation of an integrated water services infrastructure to replace the piecemeal local arrangements then in place, a reality amply demonstrated by Dr. John Snow’s intervention during the 1854 cholera epidemic in London. The mid-twentieth-century completion (in Europe, North America and parts of Australasia) of the resulting project of mass provision of standardised water supply and sanitation services, what we have elsewhere (Staddon 2010; Staddon and Langberg 2014) called ‘hydromodernism’, was then followed by several waves of restructuring in the water services value chain, based particularly on new ideas about the respective roles of the public and private sectors, new technologies and burgeoning recognition of the water needs of the natural environment.

Unfortunately, in much of the developing world, even ‘hydromodernism’ is as yet unattained and perhaps unattainable. In addition, too-rapid urbanisation in many developing nations has gone hand in hand with the growth of what are called ‘peri-urban’ areas that combine urban and rural characteristics and present new challenges to water (and other) services provision (Harris et al. 2013; McGee 2002; Tacoli 2006). Despite concerted international efforts in recent decades, there are still at least a BILLION people in the developing world without adequate access to basic water services. A typical pattern, exemplified by Kampala, Uganda, involves a very limited extent of piped drinking water and sewerage interconnection to urban households (classic ‘hydromodernism’), with the vast majority depending on expensive private water sellers, local water collection (often undertaken by children) and defecation in pit latrines and/or in the open. Dr. Snow would be horrified by the high level of water services *in*security prevailing in many twenty-first-century cities around the world.

Fortunately there is a way of easily presenting the historical progression from a low level of water services to a higher level, and the governance arrangements needed to bring it about. It is also possible to indicate the key drivers of water services development. Cities around the world can be understood from the point of view of their location within the ‘urban hydrosocial transition’ (UHT), a historical geographical framework that sees cities as manifestations of successive ‘hydrosocial contracts’ between agents of economic, political, cultural and technological change. This concept builds on work undertaken by Brown and Morison (2011) and Brown et al. (2009) on ‘water-sensitive cities’ (also Lundqvist et al. 2001), Turton and Meissner (2002) on the ‘hydrosocial contract’, Swyngedouw (2005) on ‘urban metabolism’ and Thapa et al. (2014) on ‘water security indices’. A key innovation offered here is the simplified three-part historical geographical schema based on a limited number of readily available key indicators and associated drivers, including models of urban water governance.

Whilst other papers (e.g. Staddon and Langberg 2014) have presented case studies of the UHT in terms of the physical extension of water services (water supply, sanitation and surface water management), this chapter focuses more on urban-scale governance of water. We argue that the progressive breakdown of Fordist neo-corporatism in water services has opened up the field for a proliferation of 'glocal' (to use Swyngedouw's useful neologism) governance arrangements. Whilst IWRM principles usually imply a supra-urban scale of governance, the fact that impacts are expressed *locally* and urbanisation brings with it a concentration of water-related impacts means that there is an ineluctable urban dimension to water governance. Conversely, urban governance has a strong water (and public works) dimension. Urban leaders have played a critical role in the development of new models of service delivery in water supply, sanitation, surface water drainage and water-related ecosystems services, even as higher-level 'apex organisations' have sought to assert themselves. As the three 'water-city' case studies show, there are real challenges in achieving urban-scale system integration between water and services, especially as articulated through development control and land-use planning. Thus analytical attention to changing geographies of urban water governance illuminates much more than the mere particularities of local experience in water services. Brief case studies from around the world are presented by way of illustration.

The purpose of this chapter is to introduce the UHT as a way of thinking about the changing relationship between cities, water services and the related institution of urban water governance. In addition to permitting observers to place any given city on a comparative continuum of hydrosocial development, the concept also suggests likely hydrosocial development futures based on attention to the underlying drivers of progress through the UHT. The salience of the UHT concept is illustrated with data from urban exemplars from the developed world (Bristol, UK, and Osaka, Japan) and the developing world (Kampala, Uganda).

5.2 The Urban Hydrosocial Transition

The scholarly study of water networks has focused mainly on urban areas, following well-known studies of large sociotechnical systems such as electricity (Hughes 1985), transportation (Hall 1969), telecommunications (Hadlaw 2011) and gas (Tarr and Dupuy 1988). These works generally presuppose a static state of natural resources and tend to overemphasise technological innovations as the primary engines of urban change. This approach generally consists of urban case studies of infrastructure development through continuous waves of technological innovation, business model restructuring and changing attitudes about state regulation. Hughes's (1985) otherwise gripping account of the battle between advocates of DC and AC electricity distribution systems in the eastern US is a good example of this genre. The literature on urban water services is by now large, focusing especially on the study of the local water markets, the consequences of service privatisation (as part of a larger restructuring of the state apparatus) and urban management of the

networks and changing urban water cultures (e.g. Barraqué 1998; Brown and Morison 2011; Brown et al. 2009; Jaglin 2004; Molle 2001; Schneier-Madanes 2003; Swyngedouw 2005). However, as with the literature on urban infrastructures, there is a tendency towards either technological or economic determinism.

In contrast to the above literature, we argue that urban water services strategies that are sensitive to regional or local, social, economic and cultural factors emerge through what Turton and others have called the ‘hydrosocial contract’ (Lundqvist et al. 2001; Turton and Ohlsson 1999). Turton and Meissner (2002) characterise the hydrosocial contract as:

...the unwritten contract that exists between the public and the government...that comes into existence when the individual is no longer capable of mobilising sufficient water for their own personal survival, and that acts as a mandate by which government ultimately takes on and executes this responsibility. This hydrosocial contract thus acts as the basis for institutional development, and also determines what the public deems to be fair and legitimate practice such as the desire for ecological sustainability...

This is an important underpinning to the UHT model because it grounds thinking in acknowledgement of the fact that ‘big’ ideas (e.g. about the relative roles of public and private sectors or about the ‘rights’ of urban citizens to certain services) must always enter into accommodations with pre-existing local conditions (e.g. the pre-existing institutional and geographical structures of water provision in England and Wales prior to privatisation in 1989). In other words, from the mass cholera and typhus epidemics in nineteenth-century European cities, water services infrastructure has developed as a function of the interaction between new technical capabilities (e.g. perfection of sand filtration, invention of chlorination and other disinfection methods, etc.), the inertia of the pre-existing hydrosocial system (based on paternalistic localism) and the changing attitudes of citizens and government (‘governmentality’) towards the respective roles of public and private sectors in planning, financing and regulating this burgeoning civil infrastructure. Context really does matter – water services governance is both a general and a specific phenomenon. Thus privatisation in England and Wales came at the price of quite strong regulation reflective of prevailing British ideas about state-economy-society relations, a British ‘hydrosocial contract’ if you will. In other places, as is well known, water services privatisation has been less well regulated, reflecting different local conditions and with sometimes disastrous results (Cochabamba, Bolivia, being a particularly poignant example – see Olivera and Lewis 2004).

So the UHT depends, ultimately, on the underlying ‘hydrosocial contract’ prevailing in a given place and time. And it is possible to sketch out in greater detail its specific economic, political, technical and environmental characteristics. Table 5.1 depicts some of the key characteristics and drivers of the UHT since the mid-nineteenth century. As nineteenth-century societies really began to urbanise, modernise and democratise, starting in Europe and North America, water services necessarily became an ever larger part of the political ‘conversation’. In the first phase of the UHT, what we call ‘hydro-precarity’, a sense of ‘civic mission’ eventually developed around public health and water services, combining with available technologies and investment capital (public and private) to create what Barraqué calls the ‘more water from further’ hydroengineering principle.

Table 5.1 The urban hydrosocial transition

	Phase 1	Phase 2	Phase 3
	Hydro-precarity	Hydromodernism	Hydro-security
Approximate dates	Up to 1914	1914 to 1992	After 1992
Economic system	Pre-Fordist	Fordist/industrial	Post-Fordist/ post-industrial
Political system	Feudal/absolutist	Democratising	Democratic/pluralist
Water management objective	Expanding water services	Industrialising water services, esp. vertical integration	Multifunctional water services, nexus integration
Engineering paradigm	Spatial extensivity	Reductionist/scientific/ monolithic	Integrated water resource management (IWRM)
Environmental paradigm	Interdependence of human and nature	Utilitarian, ecological modernism	Biocentric

Though there are important differences between the urban hydropolitics of, say, early American versus French or Japanese cities, there are also abiding commonalities, most importantly the over-reliance on a technocratic elite of engineers and their (neo)corporatist political allies. This is what makes the systems of Roman Bath and sixteenth-century Plymouth more alike to each other than their nineteenth-century counterparts: similar political economic alliances deploying water services technologies to make the cities of their eras more comfortable *for themselves*. The idea of a broader public good was still a long way off, notwithstanding the occasional public water supplies offered by (usually) religious institutions. Feudal political systems simply did not include the idea of the irreducible equality of all people, which would be a prerequisite for bearing the cost and administrative burden of extending water services (or any other utility) beyond the aristocratic and burgeoning capitalist classes. As late as the mid-1830s, only a few private companies were in the business of providing water to local customers who could pay, with no onus to provide to poorer residents (Dickinson 1954; Staddon 2010). Not until 1852 did the British Parliament legislate for a uniform, mass public water services system in the capital. The specificity of this new hydrosocial contract can be seen more clearly if we contrast it with the strong sense of public duty that underwrote the more expansive, but disaggregated, systems of public water supply prevailing in Middle Eastern cities through the latter part of the same time period, even in the absence of central mandate or decree (Staddon 2010).

We suggest that 1914 is a convenient date attaching to the beginning of the irreversible decline of the first era and the faint beginnings of the second, ‘hydromodernity’. Whilst the old regime does not disappear overnight, it appears that by the outbreak of the First World War, water services systems not just in London but throughout the British Isles (and in Europe and North America) were being developed according to the belief that all should enjoy some standard of water, regardless of ability to pay. Indeed, the urban hygiene movement of the late nineteenth and

early twentieth centuries made tutored use of water services a *moral* obligation. It is surely no coincidence that in the latter part of the nineteenth century, the major technological means to organise and deliver such an ambitious agenda also appeared – necessity, as so often, was the mother of invention. Joseph Bazalgette began his ‘great interceptor sewer’ project in 1859, an iconic project that required a new politics of water services as well as new technologies and new ways of organising capital investment (Halliday 2001). Perfection of slow sand filtration, adoption of chlorine as a purifying additive to drinking water, the proliferation of reservoirs (often underwritten by Acts of Parliament) and the emergence of limited liability companies as the key commercial vehicles for commercial organisation all came about in the second half of the nineteenth century. This hydrosocial contract was however not completed until the passage of the 1945 Water Act which mandated consolidation, and part-nationalisation, of Britain’s water services system.

The second phase, ‘hydromodernism’, was characterised by an almost messianic belief in water technologies (especially dams and big engineering works) and the ultimate responsibility of government to provide mass water services. Water services were seen predominantly as functions of large public bureaucracies operating at the urban or regional scales. This hydrosocial contract prevailed well into the 1980s and early 1990s before it was decisively challenged by a new urban hydropolitics, based on a burgeoning distrust of both the technocentrism and the public authority premises upon which hydromodernism rested (at least in Britain). Indeed the shift away from ecological modernism towards a more biocentric value system meant that water services increasingly had to take account of the needs of the natural environment. This new sensitivity to the environmental dimension of water services has emerged at nearly the same moment as the prevailing faith in government as an efficient service provider has faltered. After 1992 a new hydrosocial contract, integrated water resource management (IWRM), was articulated based on the neoliberal view that environmental and social outcomes could be achieved more efficiently by private providers. In the UK, water services governance underwent a marked transformation just before 1992 as water services companies were privatised in 1989 and the state role recast as one of providing strong economic, quality assurance and environmental regulation of privatised local water services monopolies (Bakker 2003; Staddon 2010). Jamie Linton (2010) points out that this current hydrosocial contract reframes peoples’ relationship with water services in terms of commodification and (financial) exchange relations. Even the names of public oversight bodies in the UK, the ‘Consumer Council for Water’ and ‘Customer Challenge Groups’, now reflect the priority given to water services as commercial exchange.

The depiction of the UHT in Table 5.1 is not the only way we have sought to visualise this complex geohistorical process. Elsewhere (Staddon and Langberg 2014) we have used an indicator-based approach, presenting such quantitative measures as:

- Percentage serviced by piped water supply
- Percentage served by wastewater systems
- Daily per capita water consumption

- Capital intensity in water services provision
- Water intensity in urban GDP
- Water tariffs

However, for our purposes here we focus not on the outward quantitative measures of urban water services transitions but on the underlying social, economic and (especially) political processes. In the case studies that follow (drawn from a rapidly accumulating set of case studies currently being developed through the International Water Security Network – www.watersecuritynetwork.org), we will concentrate our attention on critical shifts in the drivers identified in Table 5.1. As noted above, the three case studies were chosen specifically with a view to highlighting contrasts in the approaches to urban water governance.

5.3 Urban Water Governance in Three Cities

5.3.1 *Bristol, England*

The city of Bristol, England, is (in British terms) a middle-sized city of approximately 400 000 people. Even as late as the early 1980s, traditions of locally or regionally focused heavy industry and engineering were economically dominant, though these have suffered greatly from cheaper overseas competition, and secondary manufacturing has now largely disappeared. By 2014 Bristol was a very different sort of place, dependent now on high-value engineering (especially in aerospace), higher education (it is home to two major universities and numerous further education colleges) and financial management (banking, insurance and investment services). Gross value added per employed person and rates of tertiary education are amongst the best in Britain although there are significant geographical pockets of social and economic deprivation, especially in the Southmead, Easton and Lawrence Hill wards of the central city.

Prior to the attempt to create a mass water services system from the mid-nineteenth century onwards, the only piped water supplies to the city were 'conduits' originally commissioned by various religious orders to serve their parishes, such as the pipe from Knowle to St Mary Redcliffe church originally installed by Robert de Berkeley in the twelfth century. Water *quality* was barely considered at all, unfortunately, as the long-standing practice of dumping refuse, including industrial waste (Bristol had numerous tanneries and dye works), domestic rubbish (including dead animals) and excrement (animal and human) into the streets to be flushed into the nearest watercourse, continued to be practised until well into the nineteenth century. The English satirist Tobias Smollett might have been speaking about Bristol when in 1769 he observed of London that:

If I would drink water, I must quaff the mawkish contents of an open aqueduct exposed to all manner of defilement from the Thames...human excrement is the least offensive part of the concrete, which is composed of all the drugs, minerals, poisons used in mechanics and manufacture, enriched with the putrefying carcasses of beasts and men...

The cholera, typhus and diarrhoea epidemics of the mid-nineteenth century provided the next great push for improved water services. With citizens, especially poorer ones, dying in their tens of thousands, social reformers such as the Webbs, Edwin Chadwick and Sir Joseph Bazalgette began the process of transforming England's ancient and ill-adapted water and sewerage systems into something fit for purpose (Fig. 5.1). At this time the first comprehensive legislation to monitor and manage public infrastructure, the 1848 Public Health Act, was passed. Although its requirements would not become mandatory until 1875, after this time local authorities had a formal duty to provide (minimal) water supply and sewerage and to monitor public health. In Bristol, the actions of Dr. William Budd, founder director of Bristol Water Corporation and a medical researcher much influenced by the seminal work of Dr. John Snow in London, were central to the early development of a systematic water services network for the city. This systematic water services infrastructure was initiated in 1846 when the Bristol Waterworks Company (now Bristol Water) was created to develop and manage a uniform public water services network for the burgeoning city. The first of the Barrow reservoirs (the so-called 'line of works') was commissioned in 1850, the Blagdon Reservoir in 1888 and the Cheddar Reservoir in 1922. By 1898 the company was supplying a daily average of 22 gallons (about 100 litres) per person – a level of supply many twenty-first-century providers around the world even now fail to achieve. The Littleton and Sharpness schemes, located to the north of the city, plumbed Bristol into the Severn River (one of Britain's largest rivers) in the 1950s and remains central to the city's water services security. Currently Bristol Water supplies customers with approximately 300 megalitres (ML) of drinking water per day, drawn largely from these main sources.

With respect to wastewater management, advances in technology in the nineteenth century combined with increasing certainty about the causal link between exposure to contaminated water and illness to create both the technical means to act and the political will to do so. From mid-century Metropolitan Boards of (Public) Works, often led by physicians and public health specialists such as Doctors Snow and Budd, were formed in most major British cities. These Boards organised civic investment in wastewater collection and transport pipe networks towards water treatment works on the fringes of cities.¹ Sand filtration and other kinds of more sophisticated water treatment systems were developed in the first half of the nineteenth century by engineers such as James Peacock, Robert Thom and James Simpson. Indeed Simpson's 'slow sand filtration system' which depends upon the aerobic digestion of sewage wastes by diatoms and green algae growing on the sand surface is still in use in parts of the UK, though now augmented by a wide range of other technologies. Bristol's MBW managed to successfully broker the transition towards integrated and universal wastewater management (McGrath 1985). Chew Valley reservoir, located to the south of the city and completed in the early 1950s, is a monument to this 'big engineering, big government' form of water services provision (Fig. 5.2).

¹In fact, the MBWs were in part a creature of the backlash against the unaccountable power, especially to tax, of Edwin Chadwick's 'Metropolitan Sewers Commissions' created during the 1840s (Davis 2001).

Fig. 5.1 'Death's Dispensary' 1866 woodcut illustration depicting London's often deadly water supply



Fig. 5.2 Chew Valley reservoir: hydromodernity in Bristol, UK



As of 2015, the main Bristol area sewage treatment plant, located at Avonmouth and operated by Wessex Water², treats most of the sewage generated by the city of

²Bristol's drinking water is supplied by Bristol Water and its sewerage services by Wessex Water, a functional split that is slightly unusual, though Bristol is not the only English city where this arrangement prevails.

Fig. 5.3 Avonmouth wastewater treatment works, Bristol, UK: beyond the ‘engineering paradigm’



Bristol, approximately 210 ML of sewage each day. Plant upgrades and sustainability-orientated changes to the treatment process mean that it now transforms that sewage into its own power (through biogas recovery), agricultural fertiliser (which is given away virtually free of charge) and clean water for release back into the natural environment according to the terms of its licences with the Environment Agency. In fact such is the success of the biogas recovery plant that Wessex Water now imports additional digestible wastes from a variety of sources including other wastewater treatment facilities in the region (Fig. 5.3).

From the point of view of transitions in urban water governance, there are three key things to note. First, the shift from phase 1 to phase 2 was largely completed by 1914, when virtually 100% of the urban population had some form of reliable water supply and sanitation was considerably improved and water services companies such as the Bristol Waterworks Company had become vertically integrated entities. Both direct measures (percentage population served) and indirect measures (health outcomes as measured in disability-adjusted life-years³ or ‘DALYs’) bear this out. The emergence of central administrative responsibility for public health in the 1840s and 1850s was central to this success. Second, the transition from phase 2 to phase 3 was manifest by the late 1980s when the emphasis began to clearly shift from ‘more water from further’ (to use Barraqué’s felicitous phrase) and ‘more hard engineering’ to more attention to behaviour change, efficiency and the environment. In this transition process, the key drivers of business strategy for both water services companies are more firmly linked to environmental sustainability, horizontal integration with other synergistic services sectors and water demand management. Although there are new responsibilities for local governments in managing especially surface water (under the Flooding and Water Management Act 2010 and the Water Act 2014), governance of water services in England and Wales remains the province of centrally mandated government agencies including the Office of the

³ A measure of overall disease burden, expressed as the number of years lost due to ill-health, disability or early death

Water Regulator (Ofwat), the Drinking Water Inspectorate (DWI) and the Environment Agency.⁴ There are also avenues for local input into water services planning through the so-called Customer Challenge Groups tasked with ensuring that water companies' business plans reflect customer priorities and willingness to pay for capital and operational improvements.

5.3.2 *Kampala, Uganda*

Having started as a centre of the Buganda kingdom, by the late nineteenth century, Kampala had become a centre of colonial administration for British East Africa before becoming the capital of an independent Uganda in 1962. Since independence Uganda has endured frequent spasms of violent conflict and repression, including during the regime of Idi Amin (1971–1979), the Ugandan Civil War (1981–1986), First (1996–1997) and Second (1998–2003) Congo Wars as well as confronted ongoing depredations by the Lord's Resistance Army between 1987 and 2005. During these periods economic and infrastructure development slowed dramatically across the country. The economy of Uganda remains overdependent on agricultural and horticultural exports although recent discoveries of oil and mineral resources have spurred higher-value industrial development especially in the north of the country. Unlike many other areas of Africa, such as the Sahel and North Africa, Uganda is endowed with significant freshwater resources. Lying within the Nile Basin, about 18% of the country is covered by rivers, lakes and wetlands, including Lake Victoria, the second largest freshwater lake in the world (UNESCO-WWAP 2006).

Kampala's first piped water and sewerage systems were completed during the colonial period in the 1930s. The construction of new facilities accelerated between 1950 and 1965 under the framework of large national development programmes, though many of these facilities fell rapidly into disrepair in the 1970s. Since independence the city has experienced several periods of rural to urban migration-accelerated population growth, coinciding with periods of relative political calm and economic development. Nonetheless, the lack of rigorous development control and the large influx of rural poor, particularly in the 1990s and 2000s, have created a huge, and largely unmet, demand for water services in the Kampala urban region. By 1990 this urban water infrastructure served less than 10% of the population with plumbed-in domestic connections (UNESCO-WWAP 2006). Most urban dwellers, like their rural counterparts, remain largely reliant on informal, decentralised systems of water services supply. Though the Millennium Development Goals' Joint Monitoring Programme considers that more than 80% of urban Ugandans now enjoy access to an 'improved' water source, the same publication notes that less than

⁴In fact, in a recent case decided by the Upper Tribunal of the Court of Justice of the European Union makes it clear that although private economic entities, Britain's water companies have the legal status and responsibilities of 'public authorities'.

20% have access to piped water. Moreover, Hopewell and Graham (2014) note that it is still the case that fully 10% of Kampala's residents spend more than 30 min collecting water for household use each and every day.

Most of the city's water originates to the south in Lake Victoria, is stored in 24 onshore reservoirs and is treated at the Ggaba I (1928), II (1992) and III (2007) water treatment works, all operated by the National Water and Sanitation Company (NWSC). The three plants have an average daily production of 147,955 m³ of drinking water (Directorate of Water Development 2010; MWE 2006). They are designed as conventional urban water systems utilising a first stage of physical separation, consisting of coagulation and flocculation chambers together with clarifiers, a rapid sand filtration second stage and a third stage involving chlorination. In 2011 the Ugandan government announced plans to build a water treatment plant in Katosi that would serve 2.4 million people in and around Kampala and upgrade the Ggaba Treatment Complex (NWSC 2011).

Originally set up in 1972 the publically owned NWSC was reorganised in 1995 after passage of The National Environmental Act and given more authority to expand its area of service. Throughout the late 1990s, NWSC began serving, although rather incompletely, cities and towns throughout Uganda. As of 2012 the NWSC had barely 300 000 connections spread across 34 urban areas, with Kampala District alone accounting for nearly 106 000, meaning that most Ugandans do not benefit directly from its services (Directorate of Water Development 2010).⁵ Whilst NWSC is attempting to extend the number of connections in all its service areas, it acknowledges that a near-universal level of household and business connections (as in European water systems) is not attainable. Thus, water services provision is characterised by a complex hybrid of the 'hydromodernist' formal system and myriad 'informal' systems, ranging from small-scale water sellers to community-level water supply and management schemes (as mandated in the 1999 Water Act). This hybridity makes Kampala, and Uganda more broadly, quite different from the other two case studies discussed in this chapter. It does not neatly fall into phase 1 or 2 of the UHT but rather juggles geographically uneven development of water provision services (Figs. 5.4 and 5.5).

In small- and medium-sized towns, the private sector plays a larger role in providing water. In 2006, out of the 143 small towns that had operational piped water supplies and schemes, 57 were managed and operated by private companies. The push to privatise has produced mixed results with some areas of improvement and efficiency offset by areas of abject service failure (Danert et al. 2003). Kampala, with its oscillation between public, private and public-private control of water services as well as the broader countrywide debate over privatisation, exists within the context of an even broader continent-wide search for the balance between public capacity and private sector support. We expect water services in Kampala (and Uganda) to evolve with and perhaps also shape this debate.

⁵ With approximately 6.5 million households and only 300 000 connections, this implies a connection rate of 5% (MWE 2006).

Fig. 5.4 Surface water collection: hydro-precarity



Fig. 5.5 Rainwater harvesting tank: a sustainable approach to hydro-security?



Though incredibly labour intensive, especially for women and girls, most Ugandans outside the modest service area served by NWSC or local water systems depend on surface water or groundwater collection systems for their domestic needs. The Poverty Eradication Action Plan (PEAP) drafted in 1999 and updated in subsequent years that guides the countrywide economic development strategy devotes a substantial space to discussing the development of water provision services. However, the disparity between urban and rural water services – which creates hybridity – is evident within the document. As of 2004, the PEAP notes that 60% of urban households had access to an improved water source compared to only 5% of rural households.⁶ Even when water is commercially available, it typically

⁶One of the MDGs was to 'halve the proportion of the population without sustainable access to an improved water source', though this could include such self-supply initiatives as rainwater harvest-

consumes up to 22% of household income making it even more difficult for rural areas to engage in provision centralisation and, in turn, forcing reliance on informal water collection (Ministry of Finance 2004).

Though significant progress has been made in improving access to basic water supplies, there are still chronic problems with undersupply and water quality management. In many areas, and supported by the 1999 Water Act and National Water Plan, many communities have developed self-supply systems, based on some combination of groundwater collection and rainwater harvesting (McLaughlin et al. 2014; UNESCO-WWAP 2006). One of the key objectives of the 1999 Water Act is ‘To promote the rational management and use of the waters of Uganda through use of appropriate standards, co-ordination of activities, allocation and delegation of responsibilities’ (MWE 2006; MWLE 1999: 8).

A key mechanism for so doing involves the creation of community-level water user committees (WUCs) whose membership is drawn from the beneficiaries of the water supply, tasking them with ensuring the proper maintenance of the water system by collecting revenue from users (Terry et al. 2015). This demonstrates the move from a rights-based to a more market-based system of resource allocation, much in line with IWRM principles declared in 1992. However, whilst handing over responsibility for day-to-day planning and running of water resources to WUCs, the Act also vests all water rights in the government which has therefore become the owner of all water resources in Uganda. Local authorities are required to organise the formation of WUCs within their area, although the responsibility for this task between the district, sub-county or parish is ambiguously drafted within the Act which has added to the confusion. Once created, the WUC is responsible for planning and managing local water services. The poor drafting of the Act is one factor that has made the implementation of better functioning local water supplies less successful than had been expected.

The case of Kampala indicates what may turn out to be a common developing world scenario – a form of hybrid ‘hydro-precarity/hydroprecarity’ whereby some areas of the urban region have fully modern water services, whilst others, even close by, do not. Also ‘hybrid’ is the complex welter of formal and informal water systems, with significant service gaps and disparities stubbornly manifest in the twenty-first-century city (Poupeau and Hardy 2014). Unfortunately it appears not necessarily to be the case that the two different types of service will necessarily converge over time, as the lagging ‘hydroprecarious’ zones catch up to the more advanced zones. Therefore, a key challenge for both the NWSC and urban government will be the rationalisation and integration of these formal and informal systems into a system providing more comprehensive coverage at a standard level of service. Even more importantly, Uganda needs to translate its rapidly improving policy and institutional framework into improved water services ‘on the ground’. As in Bristol, this will also involve getting to grips with the water services implications of development planning and control – the need for integrated urban water services planning is manifest.

ing, private water selling and NGO-brokered groundwater collection systems.

5.3.3 *Osaka, Japan*

The modern city of Osaka grew out of the planned settlement developed around Osaka Castle from the late sixteenth century onwards. This town was built on a grid system, with water supply and sewerage provided by ditches ('seweri desui') running behind properties on an east–west line. After the Meiji Restoration in 1868, Japan entered into a period of comprehensive modernisation which also led to modernisation of water supply and sewerage systems. In Osaka, the 'seweri desui' and the rest of the city's rudimentary water services system were modernised starting in the late nineteenth century. During this period accelerated urbanisation and active trading with foreign countries had caused Japan to experience epidemics of water-borne diseases such as cholera and typhus (scourges that were on the wane in Europe by this time) which saw the total number of cases rise to 410 000 by the end of the century. Port cities, beginning with Yokohama in 1887, were thus especially motivated to introduce waterworks infrastructure since these cities were at high risk of outbreaks. In 1895 Osaka city became the fourth Japanese urban region to construct an integrated water supply system (MHLWGJ 2008). As the city moved from the first to the second phase of the UHT, service coverage rapidly increased until the Second World War when 97% of the entire country's population enjoyed piped water services – a huge achievement.

Although densely inhabited, Japan enjoys relatively high levels of rainfall across much of its land area, with more than 3 300 m³/person/year renewable water availability⁷ (Aquastat 2015). Japan also has some of the most efficient urban water utilities in the world (Hall et al. 2005). In an Asian Development Bank (ADB) survey of water in Asian cities, the Japanese city of Osaka was described as providing 'an excellent water service' (Corral 2007), rising well above safety and quality standards set by the country's Water Supply Act 2002 (OMWB 2012). This performance however is now threatened by the policies of the Japanese government of Shinzo Abe (elected in 2007 on a promise to reform the long sluggish Japanese economy) and proposals from the state-owned Development Bank of Japan (DBJ) to privatise public infrastructure. The city of Osaka is readying itself to unleash the country's first big experiment in turning a water utility into a public-private entity, a move which will pave the way for a partial equity sale of local water utilities and privatise a fundamentally communal resource over the coming years (GWI 2014) (Table 5.2).

Today Osaka city has a population of some 2 782 000 people with a population density of 33 335 people per square mile (WPS 2013). As of 2010 daily water production is over 1.2 million m³/day with per capita consumption at 310 l/person/day (Aquastat 2015), which is the fourth highest in the world (Asian Development Bank 2006; Data360 2014). The Osaka Municipal Waterworks Bureau (OMWB) manages and oversees tap water and industrial water supply for the city, as well as water treatment technologies, water distribution management, leakage reduction and anti-

⁷Between 1 000 and 2 000 m³/person/year makes a country 'water stressed' – Japan is a long way from that.

Table 5.2 Water services statistics

Drinking water		Wastewater	
% population served	100	% population served	99.9
Daily per capita Consumption (litres/day)	310	Wastewater treatment capacity (1x10 ⁶ m ³ /day)	2.9
Water losses (%)	6	Sludge to landfill	0
Water charges (¥/m³)	95 – 200	Length of sanitary sewers (km)	4 857
Treated water volume (1x10⁶ m³/day)	2.4	% wastewater reuse	5

OMWB 2014

earthquake measures (OMWB 2014). In the last fiscal year, the OMWB earned a net income of US\$103 million on a revenue of US\$654 million and is considered a successful, fully modern water utility (SIWW 2014).

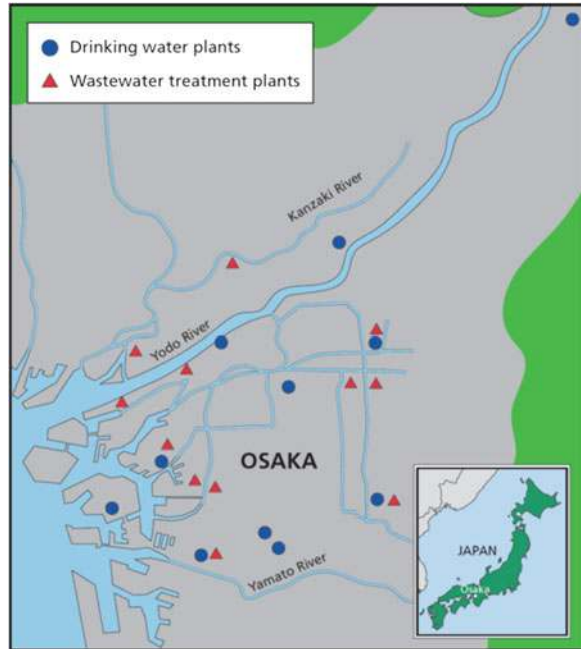
The modern Osaka water services system has significant dam and reservoir developments throughout the upper Yodo River catchment above the city. Starting with the Kunijima Water Treatment Plant, opened in 1914, OMWB has developed a large network of supply reservoirs, distribution pipelines and treatment plants, the latter built around granular activated charcoal (GAC), ozonation and post-contact chlorination treatment technologies (Fig. 5.6). The storm water and sewerage system was begun in the 1890s with the construction of brick-lined interceptor sewers (as in London and Paris) which are still in use today (as in Paris and London!). Domestic night-soil collection was still the primary method of domestic sewerage until the late 1950s (as in many Asian cities), after which human waste collection was switched over to a conventional industrial piped system. Given its available onshore resources, there has been no inclination to develop desalination as part of the water-into-supply network.

Since 2000 OMWB has invested heavily in sustainability measures, including a 253 kW hydropower installation at the Nagai Distribution Plant and a 150 kW solar installation at the Kunijima Purification Plant. OMWB has also implemented a new biosolids treatment plan based on:

- Better management of the extensive network of combined sewer overflows in the city
- Processing of biosolids ('cake') for power generation via biogas recovery and incineration
- Creation of post-treatment consumer products such as 'Yodo soil' and slag concrete for general distribution and use

As land is at a premium in densely inhabited Osaka, OWB has also incorporated green infrastructure developments, including playing fields and allotment-style gardens at many of its more spatially extensive treatment installations. The region's vulnerability to natural disasters, especially earthquakes, means that special attention has been given to infrastructural resilience with OWB constructing vast underground 'floodways' as well as encouraging green infrastructure amongst domestic

Fig. 5.6 Osaka's network of drinking water and sewage treatment plants



and industrial users to reduce urban flood risk. This sort of system integration between different public bureaucracies, in this case between water utility and civil defence authorities, is one of the hallmarks of the city's particular version of 'hydro-security'.

However, structural change to Osaka's water supply is imminent. In March 2015 city leaders announced a plan to auction off the water services 'concession' by March 2016 (SIWW 2014). The Osaka government has said that 'partially privatising the city's water services will promote collaboration between the government and private companies, as well as prepare water businesses to expand overseas to offset declining domestic demand' (SIWW 2014). City officials also hope that the initiative will decrease debt and increase private investment in the coming years. These are of course the standard reasons given for water utility privatisation around the world (Staddon 2010).

Privatising public services and portions of public infrastructure is not a new concept in Japan. Other Japanese cities have sold rights in airports as well as the Japanese National Railways and the Tokyo Metro, which were privatised in 1987 and 2004, respectively (SIWW 2014). The Japanese government has, over the past few years, also adopted a series of policies to facilitate private operation of public services, including water. These include a law promoting Public Finance Initiatives (PFI), a new Water Act in 2002 which enabled delegation of water services management and new laws enabling local governments to outsource municipal services more generally. In 2003 the DBJ launched a new financial mechanism designed to provide low interest funds for private companies to invest in acquiring and running

municipal assets, with the DBJ itself prepared to become an equity investor holding a stake of up to 50%. In practice municipalities have been slow to respond to the various pressures for more privatisation due in part to union opposition, as well as the fact that water services are seen by users as excellent (Hall et al. 2005). There is no grass-roots support for restructuring the water services sector.

Cities like Osaka, where water is managed well by public authorities, have however demolished the argument that private sector participation is the only way to improve efficiency and even outperformed cities with prominent water services privatisation arrangements such as Jakarta and Manila (Staddon 2010). Furthermore, Osaka boasts a non-revenue water level (NRW) (an indicator of the level of unaccounted-for water and lost income due to leakages and unpaid bills) of only 7%, which is an outstanding performance by international standards (Netto 2005) – by contrast, NRW in England is closer to 20%.

Opponents to privatisation of water services provision fear that such schemes may fail to deliver clean and safe drinking water to communities and divert resources away from rural areas to urban centres via channelling and groundwater mining (Netto 2005). However, privatisation schemes are still being pushed with vigour by international financial institutions such as the Asian Development Bank and the World Bank's International Finance Corporation (IFC) which dominates global investment in water privatisation (Lappe 2014; Hagopian 2014), increasing its lending on water projects from US\$546 million to US\$7.5 billion between 2002 and 2011 (World Bank 2014).

5.4 Concluding Comments

In retrospect it is perhaps unsurprising that urban water services manifest common and predictable historical geographical development trends. It would perhaps be stranger were this not the case. After all, technological innovations in, for example, wastewater treatment are transmitted through professional networks with ever-increasing speed, and as we have seen, the hydrosocial contract has evolved inexorably from an initial inkling that there was a role for the public sector in addressing water-related illnesses in burgeoning nineteenth-century cities through a period of industrial massification of water services in the twentieth century towards the current phase of both greater democratic localism (however expressed) and environmental sensitivity. The urban hydrosocial transition is however not temporally lockstep or completely uniform; different places have experienced their own versions of each of these three phases at somewhat different times. The current phase of 'democratic localism', for instance, is Janus faced: on the one hand implying grass-roots determination of the nature of the twenty-first-century hydrosocial contract, but on the other signalling a challenge to the previous logic of public sector water services provision. In the three urban case studies presented here, we can see clear differences in geohistorical sequencing of water services development, linked to initial starting conditions, differential economic and urbanisation pressures and,

especially, different political positions on the role of the local and central states in brokering water services development.

With respect to urban water governance, the key preoccupation of this volume, there are also some clear historical patterns. First, cities tend to experience an initial public health driver for the extension and expansion of urban water services. Whether in the mid-nineteenth (Bristol), early twentieth (Osaka) or late twentieth (Kampala) centuries, increasing the density of cities also brings with it a clear need for *centralised command and control* over public health with some level of public sector involvement in water services an inevitable corollary. This involvement can entail either regulatory oversight or direct provision or both. In British cities public health-oriented 'Metropolitan Water Boards' were in place by the late nineteenth century, and similar institutions appeared later in Japanese and still later in East African cities. Sometimes these Water Boards provided water services themselves (a public provision model), and sometimes they merely acted to license and regulate private service providers. Either way, the state retained a significant role in policy formation and regulation, if not direct provision. In England and Wales these functions are now exercised by government agencies charged with regulation of drinking water quality (DWI), water business planning (Ofwat) and impact on the natural environment (Environment Agency). Since the Flooding and Water Management Act of 2010, urban authorities in England and Wales have had new statutory duties for flood planning and surface water management. In Osaka, these functions are all still largely managed within the OWB, though privatisation pressures may break up this vertically integrated system from 2015 forwards in accordance with Prime Minister Shinzo Abe's neo-liberal programme. Clearly, in Kampala, Uganda, the water services system is relatively poorly developed, particularly with respect to both wastewater and surface water management. Lack of clear government policy, political instability and economic weakness has meant that these sectors have developed primarily through programmes managed and funded by bilateral and multilateral aid organisations. Put another way, the Ugandan government has still to work out a clear hydrosocial contract with civil society, whereas in both Bristol and Osaka the basis of the hydrosocial contract has in recent years been shifted from mass service delivery towards biocentrism and resilience – alongside a shifting balance between public and private providers.

Simultaneously the geographical scale of water services regulation has increasingly shifted towards the river basin or catchment, a transition that risks pitting strictly urban interests, whether bureaucratic or private, against the broader claims to manage river basins' resources in a more holistic way for the greater good (Molle and Hoanh 2011). Yet, shifting the gaze of urban water management from cities to urban regions or river basins also allows the possibility of thinking more equitably about the distribution of water services costs and benefits from the usually more rural upper catchments to the usually more urban lower catchments. Such 'rescaling' of urban water governance has, for example, opened the way for considering how up-catchment land managers (e.g. farmers) can benefit from producing cleaner source waters for down-catchment cities through 'payment for ecosystems services' mechanisms. Yet 'rescaling' is also unavoidably contentious as different tiers of

government vie for control over water resources whilst simultaneously shying away from responsibility for water services outcomes.

References

- Aquastat. (2015). A water database of the Food and Agriculture Organization of the United Nations (FAO – Land and Water Development Division). <http://www.fao.org/nr/water/aquastat/main/index.stm>
- Asian Development Bank. (2006). *Water for all: The review panel's final report and recommendations*. ADB, Manila. <http://www.adb.org>. Accessed 28 Apr 2006.
- Bakker, K. (2003). *An uncooperative commodity: Privatising water in England and Wales*. Oxford: Oxford University Press.
- Barraqué, B. (1998, August) Les politiques de l'eau en Europe (Les Européens ont-ils les moyens de leurs services d'eau). *Annales des ponts et chaussées*, 87, 24–32.
- Brown, R. R., & Morison, P. J. (2011). Understanding the nature of public and local policy commitment to water sensitive urban design. *Landscape and Urban Planning*, 99(2), 83–92.
- Brown, R. R., Keath, N., & Wong, T. H. F. (2009). Urban water management in cities: Historical, current and future regimes. *Water Science and Technology*, 59, 847–855.
- Corral, V. (2007). *Water privatization and ADB, its impacts and responses from peoples' movements*. Public Services International Research Unit, People's Forum on ADB, Kyoto, Japan, 5–6 May 2007. http://www.waterjustice.org/uploads/attachments/1_ADB_Waterprivatization_vpc_kyoto_apr07_eng.pdf. Accessed 24 Oct 2014.
- Danert, K., Carter, R. C., Rwamwanja, R., Ssebalu, J., Carr, G., & Kane, D. (2003). The private sector in rural water and sanitation services in Uganda: Understanding the context and developing support strategies. *Journal of International Development*, 15(8), 1099–1114.
- Data360. (2014). *Average water use per person per day*. http://www.data360.org/dsg.aspx?Data_Set_Group_Id=757. Accessed 26 Oct 2014.
- Davis, J. (2001). London government 1850–1920: The Metropolitan Board of Works and the London County Council. *The London Journal*, 26(1), 47–56.
- Dickinson, H. W. (1954). *Water supply of greater London*. Leamington Spa: Newcomen Society.
- Directorate of Water Development. (2010). *Urban water supply guidelines [online]*. http://www.mwe.go.ug/index.php?option=com_docman&task=cat_view&gid=2&Itemid=223. Accessed 24 Oct 2014.
- Global Water Intelligence (GWI). (2014). *Mayor set to shake up Osaka's water utility*. <http://www.globalwaterintel.com/archive/14/12/general/mayor-set-shake-osakas-water-utility.html>. Global Water Intelligence Magazine 14(12) (December 2013). Accessed 24 Oct 2014.
- Hadlaw, J. (2011). Saving time and annihilating space: Discourses of speed in AT&T advertising, 1909–1929. *Space and Culture*, 14(1), 85–113.
- Hagopian, J. (2014). *Privatization of water as an owned commodity rather than a universal human right*. <http://www.globalresearch.ca/privatization-of-water-as-an-owned-commodity-rather-than-a-universal-human-right/5378483>. Accessed 10 Dec 2014.
- Hall, P. (1969). Transportation. *Urban Studies*, 6(3), 408–435.
- Hall, D., Corral, V., Lobina, E., & Motte, R. D. L. (2005). Water privatisation and restructuring in Asia-Pacific. Public Services International Research Unit (PSIRU), University of Greenwich, London, UK.
- Halliday, S. (2001). *The great stink of London: Sir Joseph Bazalgette and the cleansing of the Victorian metropolis*. Gloucester: Alan Sutton Publishing Limited.
- Harris, L., Goldin, J. A., & Sneddon, C. (2013). *Contemporary water governance in the global south: Scarcity, marketization and participation*. London: Earthscan Publications.

- Hopewell, M. R., & Graham, J. P. (2014). Trends in access to water supply and sanitation in 31 major sub-Saharan African cities: An analysis of DHS data from 2000 to 2012. *BMC Public Health*, 14, 208.
- Hughes, T. P. (1985). *Networks of power: Electrification in western society, 1880–1930*. Baltimore: Johns Hopkins University Press.
- Jaglin, S. (2004). Water delivery and metropolitan institution building in Cape Town: The problems of urban integration. *Urban Forum*, 15(3), 231–253.
- Lappe, A. (2014). *World Bank wants water privatized, despite risks*. <http://america.aljazeera.com/opinions/2014/4/water-managementprivatizationworldbankgroupifc.html>. Accessed 10 Dec 2014.
- Linton, J. (2010). *What is water? The history of a modern abstraction*. Vancouver: University of British Columbia Press (UBC Press).
- Lundqvist, J., Turton, A., & Narain, S. (2001). Social, institutional and regulatory issues. In C. Maksimovic & J. A. Tejada-Guilbert (Eds.), *Frontiers in urban water management: Deadlock or hope* (pp. 344–398). Cornwall: IWA Publishing.
- McGee, T. G. (2002). Reconstructing the Southeast Asian city in an era of volatile globalization. In T. Bunnell, L. Drummond, & H. Kong Chong (Eds.), *Critical reflections on cities in south-east Asia* (pp. 33–34). Singapore: Times Academic Press.
- McGrath, P. (1985). *A Bristol miscellany*. Gloucester: Alan Sutton Publishing Limited.
- McLaughlin, O., Kazooba, F., & Terry, A. (2014). Helping improve community-led management of water resources in Uganda. *Environmental Sciences*, 22(3), 63–69.
- Ministry of Finance, Planning and Economic Development. (2004). Poverty eradication action plan (2004/5-2007/8). Kampala, Uganda.
- Ministry of Health, Labour and Welfare., Government of Japan (MHLWGJ). (2008). *Policy and administration of water supply in Japan*. Water Supply Division, Health Service Bureau, Tokyo, Japan. http://www.mhlw.go.jp/english/policy/health/water_supply/dl/policy_admin.pdf. Accessed 26 Oct 2014.
- Molle, F. (2001). Nirvana concepts, narratives and policy models: Insights from the water sector. *Water Alternatives*, 1(1), 131–156.
- Molle, F., & Hoanh, C. T. (2011). Implementing integrated river basin management in the Red River basin, Vietnam: A solution looking for a problem? *Water Policy*, 13(4), 518–534.
- MWE. (2006). *Water and sanitation sector performance report 2006*. Kampala, Uganda. http://www.mwe.go.ug/index.php?option=com_docman&task=cat_view&Itemid=223&gid=15. Accessed 10 Dec 2013.
- MWLE. (1999). *A national water policy – Kampala*. <http://www.ruwas.co.ug/reports/National%20Water%20Policy.pdf>. Accessed 01 Dec 2013.
- National Water and Sewerage Corporation (NWSC) (Uganda). (2011). Uganda to build \$306m water treatment plant in Katosi. Water Technology, 18 April 2011.
- Netto, A. (2005). *World water day – Asia: Private sector still eyeing to own every drop*. Focus on the global south. <http://focusweb.org/node/595>. Accessed 25 Oct 2014.
- Olivera, O., & Lewis, T. (2004). *Cochabamba! Water war in Bolivia*. Cambridge, MA: South End Press.
- Osaka Municipal Waterworks Bureau (OMWB). (2012). *Introducing the results of FY2012 Osaka City water quality testing*. <http://www.city.osaka.lg.jp/contents/wdu030/english/quality/check/kekka.html>. Accessed 26 Oct 2014.
- Osaka Municipal Waterworks Bureau (OMWB). (2014). *Osaka Municipal Waterworks Bureau: Asia and Pacific Trade Centre (ATC)*. <http://www.city.osaka.lg.jp/contents/wdu030/english/>. Accessed 26 Oct 2014.
- Poupeau, F., & Hardy, S. (2014). The self-organization of urban water management: the function of cooperatives in the big system of La Paz and El Alto (Bolivia). Unpublished draft paper.
- Schneier-Madanes, G. (Ed.). (2003). *Globalized water: A question of governance*. Dordrecht: Springer.

- Singapore International Water Week (SIWW). (2014). *Osaka, Japan to begin privatizing water treatment and supply services*. <http://www.siww.com.sg/industry-news/osaka-japan-begin-privatizing-water-treatment-and-supply-services>. Accessed 24 Oct 2014.
- Staddon, C. (2010). *Managing Europe's water resources: 21st century challenges*. Farnham/Surrey: Ashgate Press.
- Staddon, C., & Langberg, S. (2014). Urban water security as a function of the 'urban hydrosocial transition'. *Environmental Sciences*, 23(3), 13–17.
- Swyngedouw, E. (2005). Circulations and metabolism: Hybrid natures and cyborg cities. In N. Heynen, M. Kaika, & E. Swyngedouw (Eds.), *In the nature of cities: Urban political ecology and the politics of urban metabolism*. London: Routledge.
- Tacoli, C. (Ed.). (2006). *The Earthscan reader in rural–urban linkages*. London: Earthscan Publications.
- Tarr, J. A., & Dupuy, G. (Eds.). (1988). *Technology and the rise of the networked city in Europe and America*. Philadelphia: Temple University Press.
- Terry, A., McLaughlin, O., & Kazooba, F. (2015). Improving the effectiveness of Ugandan water user committees. *Development in Practice*, 25(5), 715–727.
- Thapa, B., Varady, R., & Scott, C. (2014). Measuring water security: An assessment of the 2013 Asian Development Bank outlook national water security index. *Environmental Sciences*, 23(3), 36–42.
- Turton, A. R., & Meissner, R. (2002). The hydrosocial contract and its manifestation in society: A South African case study. In A. R. Turton & R. Henwood (Eds.), *Hydropolitics in the developing world: A southern African perspective* (pp. 37–60). Pretoria: African Water Issues Research Unit, University of Pretoria.
- Turton, A. R., & Ohlsson, L. (1999). *Water scarcity and social stability: Towards a deeper understanding of the key concepts needed to manage water scarcity in developing countries* (Occasional paper 17). London: SOAS Water Issues Group.
- UNESCO-WWAP. (2006). National Water Development Report: Uganda. Prepared for the 2nd UN World Water Development Report “Water, a shared responsibility”, UNESCO, Paris.
- World Bank. (2014). *Water projects and programs*. <http://www.worldbank.org/en/topic/water/projects>. Accessed 23 Nov 2014.
- World Population Statistics (WPS). (2013). *Osaka population statistics*. <http://www.worldpopulationstatistics.com/osaka-population-2013/>. Accessed 26 Oct 2014.

Open Access This chapter is distributed under the terms of the Creative Commons Attribution-Noncommercial 2.5 License (<http://creativecommons.org/licenses/by-nc/2.5/>) which permits any noncommercial use, distribution, and reproduction in any medium, provided the original author(s) and source are credited.

The images or other third party material in this chapter are included in the work's Creative Commons license, unless indicated otherwise in the credit line; if such material is not included in the work's Creative Commons license and the respective action is not permitted by statutory regulation, users will need to obtain permission from the license holder to duplicate, adapt or reproduce the material.



Chapter 6

Urban Water Governance for the Twenty-First Century: A Portfolio-Based Approach to Planning and Management

Ganesh Keremane, Jennifer McKay, and Zhifang Wu

Abstract Rapid urbanisation, growing urban populations, environmental issues and climate change all represent significant challenges for water resource management, the delivery of essential water and sanitation services and environmental protection. As a result, traditional approaches that have relied heavily on large-scale infrastructure development are making way for new approaches such as the portfolio-based approach to planning and management. In an urban context, this includes integration of all components of the urban water cycle, and most state governments in Australia have embarked on implementing this integrated approach by having a mix of water supply sources including demand management and conservation measures. However, effective implementation of this approach depends on policies and regulations and encounters various impediments. Accordingly this chapter focuses on the City of Adelaide in South Australia and explores the legal and policy challenges for implementing an integrated urban water management plan in Metropolitan Adelaide. Drawing on the results of governance studies carried out in Australia that included a literature review, stakeholder and community surveys, the chapter attempts to better understand the barriers to transitioning Adelaide to a water-sensitive city.

Keywords Urban water management • Governance • Portfolio approach • Stakeholder perceptions

6.1 Introduction

Over half the world's population now lives in urban areas, and most of the population growth over the next four decades is expected to take place in urban areas (UN DESA 2014). This represents a considerable challenge for water resource

G. Keremane (✉) • J. McKay • Z. Wu
School of Law, UniSA Business School, University of South Australia,
Law Building, City West Campus, GPO Box 2471, Adelaide, South Australia 5001, Australia
e-mail: ganesh.keremane@unisa.edu.au; jennifer.mckay@unisa.edu.au;
zhifang.wu@unisa.edu.au

management, the delivery of essential water and sanitation services and environmental protection. To help meet these challenges and better serve both economic and environmental objectives, there is a need to employ a broader range of tools than in the past. This means that traditional approaches which have relied heavily on large-scale infrastructure development (dams, levees and conveyance facilities) have to make way for a new integrated approach – integrated urban water management (IUWM) – which is the integration of all components of the urban water cycle. This integration takes place within the city’s urban development and in the context of wider basin management to achieve sustainable economic, social and environmental goals (Bahri 2012; World Bank 2012). Consequently, there is a shift in urban water management from a system relying on climate-dependent traditional water resources to a portfolio system that uses several sources. The portfolio paradigm includes both demand and supply management measures, and Table 6.1 compares the “old” and “new” paradigms of urban water management.

However, implementation of this approach encounters various impediments that are mostly related to governance. Governance of water resources is a long-term and complex affair involving different levels of actors at different scales, from households, irrigators and industries to the governments (Laban 2007; McKay 2007). The interactions between these actors should be considered when promoting local water governance (Laban 1994, 2007), and this is true in the case of both rural and urban water management context. This chapter focuses on the latter, and using Adelaide City in South Australia as a case study, it attempts to explore the legal and policy challenges for implementing an IUWM plan in Metropolitan Adelaide.

6.1.1 Urban Water Management in Australia

Australia, like many countries around the world, has embarked on implementing the IUWM approach to supply and secure water for urban areas. The overall strategy is to develop efficient and flexible urban water systems by adopting a holistic approach in which all components of the urban water cycle are integrated and includes a mix of water supply sources – freshwater (surface water, groundwater) and produced water (desalinated water, stormwater and treated effluent).

In Australia, urban water reform is one of the eight key elements of the National Water Initiative (NWI) which is a joint commitment by all states and territory governments and the Australian Government to manage surface water and groundwater resources for rural and urban use and optimise economic, social and environmental outcomes (COAG 2004). The initiative created a coherent and comprehensive framework for the management of Australia’s water resources; specifically, paragraph 92 of the NWI aims to identify and develop innovative ways of managing and achieving more efficient water use in our cities. Furthermore, the Initiative recognises a nested relationship between three related terms:

Table 6.1 The “old” and “new” paradigms of urban water management

Old paradigm	New paradigm
<i>Stormwater is a nuisance</i>	<i>Stormwater is a resource</i>
Convey stormwater away from urban area as rapidly as possible.	Harvest stormwater as a water supply and infiltrate or retain it to support aquifers, waterways and vegetation
<i>One use</i>	<i>Reuse and reclamation</i>
Water follows one-way path from supply, to a single use, to treatment and disposal, to the environment	Water can be used multiple times for fit to use purposes
<i>Build to demand</i>	<i>Manage demand</i>
It is necessary to build more capacity as demand increases	Demand management opportunities are real and increasing. Take advantage of all cost-effective options before increasing infrastructure capacity
<i>Limit complexity and employ standard solutions</i>	<i>Allow diverse solutions</i>
Small number of technologies by urban water professionals defines water infrastructure	Decision-makers are multidisciplinary. Allow new management strategies and technologies
<i>Integration by accident</i>	<i>Physical and institutional integration by design</i>
Physically, water supply, wastewater and stormwater are separated. However, they may be managed by the same agency as a matter of coincidence	Linkages must be made between water supply, wastewater and stormwater, which require highly coordinated management
<i>Collaboration meant public relations</i>	<i>Collaboration means engagement</i>
Approach other agencies and public when approval or prechosen solution is required	Enlist all stakeholders (other agencies and public) in search for effective solutions

Source: Pinkham (1999)

1. Integrated urban water cycle management (paragraph 92(iv))
2. Water-sensitive urban design [paragraph 92(i)]
3. Water-sensitive urban developments [paragraphs 92(ii) and (iii)]

The National Water Commission (NWC) in consultation with NWI parties and the Urban Water Advisory Group provided working definitions of the three terms to assist the NWI parties and consequently integrated urban water management is defined as:

The integrated management of all water sources, to ensure that water is used optimally within a catchment resource, state and national policy context. It promotes the coordinated planning, sustainable development and management of water, land and related resources (including energy use) that are linked to urban areas. It directs the application of Water Sensitive Urban Design principles within existing and new urban environments. (NWC 2007)

This “paradigm shift” in Australia is largely attributed to a group of key individuals in Western Australia (Mitchell 2006: 590). According to the author, in the early 1990s, these individuals were calling for a new approach to urban planning and design, based on the premise that conventional water supply, sewerage and drainage practices that rely on conveyance and centralised treatment and discharge systems

cannot be sustained in the long term. Over the years, the integrated approach to urban water management has received impetus from the governments at all levels. In addition to the NWI signed in 2004, the Council of Australian Governments (COAG) in 2009 agreed to increase its efforts to accelerate the pace of urban water management reform and as a result adopted the National Urban Water Planning Principles outlined below:

- Deliver urban water supplies in accordance with agreed levels of service.
- Base urban water planning on the best information available at the time and invest in acquiring information on an ongoing basis to continually improve the knowledge base.
- Adopt a partnership approach so that stakeholders are able to make an informed contribution to urban water planning, including consideration of the appropriate supply/demand balance.
- Manage water in the urban context on a whole of water cycle basis.
- Consider the full portfolio of water supply and demand options.
- Develop and manage urban water supplies within sustainable limits.
- Use pricing and markets, where efficient and feasible, to help achieve planned urban water supply/demand balance.
- Periodically review urban water plans.

The aim of these principles is to provide Australian governments and water utilities with the tools to develop plans to manage the supply/demand balance of a reticulated supply for an urban population. Therefore adoption of a portfolio water supply approach is a high policy priority for all the state governments in Australia.

However, implementation of this approach depends on policies and regulations and encounters various impediments. From the literature related to urban water management, it is evident that while progress on the scientific and technical aspects related to IUWM has been admirable, there are significant institutional aspects that need equal attention. Our own studies on water governance in Australia (McKay 2005, 2007), particularly on urban water management (Keremane et al. 2011; Wu et al. 2012; Keremane et al. 2014), and other studies (e.g. Maksimović and Tejada-Guibert 2001; Brown et al. 2006; Mitchell 2006) have identified a wide range of social and institutional barriers to adoption, including insufficient practitioner skills and knowledge, organisational resistance, the lack of political will, limited regulatory incentives and the lack of institutional capacity. Unlike other countries, in Australia the water reforms have led the state governments and their agencies to better align planning and development requirements with an integrated approach to the management of the urban water cycle, but a range of governance factors including regulatory conditions, management systems and institutional arrangements are impeding new practices. Furthermore, there are acute path dependency issues introspectively for each state and hence federal, state and private sector relations issues. According to Dovers (2008) water institutions in Australia generally operate within an institutional system that is consistent with past rather than present knowledge and imperatives. With regard to urban water management, “the co-evolution of institutions and large-scale technological infrastructure generates an interdepen-

dence that makes urban water regimes resistant to change” (Wallington et al. 2010). However, in recent times many new proposals such as a harmonised system of laws and privatisation of public infrastructure are on the table (Infrastructure Australia 2013); the privatisation issue is discussed in more detail later in the chapter.

While it is widely acknowledged that it is time for new approaches, such new approaches are able to evolve within a dialogue-based system as demonstrated with the Basin Plan which was embedded in several state-based Australian multi-stakeholder processes. Nevertheless, Australia has the institutions and the democratic structure to form models to enable the transition to a portfolio approach. Most state governments in Australia have embarked on implementing IUWM by having a portfolio of water supply sources. This chapter focuses on the state of South Australia, which is already a well-recognised leader in many aspects of urban water management, particularly stormwater harvesting and reuse, and wastewater reuse. Furthermore, in October 2014 the South Australian Government released an issues paper that stated the Government’s commitment to furthering the urban water management reforms by developing an innovative integrated urban water management plan for Greater Adelaide. (DEWNR 2014: 3). Accordingly, this chapter attempts to explore the legal and policy challenges for implementing an integrated urban water management plan in Adelaide.

6.2 Method

As mentioned earlier, this chapter is based on our previous work related to water governance in Australia, particularly two studies: (1) a legal and governance study to identify governance challenges and potential options to support the implementation of an IUWM plan in Adelaide and (2) examining urban community perspectives about water governance in Australia. The first study included a national and international review of literature on institutional arrangements for diversifying the water supply source portfolio, face-to-face discussions and an online survey of key actors representing different stakeholders/agencies (e.g. SA Water, DEWNR, local council, etc.) that are involved in delivering safe and secure water and wastewater services to Metropolitan Adelaide (see Table 6.2).

The second study was an online survey of urban communities in three Australian cities, namely, the cities of Salisbury and Charles Sturt in South Australia and City of Gold Coast in Queensland. The online survey was conducted using an e-mail list bought from a permission-based and research-only internet panel of a marketing company. This meant that e-mails were sent only to those people who had subscribed to receive e-mails from this company for research purposes. Respondents were offered an incentive to enter into a draw for one of eight Coles gift vouchers each valued at AUD\$50. In total, the survey was sent to 6 000 randomly selected e-mail addresses, with 370 valid responses. We acknowledge that the response rate (6.22 %) is low, and thus the results are likely to be biased. Also, the e-mail addresses bought were from three specific locations in Australia and hence cannot be generalised. We note these as the limitations of this study.

Table 6.2 List of key stakeholders participating in the study

Stakeholder agencies
SA Water (9)
Department of Environment, Water and Natural Resources (5)
Environment Protection Authority (3)
Department of Primary Industries and Regions (2)
Essential Services Commission of South Australia (1)
Stormwater Management Authority (1)
SA Health (1)
Department of Planning, Transport and Infrastructure (1)
Conservation Council of South Australia (1)
Adelaide and Mount Lofty Ranges NRM Board (1)
Local governments ^a (13)
International Centre of Excellence in Water Resources Management (3)
Private sector through the Water Industry Alliance (14)

Notes: Figures in parenthesis indicate the number of representatives

^aThere are 17 city councils in Metropolitan Adelaide, and 13 participated in the study

6.3 Findings

Australia, as discussed above, has embarked on implementing the IUWM approach to supply and secure water for urban areas. The overall strategy is to develop efficient and flexible urban water systems by adopting a holistic approach in which all the components of the urban water cycle are integrated and includes a mix of water supply sources – freshwater (surface water, groundwater) and produced water (desalinated water, stormwater and treated effluent). For example, in Victoria, Melbourne has access to a diverse range of water sources, many of which are available within the city (metropolitan) boundaries. These include groundwater, urban stormwater, rainwater (roof runoff), recycled wastewater and desalinated water. Similarly, the water supply mix in Adelaide (the city under study) includes seven sources of water listed below and demands management measures:

- Two surface water sources – Adelaide and Mount Lofty Ranges catchment and the Murray River
- Groundwater sources
- Produced or “new” water sources – desalinated water, recycled wastewater and stormwater and
- Rainwater/roof water

The objective is to secure water supply to the cities now and in the future. However, implementation is the challenge because management of water in Australia is a complex process; the following section provides an overview of the complexity.

6.3.1 Water Management in Australia: Institutional and Regulatory Model

Water management in Australian states and territories is the responsibility of various government agencies, water authorities and water utilities. Responsibility for regional and local water management lies with various organisations, including catchment management authorities, rural water utilities and local water utilities. These organisations undertake a range of regulatory, administrative and governance functions, and as a result there are different institutional models for water management. Regarding ownership of the assets and operations, state or local governments own all the water utilities in Australia. With the exception of some irrigation schemes, there has been little privatisation in the water sector. Australia also has an effective regulatory regime to protect public and environmental health along with an economic regulator in each state assigned with the responsibility both for prices and for customer service standards. More details of these arrangements are discussed later in the chapter.

The water industry in Australia operates under state laws, and as a result, different states and territories have introduced such reforms at different rates and in different ways (Srivastava 2004). Because of power sharing, each state government has created its own unique system for the allocation and use of water, and so the bodies providing water, gas and electricity have become powerful in each state, with little evidence of working together (McKay and Halanaik 2003). This has led to issues related to sharing of water resources, which in turn has forced the states to form agreements such as the Murray-Darling Basin Agreement and the Border Ranges Agreement (McKay 2002). This subsequently moved to a further set of reforms within the Australian water sector, and since 1992 the Australian Government has embarked on two phases of ambitious reform of state laws and policies for water management: the first in 1994, known as the Council of Australian Governments (COAG) reforms, and the second in 2004, known as the National Water Initiative reforms (McKay 2006, 2007; Hussey and Dovers 2006). This was followed by the passing of the *Water Act 2007* (Commonwealth) which set down a detailed regime for the use and management of Australia's water resources, most significantly through requiring the development of a "Basin Plan" (Kildea and Williams 2010). The Basin Plan was adapted by the Minister in 2012, and it envisages an integrated approach across jurisdictions. However, much of its implementation will take place through state water resource plans (Kildea and Williams 2010).

Furthermore, water management in the states and territories is the responsibility of various government agencies, water authorities and water utilities. Responsibility for regional and local water management lies with various organisations, including catchment management authorities, rural water utilities and local water utilities. These organisations undertake a range of regulatory, administrative and governance functions. Accordingly, across Australia there are different institutional models for urban water management. For example, in both Western Australia and the Northern Territory, the water service provider owns and operates its assets. In South Australia, the water service provider owns the assets, but operation and maintenance of the infrastructure have been outsourced through a long-term contract to a consortium of

Table 6.3 Institutional structure of water and wastewater service provision in Australia

Regions	Water and wastewater service providers
New South Wales	State-owned utilities, statutory authorities, local governments
Victoria	State-owned utilities, regional water authorities
Queensland	State-owned utilities, statutory authority, local governments, state-owned waterboards, drainage boards, bore waterboards, private companies
South Australia	State-owned utility, local governments
Western Australia	State-owned utility, statutory authorities
Tasmania	Local government-owned utility
Australian Capital Territory	State-owned utility
Northern Territory	State-owned utility

Source: LECG Limited Asia Pacific 2011; NWC 2012; DEWS 2013

private firms – ALLWATER. In the Australian Capital Territory (ACT), the water and sewerage assets and business are owned and operated by ACTEW Corporation (ACTEW), which is owned by the ACT Government. Table 6.3 indicates the institutional arrangements in all the Australian states. With respect to ownership and operations, state or local governments own all the water utilities in Australia. With the exception of some irrigation schemes, there has been little privatisation in the water sector. However, there has been restructuring and institutional role separation within the public sector departments. The public sector departments have been transformed to corporations, subject to the same laws that govern the private sector and with clear commercial objectives (Srivastava 2004). Further, a number of water utilities have contracted out their design, construction and various operational roles to the private sector through service or management contracts.

Regarding the regulatory models, Australia has a variety of regulatory regimes: health regulation, environmental regulation and economic regulation. An economic regulator has the responsibility both for prices and for customer service standards. The emerging trends and practices in Australia with respect to economic regulation show a clear shift towards independent regulation, and most of the state and territory jurisdictions favour a multi-sector approach. For health regulation, in almost all the states, the health department controls compliance with national water and sewage quality standards. Environmental regulation comes under an Environment Protection Authority/Agency (EPA) in all states, except in Western Australia and the Northern Territory, where it is the responsibility of a government department.

6.3.2 Governance Challenges in Implementing the IUWM Plan in Adelaide

A review of the literature suggests that there are significant institutional aspects that need equal attention while implementing an integrated urban water management strategy. Accordingly, a study was conducted in South Australia to assess the legal

and governance implications of IUWM and to explore the management issues related to diversifying the supply portfolio in Metropolitan Adelaide from institutional perspectives. The idea was to work with key stakeholders in government and the private sector to identify challenges and possible solutions, based on South Australian law and national and international experience. Solutions for implementation could include legislative (changes to the law), regulatory (changes in the way the law is implemented) and institutional (changes in the governance of water supply and management) aspects. As indicated in Table 6.2, the stakeholders who took part in the study were from a breadth of organisations involved in urban water management, thereby providing a good representation of the South Australian urban water sector. Moreover, they all had significant experience in planning and operating their systems in the face of uncertainties associated with future hydrology, weather, available water supply and projected water demand (which was a main selection criterion for participation). Table 6.4 summarises the major issues and potential solutions for implementing an integrated strategy in Adelaide, South Australia. These data were drawn from the literature review and the interviews. The following section discusses these issues in detail from the point of view of the key stakeholders.

6.3.2.1 Challenges to Implementing the IUWM Plan in Adelaide

The challenges and potential solutions to facilitating the implementation of IUWM in Adelaide were identified through preliminary discussions with the stakeholders. Literature reviews and documentary analyses also informed this process. For a more detailed examination, these issues were then organised into two categories – policy challenges and legal challenges – and the participants were asked to rate the specified challenges by using “agree and disagree” scales. They were also encouraged to identify additional challenges and/or make further recommendations in relation to overcoming these challenges. The results are presented in Table 6.5.

The main findings from the analysis presented in Table 6.5 are aligned with Giordano and Shah (2014) who argued that, in essence, integrated water resource management is a call to stop fragmentary approaches to water management. Fragmentation occurs where responsibility for water governance is allocated among multiple actors and/or agencies with relatively little, or no, coordination and a lack of clarity around how final decisions are made (Bakker and Cook 2011).

Water management in Australia is characterised by a lack of intergovernmental coordination, as indicated by the study participants who state that “too many different regulations and licenses are administered by a large number of different government agencies”, and there is a “lack of [an] integrated framework to draw policy perspectives together” (see Table 6.5). The relationships among key players were considered to be complex, and the “lack of clarity on rights and responsibilities for all aspects of water management and use” was considered as a very real concern to implementing the IUWM plan in Adelaide for operators, as was the long processing time required for licensing.

Table 6.4 Governance challenges and potential solutions for implementing IUWM plan in Adelaide

Governance challenges	Possible solutions
Institutional fragmentation	Establishing governance model that links government, civil society and science in a set of partnerships and that promotes close collaboration and interactions between each of these sectors and/or adopt models that are site specific
Unclear ownership and access rights to the new water resources (stormwater, wastewater, MAR)	Institutional reforms to ensure new water sources are considered in the planning framework at the appropriate level and complementary legislative reforms to clarify the rights and obligations for new water sources
Funding for stormwater management	Encourage private sector participation and/or local government authorities establishing their own dedicated and stable funding mechanisms known as stormwater utility ^a in the USA. This may require institutional and regulatory changes
Public perceptions and acceptance of new water resources	Public education by developing an effective water education plan
Community participation	Develop effective stakeholder engagement processes and maintain transparency

Note: ^aStormwater utility is a method of stormwater financing where property owners are charged a modest fee for using the stormwater drainage network. The revenue gained is used to finance capital and operating expenses that are needed for local stormwater quality and quantity management

To some extent these issues are universal given that water is a multipurpose flow resource that constantly transgresses political boundaries, authority over which is continually negotiated between different users, sectors and scales of governance. This raises the issue of how best to address the fragmentation that is so characteristic of water governance (Keremane et al. 2014). The setting “up [of] a process to work more collaboratively” and the “develop [ment] of an integrated water management plan” were strongly recommended by the participants. “A clear lead role for one agency” or “co-ordinat[ion] through one state agency” were other suggestions put forward by main actors (see Table 6.5). However, the participants pointed out that “there is a danger that this would add one more layer to the complexity” and that the “lead agency will be crucial for ownership, but must be careful not to only have one perspective (e.g. environmental and not industry)”.

“Cross-boundary disputes” and “unclear property rights/ownership rights for non-prescribed water sources” were considered as important legal challenges to the implementation of an integrated urban water management plan in Adelaide. However, “unclear access rights to water sources on private land” and “unclear private ownership of water courses” were not viewed as major challenges. The participants argued that ownership is clear but not well understood and expensive for individual landowners. As quoted by one, “according to legislation, watercourse ownership is clear. What’s not clear are the obligations attached to this”. The participants argued that “this extends throughout the water, wastewater, and recycled water

Table 6.5 Challenges to implementing the IUWM and potential solutions

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Unsure
1. Policy challenges						
Too many different regulations and licences are administered by a large number of different government agencies	0 %	9 %	7 %	41 %	39 %	4 %
Lack of clarity on rights and responsibilities for all aspects of water management and use	0 %	7 %	13 %	37 %	37 %	7 %
Lack of integrated framework to draw policy perspectives together	0 %	4 %	17 %	30 %	48 %	0 %
Processing of licensing takes far too long	2 %	7 %	30 %	30 %	20 %	11 %
Suggested solutions						
Set up a process to work more collaboratively	0 %	0 %	9 %	45 %	43 %	2 %
Developed an integrated water management plan	0 %	7 %	25 %	30 %	36 %	2 %
A clear lead role for one agency	2 %	5 %	20 %	36 %	36 %	0 %
Recommend to coordinate through one state-based agency	7 %	2 %	23 %	39 %	30 %	0 %
2. Legal challenges						
Cross-boundary disputes	0 %	11 %	11 %	57 %	15 %	7 %
Unclear property rights/ ownership rights for non-prescribed water sources	0 %	13 %	17 %	39 %	22 %	9 %
Unclear access rights to water sources on private land	0 %	24 %	22 %	30 %	17 %	7 %
Unclear private ownership of water courses	0 %	26 %	22 %	30 %	17 %	4 %
Suggested solutions						
There should be certainty and a collaborative effort for best policy instrument	0 %	0 %	11 %	41 %	43 %	4 %
Clarify the ownership of stormwater and water in the creek and if they need to be part of the optimal mix in case of aquifer recharge-injected water entitlements	2 %	4 %	13 %	54 %	22 %	4 %
Political solution NRM Code of Conduct for maintaining water sources	2 %	7 %	36 %	36 %	9 %	11 %

markets, whether by local government or the private sector. Unless sustainability can be re-integrated into water policy, there will be a disintegrated approach that simply drives water sources to be least cost”.

The participants strongly recommended that “certainty, collaborative effort for [the] best policy instrument” was needed to overcome the challenges. Some of the other possible solutions identified included “clarify[ing] the ownership of stormwater and water in the creek if they need to be part of the optimal mix and in case of aquifer recharge-injected water entitlements” and having “a clear Act for a multi-purpose sustainable IUWM strategy/plan”. However, the participants acknowledged that in practice, it may take a considerable amount of time to achieve certainty and collaborative effort for a best policy instrument and clear ownership.

6.3.2.2 Barriers to Implementing IUWM Plan in Adelaide

In the literature, there is agreement about the hurdles faced in implementing an IUWM plan, and two factors – organisational culture and institutional capacity – emerge as important elements that influence this change, particularly with respect to the diversification of water sources (Wallington et al. 2010). Organisational culture is defined in many different ways in the literature. However, the most commonly understood definition of organisational culture is “the way we do things around here” (Lundy and Cowling 1996: 168). Another important issue related to implementing the “new” strategy is institutional capacity. The building of institutional capacity is important for encouraging institutional change (Brown and Farrelly 2009). Also, as Wakely (1997) argues, institutional capacity determines the ability of an institution to perform effectively at its own tasks and to coordinate with others in its field. In addition, within the water industry, as argued by Mukheibir et al. (2014: 71), “the rigid cultural norms of organisations, professionals and academics ... and capacity development, are barriers to integrated and innovative water management”. In this regard, the aim of this study was to examine the perceptions of the key stakeholders in the South Australian urban water sector about these barriers (see Fig. 6.1).

The participants agreed that the organisational culture of government departments was a major barrier to the implementation of IUWM in Adelaide as reflected in the quote below:

..., the culture is one where mistakes are never acknowledged. The organisations do not hold themselves accountable for their failings and broken promises. Until this can change, the entire sector will be uncertain.

In terms of the significance of the impact of these barriers, the abovementioned issue of organisational culture was followed by institutional capacity, institutional uncertainty about access rights and institutional uncertainty about the ownership of water. Full compliance with environmental regulations and public health regulations was not considered to be a major barrier. See Keremane et al. (2014) for further discussions on these issues.

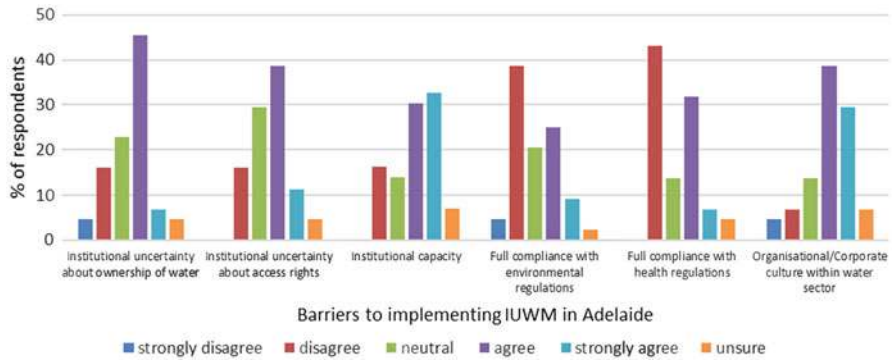


Fig. 6.1 Stakeholders’ perceptions about the barriers to implementing IUWM in Adelaide

In fact, “institutional capacity” was not considered to be an issue by the participants; they only considered it to be too dispersed/unfocused at present. This was primarily considered to be a financial issue about the resourcing of SA Water and Department of Environment, Water, and Natural Resources (DEWNR). The participants further indicated that “institutional uncertainty about the ownership of water” and “institutional uncertainty about access rights” depended on the source and were related to non-prescribed sources only. These were primarily related to stormwater reuse and managed aquifer recharge (MAR) schemes. “Full compliance with public health regulations” was not considered as a major barrier to the implementation of IUWM in Adelaide; however, “compliance” was perceived as being necessary.

The participants agreed that “IUWM must be established to be environmentally-sustainable”. Rather than a barrier, “full compliance with environmental regulations” was considered to be a driver because more wastewater and stormwater reuse results in less environmental impact on marine waters. In addition, “environmental regulation” was criticised as being “a rubber stamping exercise” and “the real barrier is that organisational players cannot make clear commitments towards how they will protect and enhance biodiversity, or how they will transition towards truly sustainable management practices”.

6.3.3 Issues Related to Ownership and Governance Structures

From the literature and discussions above, it is clear that the impediments to implementing an integrated approach are not generally technological, but are instead, socio-institutional. In this study the stakeholders were asked to voice their opinion about demand management and the existing governance arrangements related to different water sources available in Adelaide, and the results are illustrated in Fig. 6.2. From their responses, it is clear that DEWNR was seen as being responsible for the management of the catchments and groundwater, while SA Water played a larger role in governing desalinated water and recycled wastewater. When it comes to stormwater and rainwater, local governments had a major role to play.

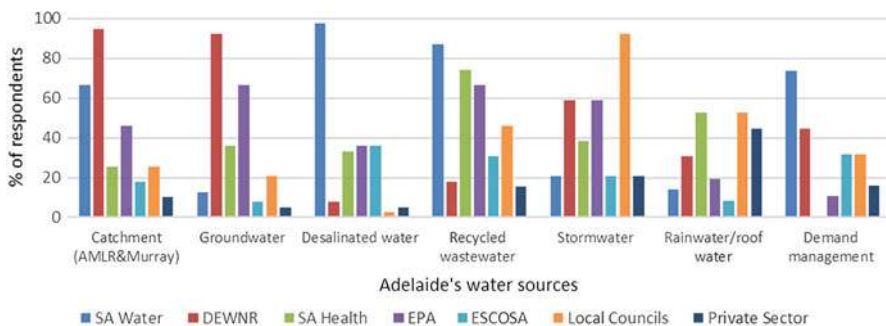


Fig. 6.2 Stakeholders’ perceptions about existing water governance arrangements in Adelaide

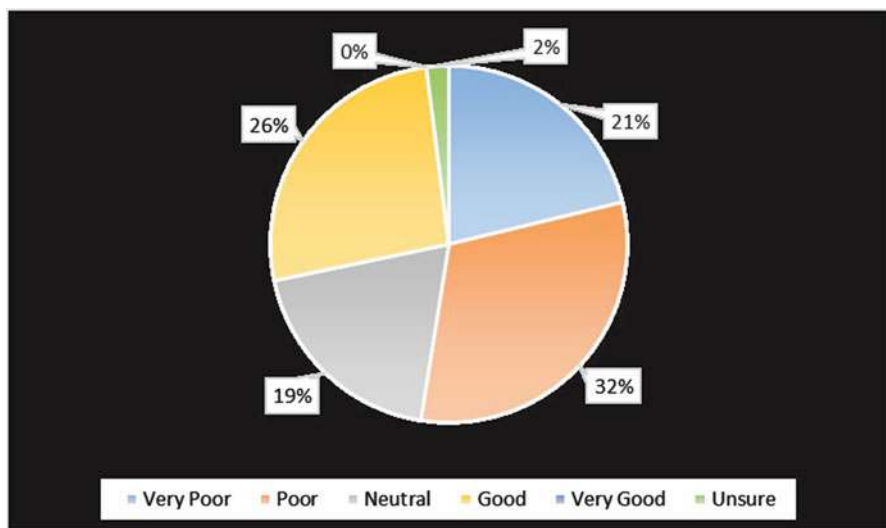


Fig. 6.3 Effectiveness of existing arrangements

However, when asked how effective the existing arrangements are, more than 50% of the respondents were of the opinion that they are poor (Fig. 6.3). The stakeholders substantiated their responses by stating the following:

Unclear who is responsible or the driver for what... Near impossible to get diverse water supply projects being undertaken. State gov. has no funding, staff or capacity to implement or administer/approve others to implement.

Too many BODIES trying to apply too many POLICIES for such a complex and life-critical resource.

Highly fragmented with differing responsibilities with established cultures.

In addition, 26% of the respondents indicated that the arrangements are good and said that “governance arrangements only need fine tuning – no perceived need by the public means no leadership by the political class”. It was interesting to note that none of the respondents stated that the existing arrangements are very good while 19% were neutral (Fig. 6.3).

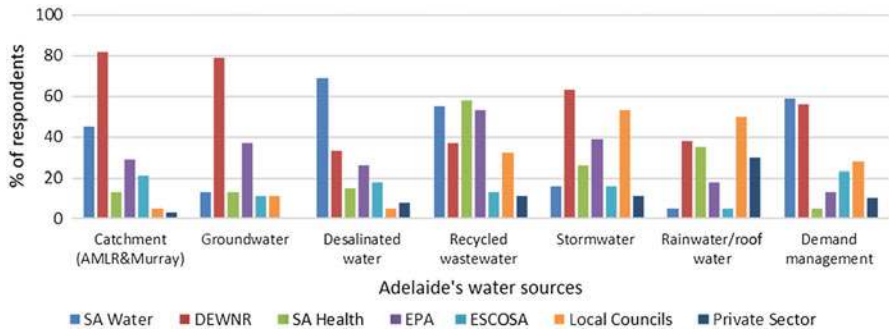


Fig. 6.4 Stakeholders' perceptions on who should be responsible for governing Adelaide's water sources

The stakeholders were further asked to indicate who, according to them, should be governing these water sources; the results are illustrated in Fig. 6.4. A major change, as indicated by the figures, is that most of the stakeholders wanted DEWNR to play an enhanced role in the management of the “new” water sources, such as stormwater, rainwater, recycled wastewater and desalinated water.

The respondents were asked to provide suggestions for improving the existing arrangements. Some of the responses are given below:

We could consider a high-level small Adelaide Water Authority reporting direct to / or chaired by the Minister with sole responsibility for Adelaide's source water supplies. This Authority could consist of a rep from each of these existing orgs.

I've indicated DEWNR from the list however consideration of a multi-stakeholder supported entity possibly lead by DEWNR may also be considered.

The survey further asked the stakeholders to respond to a question specifically related to who should control access to Adelaide's “new” water sources (see Fig. 6.5). The majority of the stakeholders perceived that SA Water should control access to desalinated water (80%) and recycled water (>60%). In relation to stormwater, the majority of the stakeholders (>70%) were of the opinion that DEWNR should control access, followed by local councils (around 60%). In the case of rooftop water/rainwater, more than 60% of the stakeholders felt that local councils should control access, followed by DEWNR at around 37%.

Some of the other suggestions provided by the stakeholders for controlling the access to Adelaide's new water sources include:

Adelaide needs a respected body strong enough to oversee the management of Adelaide's Total Water Sources.

Under current governance arrangements there is no one body that should be in control of access to stormwater. Would need to change the governance arrangements.

6.3.4 Privatisation of Public Infrastructure

As mentioned earlier in the chapter, one of the new approaches to achieve improved governance is privatisation of public infrastructure including water infrastructure assets. In 2012 Infrastructure Australia prepared a paper titled *Australia's Public*

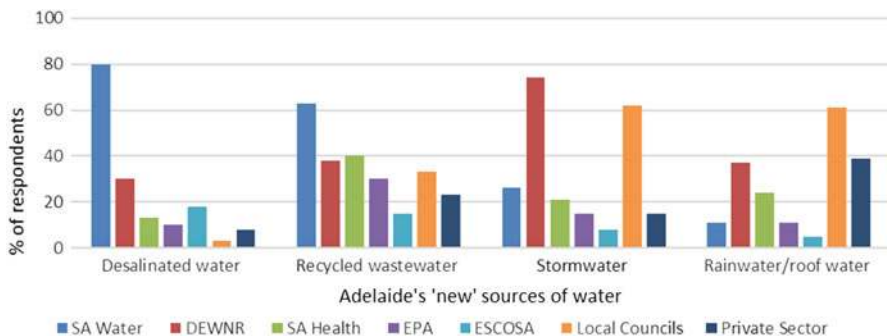


Fig. 6.5 Stakeholders' perceptions on who should control access to Adelaide's "new" sources of water

Infrastructure – Part of the Answer to Removing the Infrastructure Deficit that backed the idea of Australian governments transferring publicly owned infrastructure to the private sector and using the net proceeds to build the new infrastructure. The report further suggested that transferring existing infrastructure to the private sector would also achieve significant broader economic productivity benefits from introducing private sector discipline, improving the ability to finance the expansion of infrastructure as required, greater transparency in the costs of community service obligations and improved governance – where the government is no longer both the regulator and the owner.

The report identified 82 profit-making government assets that could be sold relatively quickly – in some cases within a year – and without major regulatory changes. It also recommended selling the assets, which include power generators, airports, ports and water utilities, to Australian superannuation funds, which are particularly attracted to the steady yields offered by public assets and would help overcome political opposition to the privatisation idea. Within the water industry, the report identified ten water infrastructure assets with a hypothetical enterprise value of AUD\$37.5 billion (US\$33.1 billion) which could potentially be sold to the private sector in order to generate cash to tackle the country's growing infrastructure deficit. A follow-up report released in 2013, entitled *Australia's Public Infrastructure – Update Paper* reinforced this point of selling public assets to fund infrastructure projects.

However, in the absence of a level regulatory playing field, the move is unlikely to be followed up with any tangible action. To address this issue, the *Infrastructure Australia: 2013 State of Play Report* recommended setting up a national water regulator to "provide stability, a clear national policy objective, improve opportunities for private sector investment through great accountability, less red tape, and appropriately put distance between a state-owned business and the regulator". Amidst all these developments, Australia's former Finance Minister Mr. Hockey had offered states billions to sell off their assets. Under the deal to promote infrastructure investment, the states would have to agree to privatise assets. The corporate tax the private owner would then pay to the federal government will be returned to the respective state government as a tax equivalent incentive payment. Currently state government-owned corporations do not pay company tax. Consequently, in the interests of com-

petition, these corporations must pay state governments a tax payment equivalent to what the corporation would pay if subject to federal company tax. However, water privatisation is a highly controversial topic and touches on the much broader arguments for and against the private control of formerly public services. For example, see Box 6.1 about a dispute between private water suppliers and the state government in Adelaide with regard to supplying drinking water.

Box 6.1: Conflict Between Water Suppliers Leaves Urban Residents in Adelaide Without Water

The Adelaide Hills Face Zone suburb of Skye was left without water for showering and flushing toilets for three days this week coinciding with a spell of extreme fire danger. The problem was blamed on a dispute between two independent water companies and a local council that does not believe it has any responsibility. Despite Skye being just 8 km from the CBD, its residents have been without mains drinking water since the area was subdivided 50 years ago. SA Water and the State Government at the time decided it would cost too much to bring mains water to Skye, making it difficult for blocks to be sold until the Foothills Water Company started digging bores to provide water.

About 100 locals sent a petition calling for a mains water supply to Burnside Council in September 2008, which was forwarded to SA Water. With any extension to its network, SA Water requires two-thirds of the residents to agree to it – at a cost of \$26,500 per property. But many residents did not want to pay and were content with their water supply, which is unaffected by water restrictions, and refused. Instead, they rely on five different private companies whose pipes pump water from bores, while others rely solely on rainwater tanks. The water is suitable only for washing and gardening, not drinking. In 2010, the Federal Government rejected a \$3 million funding application from Burnside Council to have the suburb connected to mains water.

Water provided by one of these companies, the Foothills Water Company, has announced it will cease operating from August. Foothills Water Company director Murray Willis decided to wind up his company because he faced a \$2 million bill to replace pipes. He placed blame for the pipes' demise squarely with Burnside Council, saying it refused to remove pine trees which were damaging his pipes. He and the council have been involved in a long-running conflict over who should foot the bill for the repair the pipes. Burnside has paid for some of the repairs. Burnside chief executive Paul Deb said the council had never received a request from Mr Willis to have trees removed. He said the pipes were installed in the mid-1960s and only had a life expectancy of 65 years before they needed to be replaced.

Source: *Courier Mail*, 2 January 2010; *The Advertiser*, 24 March 2014; *Messenger Community News*, 28 March 2014

6.3.5 *Community Perspectives on Water Governance*

The online survey explored perceptions of three urban communities in South Australia and Queensland about water governance arrangements and their understanding of the local water planning process. Water planning is the core of water governance, and effective water planning is fundamental to the NWI and is the best way for determining how different sectors share valuable water resources among competing uses (NWC 2004). The results of this study go some way to inform decision-makers in terms of the community's perspectives on the question of the new era post the Water Act 2007, which is *At which point or points in the Australian government structure should urban water supply be governed?* The issues addressed in the survey were presented in the form of attitude statements, and the findings are presented in the following sections.

6.3.5.1 Water Governance

Overall, there was disagreement among the respondents on water governance responsibility being clearly defined between the federal, state and local governments in Australia. However, the majority of respondents agreed that the federal government should take the main responsibility for water governance (Figs. 6.6, 6.7, and 6.8); these findings are in line with those of Brown (2007) who reported that the bulk of Australians support federalism in Australia and believe it is time for many areas of state government regulation to give way to uniform national plans. The study (Brown 2007) further argued that many citizens favour the idea of Canberra taking power because of the inability of the current states to deliver on many crucial issues and are no more likely to do so in the future. The findings of this study support this argument in the context of water governance since the communities clearly favoured a federal system of water governance (Table 6.6).

When asked to rank their preference for various authorities to be governing Australia's water resources, the federal government was given the first priority followed by the National Water Commission (NWC) which is a statutory water body established under the [National Water Commission Act 2004](#)¹ advising the Australian Government on national water issues. Therefore the NWC could be viewed as a federal authority as well, implying that the communities favoured the idea of Canberra taking over the power of water allocation and water planning from the states. The water suppliers were the least preferred (Table 6.4).

Respondents were invited to suggest any other ways to govern Australia's water resources, and we received replies such as "An independent Australia wide authority, with absolute power over all aspects of water supply & usage" and "An independent umpire" which further support our argument of federal water governance. Some replies mentioned the issue of public involvement by stating "I believe the

¹In 2014, the National Water Commission Act 2004 was repealed, and the National Water Commission was abolished.

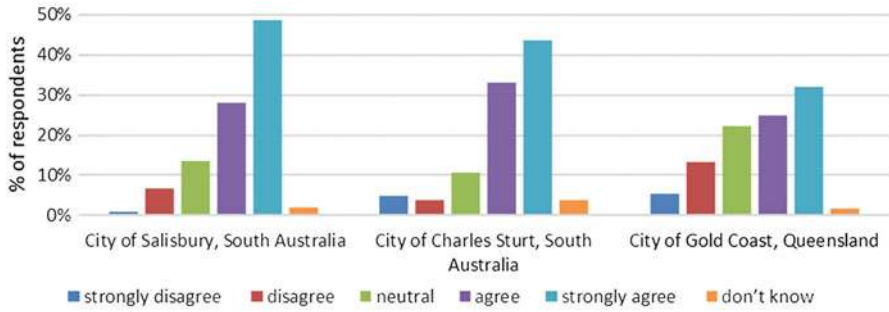


Fig. 6.6 Community perceptions about the statement: Water governance issues should be considered at national level

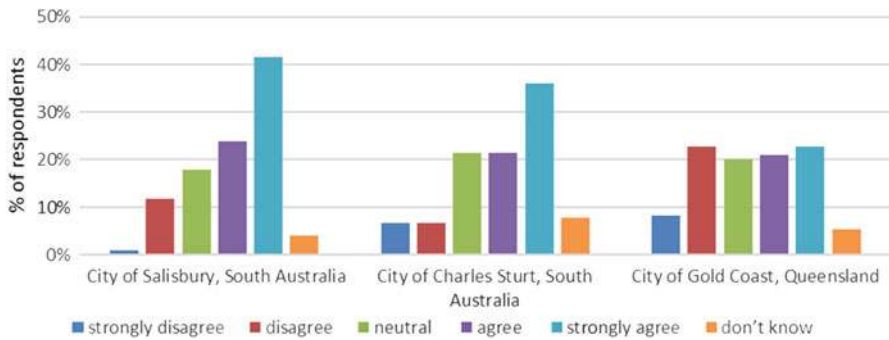


Fig. 6.7 Community perceptions about the statement: The federal government should take over the power of water allocation from states

public should have the rights to vote on what and how it should be done!!!” or “should be a joint effort like a committee made up of all concerned authorities with a public consultation” which is clearly mentioned in the NWI clause related to community partnerships and adjustment (Clause 93, NWC 2004).

6.3.5.2 Water Planning

Another issue which our study examined was how respondents perceived the water planning process in their respective state. Respondents were asked to rate their agreements with four statements related to their understanding of local water planning issues (see Figs. 6.9, 6.10, and 6.11). Overall, respondents indicated that they did not have a good understanding of the state government’s water planning process. The findings show that generally respondents did not agree that the current water planning process had worked well in their regions; neither did they believe that the aim of the current water plans is to achieve a sustainable use of groundwater in the country. However, respondents were fully confident that it is possible to have sustainable water allocation policies in local regions.

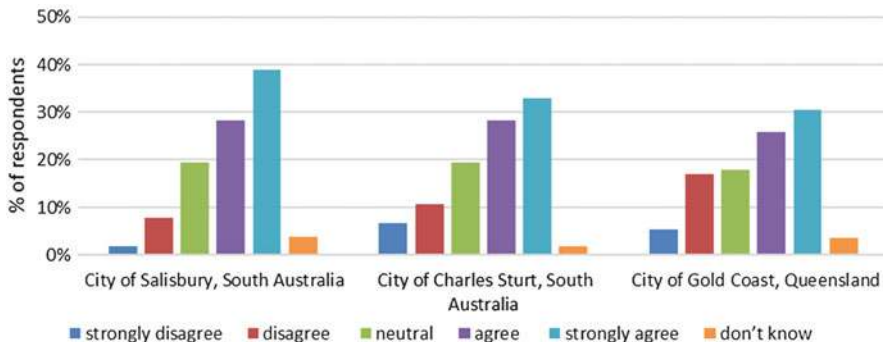


Fig. 6.8 Community perceptions about the statement: The federal government should take the responsibility for water planning and development

Table 6.6 Ranking order for question: Who do you prefer to be governing Australia’s water resources?

	City of Salisbury	City of Charles Sturt	City of Gold Coast	Response totals
The federal government	1	1	1	1
National Water Commission	2	2	3	2
State government	3	3	2	3
Water resource management regional authority	4	4	5	4
Environment Protection Authority	5	5	6	6
Council	6	6	4	5
Water supplier	7	7	7	7

(Scale from 1 =most preferable to 7=least preferable)

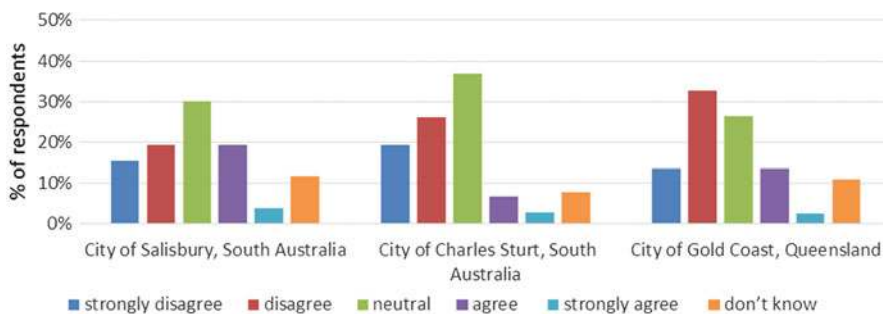


Fig. 6.9 Community perceptions about the statement: The water planning process initiated by state government in the 1990s has worked well

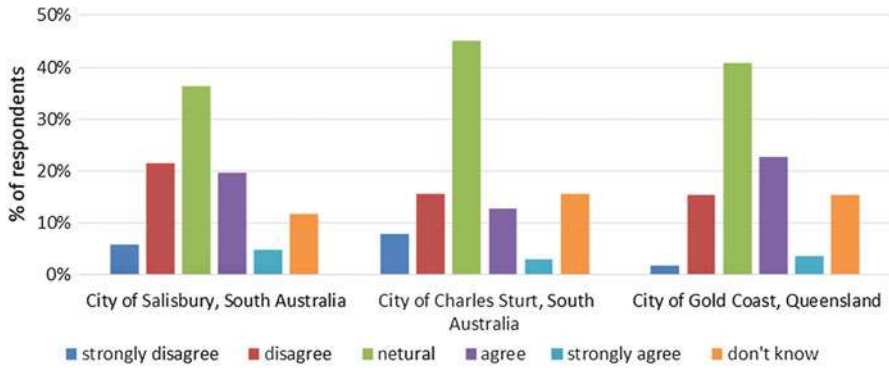


Fig. 6.10 Community perceptions about the statement: Current Australian water plans aim to achieve a sustainable use of groundwater in the country

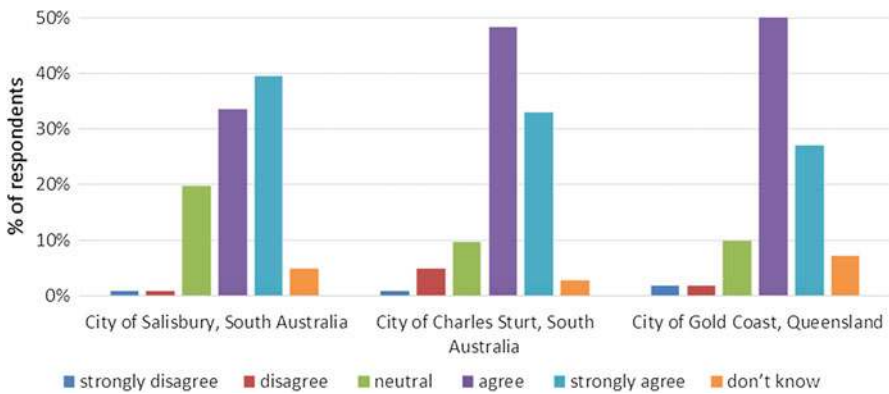


Fig. 6.11 Community perceptions about the statement: It is possible to have sustainable water policies in this region

6.4 Conclusions

The major challenge facing Australia is to balance water usage for residential consumption, irrigation, industrial consumption and other uses with provision for appropriate environmental flows. In agreeing to the first round of water reforms, COAG 1994, the Australian government formally acknowledged that rivers, catchments and aquifers are not constrained by state boundaries and that water activities in one state could have impacts in other states (Chartres and Williams 2006). The second round of water reforms known as the National Water Initiative (NWI) recognised the continuing national imperative to develop an efficient and sustainable water use in Australia (Chartres and Williams 2006). The findings of this study suggest that there is a need for the third water reform in which water governance at national level would be established. Besides, the country has to choose between

more expensive capital investment like desalination plants and environmental options like stormwater storage and use via managed aquifer recharge which was strongly supported by the respondents. Nevertheless, the question on the extent to which and for what uses the community accepts the use of stormwater needs to be researched, although our study (Keremane et al. 2011) has partly touched upon some of these issues from a community perspective.

With regard to implementing an integrated urban water management strategy in Australia, there is no “one size fits all” structural arrangement. While there is growing support for implementing a portfolio of water supply sources, it is also true that there are impediments to implementing this approach. These impediments are not generally technological, but are, instead, socio-institutional and in policy and legal areas (Keeley and Scoones 2003; Gupta 2007; Uhlendahl et al. 2011; Keremane et al. 2014). In addition, most of the challenges are related to the “new” water sources – stormwater and recycled wastewater. Results of the present study corroborate this finding in that the major policy and legal challenges highlighted by key stakeholders were related to treated stormwater and recycled wastewater. The most commonly identified impediment was the lack of a coordinated institutional framework revealing poor inter-organisational collaboration and coordination. In particular, the issues included the lack of an integrated water management plan, fragmented roles and responsibilities, unclear property rights and the lack of one leading agency to implement IUWM, often resulting in organisations being more reactive rather than reinforcing a proactive operational culture (Brown and Farrelly 2009). Fragmented and unclear roles and responsibilities relate not only to internal issues within organisations but also between and among other organisations.

As Brown (2008) points out, addressing these issues and achieving sustainable urban water management may require institutional change and extensive redesign of organisations and their basic operating practices (Brown 2008). This requires engaging the governments, corporations and society in a three-way collaborative effort (Chiplunkar et al. 2012). The focus therefore has to be on implementing institutional change through reform approaches that emphasise the introduction of developed coordinating mechanisms and an improvement in intra- and inter-organisational relationships (Briassoulis 2004; Mitchell 2005). This means creating favourable institutional contexts, with the appropriate mix of public and private actors who are supported by coherent legislative and policy frameworks (Bahri 2011). This may require modifying existing legislation and policies to conform to a consistent framework based on the NWI principles in implementing a diverse water supply portfolio. However, achieving (cultural) transformations to encourage institutional change for implementation of an integrated urban water management approach may take several years, and therefore planners and policymakers must have a long-term framework for addressing these issues. Looking ahead, there is scope for further research to explore the intergovernmental issues and provide models to enable this transition and hence be a model for the world in portfolio approaches.

Acknowledgements The funding and support of the Goyder Institute for Water Research and the National Centre for Groundwater Research and Training is greatly appreciated. The authors would like to thank all participants who gave their time to participate in the voluntary interview process and online survey supporting this work. These included personnel from the local governments, state government departments, natural resource management boards, private sector and community organisations. The authors also thank the participants from the Cities of Salisbury, Charles Sturt and the Gold Coast for their time and participation.

References

- Bahri, A. (2011). *Towards integrated urban water management*. Stockholm: GWP Perspectives Paper, Global Water Partnership.
- Bahri, A. (2012). *Integrated urban water management* (GWP, TEC background papers no.16). Stockholm: Global Water Partnership.
- Bakker, K., & Cook, C. (2011). Water governance in Canada: Innovation in the context of fragmentation. *International Journal of Water Resources Development*, 27(2), 275–289.
- Briassoulis, H. (2004). The institutional complexity of environmental policy and planning: the example of Mediterranean desertification. *Journal of Environmental Planning and Management*, 47(1), 115–135.
- Brown, A. J. (2007). Federalism in Australia – New life or old tricks? *ABC News* Online 9 February 2007. <http://www.abc.net.au/news/opinion/items/200702/s1843993.htm>
- Brown, R. R. (2008). Local institutional development and organisational change for advancing sustainable urban water futures. *Environmental Management*, 41(2), 221–223.
- Brown, R. R., & Farrelly, M. A. (2009). Delivering sustainable urban water management: A review of the hurdles we face. *Water Science and Technology*, 59(5), 839–846.
- Brown, R. R., Sharp, L., & Ashley, R. M. (2006). Implementation impediments to institutionalising the practice of sustainable urban water management. *Water Science and Technology*, 54(6–7), 415–422.
- Chartres, C., & Williams, J. (2006). Can Australia overcome its water scarcity problems? *Journal of Developments in Sustainable Agriculture*, 1, 17–24.
- Chiplunkar, A., Seetharam, K., & Tan, C. T. (Eds.). (2012). *Good practices in urban water management - Decoding good practices for a successful future*. Mandaluyong City: Asian Development Bank.
- Council of Australian Governments (COAG). (2004). *Intergovernmental agreement on a National Water Initiative between the Commonwealth of Australia, and the Governments of New South Wales, Victoria, Queensland, South Australia, the Australian Capital Territory and the Northern Territory*. Canberra: Commonwealth of Australia.
- Department of Energy and Water Supply (DEWS). (2013). *Queensland's water sector: A 30-year strategy discussion paper* (p. 22). State of Queensland.
- Department of Environment, Water and Natural Resources (DEWNR). (2014). *Transitioning Adelaide to a water sensitive city: Towards an urban water plan for Greater Adelaide. Issues paper* (p. 17). Government of South Australia.
- Dovers, S. (2008). Urban water: Policy, institutions and government. In P. Troy (Ed.), *Troubled waters: Confronting the water crisis in Australia's cities*. Canberra: ANU E Press.
- Giordano, M., & Shah, T. (2014). From IWRM back to integrated water resources management. *International Journal of Water Resources Development*, 30(3), 364–376.
- Gupta, J. (2007). 'Glocal' water governance: *Controversies and choices* (Discussion paper on governance). Delft: UNESCO-IHE, Institute for Water Education.
- Hussey, K., & Dovers, S. (2006). Trajectories in Australian water policy. *Journal of Contemporary Water Research & Education*, 135(1), 36–50.

- Infrastructure Australia. (2013). *Update paper - Balance sheet impacts of sell to build*. Canberra, December 2013.
- Keeley, J., & Scoones, I. (2003). *Understanding environmental policy processes: Cases from Africa*. London: Earthscan.
- Keremane, G. B., McKay, J. M., & Wu, Z. (2011). No stormwater in my tea cup: An internet survey of residents in three major Australian cities. *Journal of the Australian Water Association*, 38(2), 118–124.
- Keremane, G. B., Wu, Z., & McKay, J. M. (2014). Is organisational culture a barrier to implementing integrated urban water management in Adelaide. *Journal of the Australian Water Association*, 41(8), 27–29.
- Kildea, P., & Williams, G. (2010). The constitution and the management of water in Australia's rivers. *Sydney Law Review*, 32(4), 595–616.
- Laban, P. (1994). *Accountability: An indispensable condition for sustainable natural resource management*. In Proceedings of the international symposium on systems-oriented research in agriculture and rural development, CIRAD-SAR, Montpellier, 21–25 November 1994.
- Laban, P. (2007). Accountability and rights in rights-based approaches for local water governance. *Water Resources Development*, 23(2), 355–367.
- LECG Limited Asia Pacific. (2011). *Competition in the Australian urban water sector* (Waterlines report series no. 42). Canberra: National Water Commission.
- Lundy, O., & Cowling, A. (1996). *Strategic human resource management*. London: Routledge.
- Maksimović, Č., & Tejada-Guibert, J. A. (2001). *Frontiers in urban water management: Deadlock of hope?* (p. 416). Cornwall: IWA Publishing.
- McKay, J. M. (2002). *Encountering the South Australian Landscape: Early European misconceptions and our present water problems*. Hawke Institute Working paper series paper 21. www.hawkecentre.unisa.edu.au/institute
- McKay, J. M. (2005). Water institutional reform in Australia. *Water Policy*, 7(2), 35–52.
- McKay, J. M. (2006). Issues for CEOs of Australian water utilities with the implementation of the integration and ESD requirements in Australian water laws. *Journal of Contemporary Water Research & Education*, 135(1), 115–130.
- McKay, J. M. (2007). Water governance regimes in Australia: Implementing the national water initiative. *Journal of the Australian Water Association*, 34(1), 150–156.
- McKay, J. M., Halanaik, D. (2003). *New directions and national leadership in developing water policies in federations – India and Australia*. Paper presented at the ACIAR conference on institutional issues in water resource allocation: Lessons from Australia and implications for India, Beechworth, Australia, 17–18 July 2003.
- Mitchell, B. (2005). Integrated water resource management, institutional arrangements, and land-use planning. *Environment and Planning A*, 37(8), 1335–1352.
- Mitchell, V. (2006). Applying integrated urban water management concepts: A review of Australian experience. *Environmental Management*, 37(5), 589–604.
- Mukheibir, P., Howe, C., & Gallet, D. (2014). What's getting in the way of a 'one water' approach to water services planning and management? An analysis of the challenges and barriers to an integrated approach to water. *Journal of the Australian Water Association*, 41(3), 67–73.
- National Water Commission (NWC). (2004). *Intergovernmental agreements on a national water initiative*. Canberra: NWC.
- National Water Commission (NWC). (2007). *Institutional and regulatory models for integrated urban water cycle management – Issues and scoping paper* (p. 30). Canberra: Commonwealth of Australia.
- National Water Commission (NWC). (2012). *National performance report 2010–11: Urban water utilities*. Canberra: National Water Commission (NWC).
- Pinkham, R. (1999). *21st century water systems: Scenarios, visions and drivers* (p. 20). Snowmass: Rocky Mountain Institute.
- Srivastava, V. (2004). *Lessons for India: Australia's water sector reforms*. Water and Sanitation Program – South Asia Field Note, The World Bank, 55 Lodi Estate, New Delhi, India.

- Uhlendahl, T., Salian, P., Casarotto, C., & Doetsch, J. (2011). Good water governance and IWRM in Zambia: Challenges and chances. *Water Policy*, 13(6), 845–862.
- United Nations Department of Economic and Social Affairs (UN DESA), Population Division. (2014). World urbanization prospects: The 2014 revision, Highlights (ST/ESA/SER.A/352).
- Wakely, P. (1997). *Capacity building for better cities*. Journal of the Development Planning Unit, University College London. <http://www.gdrc.org/uem/capacity-build.html>
- Wallington, T., Robinson, C. J., & Head, B. (2010). *Institutional capacity for sustainable and integrated water management: Interview results* (Technical report no 22). Brisbane: Urban Water Security Research Alliance.
- World Bank. (2012). *Integrated urban water management: A summary note*. Washington, DC: The World Bank's Blue Water Green Cities Initiative.
- Wu, Z., McKay, J. M., & Keremane, G. B. (2012). Governance of urban freshwater: Some views of three urban communities in Australia. *Journal of the Australian Water Association*, 39(1), 88–92.

Open Access This chapter is distributed under the terms of the Creative Commons Attribution-Noncommercial 2.5 License (<http://creativecommons.org/licenses/by-nc/2.5/>) which permits any noncommercial use, distribution, and reproduction in any medium, provided the original author(s) and source are credited.

The images or other third party material in this chapter are included in the work's Creative Commons license, unless indicated otherwise in the credit line; if such material is not included in the work's Creative Commons license and the respective action is not permitted by statutory regulation, users will need to obtain permission from the license holder to duplicate, adapt or reproduce the material.



Chapter 7

Rights-Based Freshwater Governance for the Twenty-First Century: Beyond an Exclusionary Focus on Domestic Water Uses

Barbara Van Koppen, Anne Hellum, Lyla Mehta, Bill Derman, and Barbara Schreiner

Abstract The UN recognition of a human right to water for drinking, personal and other domestic uses and sanitation in 2010 was a political breakthrough in states' commitments to adopt a human rights framework in carrying out part of their mandate. This chapter explores other domains of freshwater governance in which human rights frameworks provide a robust and widely accepted set of normative values to such governance. The basis is General Comment No. 15 of the Committee on Economic, Social and Cultural Rights in 2002, which states that water is needed to realise a range of indivisible human rights to non-starvation, food, health, work and an adequate standard of living and also procedural rights to participation and information in water interventions. On that basis, the chapter explores concrete implications of the Comment for states' broader infrastructure-based water services

B. Van Koppen (✉)

International Water Management Institute, Southern Africa Regional Programme,
Private Bag X813, Silverton 0127, South Africa
e-mail: b.vankoppen@cgiar.org

A. Hellum

Department of Public and International Law, University of Oslo,
John Colletts Alle 68, O854 Oslo, Norway
e-mail: anne.hellum@jus.uio.no

L. Mehta

Institute of Development Studies, University of Sussex, Brighton BN1 9RE, UK
Norwegian University of Life Sciences, Aas, Norway
e-mail: L.Mehta@ids.ac.uk

B. Derman

Department of International Environment and Development studies, Norwegian University of the Life Sciences, Aas, Norway
e-mail: Bill.derman@nmbu.no

B. Schreiner

Pegasys Institute, 1209 Francis Baard St, Hatfield, Pretoria, South Africa
e-mail: barbara@pegasysinstitute.org

implied in the recognised need to access to infrastructure, rights to non-discrimination in public service delivery and respect of people's own prioritisation. This implies a right to water for livelihoods with core minimum service levels for water to homesteads that meet both domestic and small-scale productive uses, so at least 50–100 l per capita per day. Turning to the state's mandates and authority in allocating water resources, the chapter identifies three forms of unfair treatment of small-scale users in current licence systems. As illustrated by the case of South Africa, the legal tool of "Priority General Authorisations" is proposed. This prioritises water allocation to small-scale water users while targeting and enforcing regulatory licences to the few high-impact users.

Keywords Human rights • Freshwater governance • Socioeconomic rights • Multiple-use water services • Water allocation • Licence systems

7.1 Introduction

In 2010, the United Nations (UN) General Assembly and the UN Human Rights Council adopted two resolutions that affirmed the recognition of the right to water for drinking, personal and other domestic uses and sanitation as a justiciable and enforceable human right derived from the right to an adequate standard of living (A/RES/64/292 in UN 2010a; and A/HRC/RES/15/9 in UN 2010b). The far-reaching, legally binding implication was that it obliged states as duty bearers to ensure that every citizen has affordable access to water infrastructure services for drinking, personal and other domestic uses and sanitation. This political commitment was a breakthrough in linking water development and management with international human rights frameworks and national rights-based constitutions. The narrow focus on safe drinking water, personal and other domestic uses and sanitation represents a political *priority* that does not fully correspond to the right to an adequate living standard, which includes water as a part of the right to food. Some governments, for example, of South Africa and India, have enacted rights-based water laws that make *prioritisation* of domestic water uses and sanitation mandatory. Many national and international human rights institutions; public water, sanitation and hygiene organisations; and civil society organisations also *prioritise* its realisation (UNICEF and WHO 2015; WaterLex 2014).

However, this prioritisation does not exclude similar rights-based prioritisation in other domains of water development and management, on the contrary. The premise of this chapter is that international human rights instruments and constitutional rights are a highly appropriate, if not the only, normative yardstick for states in the twenty-first century to fulfil their duty and authority in freshwater governance in the broadest sense. This premise is not unique to the water sector. Human rights have been mainstreamed in the UN's development planning since 1997. In 2003, the UN produced a statement of Common Understanding on Human Rights-Based

Approaches to Development Cooperation, and in 2009, the 19 organisations of the United Nations Development Group established the Human Rights Mainstreaming Mechanism (Baillat et al. 2013). Human rights also inspire citizens and states, as in Tanzania, Kenya, South Africa and Zimbabwe, to adopt new rights-based constitutions to shed the legal legacy of their colonial predecessors. As also reflected in the UN Sustainable Development Goals (SDGs), a global consensus is emerging on human values embodied in human and constitutional rights. This is undoubtedly the world's most influential normative value system and yardstick to steer global and national state interventions. These trends also provide fertile ground for rights-based freshwater governance in the broad sense, including, but not limited to, a priority for water for drinking, personal and other domestic uses and sanitation alone.

In the water sector, a growing number of human rights institutions, civil society organisations and researchers have conceptualised rights-based freshwater governance and have invoked human rights frameworks in action and litigation. For example, a call for wastewater management supported the realisation of the right to sanitation. Various national and global human rights institutions, especially in Latin America, exposed major water pollution and damage by mines and exclusion from any voluntary, informed and prior consent as violation of the human right to a clean environment (WaterLex 2014). In other cases, rights to a clean environment are invoked to justify a quantitative reservation of “environmental flows”. New issues have been raised pertaining to the duty of the state to ensure flood protection and prevent soil erosion (WaterLex 2014).

The past two decades have also seen a strong global move towards participation, transparency, accountability and access to information or “free, prior and informed consent”. In some cases of large-scale investments in dams, for example, in Latin America, human rights to participation are invoked. However, others, such as the global Water Integrity Network, aim at transparency, accountability and participation in the water sector and combating corruption as values on their own, and reference to human rights is rare. A case that is raised as a human rights issue with far-reaching implications regards the nature of private water services providers' obligations relating to disclosure of environmental information (WaterLex 2014).

Duties of the state to realise constitutional rights and international human rights that it ratified also hold for two other core mandates of the state in freshwater governance. One is public infrastructure-based service provision for productive water uses, including agriculture, mining and industries. Water volumes used for productive purposes are much higher than for domestic uses; the latter represent at the most two to three percent of total water volumes used. The state is also the primary regulatory authority, not only with responsibilities to safeguard water quality as mentioned, but also responsible for the allocation of water quantities, often as the statutory custodian of the nation's water resources.

The importance of rights-based approaches in these two core tasks of states is increasingly recognised. The Water Governance Facility of the United Nations Development Programme at Stockholm International Water Institute (WGF 2012) emphasised precisely these domains: “Human Rights Based Approaches can be

very useful to advance equity aspects of distribution of water rights and non-discrimination of water resources management and allocation” (WGF 2012: 5). “The international human rights framework can help to set development priorities and provide a way to address conflicting rights and interests that is transparent and emphasises redress when rights are violated” (WGF 2012: 12). Rights-based approaches fill a major gap in the dominant discourse of Integrated Water Resource Management (IWRM), as “In practice IWRM has to a large degree neglected to directly address social equity issues and Human Rights Based Approaches can be seen as a methodology to strengthen such work” (WGF 2012: 13).

The High Level Panel of Experts on Food Security and Nutrition in their report on Water for Food Security and Nutrition examined the interlinkages between food security, water and nutrition in relation to the right to food and the current right to water for personal and domestic uses. One of the key recommendations is “Promoting a rights-based approach to water for food security and nutrition” (HLPE 2015: 108).

Scholars started exploring concrete implications of rights-based approaches for women, the poor and other marginalised groups. Hellum et al. (2015) invoked the right to non-discrimination in the Convention of the Elimination of All Forms of Discrimination against Women. Recognising the indivisibility of rights and the importance of both domestic and productive uses of water for multifaceted well-being, they made the case for a gender-equal right to water for livelihoods (Hellum et al. 2015).

In the remainder of this chapter, we will further examine concrete implications of closing the current gap between the state as duty bearer of human rights and the state as infrastructure-based water provider for both domestic and productive uses and as regulator in allocating water resources. The focus is on the most marginalised women and men in low- and middle-income countries, whose human rights to water are most severely violated. In the following, we first go back to the first milestone in connecting human rights and water management. This is the legal opinion on the human right to water by the Committee on Economic, Social and Cultural Rights (CESCR), in its General Comment No. 15 of 2002 (UN CESCR 2003). This Comment prioritised water for drinking and other domestic uses and underpinned the Resolutions in 2010. However, as we will see in the next section, this Comment also clearly identified prioritisation in other dimensions of freshwater governance, in particular in infrastructure development and water allocation.

Section 7.3 discusses rights-based approaches for the core function of the state of promoting infrastructure development, partly by own public investments in infrastructure and partly by promoting others to invest. Section 7.4 examines rights-based state regulation in the quantitative allocation of water resources, as illustrated by experiences in South Africa. Section 7.5 draws conclusions.

7.2 Broader Prioritisation in CESCR General Comment No. 15

Unlike the right to food, the right to water was not explicitly acknowledged in the 1948 Universal Declaration of Human Rights. Water was only indirectly referred to as derived from the right to life and dignity. Explicit but very brief references to a right to water were made in the Convention on the Elimination of All Forms of Discrimination against Women (UN 1979) and the Convention on the Rights of the Child (UN 1990). The process of recognition of the right to water thus evolved much later than the right to food (Mehta 2014; Hellum et al. 2015).

On November 27, 2002, the United Nations Committee on Economic, Social and Cultural Rights adopted the General Comment No. 15 on the Right to Water, elaborating the norms and definitions of the human right to water.¹ The Committee articulated both substantive and procedural aspects of a human right to water (UN CESCR 2003). It highlighted the many ways in which a right to water is derived from and contributes to realising other socioeconomic rights, referring to the Vienna Declaration (UN 1993) that states: “All human rights are universal, indivisible and interdependent and interrelated. The international community must treat human rights globally in a fair and equal manner, on the same footing, and with the same emphasis”.

While emphasising a priority for water provision for personal and domestic uses, the Comment recognises that priorities *also* and simultaneously include water to prevent starvation and meet “core obligations” in general. Sanitation is also mentioned:

Water is required for a range of different purposes, besides personal and domestic uses, to realize many of the Covenant rights. For instance, water is necessary to produce food (right to adequate food) and ensure environmental hygiene (right to health). Water is essential for securing livelihoods (right to gain a living by work) and enjoying certain cultural practices (right to take part in cultural life). Nevertheless, priority in the allocation of water must be given to the right to water for personal and domestic uses. Priority should also be given to the water resources required to prevent starvation and disease, as well as water required to meet the core obligations of each of the Covenant rights. (General Comment No. 15 para 6)

General Comment No. 15 further explicitly refers to farming and livelihoods and the need for infrastructure to realise access to water:

People should not be deprived of their means of subsistence. States should ensure adequate access to water for subsistence farming and for securing the livelihoods of indigenous peoples. This also entails that disadvantaged and marginalized farmers, including women farmers, have equitable access to water and water management systems, including sustainable rain harvesting and irrigation technology. (General Comment No. 15 para 7)

¹General Comment No. 15, The right to water (arts. 11 and 12 of the International Covenant on Economic, Social and Cultural Rights – ICESCR), U.N. Doc. E/C.12/2002/11 (Twenty-ninth session, 2002). The Committee on Economic, Social and Cultural Rights (CESCR) monitors the implementation of the International Covenant on Social, Economic and Cultural Rights (UN 1966). General comments are interpretations of the contents of rights included in the ICESCR by the Committee. The Committee stressed the State’s legal responsibility in fulfilling the right and defined water as a social and cultural good and not solely an economic commodity.

Referring to the general right to non-discrimination, “the right of access to water and water facilities and services should be ensured on a non-discriminatory basis, especially for disadvantaged or marginalized groups” (General Comment No. 15 para 8).

The Comment also includes procedural rights:

The right of individuals and groups to participate in decision-making processes that may affect their exercise of the right to water must be an integral part of any policy, programme or strategy concerning water. Individuals and groups should be given full and equal access to information concerning water, water services and the environment, held by public authorities or third parties. (General Comment No. 15 para 48)

Impacts from state and non-state actors’ actions are included in these procedural rights:

Before any action that interferes with an individual’s right to water is carried out by the State party, or by any other third party, the relevant authorities must ensure that such actions are performed in a manner warranted by law, compatible with the Covenant, and that comprises: (a) opportunity for genuine consultation with those affected; (b) timely and full disclosure of information on the proposed measures; (c) reasonable notice of proposed actions; (d) legal recourse and remedies for those affected; and (e) legal assistance for obtaining legal remedies. (General Comment No. 15 para 25)

As mentioned, the prioritisation for domestic water uses in General Comment No. 15 was the basis for the breakthrough in rights-based approaches to water development and management in 2010. In the next section, we explore the implications of General Comment No. 15 for prioritisation in infrastructure development for productive and multiple water uses.

7.3 Rights-Based Water Services for Productive and Multiple Water Uses

Infrastructure development is society’s primary way to ensure that water of the right quality and quantity is available at the right time at the right site for human use or to protect against flooding and too much water. Storage infrastructure increases the quantities of water resources available for human use year-round, so as to “increase the pie” of available water. Water “infrastructure” is broad; it ranges from buckets or micro-basins to capture run-off for plant roots to large-scale dams. The state plays a crucial role in infrastructure development by investing in construction, operation and maintenance or by enabling and capacitating people to invest themselves in technologies for self-supply, for example, by training or supporting water technology supply chains and dissemination of, for example, affordable pumps and energy.

A human right to state-promoted infrastructure services for productive water uses to realise the right to non-starvation, food, work and an adequate standard of living can be derived from at least three aspects of General Comment No. 15. The

first aspect is the Comment's acknowledgement that irrigation and water-harvesting technologies (or more broadly, agricultural water management technologies) are needed and, hence, that the state is a duty bearer in respecting, protecting and fulfilling this need, in the same way as the state already commits to the current human right to water for personal and domestic uses.

The second aspect, namely, the reference in the General Comment to equitable access and non-discrimination in state subsidies in public irrigation schemes and other projects, raises pertinent new questions about the beneficiaries of public investments in water infrastructure. The water, sanitation and hygiene subsector measures the performance of its services in terms of people reached with those services. In contrast, people are largely invisible in the productive water subsectors. For example, irrigation performance indicators are about sizes of irrigated land, kilometres of canals and perhaps performance and users' satisfaction about water service delivery, crop yields and potential aggregate incomes. Numbers of farmers, let alone their gender or class, are lacking in routine monitoring. At best, assumptions about beneficiaries can be made on the basis of the affordability of technology: bucket irrigation is likely to benefit the poorest.

More broadly as well, the terminologies for productive water uses are monolithic, abstract, aggregate "sectors", such as "the" irrigation, hydropower, mining or municipal water sectors. Major intra-sectoral differences between, for example, small-scale subsistence farmers and large-scale agribusiness are too often overlooked. Connecting two or three sectors into a "nexus" confirms this people-blind discourse. This persistent single-water use and sector-based discourse hides inequalities, depoliticises priority setting and is a strong obstacle for any people-centred approach, including human rights-based approaches. Benefits of irrigation schemes depend on irrigated area, so people with more land benefit more from "irrigation" investments. Or as illustrated in South Africa, it is true that the government is progressively working towards non-discrimination in access to public funding and payment for municipal and irrigation water services by those who can pay. However, a sector-based language continues to hide how the "haves" who benefitted from large public investments in sophisticated infrastructure by the apartheid state are still the main beneficiaries of state subsidies to operate and maintain these bulk water supplies. Insight into the distribution of benefits of public sector-based fund allocation and the grounds for this distribution is likely to reveal unfair discrimination.

Hidden in these sectors, poor women's and men's water needs for productive uses to meet the human right to food and an adequate standard of living and cultural uses and to prevent starvation are mostly ignored. Yet, without alternative livelihood strategies, poor people tend to have more diversified and climate-dependent livelihoods than anyone else and, hence, depend more than anyone else on secure access to water for a range of productive uses in livestock, cropping, horticulture, fisheries, tree growing, crafts and small-scale enterprise.

The third aspect of General Comment No. 15 that underpins a right to water infrastructure services for productive uses is the right to participation. In addition to ensuring participatory procedures, participation also concerns respecting, protecting and fulfilling poor people's own priorities for domestic *and* a range of productive

uses. These priorities for multiple uses are overlooked in the single-use sectoral approaches of the compartmentalised water sector, in which infrastructure is designed for one single use, either irrigation, or domestic uses, or livestock. Such infrastructure designed by public planners for single uses is in reality and invariably turned into multipurpose infrastructure (Van Koppen et al. 2009, 2014a).

“Domestic” water supplies are used for a range of productive uses, which help meeting basic food supplies and income generation (Moriarty et al. 2004). For example, Hall et al. (2013) found that even at consumption levels of 20 l per capita per day, half of the households used these quantities for domestic *and* productive uses. In mountainous areas with free gravity energy in Colombia, the proportion of households using pipes for multiple uses is 82–98 % in three rural areas, but only just below 50 % in two urban areas (Van Koppen et al. 2009). Pérez de Mendiguren Castresana (2004) found in a rural area in South Africa that the proportion of households using “domestic” supplies for productive uses was higher where the water supplies were more reliable. Similarly, irrigation schemes are used for multiple purposes as the rule, also by the landless and women who don’t have access to irrigated land (Meinzen-Dick 1997; Renault et al. 2013). Infrastructure exclusively for irrigation is the exception, for example, as groundwater pumping in distant fields.

Instead of declaring such non-planned uses as “illegal” and trying to prevent these uses (typically in vain), these uses should be acknowledged as people’s right to set their own priorities. Irrigation planners should certainly respect people’s priority for domestic uses. In genuine participatory water services, people’s multiple water needs and priorities should be the starting point of planning and providing water services. Since the early 2000s, this approach of so-called Multiple Use Water Services (MUS) has been field tested across the world and is now applied in 22 countries (see www.musgroup.net). Multipurpose infrastructure and locally driven combinations of multiple water sources also emerged spontaneously wherever the prioritisation of general development interventions was left to local players. This was the case in India’s Mahatma Gandhi National Rural Employment Guarantee Scheme, which reaches 55 million people per year. This turned out to be the world’s largest rural water supply programme (Verma et al. 2011). The development of multipurpose infrastructure, in which water is taken from multiple sources to meet multiple needs, is the way in which communities have been managing their water resources since time immemorial in a more cost-effective and environmentally friendly way than the public sector.

One concrete implication of these aspects of General Comment No. 15 for infrastructure-based services is a new definition of the substantive core minimum human right to infrastructure-based water services. Currently, service levels for water supplies delivered near or at homesteads are 20–50 l per capita per day, supposedly to meet personal and domestic needs (and sanitation) only. This should be raised to 50–100 l per capita per day in order to *also* enable basic productive uses (Hall et al. 2013; Van Koppen et al. 2014a). Unlike irrigation development that tends to disproportionately favour those with more land, multiple-use water services to homesteads benefit everybody, including the land-poor and landless, child-headed households, the sick and disabled. Out of these quantities, three to five litres

per capita per day should be safe for drinking and cooking, for example, through point-of-use water treatment as also recommended by health specialists. Insisting on the high drinking water quality standards for all other domestic water uses and productive water uses can be a wasteful expenditure.

7.4 Rights-Based Water Allocation

With increasing competition for water, the role of the state in water allocation becomes increasingly important as well. This is also the case in the widespread land acquisitions and grabs that are typically accompanied by water grabs. The Special Rapporteur on the right to food has, in recent years, frequently commented on their impact(s) on local people's food security (Franco et al. 2013). As a result of these challenges, there have been growing calls to elaborate a human rights perspective to land and to water that is more interconnected, more social justice oriented and more participatory and encompasses the use of water for production of food at the household level to meet the right to food (Franco et al. 2013).

The case of South Africa highlights the challenges and potential rights-based solutions at stake. South Africa articulated a progressive rights-based constitution under its post-1994 dispensation, committing to sufficient access to water and food for all (RSA 1996: section 27 (2)). It translated these rights into a rights-based Water Services Act (1997) prioritising access to water for domestic uses and sanitation for all. The South African Human Rights Commission proactively monitors the realisation of constitutional rights, including the right to water and sanitation (SAHRC 2014).

Moreover, the National Water Act (1998) (RSA 1998) also formally addresses the highly unequal distribution of water use as a result of the land and water grabs in the colonial era. Calculations show that 1.2% of the population uses 95% of the allocated water resources, leading to a Gini coefficient of 0.99 for rural areas (Cullis and Van Koppen 2008). The constitutional commitment to redress the inequities of the past is translated into the National Water Act as the legal possibility of a distributive water reform to reallocate water from the "haves" to the "have-nots". Under certain conditions those who have to give up a small share of their water allocations for that purpose are not compensated. The Act further enshrines legal instruments to allocate water resources, while also redressing inequities of the past. The periodic National Water Resource Strategy sets priorities. The administrative system to implement water allocation is the licence (or permit) system. The latter system is widely applied elsewhere in the world as well (Van Koppen et al. 2014b). The issuing and monitoring of licences are the government's main tool to *regulate* water users, for example, by rejecting an application for a licence altogether in over-allocated areas or by setting caps on volumes used and reducing the period of a licence. Waste discharge conditions (the polluter pays) and payment for water resource management tasks (the user pays) are other conditions tied to licences. Obviously, such regulation to safeguard sufficient availability of water of the right

quality is especially important for the marginalised, who are often hit hardest by others' overuse and pollution. So licences can be vital tools to implement rights-based water allocation. However, as further discussed below, what is often ignored is that the licence system is also the only way to obtain formal entitlements to water.

In 2008, this commitment to redress the inequities of the past was operationalised in a Water Allocation Reform. This sets as targets that 60 % of allocable water should be in black hands ("black" meaning Africans, Coloureds and Indians) by 2020, equally divided among women and men (DWA 2008). Moreover, the National Water Resource Strategy (2nd volume) (DWA 2013a) follows the main principle of General Comment No. 15 in *prioritising* water uses for poverty eradication and redress of inequities of the past as the third highest priority. The first priority is for the Reserve, which consists of a Human Basic Needs Reserve (which is currently set at 25 l per capita per day and amounts to just one percent of the mean annual run-off) and an Ecological Reserve (which is set at considerably higher volumes of about one fifth of the mean annual run-off). The second priority is for international obligations. Significantly, water use for poverty eradication and redress of inequities of the past has a *higher* priority than so-called strategic uses, which is mainly electricity generation and, lastly, water for general economic purposes that require licences.

In spite of these progressive policies and regulations, the disappointing reality is that the distribution of all new water uses that were taken up after the promulgation of the National Water Act (1998) has remained as skewed as before. Out of the 4 284 water-use licences for new water uptake issued between 1998 and 2012, only 1 518 were for black individuals. Significantly, the total volumes allocated to them were very low: just 1.6 % of total water allocated through all licences (DWA 2013b). The percentage of women licence holders is probably less than 10 % (Anderson, personal communication).

While this perpetuation of inequalities is largely the result of a continued lack of access to water infrastructure and skewed land tenure, the policies, regulations and the Water Allocation Reform targets fail to be operationalised. Even worse, the main water allocation tool to operationalise redress, the licence system, is designed in such a way that it treats black women and men, the majority of whom are small- and microscale water users, unfairly (as in many licence systems elsewhere). There are three grounds why this treatment is unfair.

First, while introducing the licence system, the National Water Act (1998) consolidated the racial discrimination of black people entrenched in past water rights regimes. The Act recognises Existing Lawful Uses that were lawful under the water laws preceding 1998 as continuing to be lawful until those rights are converted into licences (under a specific process of compulsory licensing in specific geographic areas with one or more water resources). Those former laws were a patchwork of legal arrangements, including riparian rights, access to normal and surplus flows, private groundwater rights, irrigation schedules determined by the irrigation boards, permits for commercial afforestation, permits in area-specific Government Water Control Areas (in both the white Republic of South Africa and former homelands) and very weak rights for Africans in former homelands, on white-owned farms or black townships. The homelands were declared as state land, so the water resources

were also owned by the colonial state. Formally, this right could be transferred to inhabitants of the homelands. However, in practice, this hardly ever happened. This was “justified” by referring to the bureaucracy: “Sometimes the problem was to determine which official of the State had to grant the necessary permission” (Thompson et al. 2001). In reality, in homelands and on white-owned farms and peri-urban settlements, living customary water rights regimes coexisted with the formal legislative regime. The recognition of the “Existing Lawful Uses” not only implied the acceptance of the highly skewed distribution of water uses but also consolidated the much weaker legal status of customary living laws in the former homelands, on large-scale farms and peri-urban settings. Where white men can, and do, refer to well-defined pre-1998 rights, black people cannot, not even to the much smaller quantities used.

The second ground of unfair treatment of small-scale users regards the obligatory application for licences for the uptake of new water or the area-wide application of licensing by every water user under compulsory licensing. In this process, small-scale water users, the large majority of whom are black people, face disproportionate administrative costs for relatively small volumes of water. Even though procedures for small-scale users are less complex than for high-impact users, the efforts remain disproportionate. Moreover, through no fault of their own, the state is not even able to allocate its scarce human resources to reach out to all small-scale water users who typically live in remote areas with fewer transport and administrative facilities. Women are even more discriminated because licences are typically allocated in the name of the household head, which is assumed to be a man and only by default a woman.

Micro-users are exempted from the obligation to apply for a licence. This is a third form of unfair treatment, because the legal status of exempted microscale water uses is second-class, as confirmed by the FAO (2004):

The problem is that a person who seeks to benefit from such an entitlement cannot lawfully prevent anyone else from also using the resource even if that use affects his own prior use/entitlement. Indeed the question arises as to whether or not they really amount to legal rights at all. (FAO 2004)

In line with both General Comment No. 15 and the National Water Resource Strategy (2nd volume), this unfair treatment can be ended by rights-based water allocation, which legally prioritises water uses that meet the constitution’s socio-economic rights to access to sufficient water and food, especially by (indigenous) black people (Van Koppen and Schreiner 2015). In South Africa, this can be operationalised through the Act’s legal tool of so-called General Authorisations. These are exemptions to the obligation to apply for a licence for small-scale uses for specific groups or water sources, just above the exempted microscale uses (Anderson et al. 2007). By vesting a priority in such General Authorisation, the second-class legal status of exemptions shifts, in principle, to premium-class legal entitlement status in line with the high priority in the National Water Resource Strategy (2nd volume). The threshold above which water users need to apply for a licence and below which they are exempted could be set by realistically assessing the state’s

logistic capacity to issue and monitor licences of many small-scale users who, together, still hardly use any significant water volumes and the handful of high-impact users, such as mines and large-scale farmers. State capacity is low; till today, many of the high-impact users still get away without any licence, so without any state regulation of their water use and waste discharge. As custodian of the nation's water resources, the minister can issue such priority general authorisation with the stroke of a pen. However, this option is still being debated, even though such rights-based priority entitlement to water does not oblige the state in any way to also provide the infrastructure.

7.5 Conclusion

In this chapter, we discussed how international human rights instruments in general and the CESCR General Comment No. 15 on the human right to water in particular provide a robust normative system that is well able to address end goals of human well-being across the key mandates of the water sector, namely, infrastructure development and water resource allocation. Moreover, the recognition of the indivisibility and interdependency of human rights applies exceptionally well to water resources. Water is key to many dimensions of human well-being and ill-being. Secure access to water is especially important for the agrarian livelihoods of the rural and peri-urban poor.

While the recognition of a justiciable and enforceable right to water for drinking, personal and other domestic uses and sanitation has been an important milestone in closing the disconnection between the state as duty bearer for human rights and the state as investor in water infrastructure and regulator, we argued that this has only been a very partial interpretation of the underpinning General Comment No. 15 of the Committee on Economic, Social and Cultural Rights. The same Comment also indicates priorities in other freshwater governance domains to realise the substantive rights to livelihoods, food, health and an adequate standard of living. This has concrete implications for the state's infrastructure-based water services. Poor people's productive water needs should be fully recognised and met in a non-discriminatory manner. The definition of a core minimum should not be assumed to be for domestic uses only, but should include water for small-scale productive uses at and around homesteads as well. This priority for multiple basic uses is already widespread practice, but often still seen as "illegal" by sectoral professionals who design single-use infrastructure. An inclusive people-driven planning process for infrastructure services will spontaneously identify such multiple priorities.

A concrete implication of a rights-based approach to the state's authority and responsibility in water allocation is that water should be available for such basic uses to meet the right to food, health and an adequate standard of living. Priorities in allocation should safeguard such minimum volumes. This should not only be defined in policies and regulations, but also operationalised in the legal instruments to allocate water. Licence systems in particular should be redesigned to prioritise

such uses, while targeting regulation and prioritising the state's resources to enforce compliance to the large-scale high-impact users who overuse and pollute water most severely.

The identification of these further implications of General Comment No. 15 underlines the chapter's premise that human rights frameworks provide the indispensable normative framework for twenty-first-century freshwater governance.

References

- Anderson, A., Quibell, G., Cullis, J., & Ncapayi, N. (2007). General authorisations as a tool to promote water allocation reform in South Africa. *Law, Environment and Development Journal*, 3(2), 164–178.
- Baillat, A., Schmitz, T., & Szabó, M. (2013). *Towards a human rights based water governance: Challenges for the post 2015 thematic consultations on water*. WaterLex, Geneva, Switzerland. <http://www.waterlex.org/new/wp>
- Cullis, J., & Van Koppen, B. (2008). *Applying the Gini coefficient to measure the distribution of water use and benefits of water use in South Africa's provinces* (Unpublished report). Department of Water Affairs and Forestry and International Water Management Institute, Pretoria, South Africa.
- Department of Water Affairs (DWA), Republic of South Africa. (2013a). *National Water Resource Strategy* (2nd edn, Water for an Equitable and Sustainable Future). Pretoria: Department of Water Affairs.
- Department of Water Affairs (DWA), Republic of South Africa. (2013b). *Water allocation reform*. Portfolio Committee on Water and Environmental Affairs. PowerPoint presentation, 16 April 2013. http://d2zmx6mlqh7g3a.cloudfront.net/cdn/farfuture/b24vv0q7YzDjaLQee34wk_VAU_uXpX1_3cq8Lf-w
- Department of Water Affairs and Forestry, Republic of South Africa. (2008). *Water allocation reform strategy*. Pretoria: Chief Directorate Water Use, Department of Water Affairs and Forestry.
- FAO. (2004). *Land and water – The rights interface* (FAO Legislative Study 84). Rome: Food and Agricultural Organization of the United Nations.
- Franco, J., Mehta, L., & Veldwisch, G. J. (2013). The global politics of water grabbing. *Third World Quarterly*, 34(9), 1651–1675.
- Hall, R., Van Koppen, B., & Houweling, E. (2013). The human right to safe and clean drinking water: A necessary condition for, and limitation on, development in rural and peri-urban communities. *Science and Engineering Ethics*, 20(4), 849–868. doi:10.1007/s11948-013-9499-3.
- Hellum, A., Ikdahl, I., & Kameri-Mbote, P. (2015). Against the current: Engendering the human right to water and sanitation. In A. Hellum, M. Kameri, & B. Van Koppen (Eds.), *Water is life: Women's human rights in national and local water governance in Southern and Eastern Africa*. Harare: Weaver Press.
- High Level Panel of Experts. (2015). *Water for food security and nutrition*. A report by the High Level Panel of Experts on Food Security and Nutrition of the Committee on World Food Security, HLPE, Rome, Italy.
- Mehta, L. (2014). Water and human development. *World Development*, 59, 59–69.
- Meinzen-Dick, R. (1997). Valuing the multiple uses of water. In M. Kay, Y. Franks, & L. Smith (Eds.), *Water: Economics, management and demand* (pp. 50–58). London: E&FN Spon.
- Moriarty, P., Butterworth, J., & Van Koppen, B. (Eds.). (2004). *Beyond domestic: Case studies on poverty and productive uses of water at the household level* (IRC technical papers series 41). Delft: IRC/NRI/IWMI.

- Pérez de Mendiguren Castresana, J. C. (2004). Productive uses of water at the household level: Evidence from Bushbuckridge, South Africa. In P. Moriarty, J. Butterworth, & B. Van Koppen (Eds.), *Beyond domestic: Case studies on poverty and productive uses of water at the household level* (IRC technical papers series 41). Delft: IRC/NRI/IWMI.
- Renault, D., Wahaj, R., & Smits, S. (2013). *Multiple uses of water services in large irrigation systems. Auditing and planning modernization* (The MASSMUS approach, FAO Irrigation and Drainage Paper 67). Rome: Food and Agriculture Organization of the United Nations.
- Republic of South Africa (RSA). (1996). Constitution of the Republic of South Africa (Act No. 108). Statutes of the Republic of South Africa Constitutional Law, Office of the President, Cape Town, South Africa.
- Republic of South Africa (RSA). (1997). Water Services Act. Act No. 108 of 1997, Government Gazette No. 18522, Office of the President, Cape Town, South Africa.
- Republic of South Africa (RSA). (1998). National Water Act. Act No. 36, Government Gazette Vol. 398, 26 August 1998, Office of the President, Cape Town, South Africa.
- South African Human Rights Commission. (2014). *Report on the right to access sufficient water and decent sanitation in South Africa*. South African Human Rights Commission, Johannesburg. <http://www.gov.za/documents/report-right-access-sufficient-water-and-decent-sanitation-south-africa-2014>
- Thompson, H. C. M., Stimie, E., Richters, S., & Perret, S. (2001). *Policies, legislation and organizations related to water in South Africa, with special reference to the Olifants River basin* (Working paper 18 (South Africa working paper no. 7)). Colombo: International Water Management Institute.
- UNICEF., & World Health Organisation. (2015). *Progress on sanitation and drinking water – 2015 update and MDG assessment*. New York: Joint Monitoring Programme UNICEF/WHO. http://www.wssinfo.org/fileadmin/user_upload/resources/JMP-Update-report-2015_English.pdf
- United Nations. (1966). International Covenant on Economic, Social and Cultural Rights (ICESCR) (1966) UN Doc A/6316.
- United Nations. (1979). Convention on the Elimination of All Forms of Discrimination against Women (CEDAW) (1979), UN Doc. A/34/46, United Nations, New York, USA.
- United Nations. (1990). Convention on the Rights of the Child. General Assembly Resolution 44/25 of 20 November 1989, United Nations, New York, USA.
- United Nations. (1993). Vienna Declaration and Programme of Action, UN Doc. A/Conf.157/23 (12 June 1993), United Nations, New York, USA.
- United Nations. (2010a). Resolution adopted by the General Assembly. 64/292. The human right to water and sanitation. A/RES/64/292, United Nations, New York, USA.
- United Nations. (2010b). Human rights and access to safe drinking water and sanitation, Human Rights Council 6 October 2010, A/HRC/RES/15/9, United Nations, New York, USA.
- United Nations Committee on Economic Social and Cultural Rights (CESCR). (2003). General Comment No. 15. The right to water and sanitation (Arts. 11 and 12 of the International Covenant on Economic, Social and Cultural Rights), E/C.12/2002/11, United Nations, New York, USA. http://www2.ohchr.org/english/issues/water/docs/CESCR_GC_15.pdf
- Van Koppen, B., & Schreiner, B. (2015). Gender-equality in statutory water law: The case of priority general authorisations in South Africa. In A. Hellum, M. Kameri, & B. Van Koppen (Eds.), *Water is life: Women's human rights in national and local water governance in Southern and Eastern Africa*. Harare: Weaver Press.
- Van Koppen, B., Smits, S., Penning De Vries, F., Mikhail, M., & Boelee, E. (2009). *Climbing the water ladder: Multiple-use water services for poverty reduction* (Technical report 52). Delft: IRC International Water and Sanitation Centre, International Water Management Institute and CPWF. www.musgroup.net
- Van Koppen, B., Smits, S., Rumbaitis del Rio, C., & Thomas, J. (2014a). *Upscaling multiple use water services: Accountability in the water sector*. London/The Hague: Practical Action/IWMI/WLE – International Water and Sanitation Centre IRC – Rockefeller Foundation.

- Van Koppen, B., Van der Zaag, P., Manzungu, E., & Tapela, B. (2014b). Roman water law in rural Africa: Finishing the unfinished business of colonial dispossession. *Water International*, 39(1): 49–62. <http://dx.doi.org/10.1080/02508060.2013.863636>
- Verma, S., Kurian, B., Malik, R. P. S., Shah, T., & Van Koppen, B. (2011). *Multiple use water services in India: Scoping study*. India: International Water Management Institute, IRC International Water and Sanitation Centre and Rockefeller Foundation.
- Water Governance Facility (WGF). (2012). *Human rights-based approaches and managing water resources: Exploring the potential for enhancing development outcomes* (WGF report no 1). Stockholm: Stockholm International Water Institute.
- WaterLex. (2014). *National human rights institutions and water governance: Compilation of good practices*. Geneva: WaterLex.

Open Access This chapter is distributed under the terms of the Creative Commons Attribution-Noncommercial 2.5 License (<http://creativecommons.org/licenses/by-nc/2.5/>) which permits any noncommercial use, distribution, and reproduction in any medium, provided the original author(s) and source are credited.

The images or other third party material in this chapter are included in the work's Creative Commons license, unless indicated otherwise in the credit line; if such material is not included in the work's Creative Commons license and the respective action is not permitted by statutory regulation, users will need to obtain permission from the license holder to duplicate, adapt or reproduce the material.



Chapter 8

Inclusive Transboundary Water Governance

Anton Earle and Marian J. Neal

Abstract Transboundary watercourses, including rivers, lakes and aquifers (confined and unconfined), shared between two or more countries, are home to over 70% of the world's population and supply water for roughly 60% of global food production. It is no surprise that the management of these watercourses has been entrusted to national states, which have the power to take sovereign decisions over their management, use and conservation. State sovereignty is mitigated through the existence of a global institutional framework comprised of customary international water law (the norms dictating how states behave), global and regional conventions, basin-level agreements and basin management organisations. The good news is that there is a large body of joint institutions between countries with transboundary watercourses, the UN estimating that around 3600 exist. This in part explains the relative lack of military interstate conflicts. Less good news is that despite the existence of international- and basin-level agreements and basin organisations, the benefits to be expected from international cooperation around transboundary watercourses have in most cases not materialised. Acute, persistent and seemingly intractable problems persist, with ecosystem degradation not being reversed, joint investments in water infrastructure not materialising and joint management organisations failing to attract significant long-term support from the respective basin states. Despite at least two decades of concerted support by the international development community, the impacts of enhanced interstate cooperation are noticeable through their absence. This chapter investigates why this may be so and introduces a starting point which moves beyond the state-centric approach to transboundary water management. In doing so it does not challenge the sovereign right of states to manage their watercourses; instead it shows how a range of non-state actors do in fact influence state practice through a variety of mechanisms. As these mechanisms are frequently covert, it becomes difficult to assess the integrity of the relationships between actors, in turn making public engagement and participation difficult. Needed is a governance paradigm which opens the decision-making arena to non-state actors all in support of the national governments and their respective mandates. This chapter ends with an indication of what such a governance arrangement

A. Earle (✉) • M.J. Neal
SIWI Africa Regional Centre, Stockholm International Water Institute (SIWI),
Block A, GWP, Hatfield Gardens, 333 Grosvenor St, Pretoria 0083, South Africa
e-mail: anton.earle@siwi.org

would look like across the four success factors identified in the preface of this book: science-informed decision-making, investments in appropriate infrastructure, development of skills and talent and the water use behaviour of stakeholders.

Keywords Transboundary water management • Customary international law • Cooperation • Justice • Governance frameworks

8.1 Introduction

The UN Human Development Report of 2006, which focuses on water issues, concludes that the “scarcity at the heart of the global water crisis is rooted in power, poverty and inequality, not in physical availability” (UNDP 2006: 2). In essence this is a crisis of governance. This message is echoed by a range of international organisations (UNDP 2006; UNESCO 2008; UNEP 2009; UN-Water 2008; Jacobsen et al. 2013; World Bank 2013).

Lacking are effective organisations and institutions for the sustainable development and management of the world’s water resources (Bigas 2012). This ineffectiveness manifests itself in the poor state of freshwater ecosystems, which according to the Worldwide Fund for Nature is the most degraded of all the biomes (WWF 2012). Of the world’s 177 large rivers (those over 1000 km), only 64 remain free flowing, unimpeded by dams and other barriers, while only 21 of these large rivers retain a direct connection with the sea (WWF 2012). Water resources are under increasing pressure from human growth, activities and settlement (WI 2010), industries and cities that consume vast quantities of water and have to convey water over increasing distances to satisfy demands (UN-Habitat 2010) and production of crops for food and fuel that use ever-increasing amounts of water.

Transboundary water resources, including rivers, lakes and aquifers that are shared between two or more states, further complicate effective water governance, by introducing an international-political dimension. Approximately 276 river basins cross international borders and serve as a primary source of freshwater for approximately 40% of the world’s population. These basins are home to over 70% of the world’s population and supply water for roughly 60% of global food production. About 30–50% of the world’s population depend on groundwater source from 608 transboundary aquifer systems (IGRAC and UNESCO-IHP 2015).

Water management and allocation decisions that are made at the international and national levels often rely on national and subnational organisations for their implementation and often rely on civil society and/or local communities for their acceptance and legitimisation. This chapter illustrates the imperative for the inclusion of non-state actors in the decision-making architecture of transboundary water governance.

This chapter will firstly clarify a number of terms used in the chapter; it then describes the issue of a state-centric approach and the problem that this creates; the

concept of multilevel governance is then discussed as a concept that could shed some light on the issue; we then delve into more detail on the organisational structure of transboundary water governance, followed by an exploration of water justice and social inclusion.

8.2 Clarifying Terms

8.2.1 Scales and Levels

There are many definitions of scale and level in the literature, and the terms are often conflated. For the purposes of this chapter, it is useful to distinguish between these two terms. Thus the term scale refers to different ordering systems for space, time, administration and jurisdiction (Ramasar 2014); and the term level refers to points along a scale which in most cases takes on a spatial unit of analysis, for example, global, basin, state, province and local levels (Gibson et al. 2000; Cash et al. 2006).

8.2.2 Organisations and Institutions

The decision-making architecture of transboundary water governance comprises two scales, namely, organisation and institution. In this chapter the definitions from North (1990) are adopted, where institutions are considered “the rules of the game” and include principles, policies, regulations, legislation, conventions, agreements, treaties and social norms and organisations are considered the “players”, for example, government departments, non-government organisations, civil society groups, river basin organisations, municipalities and community-based organisations. These organisations and institutions can be explicitly mapped out for each transboundary water issue of interest as a mechanism to develop a deeper understanding of the levels within each scale that comprise this architecture.

8.2.3 The Issue: A State-Centric Approach

The management of transboundary waters naturally falls within the ambit of the state. The state is the referent level that is entrusted and empowered to make sovereign decisions over the management, use and conservation of these shared waters. In relation to water, state sovereignty is upheld through the existence of a global institutional framework comprised of customary international water law (the norms dictating how states behave), global and regional conventions and bilateral or

multilateral basin-level agreements and treaties. The UN estimates that approximately 3600 joint institutions exist between states to govern transboundary water resources (UN-Water 2013).

However, despite the existence of these institutions, the benefits to be expected from international cooperation over transboundary water resources have in most cases not materialised as expected (Earle et al. 2010). Acute, persistent or seemingly intractable problems persist, with ecosystem degradation continuing unabated, joint investments in water infrastructure not materialising and joint management organisations failing to attract significant long-term support from their respective basin states. Despite at least two decades of concerted support by the international development community, the impacts of enhanced interstate cooperation are noticeable through their absence (Earle and Bazilli 2013). These challenges pose a risk to other interventions seeking to promote development, peace, regional integration, ecosystem protection and poverty eradication in a transboundary context. Coupled with the multiplier effects of climatic change, there exists a real possibility of tensions over water escalating at various levels (Ki-Moon 2007; NATO 2010; OSCE 2010; Department of Defense (DoD) 2010; NIC 2012).

States at times choose to engage in cooperative processes, while at other times, or indeed in other basins, they do not. In the majority of research efforts on transboundary water governance, states are viewed and analysed as homogeneous units, with an assumption that water resource use and allocation occurring at the national level will cascade down to a broad range of users (Sneddon and Fox 2006; Hirsch and Jensen 2006; Suhardiman and Giordano 2012; Reed and Bruyneel 2010). The flaw of this assumption is that it omits subnational actors and the role they may play in driving transboundary water governance processes at the national and international level.

8.2.4 Connecting the Scales and Levels

One thesis that could shed some light on the lack of cooperation over transboundary water resources is that of a multilevel governance approach. Multilevel governance is both a process and a description of governance architecture. It provides a framework for describing the complex interaction and interdependencies between the plethora of “actors” and “rules of the game”. An explicit integration of the different levels within the organisational and institutional scales of governance is imperative for effective decisions over transboundary water resources to be made, implemented and accepted (Patrick et al. 2014a).

Multilevel governance is an arrangement where institutions operate at various levels (e.g. local, regional, state, national, global) with multiple mandates and across different, but overlapping areas. The use of the term governance rather than government reflects the shift in decision-making powers from the state, where a state is a political and geopolitical entity administrated by a government, to non-state actors. The more nuanced understanding of this is not a complete shift in power but rather

a model of collective bundling of organisations that all influence the decision-making process (Patrick et al. 2014b). The devolution of power to other government actors through a decentralised state model also adds to this new collective governance model. The sharing between different actors of the role of institutional development, institutional formulation, institutional implementation and institutional regulation and monitoring add a further layer of complexity to our understanding of governance.

Multilevel governance is a network arrangement of institutions that can cooperate to successfully manage common pool resources such as water. Some of these institutions may be initiated to manage specific aspects of natural resource management such as water allocation, or they may be of a more general nature where water allocation is one aspect of a bigger portfolio. Each institution is essentially independent of the other, although some may be nested, where the scope of authority is superseded by the next higher level or they may form an autonomous network of institutions with overlapping goals and policy objectives (Ostrom 1996). Suhardiman and Giordano (2012: 304) contend that the distinctions between what constitutes a state and a non-state actor have become blurred, with overlap between these groups due to partnerships being formed as well as a movement of individuals between these groups. This leads state and non-state actors to develop “nested institutional structures” which manage resources at various levels of scale.

A multilevel institutional arrangement could distribute resources and capacities in such a way that any “perverse incentive and information problems at one level are offset to some extent by the positive incentives and information capabilities for actors at other levels” (Andersson and Ostrom 2008: 73) and that this arrangement will achieve better water management outcomes than either a completely decentralised or centralised institutional structure (Patrick et al. 2014a).

There are various costs associated with a multilevel governance arrangement such as production, administration and bureaucratic costs (McGinnis 2005) that might exclude it as the most appropriate organisational arrangement for all problems and goals. It is, however, an appealing concept as it does not prescribe a specific blueprint governance model (Andersson and Ostrom 2008), and thus it can accommodate contextual issues and differences and make use of existing institutional and organisational structures. It is a system that also acknowledges the dynamic nature of water resource governance and is thus more adaptive and responsive to issues that arise at different levels and encourages a cooperative approach to addressing water management issues.

8.2.5 A Closer Look at Organisational Structure

Earle et al. (2010) propose that transboundary water resources can provide an opportunity to contribute to regional development and peace if the organisational capacity exists to manage them cooperatively. They propose a conceptualisation of this organisational framework as consisting of three interrelated communities of

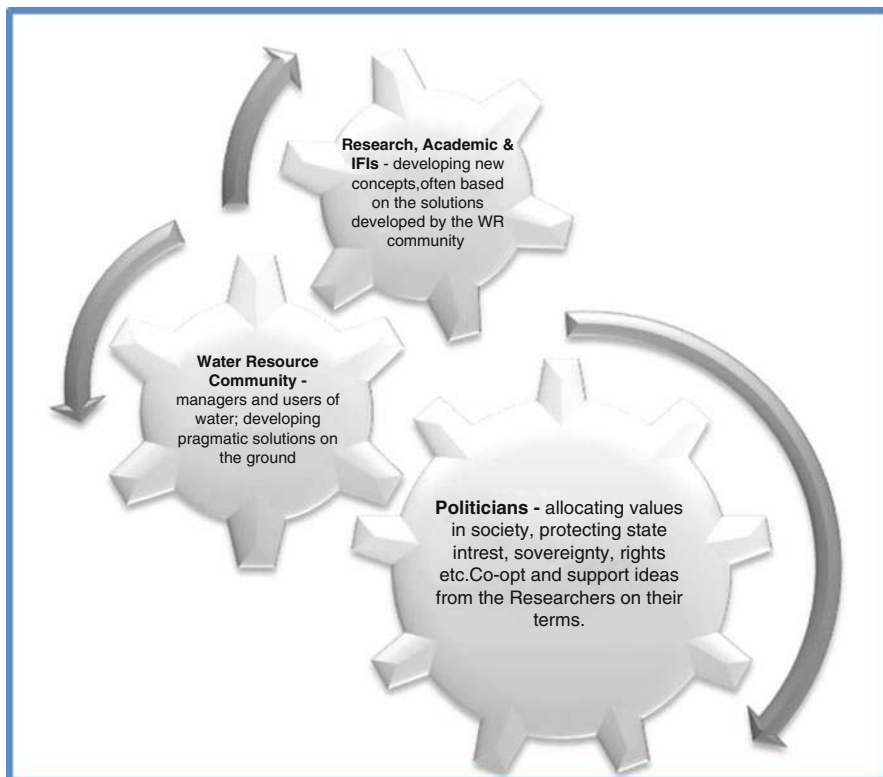


Fig. 8.1 The cogs within the organisational scale of transboundary water governance (Earle et al. 2010)

actors. They comprise the water management community (including water users from civil society and the private sector and water managers from governmental departments or agencies), international community (external to the basin actors such as researchers and development partners) and politicians in the basin states (see Fig. 8.1).

These three communities interact in a variety of ways, influencing each other and learning from each other; however, the overall pace and direction of transboundary water governance processes is set by the politicians (as representatives of the central state). These communities are not heterogeneous; their components are exposed to a range of pressures and power dynamics operating at various levels, some within the water sector and some from outside. The nuances of pressures and power relations at a variety of levels need to be better understood if transboundary waters are not to become a source of conflict or countries remain trapped in a state of “negative peace” – merely the absence of war (Earle et al. 2010).

Interested groups operate at a variety of levels and often place pressure on politicians to provide them with access to resources, jobs or other services, in so doing

influencing the actions of these politicians at the international level (Earle 2013). The politicians in turn have final say over the international water management regimes which they are willing to commit their respective country to; if there is the perception amongst local-level stakeholders that entering into an international agreement will negatively impact their access to water resources, then there is great pressure placed on politicians not to proceed with such an action. Thus states, as represented by politicians, are not the only actors possessing agency; they are but part of a range of actors that play a role in water governance frameworks (Earle et al. 2010). By better understanding the interests of these non-state actors, it may be possible to better understand some of the choices articulated by states at the international level (Earle and Bazilli 2013; Earle et al. 2015).

8.3 Driving the Cogs

8.3.1 Power

Issues around power become paramount at this point – with various subnational actors possessing better access to political decision-makers than others. As a result of what Allan and Mirumachi (2010) refer to as the “hydraulic mission” approach to managing and developing water resources, the primary actors in TWM processes have been states – represented by technical, economic and political elites operating in what generally gets termed “the national interest”. Left out are the local communities relying on the resource directly: the water users, poor, women and other important groups. Instruments such as the UN Watercourses Convention of 1997 make an effort of presenting an attempt at an inclusive stakeholder approach – through asserting the importance of the “no-harm rule” and the “equitable share approach”. However, it lands up supporting the status quo through the omission of any reference to stakeholder issues or participation mechanisms. Likewise, regional transboundary laws such as the UNECE Convention on the Protection and Use of Transboundary Watercourses and International Lakes and the SADC Protocol on Shared Watercourses are found to be silent on issues related to stakeholder participation and gender (Earle and Bazilli 2013).

8.3.2 Reframing Issues Across Levels

National interests and socio-economic imperatives drive the political agenda of individual nation-states. The uptake of transboundary water management and cooperation efforts could be greatly improved by reframing them in the national interest. The same can be said about human security needs. What mechanisms of reframing can be adopted by international- and local-level issues to align them more with

national interests? What compliance and implementation mechanisms of national interest priorities can be utilised to improve human and water security? We need to understand better how knowledge on regional water resources can more effectively feed into decision-making at different scales. We need to demonstrate how existing knowledge can add value. This is not only knowledge of biophysical systems but the political processes that drive choices and trade-offs. Can we reframe the “duty to cooperate” outlined in the UN Charter to move beyond state actors and identify a role of non-state actors?

8.3.3 Shifting Power Dynamics

8.3.3.1 Municipal to National to International

Cities are powerful actors since the majority of the earth’s population today live in urban areas, making cities important drivers of water resource management processes (UN-Habitat 2010; Earle 2013). While municipal water use in most countries is a small portion of overall water use, it commands a high assurance of supply due to economic and political influence, placing cities in a strong position to compete for water resources across increasing distances. The quest for urban water security includes the provision of services directly related to water resources, such as electricity generated from hydropower, on international transboundary water management processes.

Cities have driven several transboundary water governance processes, accessing central state politicians through a variety of mechanisms, some explicit and others not. In a study unpacking the role of cities on transboundary water processes, Earle (2013) contends that cities influence the agenda in transboundary water governance in three main ways: (1) their increased capacity to pay for water resources (in comparison with rural water users) means that they can harness large-scale water transfers for their use; (2) via their need for electricity and other services (such as flood protection) where cities are dependent on water resources; and (3) the need for their politicians to secure a political power base in the rural areas. For example, cities such as Johannesburg, Amman, Windhoek, Lusaka, Bangkok and Cairo have all played a driving role in the development of water resources or the evolution of water management institutions in the international transboundary basins around them. This can in cases lead to increased cooperation, where the water-related needs of cities have led to the development of new laws, institutions and collaborative infrastructure projects. However, this same thirst can lead to increasing water stress in the basin as well as neighbouring basins, possibly resulting in conflict at the inter-state level. Further investigation is required to determine how the water-related needs of cities are articulated at the national level. Most likely it is not through any one channel or mechanism, but rather a range of actors that reflect the needs of cities and (mostly independent of one another) motivate national governments to take up specific initiatives at the transboundary water level.

Generally it is found that the role of cities in transboundary water processes is not often considered in research on transboundary water, making it important to reach a better understanding of this interaction (Earle 2013). By better understanding this role, light is shed on the “black box” of interstate interactions around transboundary water. Data and records of city-level planning and policies on water resources are, arguably, more accessible to researchers than the records of interstate negotiation and policy processes on transboundary watercourses.

8.3.3.2 International Interests over Local Interests

International agreements or treaties are often used to codify water-sharing arrangements between sovereign states, but there have been some cases where local communities have been disproportionately burdened with some of the negative outcomes of decisions made at the international level. This is illustrated by way of example by the Lesotho Highlands Water Project, an international water-sharing project between Lesotho and South Africa. South Africa pays royalties to Lesotho for water transferred to its economic hub, and Lesotho receives hydropower electricity for its domestic use. The treaty signed between Lesotho and South Africa is considered by some as an example of good practice (Haas et al. 2010). However, the infrastructure involved in this interbasin transfer and hydropower scheme includes large dam development which has had significant negative impacts on the long-term ability of the affected local communities within Lesotho to maintain their livelihoods even though they received monetary compensation or were resettled (Mokorosi and Van der Zaag 2007). This example illustrates that decisions that are sometimes considered good practice at one level (in this case at the international level between South Africa and Lesotho) do not necessarily translate to positive outcomes at other levels (in this case at the local community level within Lesotho).

8.3.3.3 International Interests over National Interests

The state is treated as a “black box” with little possibility of gaining an insider’s point of view. This approach has been challenged by Hirsch and Jensen (2006) in their study on national interests in the Mekong River basin where they contend that the working assumption of the international partners supporting cooperative management structures of the Mekong River Commission (MRC) has been that the respective riparian governments represent the collective interests of the states (Hirsch and Jensen 2006). They find a wide range of interests which are not easily reducible to “the national interest”, the result being that MRC institutional processes are not implemented at national level – due to the lack of support within riparian countries. At best this represents a waste of taxpayers’ money from the countries supporting the development of the MRC; at worst it opens the possibility for specific interested groups in the basin to dominate the agenda and promote approaches which legitimise their objectives and standing. Appeals to the “national

interest” in doing so become a “discursive strategy often invoked to legitimise large infrastructure projects whose environmental and social consequences may in fact be quite disastrous” (Hirsch and Jensen 2006: xviii). Put another way, “by virtue of their invocations of sovereignty and overarching concern with cooperation among riparian states over a highly abstracted notion of “water resource”, they are necessarily oblivious to environmental conflicts involving non-state actors” (Sneddon and Fox 2006: 197).

8.3.4 Tracking Water Diplomacy

Water diplomacy is a process that enables countries to prevent, resolve or manage conflicts and negotiate arrangements or agreements on the allocation and management of international water resources. It is a dynamic process that seeks to develop reasonable, sustainable and peaceful solutions to water allocation and management while promoting or influencing regional cooperation and collaboration. Water diplomacy can open up the cooperation dialogue to multiple stakeholders, including municipalities, provinces and civil society. Water diplomacy necessarily involves a suite of skill sets, with hydrologists, lawyers and political scientists sharing the negotiation table with diplomats and decision-makers.

Tensions over shared water resources are cross-cutting and often lie at the heart of national security priorities with close linkages to a wider set of economic, social and geopolitical issues (Patrick et al. 2014a). At the international level, tensions over water resources can impact negatively on regional development, dampen resilience to climate change and raise the risk of geopolitical instability. Conventionally, diplomacy is seen as high-level interaction and dialogue between nation-states. Diplomacy is now defined according to various levels and can be categorised into Track I, II and III diplomacy. These different tracks vary in terms of degree of official (Track I) vs. unofficial dialogue (Track II); actors in the dialogue, high-level political and military leaders (Track I) vs. individuals and private groups (Track III); and the purpose of the dialogue: peace talks (Track I), sharing of ideas that inform the official process (Track II) and empowerment of individuals and communities to participate in the negotiation process (Track III) (Snodderly 2011).

8.3.5 Striving for Water Justice and Social Inclusion

Water allocation and management decisions made at one level, for example, the diplomatic or international level, *should* translate into socially and environmentally acceptable outcomes at the local level. What do we mean by acceptable and how do we measure improvements in water and human security? How can local-level processes and issues translate into national and international-political imperatives for peace and cooperation? Can we identify good practices of transboundary water and

benefit sharing that contribute to human security? Are there explanatory variables for cooperation and conflict that can be drawn from the social sciences? For example, justice, ethics, faith and customs and spirituality are all in some way connected and influence human security. Are there underlying values and philosophies that can act as a catalyst for peace or conflict resolution or require incorporation into water diplomacy efforts?

Reframing a problem, a solution or a system can be used as a means of including or excluding certain actors, perspectives and processes (Kurtz 2003; Van Lieshout et al. 2011). This process of inclusion and exclusion has also been examined in the justice literature, primarily by Susan Opatow. She explores it in the context of environmental conflicts and has termed it the *scope of justice* (Opatow and Weiss 2000). The scope of justice, also known as the scope of moral exclusion, has been defined as the psychological boundary for fairness (Opatow and Weiss 2000) or the boundary within which justice is perceived to be relevant (Patrick et al. 2014a). Principles of justice govern our conduct towards those within our scope of justice, while moral exclusion rationalises the denial of those outside our scope of justice (Opatow and Weiss 2000) and thus enables and justifies the application of justice principles in an inconsistent or even in an unjust manner.

By obtaining a better understanding of the way in which non-state actors influence transboundary water management, or are excluded from these processes, it is possible to gain access to what Allan and Mirumachi (2010: 25) refer to as the “world of disappeared hydropolitics”. In situations of water scarcity, relations between states over water resources become politicised and possibly securitised, leading to decision-making disappearing from public view; researchers are not privy to the discussions and decision-making processes between central states, but by analysing some of the non-state actors and their interests (which are usually more openly stated), it is possible to gain an insight into some of the hidden practices of states.

Tensions also exist between international justice and social justice. The development of theories of social justice has predominately focused on or assumed the state level rather than the international level (Cole and Schroeder 2004) and has resulted in much discussion about which should take precedence. The debate centres on whether international justice is only about relations between states or whether it is between people throughout the globe. This discussion is becoming more and more relevant with the globalisation of industry and commerce, and the development of supranational level organisations, and is a concern when discussing issues of justice within and between supranational entities, such as the European Union, and individual persons whose claims for justice are largely confined to state structures. As it stands, issues of social justice at the local level as well as issues of social justice at the global level are seen as the responsibility of the state (Cole and Schroeder 2004); it is therefore an entity that matters for social justice.

8.4 Conclusion

In their article on process-based approaches to researching transboundary water management, Suhardiman and Giordano (2012: 305) highlight the need to “better understand transboundary decision making processes, and how these processes are shaped by different actors’ interests, strategies, and access to resources within multiple governance levels and domains”. By gaining more insight into their roles as well as the way in which they are excluded from these processes, it should be possible to carry out a more effective analysis of the actions and positions adopted at a state level regarding transboundary water management.

The good governance of water resources is an integral part of promoting sustainable development globally (OECD 2012). What is needed is a governance paradigm that opens the decision-making arena to non-state actors, all in support of the national governments and their respective mandates. The rationale behind many international interventions to improve transboundary water governance is that the state is the prime actor amongst a range of other actors because they hold the main decision-making power. This has meant that the role of non-(central) state actors in transboundary water management has typically been under-researched (Suhardiman and Giordano 2012), producing only a partial picture of the full governance landscape.

The complexity of collaborative management institutions between countries, as well as the range of stakeholders within these countries (and the need for equitable and just allocation of resources between them), presents an opportunity to contribute to regional development objectives, provided that timely and well-structured institutions are put in place to avoid and mitigate the possibility of disputes developing into conflict (Earle et al. 2010). All this needs to take place with due recognition of the probable impacts of climate change, with effective policies developed and implemented across all levels to mitigate as well as adapt to these adverse impacts.

References

- Allan, J. A., & Mirumachi, N. (2010). Why negotiate? Asymmetric endowments, asymmetric power and the invisible nexus of water, trade and power that brings apparent water security. In A. Earle, A. Jägerskog, & J. Öjendal (Eds.), *Transboundary water management – Principles and practice*. London: Earthscan.
- Andersson, K. P., & Ostrom, E. (2008). Analyzing decentralized resource regimes from a polycentric perspective. *Policy Sciences*, 41(1), 71–93. <http://www.jstor.org/stable/25474353>
- Bigas, H. (Ed.). (2012). *The global water crisis: Addressing an urgent security issue*. Papers for the InterAction Council, 2011–2012, UNU-INWEH, Hamilton, Canada.
- Cash, D. W., Adger, W. N., Berkes, F., Garden, P., Lebel, L., Olsson, P., Pritchard, L., & Young, O. (2006). Scale and cross-scale dynamics: Governance and information in a multilevel world. *Ecology and Society*, 11(2), 8.
- Cole, P., & Schroeder, D. (2004). Justice beyond borders. *Res Publica*, 10(2), 107–113.
- Department of Defense. (2010). *Quadrennial defense review (QDR) report*. Washington, DC: Department of Defense (DoD).

- Earle, A. (2013). The role of cities as drivers of international transboundary water management processes. In B. A. Lankford, K. Bakker, M. Zeitoun, & D. Conway (Eds.), *Water security: Principles, perspectives and practices*. London: Earthscan.
- Earle, A., & Bazilli, S. (2013). A gendered critique of transboundary water management. *Feminist Review*, 103(Special Edition on Water), 99–119. Palgrave Macmillan.
- Earle, A., Jägerskog, A., & Öjendal, J. (2010). *Transboundary water management – Principles and practice*. London: Earthscan.
- Earle, A., Cascao, A. E., Hansson, S., Jägerskog, A., Swain, A., & Öjendal, J. (2015). *Transboundary water management and the climate change debate*. London: Routledge.
- Gibson, C. C., Ostrom, E., & Ahn, T. K. (2000). The concept of scale and the human dimensions of global change: A survey. *Ecological Economics*, 32, 217–239.
- Haas, J. M., Mazzei, L., & O’Leary, D. T. (2010). *Lesotho highlands water project: Communication practices for governance and sustainability improvement* (World Bank Working Papers). Herndon: World Bank Publications.
- Hirsch, P., & Jensen, K. M. (2006). *National interests and transboundary water governance in the Mekong* (Draft report). Sydney: Australian Mekong Resource Centre (AMRC).
- IGRAC, & UNESCO-IHP. (2015). *Guidelines for multi-disciplinary assessment of transboundary aquifers – Draft version*. Delft: IGRAC Publications.
- Jacobsen, M., Webster, M., & Vairavamoorthy, K. (2013). *The future of water in African cities: Why waste water?* Washington, DC: The World Bank.
- Ki-Moon, B. (2007, September 14). What I saw in Darfur. *Washington Post*, p. A13.
- Kurtz, H. E. (2003). Scale frames and counter-scale frames: Constructing the problem of environmental justice. *Political Geography*, 22, 887–916.
- McGinnis, M. D. (2005). *Costs and challenges of polycentric governance*. Workshop on analysing problems of polycentric governance in the growing EU, Humboldt University, Berlin.
- Mokorosi, P. S., & Van der Zaag, P. (2007). Can local people also gain from benefit sharing in water resources management? Experiences from dam development in the Orange-Senqu River Basin. *Physics and Chemistry of the Earth*, 32, 1322–1329.
- NATO. (2010). *NATO 2020: Assured security; Dynamic engagement*. http://www.nato.int/cps/en/natolive/official_texts_63654.htm?selectedLocale=en#p1. Accessed 2 Nov 2011.
- NIC. (2012). *Global water security: Intelligence community assessment*. Washington, DC: National Intelligence Council.
- North, D. C. (1990). *Institutions, institutional change and economic performance*. Cambridge: Cambridge University Press.
- OECD. (2012). *Condition for success 1 “good governance”*. Paris: Organisation for Economic Cooperation and Development (OECD).
- Opotow, S., & Weiss, L. (2000). Denial and the process of moral exclusion in environmental conflict. *Journal of Social Issues*, 56(3), 475–490.
- OSCE. (2010). *Shifting bases, shifting perils: A scoping study on security implications of climate change in the OSCE region*. Organisation for Security and Co-operation in Europe, Vienna, Austria. <http://www.osce.org/eea/78357>. Accessed 2 Nov 2011.
- Ostrom, E. (1996). Crossing the great divide: Coproduction, synergy and development. *World Development*, 24(6), 1073–1087.
- Patrick, M. J., Syme, G. J., & Horwitz, P. (2014a). How reframing a water management issue across scales and levels impacts on perceptions of justice and injustice. *Journal of Hydrology*, 519, 2475–2482.
- Patrick, M. J., Komakech, H., Mirumachi, N., Moosa, P. A., Salame, L., Shubber, Z., Van der Zaag, P., & Wolf, A. T. (2014b). Building bridges between the sciences and the arts of water cooperation – Reflections. *Aquatic Procedia*, 2, 48–54.
- Ramasar, V. (2014). *Fluid governance: Scalar politics in the South African waterscape*. PhD thesis, Lund University, Lund, Sweden.
- Reed, M. G., & Bruyneel, S. (2010). Rescaling environmental governance, rethinking the state: A three-dimensional review. *Progress in Human Geography*, 34(5), 646–653.

- Sneddon, C., & Fox, C. (2006). Rethinking transboundary waters: A critical hydrogeopolitics of the Mekong basin. *Political Geography*, 25, 181–202.
- Snodderly, D. (2011). *Peace terms: Glossary of terms for conflict management and peacebuilding*. Washington, DC: United States Institute of Peace.
- Suhardiman, D., & Giordano, M. (2012). Process-focused analysis in transboundary water governance research. *International Environmental Agreements-P*, 12(3), 299–308.
- UNDP. (2006). *Human development report. Beyond scarcity: Power, poverty and the global water crisis*. New York: UNDP.
- UNEP. (2009). *Water at a glance: The global crisis*. <http://www.unep.org/ourplanet/imgversn/141/glance.html>. Accessed 3 Mar 2015.
- UNESCO. (2008). *From potential conflict to cooperation potential*. <http://www.unesco.org/water/wwap/pccp/>. Accessed 3 Mar 2015.
- UN-Habitat. (2010). *State of the world's cities 2010–2011: Bridging the urban divide*. Nairobi: UN-Habitat.
- UN-Water. (2008). *Tackling a global crisis: International year of sanitation 2008*. New York: UN-Water.
- UN-Water. (2013). *International decade for action: Water for life (2005–2015)*. http://www.un.org/waterforlifedecade/transboundary_waters.shtml. Accessed 30 Oct 2014.
- Van Lieshout, M., Dewulf, A., Aarts, N., & Termeer, C. (2011). Do scale frames matter? Scale frame mismatches in the decision making process of a “mega farm” in a small Dutch village. *Ecology and Society*, 16(1), 38.
- WI. (2010). *Biodiversity loss and the global water crisis: A fact book on the links between biodiversity and water security*. Wageningen: Wetlands International.
- World Bank. (2013). *Water resources management: Sector results profile*. <http://www.worldbank.org/en/results/2013/04/15/water-resources-management-results-profile>. Accessed 30 Oct 2014.
- WWF. (2012). *Shared risk and opportunity in water resources: Seeking a sustainable future for Lake Naivasha*. Authored by Pegasys Strategy and Development (Pty) Ltd. http://awsassets.panda.org/downloads/navaisha_final_08_12_lr.pdf. Accessed 26 Mar 2013.

Open Access This chapter is distributed under the terms of the Creative Commons Attribution-Noncommercial 2.5 License (<http://creativecommons.org/licenses/by-nc/2.5/>) which permits any noncommercial use, distribution, and reproduction in any medium, provided the original author(s) and source are credited.

The images or other third party material in this chapter are included in the work's Creative Commons license, unless indicated otherwise in the credit line; if such material is not included in the work's Creative Commons license and the respective action is not permitted by statutory regulation, users will need to obtain permission from the license holder to duplicate, adapt or reproduce the material.



Chapter 9

Mechanisms for Inclusive Governance

Raymond L. Ison and Philip J. Wallis

Abstract How mechanisms for inclusive governance are understood is built on the framing choices that are made about governance and that which is being governed. This chapter unpacks how governance can be understood and considers different historical and contemporary framings of water governance. A framing of “governance as praxis” is developed as a central element in the chapter. What makes governance inclusive is explored, drawing on theoretical, practical and institutional aspects before elucidating some of the different mechanisms currently used or proposed for creating inclusive water governance (though we argue against praxis based on simple mechanism). Finally, the factors that either constrain or enable inclusive water governance are explored with a focus on systemic concepts of learning and feedback.

Keywords Water governance • Participation • Institutional arrangements • Social learning • Adaptive management • Framing

9.1 Scene Setting

We were invited to address the topic of “mechanisms for inclusive governance”. In many ways this is a loaded title as it comprises three terms that cannot be taken for granted: “governance”, “inclusive” and “mechanism”. For us the pivotal term is governance which, as a contested concept, requires an appreciation of how it might be framed and the possible implications of a given framing choice. Expressed in this way, it is also necessary that we say what we mean by “framing” and “framing choice”. In turn, our title leaves open, and thus potentially ambiguous, the question of what is being governed – a river, a catchment, a complex adaptive system, etc.

R.L. Ison (✉)

Applied Systems Thinking in Practice Group, Engineering & Innovation Department, The Open University, Milton Keynes, UK
e-mail: ray.ison@open.ac.uk

P.J. Wallis

Systemic Governance Research Program, Monash Sustainability Institute, Monash University, Clayton, VIC, Australia



Fig. 9.1 A concept, theory, institution (e.g. policy, regulation, etc.) and a codified practice (e.g. EIA, environmental impact assessment) can be understood as a social technology that acts systematically in relation to practice and human purpose just like a hammer (Source: Ison 2010)

Resolution of this question involves a second set of framing choices. The question of inclusivity can only be addressed conceptually once the former issues are resolved. Questions of how framing happens at the start of any activity and who is involved are suffused with power with both practical and theoretical implications.

In making our claims, we appreciate that there are multiple pathways to inclusivity in a given context and no blueprint or panacea; what is or is not inclusive will be open to interpretation and contextual design. The term “mechanism” has been the subject of intense critique in science studies and certainly cannot be used non-reflexively. It would be unfortunate, for example, if policy-makers and practitioners in water governance felt that they could do their job by selecting elements (e.g. tools, techniques, methods) to combine in simple, mechanistic ways. Our antidote to the trap of mechanism is to recognise that every concept, theory, tool, technique or method always has a user and that this use always happens within a context and for a human set purpose (Fig. 9.1). It is the relational dynamic depicted in Fig. 9.1 that constitutes what we will call a practice performance, though this is a very basic form – usually it is far more complex with multiple actors, tools, techniques, theories, etc. When the performance involves the conscious but practical use of theory, we call that praxis.

The next part of our chapter, Sect. 9.2, addresses framing, explores how governance can be understood and considers different framings of water governance, in particular how these “framings” have developed over time and can be shaped, or transformed, through practical, inclusive, processes. The section also puts forward the framing of “governance as praxis” for discussion throughout the chapter. Section 9.3 addresses what makes governance inclusive, drawing on theoretical, practical and institutional aspects. In Sect 9.4, we deal with some of the different mechanisms currently used or proposed for creating inclusive water governance. Finally, in Sect. 9.5, the factors that either constrain or enable inclusive water

governance are explored with a focus on the constraints to, or opportunities for, systemic water governance.

9.2 Framing Choices

A frame is the context through which a person interprets the world, also known as his or her perception, perspective, worldview, mental model, script or schema (Schön and Rein 1994; Isendahl et al. 2009; Dewulf et al. 2009).

9.2.1 *Why Start with Framing?*

It is generally not appreciated that there are choices that can, and need to, be made as any practitioner engages with a situation of concern. Failure to recognise agency in framing one's practice and the situation of concern leads to loss of transparency, inefficiencies and, too often, conflict, e.g. competing frames arise around contested topics and concepts, such as social-ecological systems, or resilience (McEvoy et al. 2013). Both governance, as a practice, and choices over that which is governed exemplify this conundrum. Power over others is manifest when one group or set of interests control how a concept (e.g. social ecological system), issue or problem is framed to the detriment of other stakeholders.

Framing failure occurs when policy-makers and researchers fail to recognise that they have agency, and thus choices, about how to frame situations of concern; inclusive framing failure happens when those responsible for a policy, or other forms of purposeful action, fail to appreciate that inclusivity begins with opening up opportunities for diverse stakeholders, holding multiple perspectives, to be involved in making framing decisions, e.g. is a catchment framed as a hydrological system, an ecological system, a social-ecological system, etc. It is because of the practical and ethical implications of framing choices that we want to make our own choices in writing this chapter as transparent as we can.

At its most basic, governance can be understood as an abstract and descriptive concept or alternatively, in its verb form, "governing" as a form of practice that has to be carried out in unique ways in multiple contexts and at multiple scales, e.g. across and between national, regional and local levels (Wallis and Ison 2011a, b). In recent history, the framing of rivers and/or catchments (terms which are framing choices in themselves) has been largely the province of hydrologists, engineers, physical geographers and, more recently, ecologists (Molle 2009). These are the framing choices on which integrated water resource management (IWRM) has been largely built. Too often these choices have had the consequence of restricting conceptually and practically, in governance terms, water to the river channel (e.g. through focusing on water quality and biodiversity). For example, historical framing choices currently constrain the activities of the English Environment Agency as

it grapples with implementation of a new catchment-based approach because it is administratively not able to deal with water in the landscape (the province of another government body). Most significantly though, past framing has failed to account for the social in relation to the biophysical and, where present, treating it as an add-on rather than integral to the question of what has to be governed (Ison et al. 2007).

Framing failure is often a precursor to maladaptive responses (practices, policies, investments – see Barnett and O’Neill 2010) because “frames” are used by humans to negotiate the complexity of the world they experience by determining what requires attention and what can be ignored. Any framing choice brings with it systemic consequences; they shape practice and create pathway dependencies. As Lakoff (2010: 71–72) notes:

All thinking and talking involves ‘framing.’ And since frames come in systems, a single word typically activates not only its defining frame, but also much of the system its defining frame is in. Moreover, many frame-circuits have direct connections to the emotional regions of the brain. Emotions are an inescapable part of normal thought. Indeed, you cannot be rational without emotions.

Lakoff’s claims are insightful as they draw attention to the systemic consequences of framing choices including the effects both cognitively and physiologically on the user of a framing choice – which includes both speaker/writer and listener/reader. In other words, it is not possible to avoid the situated and embodied nature of our engagement with the world, for which we each must take responsibility (Ison 2010). Ison et al. (2015b) demonstrate how metaphor theory could be used in practical ways to enhance inclusivity in framing choices; failure to unpack framing assumptions when working collaboratively can undermine governance effectiveness. Of course this also includes how governance or governing is framed.

9.2.2 *Framing Governance*

In the title of his paper “the new governance: governing without government”, Rhodes (1996: 652) makes the first major distinction we wish to reinforce, i.e. governance is not the same as government. Rhodes (1996: 652–3) points out that “governance signifies a change in the meaning of government, referring to a new process of governing; or a changed condition of ordered rule; or the new method by which society is governed”. He goes on to outline six different uses of governance: “(i) as the minimal state; (ii) as corporate governance; (iii) as the new public management; (iv) as “good governance”; (v) as a socio-cybernetic system; and (vi) as self-organizing networks”. These categories are clearly not mutually exclusive.

Rhodes’ (1996) categories, and those of other authors like Steurer (2013), could be used to create a typology of governance. However, we are wary of typologies that become reified as classificatory schemas (Ison 2010), instead favouring inquiry into the concept of governance (and other concepts) that reveals (i) the epistemological commitments that are being put to use when a concept is used (e.g. see Ison et al. 2013a for a discussion on the concept of social learning) and (ii) the elements of

praxis, or enactment of governance (a governance/governing performance) and where praxis is understood as context-sensitive, theory-informed practical action (Ison et al. 2014a). Such an inquiry may reveal praxis features in all or none of Rhodes' six categories which could then be used to inform innovations in practice in contextual and purposeful ways. In our experience, debates about the structures and definitions of categories do little to enhance praxis.

Many but not all authors recognise the historical links of the term "governance" to the act of steering; usually, it is claimed by state and non-state actors (e.g. Steurer 2013: 388). However, not many authors make the connection between governance and the Greek word "kybernetes" (from which cybernetics is derived) meaning helmsperson or steersperson as in sailing a boat. Thus a governor can be understood to regulate a steam engine's function in response to feedback or a sailor may chart a course in response to the complex interdependencies that connect them, via feedback processes, with wind, current and human purpose. It follows that governance may be mechanistic in response to complicated situations or systemic in response to complex situations in the sense used by Snowden and Kurzl (2003) to differentiate between complicated and complex.

The choice of a cyber-systemic lineage of framing governance issues which we adopt in this chapter is not new (e.g. Blunden and Dando 1994) but is possibly neglected or poorly articulated in recent governance discourse (e.g. Rhodes *ibid*). Within this framing, our central organising metaphor is of a helmsperson (sailor) steering, or charting, an ongoing viable course in response to feedback (from currents, wind, etc.) and in relation to a purpose that is negotiated and renegotiated within an unfolding context, i.e. in response to uncertainty (Cook and Yanow 1993; Ison 2010). It is in relation to questions of purpose and who participates in agreeing purpose that inclusivity becomes central, both practically and theoretically.

Other dilemmas appear in the governance literature such as that articulated by Steurer (2013: 388), as "who steers and how". Whilst questions of "who" and "how" are vitally important, they must, in our view, be systemically related to questions of "what" and "why". Consistent with systems theory, we choose to understand why/what/how as a nested hierarchy equating to supra-system/system/subsystem (Fig. 9.2). "What" relates to a purposeful framing choice, e.g. a catchment understood as a hydrological system, a social-ecological system, a complex adaptive system, etc. – but it is important to understand that a system is not some pre-given entity, but a device that is created so as to learn about, or change, a situation of concern from a systemic perspective; "why" relates to the purpose of the system as understood by those who want to learn about or change the conceptualised system of interest. For a given "what", there are multiple "hows". Working in the Cooum River, Chennai, India, Bunch (2003) exemplifies how using soft systems methodology (SSM) these systemic concepts can be used with stakeholders to effect improvements.

Conceptually "who" is in another domain – in some contexts "who" can equate to a "how" (e.g. by engaging stakeholders in a situation of concern), but within second-order cybernetic understandings (Ison 2010), the answer to "who" is present in every saying and doing; the "observer" is always present even if social practices,

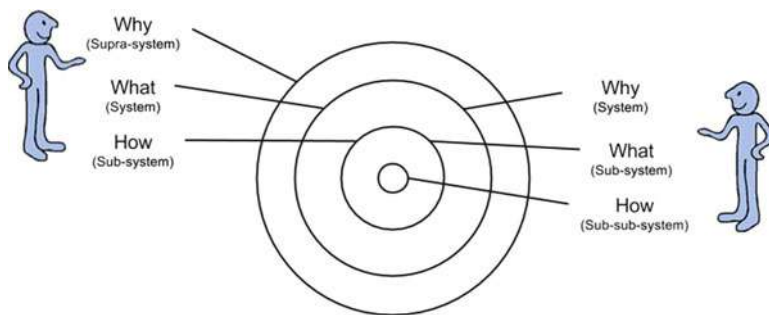


Fig. 9.2 The systemic relationships between why, what and how as understood from a systems theoretical perspective – these are observer-dependent categories (Source: Adapted from Checkland and Poulter 2006)

particularly practices associated with doing science, abstract them away. In this regard, we as authors are present in what we say and acknowledge responsibility for our saying/writing. From this perspective, there is no external, objective, observer position, i.e. we are all situated in what we do when we do what we do. Our position has broader implications for understanding inclusivity which is not just a question of “who” but also “when”, i.e. is consultation tokenistic after “what” and “why” have been decided, or do a full range of potential stakeholders participate in effecting “why” and “what” through active citizenship that develops eco-literacy and processes that deepen democracy? Put another way, inclusivity is creating the means for taking and enabling responsibility, including for one’s own practice.

9.2.3 Framing Practice

Figure 9.3 is a heuristic developed to facilitate a conversation about what practitioners do when they engage in their practices, e.g. governing water catchments. It is important to understand this dynamic to begin to fully appreciate (i) how framing operates, (ii) the implications of particular framing choices, and (iii) how governance might be enacted in relation to chosen framings. The systemic implications for framing choices can be understood by exploring Fig. 9.3. If policy-makers (e.g. government agencies) and outsider researchers are understood as those on the left who bring their politics, theories of change and implicit and explicit theoretical and methodological understandings (e.g. disciplines) to the collaborative situation (programme, project, catchment management agency, water users association, etc.), they face local people (extant stakeholders or those whose stakes need to be built) who too have their politics, theories of change, etc. Then of course there are the differing cultural traditions of the researchers, administrators, local actors, etc.

One pervasive and ultimately divisive division is that between biophysical and social research/researcher traditions (Ison et al. 2013c). Programmes, projects and

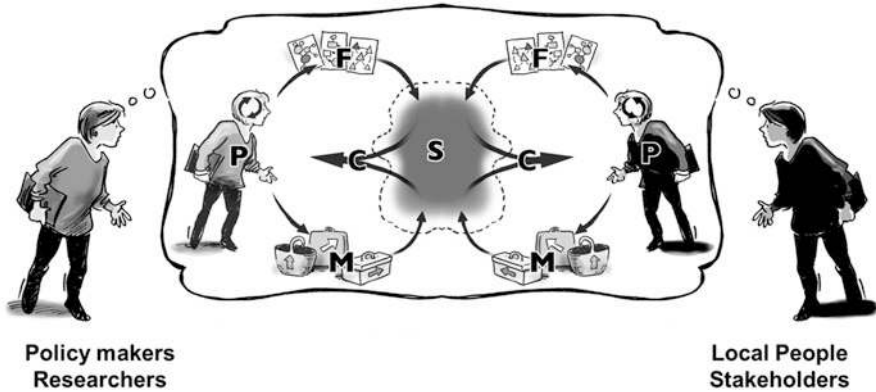


Fig. 9.3 A Janus-like dynamic between water governance policy-makers and funders with catchment-based stakeholders – all actors with their own histories as practitioners (P), frameworks of ideas (F) and methods and methodologies (M) brought to bear on situation of concern (S), framed initially in different ways, from which data and information are captured (C) in some form (Source: Adapted from Ison et al. 2013d)

NRM agencies – in fact any purposeful human action in the field of natural resource management (NRM) to succeed – must be capable of creating an effective performance (a relational dynamic) amongst these multiple actors just like the players in a new band or orchestra. Our framing rests on the acknowledgment of uncertainty and the realisation that it is the quality of the relationship between the social and the biophysical as revealed in different trajectories that now warrants attention.

As a means to unpack this relational dynamic, we have invoked the Janus metaphor (Ison et al. 2014b). Janus was the Roman god of gates, doors, doorways, beginnings and endings. What the Romans realised in admitting Janus to their Pantheon of Gods was the eternal flow and connectedness that is central to our world – that for every outside there is an inside. Janus is an antidote to the trap of language and thinking that arises when we name, and think of, things in isolation from the processes of which they are a part (Koestler 1967, 1978). In other words, when actions are isolated conceptually, practically and methodologically in a project situation (outside) from the same set of considerations in programme and project framing, design and conduct (inside), then systemic coherence can too easily be lost, e.g. whether the outside research team has the right mix of social and biophysical scientists and thus the requisite skills set that such mixes enable (Ison et al. 2013c, 2014b). Systemic coherence between the outside of on-the-ground projects or agency operations and the inside of programme design and logic, what is increasingly referred to in the literature as the “programme theory of change”, is we will argue a matter of achieving the systemic governance of a series of nested purposeful activities that could be framed as ongoing inquiries, as medium-term programmes or short-term projects. However, projects as an institutional form are no longer adequate for achieving effective, long-term systemic governance (Ison 2010).

9.2.4 *Governance as Praxis*

Historically, and in some circles still, rivers and/or catchments have been framed as natural, biological, hydrological, ecological entities, sometimes “systems” (Molle 2009). However, there is a shift underway, driven in part by emergent understandings of the need for climate change adaptation. In the pre-Anthropocene era, many, if not most, of our institutions were built on a belief that there is a fixed form of knowledge around which a problem can be stabilised and regulations or other governance mechanisms formulated and applied as a fix (Ison et al. 2007). This is linked to the pervasiveness of evidence-based decision-making, especially within the medical sciences, and has been historically applied in many other fields, such as hydrology. In the water field, historically dominated by engineers and water technologists, Milly et al. (2008) outline how “stationarity”, the idea that natural systems fluctuate within an unchanging envelope of variability, has become a foundational concept that permeates training and practice in water-resource engineering. However, in the context of climate change, they argue that “...stationarity is dead and should no longer serve as a central, default assumption in water-resource risk assessment and planning” (p. 573). They argue that “finding a suitable successor is crucial for human adaptation to changing climate” (p. 573). Lins and Cohn (2011: 476) put the situation this way:

Instances where nonstationarities are fundamentally uncertain or chaotic pose a qualitatively different problem. With respect to climate, for example, it has been hypothesized that the addition of carbon dioxide to the atmosphere will alter the hydrologic cycle. Details of future change – magnitude, sign, timing, and location – are unknown, and possibly unknowable, even for large watersheds. Given such “information” what, if anything, should one do?

They go on to argue that:

based on the scientific uncertainties that exist with respect to climate change at practical, spatial, and temporal scales, and existing challenges ..., we conclude that climate change is better understood as a cause for humility [rather than for physics] and caution, and that model-based scenarios of future climatic conditions are unlikely to make a quantitative contribution to our physical understanding.

Galloway (2011: 563) reports on a meeting of US water professionals which sought to address the “death of stationarity” and the implications for their praxis. He says: “Two decades ago they would simply have turned to the Interagency Advisory Committee on Water Data Bulletin 17B (1982) to produce an estimate of 100-year and other flood flows, knowing that stationarity permitted them to create a statistical estimate of their threats.” This is a good example of climate change triggering awareness of the need for institutional transformation. Amongst their conclusions was that future “change will necessitate new approaches in planning”, i.e. “(a) dynamic design – pick the plan that is effective in meeting multiple plausible futures and (b) [the] need [for] a new, multi-disciplinary attack on water resources planning and management – we need a new paradigm” (p.564). Galloway (ibid) notes, however, that there is conflict over future direction and that most hydrologists continue to use techniques that assume stationarity.

Performances and designs built on stationarity and fixed knowledge forms give rise to systematic (i.e. linear, step by step) practice rather than systemic practice that is relational, recursive and circular and characterised by feedback processes, learning and adaptation (Ison 2010). In other words, traditional framings used in water/catchment governance are no longer adequate to our circumstances. As the commentators cited above argue, new understandings and practices (new paradigms) are needed. What a river/catchment is taken to be is undergoing a shift of historical proportions as exemplified in a move from the framings on which IWRM rests (see below) to the governance of a social-ecological system. The use of the concept “nexus” is a further shift in framing choice exemplified by Campbell (2014) when he spoke about “converging insecurities of food, water, energy and climate, and their implications for 21st Century farming systems”.

In our Systemic Governance Research Program (SGRP) and CADWAGO research (see <http://www.cadwago.net/>), we are exploring the implications of framing governance in terms of the theory-informed practices (praxis) that can give rise to effective performances amongst multiple stakeholders in contexts of uncertainty and surprise (Ison and Wallis 2011; Ison et al. 2013b). A performance as in a good team, an orchestra, dance or play demands inclusion of the “right actors”.

9.3 What Makes Governance Inclusive?

This section addresses what makes governance inclusive, drawing on theoretical, practical and institutional aspects. To address the idea of inclusivity, we do not draw our boundary purely in the social domain but instead prefer a framing of a river/catchment as a structurally coupled social-biophysical system (Fig. 9.4). Please note we are not claiming that catchments *are* these types of systems but that it makes sense to frame them as such whilst recognising that other framings may also



Fig. 9.4 A metaphor for a mutually influencing, structurally coupled, social-biophysical system. The bubble constitutes the human social system; in the image on the right, the arrows represent processes and institutions invented by humans that mediate the relationship, over time, of a social and biophysical system (Source: Adapted from Ison 2010)

have utility. We choose this framing because of experiences of confusion around the concept social-ecological system, especially as to how boundary judgements (to the system) and relational dynamics are understood. Our framing choice does not treat a social-biophysical system as a single entity or system, but as a relational dynamic between two systems mediated by human-invented institutions (rules of the game) and technologies. This framing is also an act of inclusion as it recognises the systemic, relational dynamics between people and their biophysical environments as well as distinct relational dynamics within a social and a biophysical system (Figs. 9.3 and 9.4); situational framing sets the key initial starting conditions which give rise to inclusivity, or not. Within our preferred framing, concerns like “biodiversity conservation” are means of influencing the unfolding dynamic between the social and the biophysical through the design and use of new institutions that serve human purposes in relation to conservation, e.g. the institutional forms of “ecosystems services” if they become widespread are likely to have a major impact on this unfolding dynamic (Ison 2011).

Framing choices and awareness need to operate at multiple levels and in relation to situations and practices. We have outlined our framing preference for the situations that have to be governed – structurally coupled social-biophysical systems. However, how these might be governed requires another framing choice – here our preference is to see governance situations as akin to “wicked problems” or situations characterised by complexity, uncertainty, interdependencies, and multiple perspectives where what is at issue has to be constructed by concerned stakeholders (Ison et al. 2007, 2015a). Thus, what is, or is not, inclusive is related to the locked-in historical features of a situation that can create pathway dependencies and to initial starting conditions associated with a new issue or an emergent concern or crisis. As practice in relation to situation unfolds, there are multiple opportunities for being inclusive or not. Here we outline three matters that if not understood can affect inclusivity.

9.3.1 *Theories of Change*

In research for development (R4D) and water governance circles, the concept of “theories of change” has begun to shape almost all praxis because of how it is linked to monitoring and evaluation (M&E) of projects and programmes and thus measures of success and funding. Because of the power this concept has been given and because it is in some ways foundational to praxis, we explore it here. Figure 9.3 can be used to unpack the various understandings that can be attributed to a “theory of change”. Unfortunately, all too often this term has come to mean the systematic coherence between the “outside” of on-the-ground projects and the “inside” of programme design and logic, i.e. it has become a mechanism known as the “programme theory of change” to test *ex ante* what a programme design will deliver or the impact it will have. At its crudest, a “theory of change” diagram (as they are usually expressed) is a more sophisticated form of a project logframe. At its most

sophisticated, “theories of change” are concerned with an *ex ante* (and continuing) process of inquiry that surfaces different worldviews amongst multiple stakeholders, usually in designed “theories of change” workshops.

For example, Coover et al. (1977) advocate exploring elements of a theory of change so as to clarify purpose and to establish what would be regarded as success. Their elements include a consideration of the nature of human beings; the nature and sources of power, truth and authority; an analysis of causality of social problems; roles of individuals and institutions; visions of how change can occur; and mechanisms for change. These elements might well be adapted to use in the context of catchments framed as we have chosen. Earlier sections of our chapter are, we claim, very practical because all issues we raise underpin the theories of change that different stakeholders hold. The point is that the more that an individual or group’s “conceptual baggage” and epistemological and theoretical commitments (e.g. local knowledge, cultural knowledge, scientific knowledge) are surfaced within a conversation or dialogue, then the more the inclusivity deepened and the conditions for building a creative and effective performance emerge (Ison and Russell 2000). Inclusivity gets nowhere unless these issues are appreciated and addressed. In turn, how learning is understood and thus enabled is shaped by theories of change and learning.

9.3.2 *Understandings and Practices*

Within social theories of learning (in contrast to older, cognitivist theories), learning emerges from the dynamics of social relations (Blackmore 2007). In researching social learning from this theoretical understanding of learning, what changes through inclusivity are the practices and understandings of those involved as they construct and transform what is at issue (Fig. 9.5). Participation is a necessary but not sufficient condition for social learning to happen (Carr and Wilkinson 2005; Collins and Ison 2009, 2010; Collins et al. 2009). Much has been made of Arnstein’s (1969) ladder of public participation, where participation is conceptualised as power. Various models of participation have been institutionalised, such as the International Association for Public Participation (iap2) spectrum of participation, commonly employed in the public service as guidance for engaging citizens. Critique of ladder or spectrum metaphors emphasise their oversimplification, a lack of learning or feedback mechanisms, hierarchical framing and, in particular, a lack of context in which participation is situated (Collins and Ison 2009).

Social learning within the SLIM research tradition moves beyond participation and is understood as both a social dynamic that transforms situations and a governance mechanism that can be invested in – much like a city’s orchestra (see Colvin et al. 2014; Ison et al. 2013a). Inclusivity is thus more than a participation as those constraints to, or enablers of the shifts in understanding, and/or practices crucial to social learning have to be addressed. Institutions are the most significant constrainters or enablers of changes in understanding and practices.

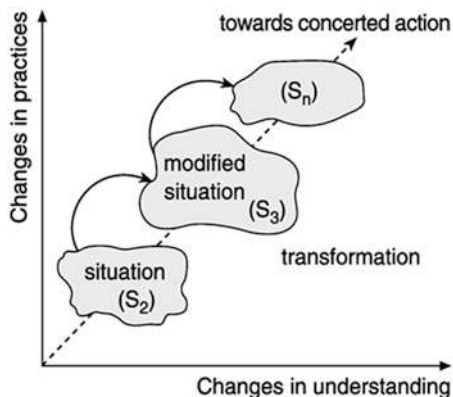


Fig. 9.5 Social learning: the process of socially constructing an issue by actors in which their understandings and practices change, leading to transformation of the situation (S_1 is the historical situation not shown and S_2 , S_3 and S_n are situations transformed over time) through collective/concerted action (Source: Steyaert and Jiggins 2007)

9.3.3 Institutions and Social Technologies

Adopting North's (1990) understanding of institutions as “rules of the game”, we find that some rules are more inclusive than others and also that there are advantages to regarding institutions as a form of social technology in the sense depicted in Fig. 9.1. Institutions understood as technologies enable a questioning of the mediating role that they play in relation to practice rather than entities considered in isolation. Institutions for governing water resources range from stringently defined legislation and regulation, to more flexible forms such as organisations, community groups, projects or policies, to emergent phenomena such as markets or different “types” of water (e.g. potable water, wastewater, etc.). In catchment management, institutions are pervasive and resolve into a high degree of complexity (Wallis and Ison 2011b).

9.4 Enacting Inclusive Governance

This section deals with some different approaches that are currently utilised or proposed for creating inclusive water governance. Traditional framings, we claim, are not inclusive, whereas the examples following tend to open up the possibility of inclusiveness though do not guarantee it. These are not mechanisms in a mechanistic sense; rather they represent different framings potentially conducive to inclusive

governance; they are mechanisms in the sense that they are choices that can be made purposefully, but they are not “blueprints” to be followed mechanistically through rule-based procedures. As we outline in the last section, these framing choices create contexts for systemic innovation and design. Each, as domains of praxis, has developed particular tools, techniques, institutions, metaphors and methods which when used effectively can facilitate inclusivity – we exemplify some of these in the final part of this section under the rubric of “modalities of practice”.

9.4.1 Integrated Water Resource Management (IWRM)

IWRM is considered to be a central concept in contemporary water governance (White 1998; Lubell and Edelenbos 2013). The key feature of IWRM is “integration”, which is a normative goal that can refer to the integration of fragmented responsibilities for water governance (functions), institutional fragmentation (e.g. Wallis and Ison 2011b) and societal fragmentation (Lubell and Edelenbos 2013). The latter, societal fragmentation, is characterised by a disconnect between those making decisions and those affected by them. IWRM promotes stakeholder participation through some platform or institutional arrangement that promotes inclusion. However, as Warner (2006) found in an assessment of multi-stakeholder platforms in managing catchments, a realistic assessment of their purpose and capacity to achieve this ought to be considered before initiation. A finding from SLIM research (Ison et al. 2007), in which 14 empirical case studies of water governance platforms were undertaken, was that the existence of a multi-stakeholder platform, i.e. of multi-stakeholder institutions, did not guarantee effective performances that could be said to constitute social learning.

How is IWRM suited to governing the relational dynamics between people and their biophysical environments? One enduring challenge that Molle (2009) highlighted is managing interconnected and nested biophysical landscapes with disconnected administrative and social systems. Inclusiveness in IWRM could help “connect” social systems, achieving a greater variety of participants particularly through inclusion of people with local-scale interests. Institutional barriers, such as the centralisation of policy and lack of support for local capacity to implement IWRM (Medema et al. 2008), are both impediments to and arguments for greater inclusiveness.

Despite the duration of IWRM as a governance framing choice (White 1998), what has not become clear is a praxis (or praxeology) of IWRM including the institutional forms needed to support this praxis. In this framing, the perennial issue is how to address the question: what do actors need to experience to claim that integration has occurred? In our experience, this question is rarely addressed well, in situations where integration is sought or claimed.

9.4.2 *Strategic Adaptive Management (SAM)*

SAM has developed as a praxis in response to a framing choice about situations such as those concerned with “freshwater ecosystem conservation” (Kingsford and Biggs 2012), the adaptive management of national parks (Biggs and Rogers 2003; Freitag et al. 2014) or the systemic governance of river catchments (Pollard and Du Toit 2011; Kingsford et al. 2010) framed as complex (sometimes as complex adaptive) systems. It is mainly, though not exclusively, a South African innovation which continues to evolve (Roux and Foxcroft 2011; see RESILIM Project – <http://award.org.za/project/resilience-in-the-limpopo-basin>). Freitag et al. (2014: 4) describe SAM’s origins in the following terms:

The KNP turned to the ecosystem management approach advocated by Rogers and Bestbier (1997), which acknowledged the centralities of scale and participation, incorporated societal value systems, and provided management accountability. It was termed strategic adaptive management (SAM) because it emphasized the notion of preparing for the future rather than reacting to the past (Rogers and Bestbier 1997; Rogers and Biggs 1999) and was facilitated through an inclusive process designed to establish a shared vision and hierarchy of objectives, which would direct management toward acceptable and achievable operational goals. A goal maintenance and revision process promoted learning and institutional memory to accommodate ongoing adjustments to emerging conditions and new understandings. (Rogers and Bestbier 1997)

As Fig. 9.6 depicts, there are a range of stages to SAM each employing different methods, techniques and tools. The quality of engagement is regarded as a key first step, i.e. inclusivity, although the criteria for, and thus the boundaries of, inclusivity are not always elucidated in reports on SAM. Nonetheless, there is evidence, in the rivers of Kruger Park in particular, of a “closer working partnership between researchers, managers and field staff with buy-in [to the SAM approach] and co-learning” (Pollard et al. 2011).

As with all method innovation, it is important that users do not fall into the trap of thinking of SAM (or other approaches) as blueprints to be blindly followed; praxis that is methodologically robust always involves the adaptation of the method (and its constituent elements) to a given context, and all users should be open to theory-informed innovation whilst avoiding the ad hoc addition of tools and techniques.

9.4.3 *Social Learning*

Whilst the concept of social learning can be represented through a variety of metaphors (Ison et al. 2013a), we opt to use it in the sense of creating a governance performance that can frame learning amongst stakeholders in social-biophysical systems. This process is depicted in simple terms in Fig. 9.5. As with any praxis that is performative in nature, the effectiveness of the performance is a product of, as well as a producer of, social relationships between those involved – something we

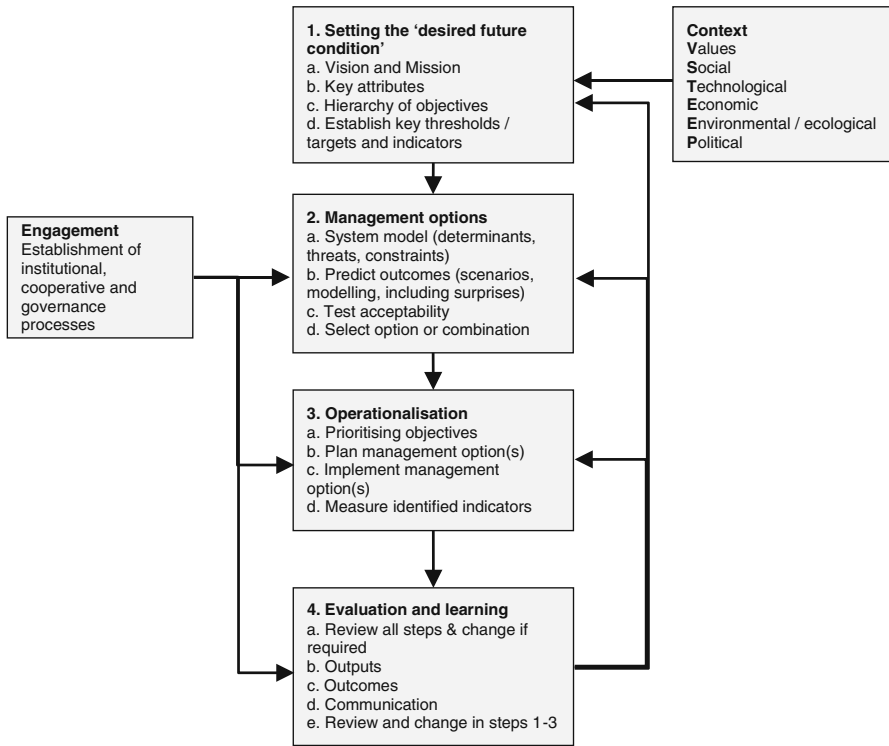


Fig. 9.6 A model of generic strategic adaptive management (Source: Adapted from Kingsford and Biggs 2012: 19)

have described as building relational capital. In contrast to the traditional governance approaches of regulation, information and markets where fixed forms of knowledge are applied to manage natural resources, social learning offers a chance for inclusive learning about and acting to improve situations (Ison et al. 2007; Collins and Ison 2009). In this sense, social learning can be understood as both governance mechanism, something to invest in like the orchestra of a city, and a social dynamic between different actors with different instruments who strive to create a performance that is agreed to be effective for the context or issue.

As Wallis et al. (2013) describe, social learning is not necessarily new – they provide evidence of social learning from a Salinity Pilot Program Advisory Committee in Victoria, Australia, that evolved under a particular set of historical circumstances. “Effective performances” were built in addressing salinity at catchment scale, but the understandings, practices and institutional arrangements that enabled this to happen have been largely lost to the current generation of policy-makers and practitioners. This exemplifies a failure to institutionalise learning.

9.4.4 *Modalities of Practice*

Each of the approaches outlined above incorporates different tools and techniques that when enacted give rise to an effective performance, or not. Like all performances, mastery from hard work is required. No approach is intrinsically bad or good but offers different governance possibilities when adapted to context and with innovations through incorporating different modalities of practice. Sometimes, however, unhelpful modalities of practice become conserved. Ison et al. (2011: 3979) drew attention to the widespread conservation within ICM and IWRM of the linear metaphor associated with systematic, linear cause and effect, and mainly reductionist, thinking despite the espoused holistic intent of these approaches. They make the case for:

experimenting with and progressing innovative second-order modalities' of dialogue (those forms of conversation in which there is a reciprocal 'turning together' as in some dances) and learning through various forms of deliberation across relevant organisations. A key focus [being] how policy makers, policy implementers and scientists might better work and learn together, and the specific skills and practices the new modalities require.

In Table 9.1, seven modalities of practice are described which could, in theory, be used within any governance framing, but, when used effectively and with contextual understanding, have the potential to enhance inclusivity. We caution against interpreting these as tools – unless one understands that all tools have a use context and a user that is generally unique.

The examples within Table 9.1 are by no means exhaustive, and as argued by Ison et al. (2011: 3984), “no modality can be considered successful in and of itself, as success will be derived from an awareness of context and the generation of performances fit for circumstances”.

9.5 Constraints and Opportunities

This final discussion explores the factors that either constrain or enable inclusive water governance, with a focus on those factors which currently constrain shifts towards systemic governance. It is important to realise that despite considerable research activity which has generated conceptual and methodological innovation for inclusive governance of rivers/water catchments, there are limited examples of sustained, inclusive, “governance performances”. We make this claim despite the very large effort and resultant literature devoted to participatory approaches. Why is this the case? The answer is of course multifaceted.

Table 9.1 Modalities of practice and implications for inclusivity in water governance

Modalities of practice	Implications for inclusivity
Mapping and diagramming	The act of diagramming using a range of systems techniques (e.g. rich pictures, systems maps, etc.), either individually or collectively can unpack mental models and worldviews, surface patterns of causality and influence and boundary judgements
Media technology	Social media, participatory mapping platforms, online communities and other media technologies provide platforms for participation in policy-making and planning
Intermediary objects	Objects, such as geographic landmarks, documents or even living things can act as mediating or facilitating devices for identifying stakeholders and encouraging deliberation
Development and use of heuristics	Heuristics are conceptual models that are purposefully designed to facilitate learning and change. The figures in this chapter are examples of heuristics that mediate new understandings
Metaphor exploration	Questioning the phrases used by stakeholders in conveying their ideas can reveal particular worldviews and conceptual traps (e.g. the “roll-out” of policy implies a linear transfer). Exploring metaphors with other stakeholders can lead to greater shared understanding
Systemic inquiry	Systemic inquiry involves a more free-form exploration of complex situations, compared to predefined projects. Performed jointly, systemic inquiry can lead to greater appreciation of situations amongst stakeholders
Building communities of practice	Communities of practice are groups of people who work together towards realising a common goal. They cannot simply be created, but the conditions for their emergence can be provided

Source: Adapted from Ison et al. (2011: 3983–4)

9.5.1 Key Constraints to Inclusivity

The following are, from our perspective, key constraints to governance innovation that secures inclusivity in a sustained, ongoing manner.

1. *Persistent, inappropriate framing failure:* As argued by Jorgenson and Steir (2013: 15), practitioners, in whatever domain, must take responsibility for their invitations and context setting as well as how their frame is heard and acted upon by others. They argue for taking seriously “Schön’s (1983) notion of ‘reflection-in-action’, responding in the moment to divergences in frame setting that we as good listeners, allow ourselves to hear”. Drawing on the insights of Gregory Bateson, these authors note how framing occurs at multiple levels and involves attention to the presence and acceptance of ambiguity and paradox as crucial sources of novelty, or innovation, which are essential when responding to uncertainty.
2. *Boundary judgement failure:* Whenever the concept “system” is invoked, then a boundary judgement as to what is system and what is environment of the system, as mediated by a boundary judgement, must be made. Otherwise the concept “system” is virtually meaningless. Once recognised as a key element of praxis,

then it becomes critical to address the question of “who participates in making the boundary judgment(s)?” (Ulrich and Reynolds 2010). Unlike Huntjens et al. (2012) who refer to the need for boundary definition (as if systems pre-existed their formulation), we would argue for praxis that engages critically with boundary formulation and critique (see Chapter 12 in Ison 2010).

3. *Reflexivity failure amongst practitioners and policy-makers*: By reflexivity, we mean the second-order process of reflection upon reflection. Reflexivity, as praxis, is what is needed to purposefully move between single-, double- and triple-loop learning (e.g. Huntjens et al. 2012) – to make these terms more than category descriptions. As Schneider and Ingram (n.d.) argue, the role of policy analysts has not evolved to fit a new model of collaborative governance, instead remaining narrowly focused on “production of models, forecasts, causal analysis and experimental and quasi-experimental evaluation studies”. Schneider and Ingram (ibid) along with Ison et al. (2015a) also point to the constraints to reflexivity, and thus governance reform, posed by the sustained adherence to a “utilitarian rationality”, or what is sometimes described as “the high ground of technical rationality”, rather than descending into the “swamp of real-life issues” (Schön 1995).
4. *Failure to change patterns of investment and institutions of systemic innovation*: In a climate change world where stationarity is dead, it makes no sense to sustain traditional investment patterns associated with the linear conception of problem → knowledge → regulation/education provision → monitoring → adoption/compliance. The evidence is that in environmental issues, it is easy to regulate but difficult and expensive to monitor and gain compliance. This historical model also means that upfront investment is generally low but that for effective compliance, costs increase over time, or new policies and regulations have to be sought, thus creating a treadmill of policy failure in the face of “wicked-like” issues (Ison et al. 2015a). Moves towards inclusive governance shift investment to the front end of purposeful action.
5. *Institutionalisation failure*: Over 40 years ago, Rittel and Webber (1973) invented the terms “wicked” and “tame” to frame situations of concern to them as planners and designers, and despite growing recognition of consistent public policy failure in the face of situations they called “wicked” (APSC 2007; Ison et al. 2015a), institutional arrangements have rarely been put in place to engage effectively with these types of situations. This is an example of persistent institutional failure and is part of the motivation for authors like Huntjens et al. (2012) and Ison et al. (2015a) to propose institutional design propositions for operating in a climate change world. As depicted in Fig. 9.1 though, institutions (as social technologies) must go hand in hand with praxis innovation. Institutionalisation failure needs to be separated from the failure of institutional innovation – the crafting or designing of new institutions (Ison 2014) that are more fit for purpose, e.g. there is considerable research pointing to the value of voluntary organisations such as the Tweed Forum (on the English-Scottish border) aiding more systemic water governance (Collins et al. 2007; Cook et al. 2013; Rouillard et al. 2014).

6. *Failure to understand theoretically how learning operates, or could operate, for collaborative governance and adaptive managing and how feedback processes are central to ongoing praxis and institutional innovation* (Blackmore 2007; Pollard et al. 2011). Pollard and Du Toit (2011) exemplify what is at issue. In a 3-year study in six major catchments in the water-stressed north-east of South Africa, they examined factors constraining or enabling implementation of adaptive water management. They concluded “that self-organisation and responsive multi-scale feedback loops are essential for management in catchments understood as complex systems as they provide the basis for learning and response to an evolving context”. Successful feedback processes included: “meeting the requirements of the law (the Reserve), the availability of benchmarks against which to monitor (the ‘[Environmental] Reserve’, albeit a static value), the presence of a ‘watchdog’, the responsiveness of the manager and users, communication and the ability to self-organise and self-regulate” (Pollard and Du Toit 2011: 4019). As identified by these authors, too often feedback processes are fragile, often depending on single individuals, and thus are prone to breakdown. Also they may be confined “to a local scale and lack key supportive linkages to wider scales that would confer strength and resilience” (ibid).
7. *Failure to take the “design turn” in doing and enabling governance and governing*: We use the word “turn” here in a similar way to those who advocate taking a “critical turn” – i.e., a change in how we appreciate a situation and subsequently engage with it by incorporating a new (second-order) awareness. A “design turn” opens up a space in which we can reflect on our engagement with a situation as a product of our own design; i.e. rather than adopting a preconceived set of ideas or principles embodied in a given approach, such as project management, we start to appreciate the options we have available for engaging with a situation in different ways and start to adjust (design) our approach to the specific dynamics, requirements and constraints of the situation. However, it is not only practice (governing) that has to be developed and changed but the context of practice (governance). Failure to consider both can place change efforts on a pathway to systemic failure. For example, Table 9.2 shows one of five general lessons and specific elements that Measham et al. (2009) derived from their research and engagement with the sparsely populated Lake Eyre Basin community, in arid, central Australia. Each of the elements derives from experience and has meaning in the context of their generation, including amongst those who generated them. However, as expressed, they offer little to a would-be designer of an engagement process in another context because they are not expressed as design propositions nor linked to theories that enable them to be scaffolded into governance performances.

Ryan et al. (2010), also from Australian experience, articulate ten principles for moving towards systemic NRM governance:

1. Continuity: For Australia to be sustainable, it needs an enduring, country-wide NRM delivery infrastructure.
2. Subsidiarity: Devolve decision-making to the lowest capable level.

Table 9.2 Some of the understandings and practices which contributed to successful natural resource management (NRM) community engagement in the Lake Eyre Basin, Australia

General lesson	Specific elements
Work strategically in the system	Successful NRM engagement relies on maintaining community trust whilst carefully navigating governance processes
	Learn how the system works
	Understand the rules and cultures and know-how and when to use them
	Ask about the meaning between the lines when policy is ambiguous
	Be strategic: Look for the right mix of regional independence and fitting in with federal and state government priorities
	Be adaptive
	Recognise that over time community perspectives and priorities change
	Adapt to changing governments and processes
	Use partnerships effectively
	Recognise the value of long-term collaborations
	Link with agencies, research and industry
	Meaningful inputs require meaningful outputs
	Maintain transparency
	Let the public know about decisions taken
	Publicise outcomes effectively, e.g. online
Maintain necessary documentation	
Keep people informed: Knowledge is power	

Source: Measham et al. (2009)

3. Integrated goal setting: Base investments and governance mechanisms on coherent, nested and integrated goals.
4. Holism: Plan to address whole systems.
5. Systems approach: Match governance mechanisms to the nature of the linked social-ecological system.
6. Relationship orientation: Recognise that relationships are as important as organisations.
7. Resilience: Manage for resilience of ecosystems and communities.
8. Knowledge and innovation: Equip the governance system with skills, capacity and knowledge, and encourage innovation.
9. Accountability: Base the case for investment and accountability on sound systems data and knowledge.
10. Responsiveness and adaptability: Regularly review and adapt the whole Australian NRM governance system.

Material presented in this chapter has the potential to enhance and/or refine these design principles.

8. *Failure to invest in capacity and capability building and demand creation for the right skill sets*: Attempts to articulate an agenda for skill, capability and thus capacity building for inclusive water governance have been made in the past (e.g.

SLIM 2004). However, it is not apparent that relevant curricula are widespread, or that investments are being made, to develop appropriate capabilities.¹ The challenge of governing water is complex, and thus the research needed to inquire into water governance situations necessarily comes from diverse disciplinary perspectives, as well as multi-, inter- and transdisciplinary research perspectives (Roux et al. 2010). Capabilities for doing transdisciplinary research needs to be built early in the careers of water researchers, as one group of early-career researchers claim in Patterson et al. (2013). This includes not only the abilities of the individual researchers but also the institutional settings in which research takes place, whilst the formation of self-organising communities of practice can help support cohorts of water researchers in achieving reflexive and inclusive research practice.

It is not only researcher understandings and practices that need to be enhanced; similar arguments apply to policy-makers and those involved in sector-wide professional practice. For example, Patterson et al. (2014: 1) developed a framework for assessing “enabling capacities” for facilitating collective action in catchment management contexts, which included “prior experience and contingency, institutional arrangements, collaboration, engagement, vision and strategy, knowledge building and brokerage, resourcing, entrepreneurship and leadership, and reflection and adaptation”. They found that the interplay between several of these identified capacities was important for the emergence of “practical action”.

Pollard and Du Toit (2011) found practice-based understanding of policy, the role of leadership and communication to be critical skill sets. Rouillard et al. (2014: 644) point to the need for fostering more in-depth reflection and learning during policy implementation (to which we would add development) but acknowledge that this would require more flexible policy and institutional arrangements that enable policy implementers “to work outside regulations and organisational targets, and build long-term relationships” with stakeholders.

The eight points made above cannot be considered in isolation – they first have to be dealt with systemically (holistically) rather than systematically (in a linear, step-by-step manner). On the positive side, there is widespread ferment in water governance circles with many creative attempts to generate a new wave of governance reform, whether under the framings we have described here or others which have received less attention from us such as adaptive management, collaborative governance or collaborative co-governance. There is still much to be learnt about inclusivity from governance experiments now underway, whether in the Mekong Basin through M-Power (2012), the Limpopo River basin through RESILIM², reforms of the Murray Darling Basin in Australia, implementation of the European Water Framework Directive, the currently stalled implementation of the innovative South Africa National Water Act 1998 or recent advances in transboundary water

¹Innovative examples include <http://www.watercentre.org/news/education/programs/master-of-integrated-water-management> (Accessed 8th July 2014).

²<http://award.org.za/project/resilience-in-the-limpopo-basin>

governance as described by Armitage et al. (2015). The elements to create and sustain effective inclusive, systemic governing performances are, we argue, already largely known, but yet to be embodied in the actions of practitioners and policy-makers within conducive and sustaining institutional arrangements. In the sense articulated by Whatmore and Landström (2011: 606), based on their work in the catchment of Ryedale (UK), it is not only the transformation of professional practice that has to occur but at the same time “facilitate the emergence of new kinds of public” that are capable of producing through their emergence, the power to object to, and intervene in, matters that concern them.

9.5.2 Inclusivity Through Systemic Governance

An inclusive, systemic approach to freshwater governance begins by making the distinction between situation and system; no one governance situation is the same so contextual design and application are needed even if some of the principles and practices employed are held in common across contexts. When individuals, groups, organisations and governments engage with freshwater situations, almost overwhelmingly they bring their historical framing choices to the situation. Too often new terms are quickly adopted uncritically and used in ways that do not make clear the underlying conceptions held by different users of the language – in our research this applies to the concept “social ecological system”, “complex adaptive system” and the emerging discourse about natural capital, environmental assets or asset-based management (Coffey 2015). Language and concepts used unreflexively undermine inclusivity by capturing a particular framing at the expense of others’ framings, or by undermining effective collaboration because people speak at crossed purposes. It is because of the importance of initial starting conditions in a given context, and the need to know what these are, as well as paying attention to what will help create an effective governance performance (Ison and Wallis 2011), that we have devoted considerable attention to framing issues and the role of language in this chapter. In achieving sustained systemic governance, these are important practical considerations, not unimportant theoretical musings!

As we noted at the beginning when citing Lakoff (2010), all metaphors bring forth an associated system. In other words, language precedes system; in fact the choice to see a freshwater river as a system is a framing choice – the system does not precede the choices that different actors make. In this chapter and in our research, we hope to have presented a narrative that supports our normative position – that it makes sense to see freshwater systems as coupled social-biophysical systems so that, in a human-induced climate change world, the relational dynamic between and within the social and biophysical will benefit from moving towards forms of inclusive, systemic governance.

Acknowledgements We thank the Water Research Commission (South Africa) for the invitation to contribute this chapter – particularly Eiman Karar and Dhesigen Naidoo. Jitse van Ameijde provided insightful reflections on taking a “design turn” based on Open University teaching with RLI. The support of Monash Sustainability Institute for our work is acknowledged.

References

- APSC (Australian Public Service Commission). (2007). *Tackling wicked problems: A public policy perspective*. Canberra: Australian Public Service Commission.
- Armitage, D., De Loë, R., Morris, M., Edwards, T., Gerlak, A., Hall, R., Huitema, D., Ison, R. L., Livingstone, D., MacDonald, G., Mirumachi, N., Plummer, R., & Wolfe, B. (2015). Science–policy processes for transboundary water governance. *Ambio*, *44*, 353–366.
- Arnstein, S. R. (1969). A ladder of citizen participation. *Journal of the American Institute of Planners*, *35*, 216–224.
- Barnett, J., & O’Neill, S. (2010). Maladaptation. *Global Environmental Change*, *20*, 211–213.
- Biggs, H. C., & Rogers, K. (2003). An adaptive system to link science, monitoring and management in practice. In J. T. Du Toit, K. H. Rogers, & H. C. Biggs (Eds.), *The Kruger experience: Ecology and management of savanna heterogeneity* (pp. 59–80). Washington, DC: Island Press.
- Blackmore, C. (2007). What kinds of knowledge, knowing and learning are required for addressing resource dilemmas? A theoretical overview. *Environmental Science & Policy*, *10*, 512–525.
- Blunden, M., & Dando, M. (eds) (1994). Rethinking public policy making: Questioning assumptions, challenging beliefs. Essays in honor of Sir Geoffrey Vickers on his centenary. *Special Edition American Behavioral Science*, *38*(1).
- Bunch, M. (2003). Soft systems methodology and the ecosystem approach: A system study of the Cooum River and environs in Chennai, India. *Environmental Management*, *31*, 182–197.
- Campbell, A. (2014). The converging insecurities of food, water, energy and climate, and their implications for 21st Century farming systems. In T. Aenis, A. Knierim, M.- C. Riecher, R. Ridder, H. Schobert, & H. Fischer (Eds.) *Proceedings of the 11th European IFSA Symposium, Berlin, 1–4 April 2014*.
- Carr, A., & Wilkinson, R. (2005). Beyond participation: Boundary organizations as a new space for farmers and scientists to interact. *Society and Natural Resources*, *18*, 255–265.
- Checkland, P. B., & Poulter, J. (2006). *Learning for action: A short definitive account of soft system methodology and its use for practitioners, teachers and students*. Chichester: Wiley.
- Coffey, B. (2015). Unpacking the politics of natural capital economic metaphors in environmental policy discourse. *Environmental Politics*, *25*(2), 203–222.
- Collins, K. B., & Ison, R. L. (2009). Jumping off Arnstein’s ladder: Social learning as a new policy paradigm for climate change adaptation. *Environmental Politics Government*, *19*, 358–373.
- Collins, K. B., & Ison, R. L. (2010). Trusting emergence: Some experiences of learning about integrated catchment science with the Environment Agency of England and Wales. *Water Resources Management*, *24*, 669–688.
- Collins, K. B., Blackmore, C., Morris, D., & Watson, D. (2007). A systemic approach to managing multiple perspectives and stakeholding in water catchments: Some findings from three UK case studies. *Environmental Science & Policy*, *10*, 564–574.
- Collins, K. B., Colvin, J., & Ison, R. L. (2009). Building ‘learning catchments’ for integrated catchment managing: Designing learning systems and networks based on experiences in the UK, South Africa and Australia. *Water Science and Technology*, *59*, 687–693.
- Colvin, J., Blackmore, C., Chimbuya, S., Collins, K. B., Dent, M., Goss, J., Ison, R. L., Roggero, P. P., & Seddaiu, G. (2014). In search of systemic innovation for sustainable development: A

- design praxis emerging from a decade of social learning inquiry. *Research Policy*, 43, 760–771.
- Cook, S. D. N., & Yanow, D. J. (1993). Culture and organizational learning. *Journal of Management Inquiry*, 2, 373–90.
- Cook, B. R., Atkinson, M., Chalmers, H., Comins, L., Cooksley, S., Deans, N., Fazey, I., Fenimore, A., Kesby, M., Marshall, D., & Spray, C. (2013). Interrogating participatory catchment organisations: Cases from Canada, New Zealand, Scotland and the Scottish-English borderlands. *The Geographical Journal*, 179, 234–247.
- Coover, V., Deacon, E., Esser, C., & Moore, C. (1977). *Resource manual for a living revolution*. Philadelphia: New Society Publishers.
- Dewulf, A., Gray, B., Putnam, L., Lewicki, R., Aarts, N., Bouwen, R., & Van Woerkum, C. (2009). Disentangling approaches to framing in conflict and negotiation research: A meta-paradigmatic perspective. *Human Relations*, 62, 155–193.
- Freitag, S., Biggs, H., & Breen, C. (2014). The spread and maturation of strategic adaptive management within and beyond South African national parks. *Ecology and Society*, 19(3), 25.
- Galloway, G. E. (2011). If stationarity is dead, what do we do now? *Journal of the American Water Resources Association*, 47, 563–570.
- Huntjens, P., Lebel, L., Pahl-Wostl, C., Camkin, J., Schulze, R., & Kranz, N. (2012). Institutional design propositions for the governance of adaptation to climate change in the water sector. *Global Environmental Change*, 22, 67–81.
- Isendahl, N., Dewulf, A., Brugnach, M., Francois, G., Mollenkamp, S., & Pahl-Wostl, C. (2009). Assessing framing of uncertainties in water management practice. *Water Resources Management*, 23, 3191–3205.
- Ison, R. L. (2010). *Systems practice: How to act in a climate-change world*. London/Milton Keynes: Springer/The Open University.
- Ison, R. L. (2011). Cybersystemic conviviality: Addressing the conundrum of ecosystems services. *Cybernetics and Human Knowing*, 18, 135–141.
- Ison, R. L. (2014). What is systemic about innovation systems? The implications for policies, governance and institutionalisation. In J. Francis & A. Van Huis (Eds.), *Innovation systems: Towards effective strategies in support of smallholder farmers*. Wageningen: CTA/WUR.
- Ison, R. L., & Russell, D. B. (Eds.). (2000). *Agricultural extension and rural development: Breaking out of traditions* (p. 239). Cambridge: Cambridge University Press.
- Ison, R. L., & Wallis, P. J. (2011). Planning as performance: The Murray-Darling Basin plan. In Q. Grafton & D. Connell (Eds.), *Basin futures: Water reform in the Murray-Darling Basin* (pp. 399–411). Canberra: ANU ePress.
- Ison, R. L., Röling, N., & Watson, D. (2007). Challenges to science and society in the sustainable management and use of water: Investigating the role of social learning. *Environmental Science & Policy*, 10, 499–511.
- Ison, R. L., Collins, K. B., Colvin, J. C., Jiggins, J., Roggero, P. P., Seddaiu, G., Steyaert, P., Toderi, M., & Zanolla, C. (2011). Sustainable catchment managing in a climate changing world: New integrative modalities for connecting policy makers, scientists and other stakeholders. *Water Resources Management*, 25, 3977–3992.
- Ison, R. L., Blackmore, C. P., & Iaquinto, B. (2013a). Towards systemic and adaptive governance: Exploring the revealing and concealing aspects of contemporary social-learning metaphors. *Ecological Economics*, 87, 34–42.
- Ison, R. L., Blackmore, C. P., & Collins, K. B. (2013b). *Systemic governance practices* (CADWAGO Project Brief for Work Package 3 (WP3)). <http://www.sei-international.org/mediamanager/documents/Publications/CADWAGO-factsheet-WP3.pdf>. Accessed 4 July 2014.
- Ison, R. L., Holder, R., & Davies, J. (2013c). *Integrating social and biophysical researching in R4D: African food security initiative researcher perspectives* (MSI Report 13/6). Melbourne: Monash Sustainability Institute.

- Ison, R. L., Wallis, P. J., Bruce, C., Stirzaker, R., & Maru, Y. (2013d). *Enhancing learning from AFSI research: Notes for the field* (MSI Report 13/10). Melbourne: Monash Sustainability Institute.
- Ison, R. L., Grant, A., & Bawden, R. B. (2014a). Scenario praxis for systemic and adaptive governance: A critical framework. *Environment and Planning C Government and Policy*, 32, 18.
- Ison, R. L., Carberry, P., Davies, J., Hall, A., McMillan, L., Maru, Y., Pengelly, B., Reichelt, N., Stirzaker, R., Wallis, P., Watson, I., & Webb, S. (2014b). Programs, projects and learning inquiries: Institutional mediation of innovation in research for development. *Outlook On Agriculture*, 43, 165–172.
- Ison, R. L., Collins, K. B., & Wallis, P. J. (2015a). Institutionalising social learning: Towards systemic and adaptive governance. *Environmental Science & Policy*, 53B, 105–117.
- Ison, R. L., Allan, C., & Collins, K. B. (2015b). Reframing water governance praxis: Does reflection on metaphors have a role? *Environment and Planning C: Government and Policy*, 33(6), 1697–1713.
- Jorgenson, J., & Steir, F. (2013). Frames, framing and designed conversational spaces: Lessons from the World Cafe. *The Journal of Applied Behavioral Science*, 49, 388–405.
- Kingsford, R. T., & Biggs, H. C. (2012). *Strategic adaptive management guidelines for effective conservation of freshwater ecosystems in and around protected areas of the world* (p. 43). Sydney: IUCN WCPA Freshwater Taskforce, Australian Wetlands and Rivers Centre.
- Kingsford, R. T., Biggs, H. C., & Pollard, S. R. (2010). Strategic adaptive management in freshwater protected areas and their rivers. *Biological Conservation*, 144, 1194–1203.
- Koestler, A. (1967). *The ghost in the machine*. London: Penguin.
- Koestler, A. (1978). *Janus: A summing up*. London: Hutchinson.
- Lakoff, G. (2010). Why it matters how we frame the environment. *Environmental Communication*, 4(1), 70–81.
- Lins, H. F., & Cohn, T. A. (2011). Stationarity: Wanted dead or alive? *Journal of the American Water Resources Association*, 47, 475–480.
- Lubell, M., & Edelenbos, J. (2013). Integrated water resources management: A comparative laboratory for water governance. *International Journal of Water Governance*, 1, 177–196.
- McEvoy, D., Fünfgeld, H., & Bosomworth, K. (2013). Resilience and climate change adaptation: The importance of framing. *Planning Practice and Research*, 28, 280–293.
- Measham, T. G., Robinson, C., Richards, C., Larson, S., Stafford-Smith, M., & Smith, T. (2009). Tools for successful NRM in the Lake Eyre Basin: Achieving effective engagement. In T. G. Measham & L. Brake (Eds.), *People, communities and economies of the Lake Eyre Basin* (DKCRC research report 45, pp. 125–170). Alice Springs: Desert Knowledge Cooperative Research Centre.
- Medema, W., McIntosh, B. S., & Jeffrey, P. J. (2008). From premise to practice: A critical assessment of integrated water resources management and adaptive management approaches in the water sector. *Ecology and Society*, 13(2), 29.
- Milly, P. C. D., Betancourt, J., Falkenmark, M., Hirsch, R. M., Kundzewicz, Z. W., Lettenmaier, D. P., & Stouffer, R. J. (2008). Stationarity is dead: Whither water management? *Science*, 319, 573–574.
- Molle, F. (2009). River-basin planning and management: The social life of a concept. *Geoforum*, 40, 484–494.
- North, D. (1990). *Institutions, institutional change and economic performance*. Cambridge: Cambridge University Press.
- Patterson, J. J., Lukasiewicz, A., Wallis, P. J., Rubenstein, N., Coffey, B., Gachenga, E., & Lynch, A. J. J. (2013). Tapping fresh currents: Fostering early-career researchers in transdisciplinary water governance research. *Water Alternatives*, 6, 293–312.
- Patterson, J. J., Bellamy, J., & Smith, C. (2014). Tackling the ‘how’ question: Enabling and enacting practical action for managing the wicked problem of nonpoint source pollution in catchments. In J. Bogardi, A. Bhaduri, J. Leentvaar, & S. Marx (Eds.), *The global water system in*

- the anthropocene: Challenges for science and governance, Global Water System Project.* Berlin: Springer.
- Pollard, S., & Du Toit, D. (2011). Towards adaptive integrated water resources management in Southern Africa: The role of self-organisation and multi-scale feedbacks for learning and responsiveness in the Letaba and Crocodile catchments. *Water Resources Management*, 25, 4019–4036.
- Pollard, S., Du Toit, D., & Biggs, H. (2011). River management under transformation: The emergence of strategic adaptive management of river systems in the Kruger National Park. *Koedoe*, 53(2), Art. #1011:14.
- Rhodes, R. A. W. (1996). The new governance: Governing without government. *Political Studies*, XLIV(4), 652–667.
- Rittel, H. W. J., & Webber, M. M. (1973). Dilemmas in a general theory of planning. *Policy Sciences*, 4, 155–169.
- Rogers, K. H., & Bestbier, R. (1997). *Development of a protocol for the definition of the desired state of riverine systems in South Africa*. Pretoria: Department of Environmental Affairs and Tourism.
- Rogers, K. H., & Biggs, H. C. (1999). Integrating indicators, end-points and value systems in the strategic management of the Kruger National Park. *Freshwater Biology*, 41, 439–451.
- Rouillard, J. J., Reeves, A. D., Heal, K. V., & Ball, T. (2014). The role of public participation in encouraging changes in rural land use to reduce flood risk. *Land Use Policy*, 38, 637–645.
- Roux, D. J., & Foxcroft, L. C. (2011). The development and application of strategic adaptive management within South African National Parks. *Koedoe*, 52, 1–5.
- Roux, D. J., Stirzaker, R. J., Breen, C. M., Lefroy, E. C., & Cresswell, H. P. (2010). Framework for participative reflection on the accomplishment of transdisciplinary research programs. *Environmental Science & Policy*, 13, 733–741.
- Ryan, S., Broderick, K., Sneddon, Y., & Andrews, K. (2010). *Australia's NRM governance system. Foundations and principles for meeting future challenges*. Canberra: Australian Regional NRM Chairs.
- Schneider, A., & Ingram, H. (n.d.). *Ways of knowing: A framework for inclusive, collaborative policy analysis*. Unpublished manuscript.
- Schön, D. A. (1983). *The reflective practitioner: How professionals think in action*. New York: Basic Books.
- Schön, D. A. (1995, November/December). Knowing-in-action: The new scholarship requires a new epistemology. *Change*, 27–34.
- Schön, D. A., & Rein, M. (1994). *Frame reflection: Towards the resolution of intractable policy controversies*. New York: Basic Books.
- SLIM (Social Learning for the Integrated Management and Sustainable Use of Water at Catchment Scale). (2004). *Guidelines for capacity building for social learning in integrated catchment management and sustainable use of water* (Policy briefing no. 7, SLIM, p. 4). Milton Keynes: The Open University.
- Snowden, D. J., & Kurtz, C. F. (2003). The new dynamics of strategy: Sense-making in a complex and complicated world. *IBM Systems Journal*, 42, 462–483.
- Steurer, R. (2013). Disentangling governance: A synoptic view of regulation by government, business and civil society. *Policy Sciences*, 46, 387–410.
- Steyaert, P., & Jiggins, J. (2007). Governance of complex environmental situations through social learning: A synthesis of SLIM's lessons for research, policy and practice. *Environmental Science & Policy*, 10, 575–586.
- Ulrich, W., & Reynolds, M. (2010). Critical systems heuristics. In M. Reynolds & S. Holwell (Eds.), *Systems approaches to managing change: A practical guide* (pp. 243–292). London/Milton Keynes: Springer/The Open University.
- Wallis, P. J., & Ison, R. L. (2011a). Institutional change in multi-scalar water governance regimes: A case from Victoria, Australia. *Journal of Water and Law*, 22(2/3), 85–94.

- Wallis, P., & Ison, R. L. (2011b). Appreciating institutional complexity in water governance dynamics: A case from the Murray-Darling Basin, Australia. *Water Resources Management*, 25, 4081–4097.
- Wallis, P., Ison, R. L., & Samson, K. (2013). Identifying the conditions for social learning in water governance in regional Australia. *Land Use Policy*, 31, 412–421.
- Warner, J. F. (2006). More sustainable participation? Multi-stakeholder platforms for integrated catchment management. *International Journal of Water Resources Development*, 22, 15–35.
- Whatmore, S. J., & Landström, C. (2011). Flood apprentices: An exercise in making things public. *Economy and Society*, 40, 582–610.
- White, G. F. (1998). Reflections on the 50-year international search for integrated water management. *Water Policy*, 1, 21–27.

Open Access This chapter is distributed under the terms of the Creative Commons Attribution-Noncommercial 2.5 License (<http://creativecommons.org/licenses/by-nc/2.5/>) which permits any noncommercial use, distribution, and reproduction in any medium, provided the original author(s) and source are credited.

The images or other third party material in this chapter are included in the work's Creative Commons license, unless indicated otherwise in the credit line; if such material is not included in the work's Creative Commons license and the respective action is not permitted by statutory regulation, users will need to obtain permission from the license holder to duplicate, adapt or reproduce the material.



Chapter 10

Water Integrity: From Concept to Practice

Håkan Tropp, Alejandro Jiménez, and Hélène Le Deunff

Abstract The adherence of water stakeholders and institutions to integrity principles is critical to improve water governance and sustainable water development. Integrity is strongly manifested in water decision-making, and the level of integrity plays a critical role in deciding the outcomes of decision-making, that is, who gets what water, when and how. In many countries, fragmented institutions obstruct accountability in a sector with high investment and aid flows, making the water sector particularly vulnerable to corruption. Governance failures such as corruption can take place at multiple levels and traverse all water uses, incurring huge cost for societies, environment and human development. This chapter provides insights into the role of integrity to improve governance and suggests an apparent need to include integrity and anticorruption-related issues in the analysis of and policy responses to water crises. Accountability in water supply services is used as an example to outline challenges and opportunities for strengthening integrity.

Keywords Integrity • Accountability • Governance • Anti-Corruption • Water • Water Services

10.1 Introduction: There Is an Elephant in the Room

Water crises are not primarily driven by water resource scarcity but by governance failures. Many factors can affect the overall effectiveness and efficiency of the water sector, such as systemic institutional inefficiency, limited staff capacities, scarce financial resources, inappropriately set planning priorities, inadequate and poorly maintained infrastructure and political instability. However, the roots, magnitude and consequences of the lack of integrity in water governance are some of the very important but much less well-known and addressed aspects. Low integrity and high levels of corruption are strong indicators that something is wrong with the governance system. Although the lack of integrity is far from unique to the water sector, water management is vulnerable to corruption, and such practices have dire

H. Tropp (✉) • A. Jiménez • H. Le Deunff
Stockholm International Water Institute (SIWI), Linnégatan 87A, 100 55 Stockholm, Sweden
e-mail: hakan.tropp@siwi.org

consequences for sustainable, efficient and equitable water use, access and allocation. It has contributed to severe limitations in water reform implementation where processes of decentralisation and privatisation sometimes rather have opened up for new groups to exploit the system, despite the fact that arguments of better transparency and accountability were used to institute such changes in the first place.

The risks associated with low integrity, such as corruption within institutions at the forefront to reform water resource management and deal with the water crisis, have to date been little recognised or studied. There is an urgent need to provide support to these institutions, which, despite the genuine commitment and honesty of their efforts to prevent corruption, often suffer from being new and poorly capacitated and working at new scales and under new policies and laws. Improved water integrity would go a long way to increase the institutional efficiency and effectiveness to make required water reform changes. Corruption is a challenge in many parts of the world. Importantly, many countries in so-called developing regions are doing much better than some European countries. For example, according to the Corruption Perception Index 2014, countries like Malaysia, Botswana, Namibia and Rwanda ranked higher than Bulgaria, Greece and Italy (Transparency International 2015).

Limited water-related integrity incurs huge costs for societies, in lives lost, stalling growth and degraded water resources. Corruption fuels unfair distributions of costs and benefits among different user groups or completely excludes certain groups of a particular water use. It can also be a strong driver to falling groundwater tables and diminishing ecosystem services due to unaccounted-for-water withdrawals of lakes and rivers. It increases transaction costs and implies very high investment risks for both public and private investors. In sum, increased sustainability, equity and efficiency of water resources and services allocation, access and use will in many places be very hard to come by, or attained at a much higher cost, without improving integrity. For example, it has been estimated that corruption in water and sanitation significantly increases the costs of reaching international water supply and sanitation targets (Transparency International 2008).

It is important to gain a better understanding of the links between corruption and policy outcomes. Most of the time policies and laws are not lacking; the problem is that they are not implemented. Key issues are how water institutions can break out of this non-implementation mentality and what measures can be taken to incentivise better adherence to policies, rules and regulations.

It is long overdue to start to speak about the elephant in the room – the politically sensitive and unspoken drivers and consequences of corruption in the water sector – and above all to make systematic and coherent efforts to improve water integrity. This chapter points towards a need to strongly include integrity and anticorruption-related issues in the analysis of and policy responses to water crises. Not only is there a need for changed behaviour among public and private water decision-makers, service providers and users, but it is also high time for setting in place a strong research agenda to assess the impacts of corruption in water and to contextualise policy responses and interventions to improve water integrity. Increased investments in integrity can reap high returns in improved revenues, efficiency

gains, equitable water distribution, increased infrastructure investments and social and economic development.

10.2 High Integrity Risks in the Water Sector

Governance failures such as corruption can take place in most facets of water management and traverse all water uses, such as irrigation, hydropower, infrastructure development, water supply and sanitation and water for environment. It can appear in many forms, from petty to grand-scale corruption – falsified water metre readings, skewed distribution of water use permits, illegal water connections and/or water outtakes (surface water and groundwater) for agriculture or households, public sector procurement processes, infrastructure development, policy capture by elites and many more. It can involve two or more actors and can take place, for example, within the public sector when funds are leaking out of budgets, kickbacks between public and private sectors in procurements and between service providers and consumers when water fees are not paid to the water utility or when water is illegally tapped (Stålgren 2006). Corruption affects all sectors, from education, health and forestry to transportation and many more (see, e.g. Edgardo Campos and Pradhan 2007). A survey in South Asia pointed to law enforcement authorities (police and judiciary systems) as the most corrupt public institutions, followed by land administration (Transparency International 2002). Similarly, the construction sector is deemed high risk for bribery and corruption. It is apparent that corruption in other sectors impacts how water is used and allocated. For example, in most countries access to land and land rights is the pathway to also have access to water resources and the right to use it. Disputes over land and water are often settled by the court system. Construction of infrastructure is common in relation to water storage, water distribution, urban and rural water services, hydropower, flood protection and wastewater treatment. As a result it is critical to consider water integrity in a broader context since it relates heavily to other sectors.

The water sector is vulnerable to corruption. For example, institutional fragmentation makes decision-making authority for water extremely dispersed across political and administrative boundaries and agencies, which creates many loopholes to exploit. The provision of water services is monopolised and involves large flows of public funds in a noncompetitive way. Large water projects are capital-intensive and complex, which makes procurement lucrative, manipulation difficult to detect and corruption more likely to occur. When these factors appear in systems characterised by limited openness, transparency and accountability, patronage and discretionary decision-making, risks turn into practices of corruption and other forms of rent-seeking behaviour.

Many countries in Africa and Asia are stepping up their efforts significantly to develop water-related infrastructure as a response to development needs and expected impacts of climate change. The Sustainable Development Solutions

Network (SDSN) estimates that USD 1–3 trillion is needed in infrastructure investments in developing countries in order to meet intergenerational development needs. It comes with high water integrity risks associated with procurement of services, location and design that can threaten the very effectiveness of investments. The construction sector is ranked globally as one of the most vulnerable sectors to corruption (Transparency International 2005). The potential for large-scale corruption in infrastructure development can be so substantial that it skews policy-making towards the most “lucrative” investments and not those that are better for technical, social and economic reasons (Butterworth and de la Harpe 2009). Similar challenges have been identified in climate proofing new or already existing water infrastructure (Jacobson and Tropp 2010).

10.3 The Consequences of Corruption

The impact of corruption in water can be severe and reaches far beyond water use and allocation and water supply services since it ultimately threatens or delays development and can make it more costly to achieve. Many times poor people are those worst affected since it hampers development of public services and skews natural resource allocation towards those with political clout and economic influence. In cases where corruption is endemic, the system becomes almost self-perpetuating and puts people and organisations between a rock and a hard place. For a farmer, not paying a bribe for water access can be the difference between having food on the table and not.

The general research on corruption concludes that it lowers investments and hampers fair competition among businesses. It undermines the rule of law, spreads mistrust and undermines the legitimacy of government institutions. It cripples the public sector to provide acceptable services to the public, such as education, health and water supplies. It causes misallocation of public funds as well as natural resources to the detriment of social justice and economic growth. Corruption systematically undermines sustainable development since it weakens environmental protection and undermines efforts to reduce income inequality and poverty (see, e.g. Edgardo Campos and Pradhan 2007; Stålgren 2006).

The lack of integrity has dire consequences for water, its uses and allocations. The following examples are provided:

- It undermines water reforms and their implementation. For example, it will be much harder to realise elements of integrated water resource management. In fact, if issues of transparency and accountability are not addressed, reforms such as decentralisation of decision-making can have perverse effects.
- It siphons off scarce monetary resources and diminishes a country’s prospects for providing water and sanitation for all or to improve water storage. It leads to inefficient and unequal allocation and distribution of water resources and related

services. It also contributes to increased water pollution and overabstraction of groundwater and surface water.

Various estimates of the costs of corruption are underestimations since they do not take into account secondary social and economic impacts or opportunity costs of corruption. For example, the costs in terms of health and loss of income-earning opportunities for poor people being locked out of certain water uses can be extremely high. It can result in loss of harvest or fewer educational opportunities for girls if they have to walk even longer distances to collect household water. While this can be observed at micro-level, it is difficult to aggregate the social and developmental impacts at macro-level. Costs of global corruption as calculated by, for example, the World Bank do not take into account opportunity costs of corruption to reduce poverty and inequalities, such as through improved access to water services. Nor does it contain costs of health impacts, environmental degradation, poor construction, inflated prices, etc. that can follow in the trail of corrupt behaviour. Kenny (2007) made use of indirect impacts to estimate the actual costs of kickbacks and cartels in some South Asian cities and found that it inflated the price of a sustainable water connection by 25–45 %.

It is clear that lack of integrity in the form of corruption has many detrimental impacts on society and development. While there are many narratives on corruption and how it impacts micro-levels, there is a lack of more systematic macro-level data. Due to the nature of corruption, it is difficult to collect data on the micro- and macro-economic, social and opportunity costs of corruption. Favours are normally exchanged behind closed doors with the intent to leave as few traces as possible. Finding and interpreting data is often a matter of building trust and endless corroboration and triangulation of data. In many cases there can be high individual and professional risks to research corruption issues.

10.4 Linking Governance and Integrity

Integrity has emerged as a new concept in the water sector, which is critical to address in order to improve water governance and achieve more sustainable water development. Integrity is often used as a euphemism for corruption. Water integrity is defined as the adherence of water stakeholders and institutions to governance principles of transparency, accountability and participation, based on core values of honesty, equity and professionalism. In a more practical sense, integrity can refer to how well governance regimes or systems adhere to the rule of law, predictability in decision-making procedures and outcomes, and whether decisions hold up to public scrutiny and to what extent they can withstand different types of vested interests and corrupt practices. Corruption in water is here used as a particular case to highlight issues of water integrity. Integrity aspects are very important for water use decision-making, and the level of integrity plays a critical role in the quality of governance that decides the outcomes of decision-making, that is, who gets what water, when

and how. Importantly, governance is a neutral concept, and in cases where corruption is widespread, it may actually be how that particular governance system functions.

Accountability in water supply services is here used as an example to outline some challenges and opportunities for strengthening integrity. Accountability must be part of the relationship among policy-makers, service providers and clients. As a result, increased emphasis has been placed on strengthening the ability of citizens, civil society organisations and other non-state actors to hold local governments accountable for their commitments to improve service delivery and make them more responsive to citizens' needs. It is crucial to build capacity in local governments to not only deliver services effectively but to also enhance their ability to engage citizens by fostering dialogue and participation.

10.5 Approaches to Water Integrity

The literature reflects only slight growth in studies on water integrity-related issues, such as on analysing the dynamics of corruption, mismanagement and poor governance in the water sector. Many of the corruption risks are generically well known, but we know far less about how corruption plays out in certain contexts and what type of incentives through social pressures, policy and legal measures can be effectively applied.

There are three main approaches to corruption and related anticorruption measures (see UNDP 2011). *The first* – and the most common view – is characterised as the “rotten-apple” perspective. Corruption is seen as the misbehaviour and moral misconduct of individual civil servants and less as something systematic or ingrained in the system. Well-functioning upward accountability systems and various checks and balances along with legal measures are considered going a long way towards minimising corruption. *The second* view is related to rent-seeking behaviour of civil servants. Civil servants are considered opportunistic and self-serving which increases the risk of corruption. More controls and checks and balances are not primarily seen as solutions but rather changes such as privatising services or contracting out more public services to the private sector. However, experience suggests that there are big corruption risks in relation to processes of privatisation and contracting between public and private sectors. Consequently improved accountability and transparency are still important factors when the private sector is increasingly engaged with, for example, water services provision. *The third* approach considers corruption in light of complex and dynamic social, political and economic processes. Corruption is not only something that goes on between individuals but is embedded and institutionalised, and in some cases it is not an anomaly but how the system functions. Corruption is seen as power struggles between groups and a way of gaining control of and securing resources in society or policy capture. Some of the remedies suggested are, for example, improved social accountability that empowers civil society groups, such as water user or consumer groups to hold civil

servants and elected politicians to account. It also presupposes an improved flow of and better access to information in society and free media.

Here a particular view is not chosen since it can be context specific and many times it may be a mix of these three approaches. It is clear that improved accountability is important for all of them to work. To date, much of the work to improve water integrity has been to prevent it from happening in the first place, that is, proposed measures have focused on improving the system and strengthening institutional set-ups.

In his seminal work on corruption in irrigation in India, Wade (1982) described how irrigation engineers were able to illicit significant revenues by controlling contracts and the distribution of water to the farmers and that it was part of a larger system, redistributing parts of revenue to higher-ranking public officials and politicians. Corruption was seen as a main reason for the poor performance of canal-irrigated agriculture. Similar studies have been undertaken in Pakistan (Rinaudo 2002) to show how corruption determines water allocation and that it entails not only the rich and influential farmers but also powerless small-scale farmers. Another study pointed to the role of patronage and clientelistic linkages in petty corruption in Kazakhstan and grand-scale political capture in Chile as determinants of how water resources are allocated within agriculture (Warner et al. 2009). Similar patterns of patronage and clientelism linkages were found in urban water pollution and in the relations between NGOs and local authorities (Tropp 1998). Another study pointed to the high frequency of kickbacks to public officials and tampering with water fees in urban water supply in some major Indian cities, leading to big revenue losses (Davis 2004).

Principal-agent theory has been used to explore relational patterns between the “principal” (consumer or client) and the “agent” (the service provider) and the various types of exchanges (money, favours, nepotism) that can take place. Problems with principal-agent relations are related to suboptimal contracts and agreements (if they exist in the first place) between exchange partners, such as between local public officials and farmers for release of water to irrigated farming or between the service provider of household water and the consumer. A major problem that can be exploited is that the providers of the service normally have better information and knowledge of the service provision value chain as compared to the consumers of the services. This is a case of asymmetric information, where the information advantage by service providers can be misused for corruption and other rent-seeking behaviours, such as overpricing. In contexts where regulation enforcement is lax and where there is little transparency and openness to share information, the risks of corrupt behaviour will increase. The provision of water services is considered close to a natural monopoly; hence, there is very little scope for replacing the water service provider with another one. This lack of competition will further increase risks of, for example, corruption and overpricing¹ (see, e.g. Huppert 2002).

¹The informal water service sector contains many small-scale operators and can be competitive. However, there are many accounts where local providers divide up local markets, creating “water

In the above cases, important features are patron-client-like relations and that information is tilted towards the advantage of government agencies. Many times public officials might be tempted to make power and information asymmetries work to their advantage to reap illicit incomes. Patronage and clientelism makes decision-making discretionary and allows for personal motivations of public officials and politicians to seek out illicit income-earning opportunities.

The improvement of accountability would require that relevant information is accessible to the public and that stakeholders can take part in decision-making processes. What makes the situation more complex is that civil society is often weakly organised. Politics can also slow, skew or stall these processes, as government departments and individuals try to prevent or impede actions that are seen to threaten their own power and authority.

10.6 Horizontal and Vertical Governance Interface

While horizontal work on strengthening governance has been ongoing for many years in areas such as putting in place anticorruption commissions, special prosecutors and ombudsman, the water sector itself has at large been turning a blind eye to integrity and anticorruption issues. It was not until 2005 that these issues started to receive international recognition and attention, and more systematic counterreactions were being developed through initiatives such as the Water Integrity Network.

The experience of setting in place national anticorruption commissions, special anticorruption prosecutors and ombudsman has had very few benefits or even negative impacts (Heilbrunn 2004). The development of anticorruption commissions and other similar bodies has frequently been demanded by donors but not owned by policy-makers and implementing agencies. Moreover, in many cases the establishment of such commissions has been used as an excuse to avoid and ignore needs for deeper reforms. A worst case scenario is that anticorruption institutions are misused in national power struggles to discredit political rivals. Anticorruption commissions have been plagued by lack of independence from the government, limited budgetary support and investigative powers and unclear procedures in forwarding cases to prosecution.

It is critical to continue to address corruption from a horizontal and holistic governance angle, but ultimately any national corruption strategy needs to be implemented within sectors. A targeted sector approach owned and driven by the sector can be more practical and realistic to actually make headway on anticorruption measures and improved governance. Successful sector work to improve integrity can thus have an important snowballing effect.

The long-term viability of a sector approach is thus supported by efforts that strengthen governance in the interfaces of horizontal and vertical governance.

oligarchs". There are also several accounts from many slum areas in cities where water services are controlled by local organised crime.

Improved water integrity also requires cross sector work and collaborations since water use cuts across many other sectors.

10.7 Improving Accountability in Water Service Delivery

Integrity is about improving transparency, accountability and participation in the service delivery framework, which has significant impacts on how services are delivered in practice.

In most countries, institutional arrangements for water service delivery are in place: policies, plans and institutions exist, yet performance remains poor. In this context, accountability, which is about improving the quality of relationships between the different stakeholders in service delivery arrangements, is a key element to make these institutional arrangements function as intended. Accountability is about coming to grips with institutional deficiencies, through implementing the allocated mandates, roles and responsibilities as outlined in, for example, rules and regulations. Some evidence supports these statements. An evaluation report by the European Union of 23 water supply and sanitation projects in sub-Saharan Africa found that although equipment was generally installed as planned, fewer than half of the projects delivered results meeting the needs of beneficiaries. It was suggested that a majority of these projects were potentially sustainable in the sense of using standard technologies and local materials, but governance aspects were the key weakness for continuous service (European Court of Auditors 2012). In another recent Overseas Development Institute (ODI) research project focused on challenges to service delivery in the African context, three main constraints for service delivery were identified: incoherent policies, poor top-down disciplines and limited bottom-up accountability relationships, and limited scope for problem-solving and local collective action (Tavakoli et al. 2013).

Transparency and participation contribute to improved accountability. Transparency refers to openness of governance processes and free access to official information. Increased access to information enables citizens to scrutinise the work of government, and more transparency can put pressure on government officials to be accountable, perform better and avoid corruption (González de Asís et al. 2009). Participation refers to the opportunity for citizens to provide informed, timely and meaningful input and influence decisions at various levels. It also refers to the mechanisms used by citizens to express themselves and to influence decisions and processes in the political, economic and social sphere.

Accountability have been identified as a key enabling factor for improved governance of water, but the challenge remains to find the best ways to strengthen accountability links in the water sector (Sohail and Cavill 2007). Acknowledging that institutional inertia is at the core of the problem, many external support agencies (donors, international organisations, NGOs, etc.) have targeted their support to national accountability on strengthening relationships between actors. How can external support strengthen accountability links in a meaningful way without distorting national accountability frameworks? This section discusses the potential roles and challenges of accountability support, based on experiences in the Water

Sanitation and Hygiene (WASH) sector. The first part attempts to define accountability, before “unpacking” the key concepts into different objectives. The section ends with a discussion about the challenges encountered in the implementation of different accountability support interventions.

10.7.1 Defining Accountability Among Service Delivery Actors

Accountability refers to sets of controls, counterweights and modes of supervision that make officials and institutions in the public and private sector answerable for their actions and ensures that sanctions are applied against poor performance, illegal acts and abuses of power. Well-functioning accountability mechanisms can help clarify the commitments of actors involved in water governance, lead to efficient management of fiscal resources, protect water resources and increase control over the actions of public and private stakeholders and ensure minimum quality standards (UNDP and SIWI 2013).

A combination of mechanisms can be put in place to operationalise the accountability principle (see Fig. 10.1). *Horizontal accountability* describes relationships where a state actor has the authority to demand explanations or impose penalties on another state actor. Horizontal oversight systems are thus based within the legal and justice system. They include mechanisms of internal oversight and checks and balances within an institution (internal control) or oversight and checks and balances of public institutions. *Vertical accountability* links citizens directly to the government. Vertical accountability exists when non-state actors such as the media, non-governmental organisations or individuals place pressure on state actors for improved services. Traditionally, elections and the use of informal processes are the direct way to channel citizens’ “voices” to exert pressure on policy-makers. Indirect forms of vertical channels include civic engagement, lobbying and mass mobilisation. *Transversal* or *hybrid accountability* refers to the participation of citizens and civil society (actors from the “vertical” accountability relationships) in horizontal (state-to-state) processes of accountability. This type of mechanism helps overcome the limited impact of traditional civil society methods, strengthens horizontal mechanisms of accountability and legitimises the inclusion of citizens in government oversight functions. The use of horizontal institutions by the public to improve accountability interactions between the state and water users can help develop civic engagement and foster the development of social accountability mechanisms. Social accountability describes mechanisms which involve civil society in holding duty bearers to account for the performance of service provision. Social accountability tools can be used both to hold public officials to account and to improve the accountability link between users and service providers. In addition, distinctions can be made between specific domains of accountability; in this sense, we talk about political, administrative, legal and financial accountability.

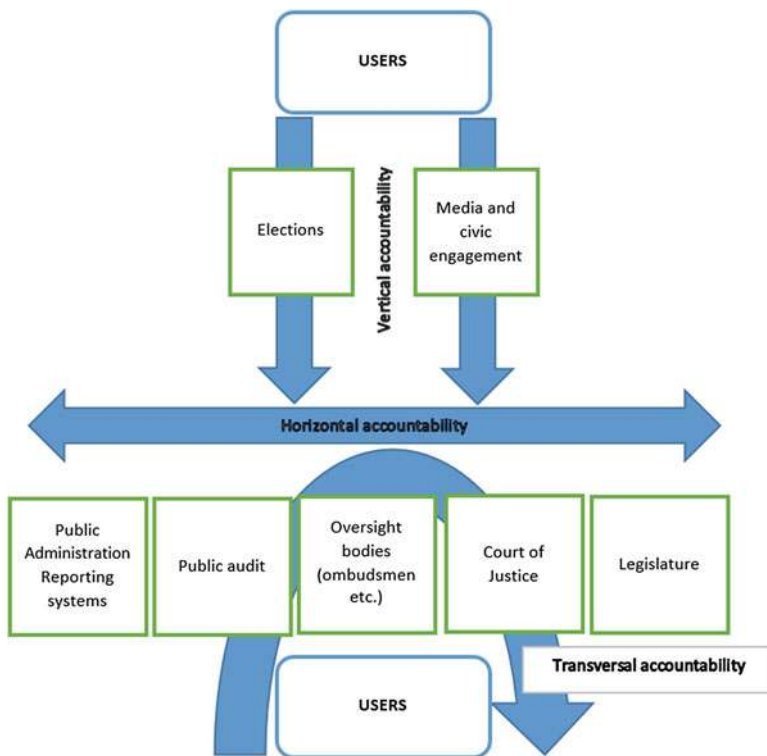


Fig. 10.1 Vertical, horizontal and transversal dimensions of accountability (Source: Own elaboration from UNIFEM 2008)

10.7.2 Unpacking Accountability in Water Service Delivery

The analysis of accountability addresses a wide range of interactions between multiple service delivery actors occurring at different levels. The human rights framework offers a useful way of understanding the accountability challenges by depicting the different dimensions of the accountability system into responsibility, answerability and enforceability (OHCHR 2013). Adapting this framework to the water sector (UNDP WGF/UNICEF 2015), we define three main levels of intervention:

- (A) *Defining the roles and enabling cooperation in service delivery.* A precondition for accountability is that those in positions of authority (governments and service providers) have clearly defined duties and performance standards, enabling their behaviour to be assessed in a transparent and objective way. At the same time, users need to know their rights and obligations. Moreover, effective coordination mechanisms between different responsible parties need to be put in place. Promoting responsibility focuses on three different objectives: enhanc-

- ing policy coherence, providing clarity in the definition of responsibilities and improving coordination in the sector.
- (B) *Informing, consulting and including stakeholders in all stages of service delivery.* The emphasis at this second level of intervention is that timely and accurate information is made available about service provision, such as the current status of services, the performance of service providers or the decisions about financial allocations. Spaces for interaction between users, services providers and government also need to be created to enable participants to explain, question, discuss and/or justify decisions. The three main objectives of support to greater answerability in service provision will be to enhance the flow of information and use of consumer feedback, to improve consumers' access to information and to create spaces for stakeholders' participation.
- (C) *Monitoring performance and supporting compliance and enforcement.* The third level of intervention focuses on enforcing mechanisms, which aim to monitor and ensure compliance of public officials, service providers and institutions with established standards; to impose sanctions on officials and companies who do not comply; and to ensure that appropriate corrective and remedial actions are taken when required. Two main objectives can be identified for improving enforceability, namely, to establish or support the regulatory function and to strengthen external and internal control mechanisms.

10.7.3 Challenges and Success Factors

Accountability is not the responsibility of only one type of institution but involves all stakeholders of the water services, often in shifting roles (as duty bearers and rights holders), and it is influenced by a range of social and political factors. There are many possible entry points and approaches for promoting accountability in water service delivery, depending on the needs as well as the wider political and economic context in which accountability processes take place. However, research suggests that initiatives taken to support accountability relationships face a series of challenges suggesting that there is space for better fitted approaches. Much effort has been dedicated in recent decades to support the definition of clear policy frameworks and to enhance sector coordination in developing countries. The Paris Declaration on Aid Effectiveness (OECD 2005/2008) has also boosted this effort. More than one decade later, a few lessons can be learnt. Too often, policies promoted and adopted have been based on international blueprints and have not taken into consideration the reality of the country, drawing a picture that is too far removed from actual practice and possibilities of the country (OECD 2013), leading to poor implementation. External support agencies have also supported coordination mechanisms in many countries. However, trickle-down effects have been limited, and on many occasions, increased coordination at the national level has not improved benefits in terms of service delivery to citizens at the other end. Hence, policy processes cannot translate into improved responsibility unless authorities provide guidance

and clarification on the general principles contained in policy documents by developing the necessary decrees, acts or laws. Moreover, information about policy and action needs to be made readily available to all stakeholders; in practice, policies often take years to be known at local levels of government or by end users. Finally, implementation of policies requires that public resources are allocated and that key actors have the necessary capacities to deliver. Very often, these conditions are not met. With regard to coordination among accountability actors in the water sector, the case of Uganda (SIWI/WIN/WSP 2012) offers important lessons in how these efforts have to be clearly linked to improved access to information, clear and measurable indicators and the establishment of feasible commitments for annual improvement.

Engaging stakeholders and increasing the flow of information and participation have been mainly supported through a social accountability approach, focusing on strengthening citizens' demand for improved transparency and performance. In certain cases, good short-term results have been announced with enthusiasm. However, in the long run, social accountability mechanisms need to be institutionalised and aligned with formal accountability mechanisms – and not compete with or undermine them. A typical example of this phenomenon can be found in the monitoring mechanisms of services based on users' collaboration in data collection. To sustain citizen mobilisation in the long run, interaction is vital as well as visible impacts. Findings in East Africa (SIWI 2013) point to the need to complement this type of tools empowering users with a parallel development of the capacity of water service providers and government to act upon the information collected. Support to accountability in the water sector involves interactions with political actors and politicised processes. In actions aiming to engage the population in order to improve answerability, a context-sensitive approach can entail addressing issues of privacy and security. In the same way, in certain contexts it might be necessary to invest time working to increase the political receptivity to citizens' demands and criticism to avoid serious risks for people and institutions. When the objective of the intervention is to build or improve the relationships across accountability actors, the main challenge is to link the stakeholder dialogue exercise with official decision-making processes. Development partners need to ensure that adequate resources are allocated for the completion of these dialogues, since they are often time and resource intensive, especially if inclusiveness is one of the objectives. Managing the expectations of dialogue participants is also crucial.

Opening up the political willingness for the establishment of regulatory functions in water services has proved to be a long and difficult process. Acceptance and understanding of the regulatory process by the consumers and other stakeholders and broad institutional support for the regulatory body is a first condition; once the institution is established, financial autonomy is required. The inclusion of citizens in the regulatory function (as, e.g. Water Watch Groups that inform the regulator directly through mobile phones) is a very interesting development of transversal accountability. Evidence from Zambia (SIWI 2008) shows that this type of cooperation can help raise the profile and public knowledge about the regulator and is a cost-effective source of information on sector performance for the regulator.

Oversight institutions can also be general and not sector specific. Anticorruption agencies and other oversight institutions will require the presence of a strong judiciary, i.e. courts to back up their constitutional authority when prosecuting cases; moreover it is essential that “whistle-blowers” and ordinary citizens are protected from retribution.

10.8 Some Lessons Learnt

Accountability is a powerful entry point to improve water integrity and thus water governance. However, external support agencies face multiple challenges in their support to accountability. Experience shows that approaches financed by external actors can run the risk of remaining externally owned at least in the short to medium term. A critical condition for effective aid-funded activities is to analyse the incentive structures for accountability in order to identify and manage risks and opportunities in the political and administrative landscape and understand the societal demands and work through or in close contact with reform-minded top public officials. Another major challenge is to avoid a situation where accountability interventions substitute civil society initiatives to failing state capacity, which can lead to even more disorganisation of the service delivery framework. The support provided by external support agencies often tends to focus on participatory approaches. However, evidence confirms that without the threat of effective sanctions (and resulting impacts), citizen mobilisation is difficult to sustain in the long run. Similarly, as noted by the general literature on anticorruption, anticorruption reforms should not only target law enforcement, but rather public officials should be part of broader changes on how they interact with the public (Rose-Ackerman and Carrington 2013).

For external support agencies to tackle these risks and to achieve sustainable results, there is a need to broaden the scope of efforts. One first useful step is to ensure that support to accountability targets both social accountability mechanisms, aimed at increasing citizens’ voice, and traditional accountability mechanisms, such as investigations, inspections and audits which can impose formal sanctions. Civil society organisations play a key role in demanding accountability, but weaknesses of the NGO sector in many aid-dependent countries can constrain the effectiveness of external support agency interventions. Many NGOs rely on external assistance while at the same time they need to develop credibility, local legitimacy and independence from the government. Donors will need to provide long-term support in a balanced way, without undermining the necessary commitment to local improvement while aiming at developing self-sustainable organisations.

An associated challenge to these processes is the long-term need to see reforms make changes on the ground, for users but also for politicians who want re-election and for external support agents who need to show short-term results to their constituencies. The next generation of accountability support will require a more politically informed understanding of the national context, more flexibility and patience

from external support agencies, a capacity to work with the existing local fabric without making it overdependent on external actors and developing a long-term and open vision from national governments to increase the role of citizens in the public space.

10.9 Conclusions

Limited integrity manifested in corruption is a concern for the whole water sector which disproportionately affects the development of the most vulnerable countries. The implementation of water policies and the sustainable use and development of water are at high risk.

Experience suggests that functioning accountability systems are one important element to improve water integrity. To increase its impacts, there is a need to use accountability measures in more integrative ways, such as developing mutually supportive measures to strengthen social accountability and horizontal accountability between government agencies. Hence, if there are real risks of not only getting exposed but that exposure can also lead to legal actions, the likelihood of accountability measures gaining impacts is enhanced. This is clearly coupled with the need for a sector governance focus more strongly coupled with other national governance efforts to strengthen anticorruption commissions, procurement oversight agencies and judiciary systems.

Most research and development cooperation programming on water integrity and corruption thus far has focused on household water supply and irrigation. While, in general, there is an urgent need to intensify work in these areas, there is a sense of urgency to develop water integrity and anticorruption research and programming across water users and institutional fragmentations. For example, the much required water infrastructure investments in many developing countries are at high risk of corruption, which can affect their efficiency as well as potential investors backing out due to too high business risks.

Some are now starting to acknowledge *the elephant in the room*. The challenges raised by limited integrity and corruption in water management have long been recognised as important. What is new, however, is the increased awareness of the issue at the international and national levels. This recognition has sparked debates on how to tackle the problems and challenges associated with it. While integrity is still a highly sensitive social and political topic in many contexts and for development partners in particular, the use of water integrity and associated measures to promote transparency, accountability and participation can offer a constructive way forward to get around some of these sensitivities.

Improving integrity and reducing corruption is a means to an end. The objective of particular reforms and the characteristics of the political and socio-economic contexts in which they are implemented should guide the choice of the types of support measures put in place. It is critical to trace and assess the link between anticorruption measures and their outcomes. This is a very challenging task since this type

of information is difficult to come by and information on costs and benefits of alternative options is frequently not available.

An urgent call is made for developing a strong research agenda on water integrity and anticorruption. In countries with malfunctioning governance systems, lack of integrity and high frequency of corrupt interactions is one of the single biggest governance issues to be resolved. Very modest resources have so far been devoted in the water sector to explore corruption hotspots, impacts and consequences and the type of measures that should be applied. To date, we know fairly little about the measures that work and in what contexts. Importantly, such research agendas should also move beyond the narrow focus on institutions to include the role of social pressures in minimising corruption.

References

- Butterworth, J., & De la Harpe, J. (2009). *Grand designs: Corruption risks in major water infrastructure projects* (p. 4). Bergen: Chr. Michelsen Institute (U4 Brief 2009:27).
- Davis, J. (2004). Corruption in public service delivery: Experience from South Asia's water and sanitation sector. *World Development*, 32(1), 53–71.
- Edgardo Campos, J., & Pradhan, S. (Eds.). (2007). *The many faces of corruption: Tracking vulnerabilities at the sector level*. Washington, DC: The International Bank for Reconstruction and Development/World Bank.
- European Court of Auditors. (2012). *European Union development assistance for drinking water supply and basic sanitation in Sub-Saharan countries*, Special Report No. 13, Luxembourg. http://www.eca.europa.eu/Lists/ECADocuments/SR12_13/SR12_13_EN.PDF
- González de Asis., et al. (2009). *Improving transparency, integrity, and accountability in water supply and sanitation*. The World Bank Institute and Transparency International. <http://documents.worldbank.org/curated/en/2009/01/10546832/improving-transparency-integrity-accountability-water-supply-sanitation-action-learning-experiences>
- Heilbrunn, J. R. (2004). *Anti-corruption commissions: Panacea or real medicine to fight corruption?* Washington, DC: The World Bank.
- Huppert, W. (2002). "Principal-agent" problems in irrigation – Inviting rent seeking and corruption. *Quarterly Journal of International Agriculture*, 41(1/2), 99–118.
- Jacobson, M., & Tropp, H. (2010). Addressing corruption in climate change water adaptation. *Reviews in Environmental Science and Biotechnology*, 9, 81–86.
- Kenny, C. (2007). *Infrastructure governance and corruption: Where next?* (World Bank Policy Research Working Paper 4331). Washington, DC: World Bank.
- OECD. (2005/2008). *Paris declaration on aid effectiveness and the Accra agenda for action*. Paris: OECD Publishing. <http://www.oecd.org/dac/effectiveness/parisdeclarationandaccraagenda-foraction.htm>
- OECD. (2013). *Accountability and democratic governance: Orientations and principles for development*. Paris: OECD Publishing. <http://www.oecd.org/publications/accountability-and-democratic-governance-9789264183636-en.htm>
- Rinaudo, J. D. (2002). Corruption and allocation of water: The case of public irrigation in Pakistan. *Water Policy*, 4(5), 405–422.
- Rose-Ackerman, S., & Carrington, P. D. (Eds.). (2013). *Anti-corruption policy: Can international actors play a constructive role?* Durham: Carolina Academic Press.
- SIWI/WIN/WSP. (2012). *Promoting transparency, integrity and accountability in the water and sanitation sector in Uganda*. http://www.watgovernance.org/documents/Resources/Reports/WIN_WSP_Uganda_report.pdf

- Sohail, M., & Cavill, S. (2007). *Accountability arrangements to combat corruption – Case study synthesis report and case study survey reports* (Partnering to combat corruption series). Loughborough: WEDC, Loughborough University.
- Stålgren, P. (2006). *Corruption in the water sector: Causes, consequences and potential reform* (Swedish water house policy brief no. 4). Stockholm: SIWI.
- Stockholm International Water Institute. (2008). *Mapping of integrity and accountability in water activities and relevant capacities in the SADC-region*. <http://www.siwi.org/publication/mapping-of-integrity-and-accountability-in-water-activities-and-relevant-capacities-in-the-sadc-region/>
- Stockholm International Water Institute (SIWI). (2013). Using information and communication technology to improve governance and cooperation. In: Cooperation for a water wise world, World Water Report 2013. www.siwi.org/Resources/Reports/2013_WWW_Report_web.pdf
- Tavakoli, H., Simson, R., Tilley, H., & Booth, D. (2013). *Unblocking results: Using aid to address governance constraints in public service delivery*. Overseas Development Institute (ODI). <http://www.odi.org/sites/odi.org.uk/files/odi-assets/publications-opinion-files/8409.pdf>
- Transparency International. (2002). *South Asia – Insights and benchmarks from citizen feedback surveys in five countries*. Berlin: Transparency International.
- Transparency International. (2005). *Global corruption report 2005: Corruption in construction and post-conflict reconstruction*. www.transparency.org/publications/gcr
- Transparency International. (2008). *Global corruption report 2008 – Corruption in the water sector*. Cambridge: Cambridge University Press.
- Transparency International. (2015). *Corruption Perception Index for 2014*. <https://www.transparency.org/cpi2014>
- Tropp, H. (1998). *Patronage, politics and pollution – Precarious NGO-state relationships: Urban environmental issues in South India* (Linköping Studies in Arts and Science 182). Linköping: Linköping University.
- United Nations Development Fund for Women (UNIFEM). (2008). Who answers to women? Gender and accountability, progress of the world's women, 2008/2009. http://www.unifem.org/progress/2008/media/POWW08_Report_Full_Text.pdf
- United Nations Development Programme – Water Governance Facility/UNICEF. (2015). *Accountability in WASH: Explaining the concept*. Accountability for sustainability partnership: UNDP Water Governance Facility at SIWI and UNICEF, Stockholm and New York. <http://www.watergovernance.org/Accountability-for-Sustainability>
- United Nations Development Programme (UNDP). (2011). *Fighting corruption in the water sector: Methods, tools and good practices*. New York: UNDP.
- United Nations Development Programme (UNDP), & Stockholm International Water Institute (SIWI). (2013). *User's guide on assessing water governance*. New York: UNDP. Jean-Daniel Rinaudo.
- United Nations Office of the High Commissioner for Human Rights (OHCHR). (2013). Who will be accountable? Human Rights and the Post-2015 Development Agenda. <http://www.ohchr.org/Documents/Publications/WhoWillBeAccountable.pdf>
- Wade, R. (1982). The system of administrative and political corruption: Canal irrigation in South India. *Journal of Development Studies*, 18(3), 287–328.
- Warner, J., Butterworth, J., Wegerich, K., Mora Vallejo, A., Martinez, G., Gouet, C., & Visscher, J. T. (2009). *Corruption risks in water licensing with case studies from Chile and Kazakhstan* (Swedish water house report no. 27). Stockholm: SIWI.

Open Access This chapter is distributed under the terms of the Creative Commons Attribution-Noncommercial 2.5 License (<http://creativecommons.org/licenses/by-nc/2.5/>) which permits any noncommercial use, distribution, and reproduction in any medium, provided the original author(s) and source are credited.

The images or other third party material in this chapter are included in the work's Creative Commons license, unless indicated otherwise in the credit line; if such material is not included in the work's Creative Commons license and the respective action is not permitted by statutory regulation, users will need to obtain permission from the license holder to duplicate, adapt or reproduce the material.



Chapter 11

Addressing the Groundwater Governance Challenge

A call from the “Groundwater Governance: A Global Framework for Action” Project

Marguerite de Chaisemartin, Robert G. Varady, Sharon B. Megdal, Kirstin I. Conti, Jac van der Gun, Andrea Merla, Geert-Jan Nijsten, and Friedemann Scheibler

Abstract This chapter provides an overview and thus contributes to a better understanding of the world’s groundwater resources, their distinctiveness and their governance. It describes the principal elements of and key instruments employed in groundwater governance. To this end, the authors introduce several case studies from across the globe and offer some corresponding lessons learnt. In particular, this chapter presents an analysis of the role of monitoring and assessment in groundwater governance, showcasing the example of The Netherlands. A global diagnostic of the current state of groundwater governance is provided, based on information from a set of commissioned thematic papers and the outcomes of five subsequent regional consultations carried out within the framework of a GEF-supported project

M. de Chaisemartin (✉)
UNESCO, International Hydrological Programme (IHP),
21 rue Pierret, 92200 Neuilly sur Seine, France
e-mail: mdechaisemartin@hotmail.com

R.G. Varady
Udall Center for Studies in Public Policy, University of Arizona,
803 East First Street, Tucson, AZ 85719, USA
e-mail: rvarady@email.arizona.edu

S.B. Megdal
Water Resources Research Center, University of Arizona,
803 East First Street, Tucson, AZ 85719, USA
e-mail: smegdal@email.arizona.edu

K.I. Conti
International Groundwater Resources Assessment Centre (IGRAC),
Westvest 7, 2611AX Delft, The Netherlands

Governance and Inclusive Development, Amsterdam Institute of Social Sciences
Research (AISSR), University of Amsterdam, Nieuwe Achtergracht 166,
1018 WV Amsterdam, The Netherlands
e-mail: Kirstin.conti@un-igrac.org

on Global Groundwater Governance. It includes insights into some of the findings of that project regarding the four main components of groundwater governance: actors, national legal frameworks, policies and information and knowledge. In addition, the authors address the issue of governance of transboundary groundwater resources and the relevant existing international legal frameworks. In conclusion, through a Global Vision for 2030, the chapter presents a way forward to govern groundwater and a Framework for Action to achieve good governance, formulated by the Groundwater Governance Project jointly implemented by UNESCO, FAO, World Bank and IAH.

Keywords Groundwater governance • Sustainable development • Water policy/water governance/water management • Freshwater • Groundwater monitoring • Hydrogeology • Transboundary aquifers

11.1 Why Groundwater Governance?

11.1.1 Background and Basic Concepts

Groundwater is an extremely important source of freshwater on earth: its global flux amounts to some 28 % of the total global freshwater flux, and even around 98 % of the world's liquid freshwater reserves are stored underground, which makes groundwater a unique buffer capable of bridging prolonged dry periods (Margat 2008; Margat and van der Gun 2013). Worldwide, 2.5 billion people depend solely on groundwater for their daily needs (UN WWDR 2015), and the volume of groundwater abstractions is increasing between 1 and 3 % annually (Margat and van der Gun 2013; Wada et al. 2013). Simultaneously, contamination of groundwater is becoming a more widespread problem, and the negative effects of groundwater abstractions are increasing, for example, on groundwater-dependent ecosystems.

J. van der Gun

Van der Gun Hydro-Consulting, Ganzeboomsveg 3 C, 7433 ES Schalkhaar, The Netherlands
e-mail: j.vandergun@home.nl

A. Merla

UNESCO, International Hydrological Programme (IHP),
7 place Fontenoy, 75353 Paris 07 SP, France
e-mail: merla.andrea@gmail.com

G.-J. Nijsten • F. Scheibler

International Groundwater Resources Assessment Centre (IGRAC),
Westvest 7, 2611AX Delft, The Netherlands
e-mail: geert-jan.nijsten@un-igrac.org; friedemann.scheibler@class.com

Climate change and variability are affecting the recharge of groundwater (Taylor et al. 2013) as well as the demand for groundwater, while population growth and improved well-drilling and development techniques also lead to increased demand.

Understanding the significance of groundwater governance is a critical part of recent, non-technical, “soft” approaches to managing the “water crisis”, which some long-time observers have termed “mainly a crisis of governance” (Mukherji and Shah 2005). Principles of governance, if appropriately identified and applied, can yield effective groundwater management policies, which can result in practices for “responsible groundwater use”, including attention to equity, sustainability and efficiency (Varady et al. 2013). The notion of (environmental) sustainability, accepted in the 1990s, features a number of corollary precepts, all of which are relevant to groundwater: “context matters” and one-size-fits-all solutions are illusory (Ostrom 1990); integrating groundwater management within other aspects of socioeconomic development is indispensable (viz. IWRM or integrated water resource management), and to be most effective, expertise should be harnessed across a full spectrum of disciplinary approaches, including the social sciences and law; communities of practice (CoPs), such as those among government authorities, scientists and water users, are catalysts for effective management of resources, while the involvement in decision-making of non-state actors and diverse stakeholders, such as communities, is a component of most successful resource-management approaches; and finally, political motives such as power concentration, equity and ethics are key factors in national, international and transboundary matters. Beyond financial and hydrological considerations, key obstacles to improved management include the lack of reliable information on groundwater resources, extensive institutional and territorial fragmentation in a sector with numerous stakeholders at different levels, and significant spillover effects in other policy areas such as agriculture, spatial planning and energy. In addition, groundwater management is confronted by the invisibility of the resource and the persistent myths of its inexhaustibility, cheapness and universally high quality (Varady et al. 2013). Another distinct feature of groundwater is that its exploitation is extremely dispersed in space and predominantly in the hands of the private sector such as irrigation farmers, water supply companies or domestic well-owners. Therefore, to a large extent, managing groundwater quantity means influencing the decisions and behaviour of numerous individuals. This is in contrast with the exploitation of surface water quantity, in which relatively large engineering infrastructure and the public sector often play a much more prominent role. All these peculiarities of groundwater make its governance and management rather different from surface water management and governance.

11.1.2 Working Definitions: Governance, Policy, Management

Moving from the loftiest to the most functional notion, we offer working definitions of three related but fundamentally different terms: governance, policy and management.

Governance Governance is generally understood to imply a societal *process* (Lautze et al. 2011). For the World Bank (1991), it is more specifically “the exercise of political authority and the use of institutional resources to manage society’s problems and affairs”. A useful corollary views governance as “the sum of the many ways individuals and institutions, public and private, manage their common affairs” (Commission on Global Governance 1995).

The GEF-supported Groundwater Governance Project, implemented by the Food and Agriculture Organization (FAO) jointly with the United Nations Educational, Scientific and Cultural Organization (UNESCO), the World Bank and the International Association of Hydrogeologists (IAH), adopted the following definition of groundwater governance: “groundwater governance comprises the promotion of responsible collective action to ensure control, protection and socially-sustainable utilisation of groundwater resources and aquifer systems for the benefit of humankind and dependent ecosystems. This action is facilitated by an enabling framework and guiding principles” (Groundwater Governance Project 2016b).

Policy While the concept of “policy” has become pervasive, working definitions remain elusive. The *Merriam-Webster Dictionary* (2011) defines policy as “a definite course or method of action...to guide and determine present and future conditions”. For the UN’s Food and Agriculture Organization (FAO 2011), policy is “a set of decisions which are oriented towards a long term purpose or to a particular problem”. This simple and succinct definition captures the centrality of the vital term, “decision”. If we understand the policies to be made by all sectors of society with a stake in governance – not just government – then policy-making can be considered synonymous with decision-making. Once policies have been formulated, putting them in place requires instruments, tools, rules, protocols and other procedures. These may include laws, sets of rights, registrations, permits and regulations (especially regulations that allow those regulated to choose among alternative ways of complying); economic incentives and disincentives such as subsidies, taxes, tradable pollution permits and pricing structures; and civil-society actions such as those that motivate voluntary actions or behavioural changes (Theesfeld 2008).

Management The term “management” is perhaps easier to grasp intuitively than “governance”. Management can be thought of as the “nitty-gritty of day-to-day operations” that emphasises the results of decisions (Linton and Brooks 2011). Other similar notions are “approaches, models, principles, and information used to make decisions” (Bakker 2007, cited in Nowlan and Bakker 2010); “regimes based on institutions, laws, cultural factors, knowledge, and practices” (Solanes and Jouravlev 2006); or purposeful activities that enable the accomplishment of goals and objectives (Pahl-Wostl 2007). These definitions share a concern for routine, practical and effective ways to achieve predetermined objectives and proceed with a common caveat: recognition of conflicting interests (Wolf 2007).

11.1.3 *Main Instruments of Groundwater Management*

Experts agree that too little is known about the institutions and policies that govern the use of groundwater resources (Mukherji and Shah 2005). Nevertheless, especially recently, innovative approaches to groundwater management have emerged worldwide (de Gooijer et al. 2009) and feature a variety of instruments to manage groundwater (Theesfeld 2010), including:

- *Technical instruments* (surveying, groundwater quantity and quality monitoring and modelling, other diagnostic analyses, sustainable aquifer yield estimations)
- *Managerial and planning instruments* (IWRM plans, land use and spatial planning, environmental impact assessment, groundwater protection zoning, clear definition of responsibilities and roles of various groundwater resource management entities)
- *Regulatory instruments* (groundwater property and usufructuary rights, well licensing and registration, drilling accreditation, water legislation, groundwater caps, bans on hazardous human activities with risks of groundwater contamination)
- *Economic instruments* (groundwater pricing, environmental taxes, tradable rights and groundwater markets) and *behaviour-changing instruments* (training, information sharing, awareness-raising).

Moench et al. (2003) argue that this relatively recent, instrument-based approach presumes extensive knowledge of the physical and social dimensions of the groundwater system and sufficient organisational capacity to implement changes in a planned and integrated manner.

11.1.4 *Existing Practices and Lessons Learnt*

There are many examples of management and governance models, along with evaluations of their effectiveness and discussions of lessons learnt. We offer four selected cases: two contrasting models in developing countries, namely, western India and China, and two distinct approaches in more industrialised, though water-short societies, namely, Spain and Arizona (USA).

Western India Some studies on groundwater management highlight *self-regulation as a governance model* (Van Steenberg and Shah 2003). For example, in the State of Gujarat, India, when government efforts failed to address the over-exploitation of groundwater and coastal groundwater salinisation, some local communities began to harvest excess rainwater during the monsoon for aquifer recharge. Based on informal rules, and inspired by a local spiritual Hindu leader, the grassroots movement grew fast. The early adopters became agents of change, inspiring neighbouring farmers in nearby villages and operating as an open and inclusive network. Although the initial focus was on increasing water supply, some demand-side

practices, sanctioned by local religious practices, were also adopted. The movement received public recognition from the state government, resulting in a pluralistic coexistence of formal governmental groundwater legislation and informal movement norms and rules. This case exemplifies public-private partnership with cooperation between government departments, citizens, communities, religious-based organisations, NGOs, and the private sector.

China Groundwater management strategies in India can be contrasted with those in China (Mukherji and Shah 2005). Since the 1950s, both countries facing high population density and embracing food self-sufficiency and an agriculture-based economy have relied on groundwater irrigation for their massive agricultural production (Siebert et al. 2010). In both countries, this practice has led to overexploitation with consequent groundwater table declines in significant parts of their territories. In contrast to India's regionalised and even localised approach to groundwater management, China's approach has been much more centralised. Each Chinese village features a governmental agent paid from villagers' taxes with the responsibility to plan and manage its irrigation. Such officials provide guidance for price-setting mechanisms in groundwater markets. Differences between the Indian and the Chinese experience illustrate the roles that both the macro-development path (Shah 2007) and the overarching political regime play in the shape and scope of groundwater governance.

Spain Traditionally, with a strong governmental bias towards surface water infrastructure, Spain offers an example of how past practices and policies influence and constrain present groundwater governance (Llamas 2003). Spain has one of the highest numbers of surface reservoirs per capita and large interbasin river water transfers. In large part, this is due to past failures associated with groundwater dependence for public water supplies. This experience has prompted a myth that assumes that groundwater use *always* leads to the depletion of the source rendering it unreliable. The Spanish Water Code of 1985 placed groundwater resources within the public domain. However, because of the historic notion of groundwater as private property, registration and licensure have been difficult to achieve. The 2001 National Water Plan appears to challenge the old paradigm of surface water infrastructure development. For the first time, it has provisions that strongly support the management of groundwater resources, and it fosters the formation of groundwater-user communities and education of the public on groundwater.

Arizona, Southwestern USA An interesting case study is that of the arid and strongly groundwater-dependent state of Arizona in the United States. Aside from drinking-water quality and discharge standards, which are established at the national level, the individual states retain the discretion to establish their own groundwater rights and management systems (Gerlak et al. 2013). Arizona's 1980 Groundwater Management Act (GMA), along with its regulatory framework for aquifer recharge, has enabled the deployment of innovative approaches to managing groundwater in hydrologically mapped regions that had experienced significant groundwater

overdraft. Key to the GMA was the establishment of statutory management goals for a set of active management areas (groundwater management jurisdictions), as well as a programme of assured water supply, whereby new municipal developments are required to show they have legally, physically and continuously available water supplies for 100 years. The GMA also requires municipal, industrial and agricultural conservation programmes. Despite this progressive management and governance framework, groundwater management challenges remain. These include absence of consideration of environmental water uses and localised drawdown of aquifers (Megdal 2012; Megdal et al. 2015).

11.2 The Role of Monitoring and Assessment in Groundwater Governance

One of the above-mentioned technical instruments in support of groundwater governance is groundwater monitoring, the practice of observing changes in the state of groundwater resources. Observations about groundwater can include but are not limited to groundwater levels, quality and abstraction volumes. Measuring changes in the state of groundwater in a reliable and sufficiently detailed way depends largely on well-designed and maintained networks of groundwater wells. Groundwater governance and monitoring are interdependent; good groundwater governance depends on a suitable understanding of the resource being governed, including processes affecting the resource such as the effects of human interaction and policies. Groundwater monitoring provides information to create this understanding. Assessment then uses this understanding to characterise the needs of the resource and its users to provide a sound basis for governance and management. Monitoring and periodic assessment allows relevant stakeholders to systematically improve resource management based on measured outcomes, i.e. adaptive management. At the same time, it is the practice of good governance that needs to provide the right framework to put monitoring and data collection in place.

11.2.1 Relevance of Groundwater Monitoring and Assessment in Relation to Governance

The importance of groundwater monitoring is gaining traction at the international level. The United Nations General Assembly Resolution on the Draft Articles on the Law of Transboundary Aquifers (UNGA 2008) includes Article 13 which requires monitoring by states sharing an aquifer. Going further, the United Nations Economic Commission for Europe Convention on the Protection and Use of Transboundary Watercourses and International Lakes has more elaborate provisions for groundwater monitoring and its objectives (UNECE 1992). The most descriptive is the

European Union Water Framework Directive (WFD), which states in Article 8 that monitoring programmes are required and provides technical design specifications in Appendix V (EC 2000). Further monitoring objectives specific to groundwater quality are described in the EU Groundwater Directive (EC 2006).

The increasing attention given to this practice at the international level is a reflection of the broader importance of groundwater monitoring. Lack of monitoring and assessment of groundwater resources can limit the effectiveness of policy-making and groundwater management, two essential elements of groundwater governance.

To be effective, the development of groundwater policies and laws should take into account existing knowledge about groundwater systems, especially if they are designed for a specific aquifer. Groundwater monitoring contributes to this knowledge by mainly measuring groundwater levels, groundwater abstractions, spring discharge and water quality (Vermooten and Kukurić 2009). Once these monitoring data are available, they can be assessed and used to evaluate whether particular policy objectives have been met or need adjusting (adaptive management). Therefore, gathering data about groundwater resources has a clear role in effective groundwater governance and assessment of groundwater resources. However, gaps and asymmetries in groundwater data pre-empt attempts at good groundwater governance, comprehensive assessment or the fulfillment of management objectives such as conservation and protection (Theesfeld 2010).

11.2.2 Law and Policy: How to Make Monitoring and Assessment Happen

Development of groundwater laws and policies should include mechanisms that facilitate groundwater monitoring. In order to ensure that groundwater monitoring takes place, an effective national (ground)water law should, at a minimum, define an obligation for groundwater monitoring and the overall objectives for the monitoring. Additionally, it should describe funding mechanisms and how rights of access will be granted for monitoring, determine whether all or some groundwater abstractions must be monitored and reported, as well as details on how results of monitoring will be made publicly available (IGRAC 2008). Administrative responsibility for the monitoring has to be assigned, and guidelines for reporting need to be provided. To be able to design a monitoring network, the objectives stated in the laws and policies need to be translated into technical objectives, which include, for example, determining groundwater flow directions, defining recharge and seepage areas, and characterising groundwater quality of the observed region and its suitability for various types of use (Jousma and Roelofsen 2004). By elaborating these technical standards in a policy, a groundwater governance regime would have the technical foundation necessary to complete a comprehensive assessment of its groundwater resources.

Comprehensive assessment would not only entail analysis of the data provided by the groundwater monitoring network but also interpretation of those data for the

purposes of creating an overview of the physical characteristics of the resource (flow volumes and dynamics), the human uses (domestic, agricultural, industrial), threats of and vulnerabilities to contamination and the ecosystems connected to the groundwater resource. Such an assessment would also indicate how these various features might interact at different times of year or as a result of changes in related environmental resources or human activities. Proper assessment might even include predictions of how factors such as population growth and climatic variability would affect groundwater. With this type of assessment, those seeking to govern groundwater would be better able to prioritise and to make strategic decisions about how to sustainably utilise the resource.

11.2.3 Some Technical Considerations on Monitoring

Groundwater monitoring networks can be classified as general reference primary networks or specific secondary networks based on their differences in geographic scale and their objectives. *Primary networks* cover large areas, up to the entire countries. Selected wells are usually at relatively large distances from one another, but still sufficiently close to provide an overall picture of the groundwater situation and to serve as a reference for specific and more detailed local studies. Routine observations of groundwater state variables (e.g. groundwater levels, hydrochemical constituents and temperature) and are performed according to a predefined sampling frequency for an indefinite period of time. *Secondary monitoring networks* serve more specific purposes such as to locally monitor groundwater pollution or water-table declines around pumping well fields. Many of these local networks are created for temporary studies and are decommissioned when the investigations end (Jousma and Roelofsen 2004).

A key objective in designing the network is to provide the required information with as few new wells as possible to reduce costs. This is accomplished by minimising the number of observation wells and the sampling frequency using statistical optimisation techniques and making use of data from the primary monitoring network when designing a secondary one (Zhou 1994; Jousma and Roelofsen 2004). Establishing a legal requirement to monitor groundwater can go a long way in terms of ensuring a properly funded and maintained network. Further, groundwater monitoring networks are ideally designed taking into consideration other relevant monitoring networks for surface water, meteorological data, vegetation and land cover, etc.

In countries without established groundwater monitoring networks, local knowledge about groundwater from communities, businesses or academic institutions might be the most sophisticated. However, countries with the capacity to maintain robust groundwater monitoring networks often combine a wide-spaced regional network (primary) with denser networks (secondary) in areas of particular interest. These networks will be linked to different objectives, and the responsibility for monitoring (and its expenses) may be divided between governmental organisations,

responsible for overall water management, and organisations with specific tasks or interests (Jousma and Roelofsen 2004).

11.2.4 Case Study: Groundwater Monitoring in the Netherlands

The example of groundwater monitoring in the Netherlands shows how the law can facilitate setting up such networks that observe the state of groundwater resources, inform the policy-making, enable adaptive management and thereby enhance governance. It also shows how citizen participation and decentralised financing mechanisms can help ensure funding and cost-effective monitoring regimes.

The main legal framework for water governance in the Netherlands is the Water Law (*Waterwet*). This 2009 law has replaced eight water-related laws, like the Groundwater Law (*Grondwaterwet*), and it also implements the EU Water Framework Directive (WFD) into Dutch National Law. The Environmental Law (*Wet Milieubeheer*) provides an additional framework with respect to groundwater quality protection.

The Dutch national government is responsible for defining general water and environmental policies, which act as a framework for lower governmental levels. The national government maintains a national groundwater quality monitoring network (primary network). Provinces are responsible for groundwater policies and management at the strategic and regional level. To this end, they maintain primary monitoring networks in which groundwater levels are measured in all relevant freshwater-bearing layers/aquifers. The networks allow for the analyses of long-term trends at the regional scale, but are not dense enough to map, for example, the highly variable shallow groundwater levels. In addition to the national groundwater quality network, provinces also monitor groundwater quality at yearly intervals in additional wells. A selection of the provincial monitoring wells is also used for monitoring obligations related to the WFD. Lastly, provinces maintain a register of groundwater abstraction rates from all licensed groundwater wells.

Municipalities have the first responsibility when it comes to addressing problems with high or low groundwater tables in built-up areas. Many municipalities have implemented secondary monitoring networks of mostly very shallow monitoring wells often just limited to the problematic or risk areas. Since the enactment of the 2009 Water Law, water boards are responsible for the licensing of most groundwater abstractions. Over recent years, the interaction between groundwater and the extremely dense and highly managed surface water systems has received more attention. Therefore, some water boards have started to implement groundwater monitoring as well, in addition to the provincial primary networks.

The national laws provide funding mechanisms by allowing provinces, waterboards and municipalities to implement taxes to fund research and measures related to their specific (ground)water task including but not limited to monitoring net-

works. To limit costs and involve stakeholders, groundwater levels of many wells in the primary groundwater network are being monitored by volunteers, despite manual measurements recently being replaced by measurements from automatic data loggers allowing for higher monitoring frequencies. Historically, this is why groundwater level monitoring in the Netherlands has developed so massively, and it is an early example of stakeholder involvement in groundwater governance. Groundwater users and environmental organisations managing groundwater-dependent ecosystems (GDEs) also participate at different levels of governance by maintaining additional temporary or semi-permanent secondary groundwater monitoring networks.

All stakeholders are urged to provide their monitoring data to be included in the national groundwater database (DINOloket) which is maintained by TNO (Netherlands Organisation for Applied Scientific Research), together with other subsurface-related data. The database is freely accessible and contains time series of groundwater levels and groundwater quality for approximately 70 000 monitoring wells containing 239 million groundwater levels and analyses of 136 000 groundwater samples (Jellema 2014). The data are widely used by all stakeholders involved in Dutch groundwater management and policy development.

With these understandings in mind, it is important to note that turning the data collected from a monitoring system into information is what ultimately becomes important for governance. Firstly, interpreted results from the primary and secondary monitoring networks must feed back into an ongoing policy mechanism which will continually assess them. Secondly, if problems with depletion or contamination are detected, the governance framework will need mechanisms to cope with such issues. Thirdly, making monitoring data available also allows a range of stakeholders including communities, businesses and academic institutions that have intimate knowledge of the groundwater resources to participate in these processes. In sum, effective groundwater governance should facilitate technically sound groundwater data that are obtained through in situ monitoring networks and should support policy development and implementation.

11.3 A Global Diagnostic of the Current State of Groundwater Governance

Since the *groundwater governance* concept emerged in water sector terminology, various interesting publications on this subject have appeared, but only a few of them (e.g. Sharma et al. 2007; Shah 2009; Garduño et al. 2011; Gerlak et al. 2013) explicitly intended to describe in some detail groundwater governance in a particular country or region. To the best of our knowledge, attempts at a global inventory and characterisation of the state of groundwater governance have not been made until recently, when such an initiative was included in the programme of activities of the GEF-supported Groundwater Governance Project, implemented by FAO jointly with UNESCO, the World Bank and IAH. Fundamental inputs from this

project to the global inventory were five regional consultation meetings, attended by several hundred groundwater experts from across the world, followed by the drafting of five Regional Diagnostic Reports and one Global Diagnostic Report on groundwater governance. What follows below draws heavily on the outcomes of the Groundwater Governance Project (Al-Zubari 2013; Braune and Adams 2013; Kataoka and Shivakoti 2013; Tujchneider 2013; Chilton and Smidt 2014; Groundwater Governance Project 2016a, b). These outcomes have enhanced the knowledge on the state and diversity of groundwater governance around the world in an unprecedented way, although the available information does not yet allow the presentation of an unbiased and comprehensive description of this state at the level of individual countries.

In order to structure the Global Groundwater Diagnostic, groundwater governance was assumed to consist of four main components: actors, legal frameworks, policies, and information and knowledge. Observed conditions related to each of these components need to be viewed against a reference framework that helps identify which of these conditions can be rated as good to satisfactory on the one hand and which critical gaps and flaws exist on the other. Important elements of this reference framework are the area-specific setting, the locally adopted groundwater resource management goals or ambitions, and professional judgement on the governance requirements in relation to the goals to be achieved.

11.3.1 Actors

The component “actors” is in principle quite heterogeneous and may include politicians and other decision-makers, government agencies, scientists, planners, NGOs, industries, water-supply companies, drilling companies, the mining sector and other segments of the private sector, well-owners, groundwater users, water-user associations, groundwater polluters, international agencies and international bodies for regional cooperation, etc. According to current views, *good governance* is not merely a matter of prudent government action but requires active participation of all relevant categories of stakeholders, with all actors cooperating harmoniously. For a diagnosis on this component, the following aspects are of particular importance (Groundwater Governance Project 2016a):

- *Involvement and roles of the different actors*

In general, governments have the primary mandate and responsibility for groundwater management and governance. Government agencies are responsible for developing an enabling environment (legal framework, institutions, information systems, communication), preparing management plans and implementing them after they have been approved by decision-makers. The extent to which other actors are participating varies strongly from country to country. In some countries (e.g. China, Israel and countries of Latin America and Central Asia), groundwater governance is dominated by government agencies; in other coun-

tries (e.g. India), important roles are being played by local communities and groundwater user groups, often assisted or led by NGOs. In many countries, the private sector provides water supply and sanitation services, but nevertheless it rarely participates in groundwater management. In the EU member countries, the European Union plays an important role through its Water Framework Directive (WFD) and Groundwater Daughter Directive on the protection of groundwater against pollution and deterioration. Although successful initiatives have been developed in several countries to enhance the involvement of groundwater users in groundwater governance, in many countries, stakeholder participation remains poorly developed or even non-existent.

- *Sense of urgency for groundwater governance and management*
Only relatively few people have a good understanding of the importance of groundwater for society and the risks of groundwater being “abandoned to chance”. As a result, groundwater is often overlooked by planners (even in water management planning), and political support for groundwater governance and management tends to be low in many countries, especially in relatively poor countries. This lack of understanding often translates into low budgets and low government priorities for groundwater governance.
- *Mandate, capacity and motivation of the government agencies in charge*
A broad, clear and undisputed mandate is one of the prerequisites for good performance of any government agency in charge of groundwater governance. Unfortunately, mandates are not always clear, and fragmentation of tasks among different government agencies occurs in many countries, quite often accompanied by institutional rivalries. Understaffing, insufficient budget and lack of motivation for proactive groundwater management provide even more serious constraints to effective functioning of government agencies related to groundwater. Such constraints are widespread, in particular in countries where the government’s financial resources are meagre.
- *Capability and motivation of relevant stakeholders to participate effectively in the process*
Many groundwater management measures are aimed at changing the behaviour of local stakeholders in one way or another (restricting abstractions, reducing pollution, etc.); therefore, it is essential to involve stakeholders in governing groundwater. However, this requires in the first place that stakeholders be capable of participating (in particular, that they understand what is at stake, know how to get their voice heard and be flexible enough to adapt) and that they be motivated to serve the public interest. To date these requirements are fulfilled only rarely.
- *Cooperation, partnerships and conflicts between actors*
The huge number and diversity of stakeholders and potential actors in groundwater governance suggests that smooth and effective cooperation between them is far from easy. Rather, incompatible goals and diverging interests, lack of trust between different categories of actors and poor communication often lead to conflicts rather than to partnerships and effective cooperation. Finding and estab-

lishing a mode of cooperation that fits local conditions and enhances groundwater governance is for most countries crucial and is decisive for failure or success of groundwater management. Herein lies one of the major challenges for improving groundwater governance.

11.3.2 National Legal Frameworks

Many countries have legal frameworks addressing groundwater, and legal reforms have taken place in many countries in recent years to make the laws and regulations consistent with modern views on groundwater and its functions. Among others, new legislation has in many countries better defined groundwater ownership and user rights, or redefined these. While private groundwater ownership and user rights are predominant in customary law, in many countries, this status has been overruled in recent formal laws by defining groundwater as public property and, consequently, by granting governments the mandate to control groundwater abstraction and protect groundwater quality. The degree of actual government control varies considerably around the world. For instance, constraints to private abstraction are relatively low in several states of the USA (in particular in Texas under the “rule of capture” doctrine), whereas groundwater abstraction is subject to strict regulation in countries like The Netherlands. Implementing the laws and regulations is often difficult or nearly impossible if they are not fully attuned to the realities on the ground, e.g. when “old” and “new” user rights coexist (Spain) or in countries where government agencies simply do not have the capacity to monitor and enforce compliance with the law and where a social culture of tolerating non-compliance has developed. In most countries, legal provisions and also institutional mandates for protecting groundwater quality are completely separate from those for managing groundwater quantity. Similarly, in the majority of countries, the legal frameworks for groundwater are not harmonised with those relating to land use and mining. Synergy can be achieved by better coordination or – where possible – integration. Harmonisation should also be considered in the case of transboundary aquifers expanding over the internal boundaries of a state (e.g. in the case of federal states), where synergy may be envisaged through interstate arrangements or influence of the federal state, while in the case of transboundary aquifers at the international level, domestic legal regimes will need to be made compatible with relevant rules of international law (Mechlem 2012).

11.3.3 Policies

Not all countries have dedicated policies on groundwater, but those that do show a broad diversity in focus, scope, type, degree of detail and other characteristics. The origin of this diversity lies not only in different country-specific physical, cultural,

socio-economic and political conditions but also in the differences in the stage of advancement of groundwater management and governance. Countries in a so-called pre-management stage typically do not have coordinated groundwater abstraction for local uses and lack a realistic notion of the need or desirability to manage and protect the groundwater resources. Groundwater-related policies in such countries usually focus on water supply and sanitation only, in response to short-term needs and without paying significant attention to the broader water resource context. This is followed by the “initial management stage”, during which emerging problems trigger groundwater resource management – still single-issue oriented and only in a reactive mode (“crisis management”). The focus of policies in this stage shifts towards resource control and protection, and their scope becomes wider. In the third stage – the “advanced management stage” – groundwater policies are more comprehensive and adopt integrated approaches to exploitation, they control and protect the water resources, and they are linked to other policy domains. Typical of this stage is also a proactive attitude, manifested by the systematic development and implementation of periodically updated groundwater or water resource management plans.

There is a correlation between the stage of advancement of groundwater management and economic development in the countries concerned. Judgments on groundwater policies and attempts at their improvement should take this into account, but even when doing so, several types of inadequacies are widespread and need to be addressed. An excessively limited policy scope is one of the most frequently observed flaws: not only in policies of countries in the pre-management stage (where this is obvious), but even in those countries in an advanced management stage, where inconsistencies with policies of related fields (such as agricultural development, land use, mining, subsurface use, etc.) are often present. Insufficient knowledge is another common deficiency – either caused by lack of data or by poor understanding of the relevant mechanisms of change – which may lead to an incorrect diagnosis of key issues and/or to promoting “wrong solutions”. Inadequate solutions are also promoted in many policies as a result of short-sightedness (short-term perspective of politicians), unrealistic goals, insufficient knowledge of human behaviour, and disregard of the role stakeholders could or should play.

11.3.4 Information and Knowledge

Around the world, considerable progress has been made over decades with regard to area-specific information and knowledge on groundwater. Important contributions have been made by the systematic implementation of groundwater assessment and mapping programmes at different scales, the generally observed widening of focus from hydrogeology to a much broader interdisciplinary spectrum and the unprecedented development in data processing and information management, facilitated by information technology. In spite of all the efforts made, many groundwater systems around the world, especially aquifers at greater depth, still remain virtually

unexplored. Moreover, although data on time-dependent groundwater variables are crucial to guide groundwater resource management, such data collection and monitoring systems are often short-lived and fragmentary, covering only minor parts of countries and regions. Positive exceptions are countries with a long tradition in groundwater monitoring (e.g. India and The Netherlands) and regions where special programmes favour groundwater monitoring activities (such as EU countries under the WFD).

Where only half a century ago most data-owning public agencies and institutions used to be reluctant to share their data with other parties, nowadays a growing number provides online public access to their well-organised databases and information systems. Nevertheless, the data often are still scattered over many organisations, and sharing information is in many countries not yet a common practice or even constrained by major hurdles. Finally, groundwater data and information usually are presented in a digestible format for groundwater professionals. If politicians have to be persuaded to support groundwater governance and if stakeholders have to be motivated and empowered to actively participate, then relevant information should be available in tailor-made formats that suit the needs of these categories of actors. However, such groundwater information products are still extremely rare.

11.4 Governance of Transboundary Groundwater Resources at the International Level

11.4.1 The Situation Worldwide

To date, 592 transboundary aquifers have been identified throughout the world, a figure that is sure to grow as reconnaissance and survey capabilities increase. Of these 592 transboundary aquifers, 72 are located in Africa, 73 in the Americas, 129 in Asia and Oceania, and 318 in Europe, among which 226 are transboundary “groundwater bodies”, as defined in the EU Water Framework Directive (IGRAC and UNESCO-IHP 2015) (Fig. 11.1). Several previous inventories and assessments of transboundary aquifers at regional level were compiled by UNESCO’s Internationally Shared Aquifer Resources Management (ISARM) Programme (Puri and Aureli 2009).

Managing transboundary aquifers coherently requires building trust and forging cooperation between countries, and despite progress reported in some regions, transboundary management instruments and approaches are generally wanting (Groundwater Governance Project 2016a). Enabling frameworks dedicated to support cooperation over transboundary groundwater resources and to achieve good groundwater governance can take a variety of forms from informal settings to the setting up of a joint institution or treaty, and be initiated through different processes, including through externally funded technical projects as in the case of some of the current transboundary aquifer agreements. Such enabling frameworks can have a limited scope, and countries may decide to focus on aspects such as data exchange

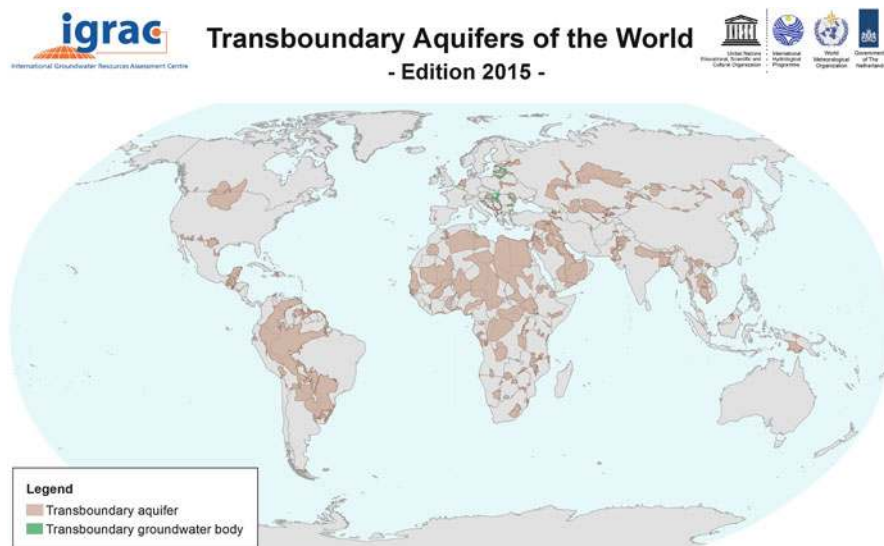


Fig. 11.1 Transboundary Aquifers of the World. Simplified version of “The Map of Transboundary Aquifers of the World”. Edition 2015. Scale 1: 50 000 000 (IGRAC and UNESCO-IHP 2015)

and monitoring or cover the use and protection of the aquifer at large. When no specifically dedicated framework is required, cooperation can also be achieved through extending the scope of an existing basin institution or treaty to the aquifer (Mechlem 2012).

While hundreds of treaties have been negotiated over the use and protection of transboundary surface rivers and lakes, the number of similar instruments specifically dedicated to groundwater resources is extremely low – and where they exist, their impact may still be questionable (Sugg et al. 2015). Studies have shown that the likelihood of tension and conflict within an international river basin is related to the interaction between rapid or extreme changes occurring within the basin and the presence and capacity of institutional mechanisms (treaty or institution) to mitigate such conflict (Yoffe et al. 2003). While these results apply to surface waters, they can give some insight into the potential costs of inaction and challenges to be faced if more efforts are not made to develop and enhance cooperative governance frameworks for transboundary groundwater resources.

11.4.2 *International Legal Frameworks*

Legal frameworks are key in groundwater governance as they lay the foundations upon which to develop policies and translate the latter into rights and obligations (Mechlem 2012). At the international level, the main instrument is the 1997 New York Convention on the Law of Non-Navigational Uses of International

Watercourses, which entered into force in 2014 and extends to “surface waters and groundwaters constituting by virtue of their physical relationships a unitary whole and normally flowing into a common terminus”, thus only considering unconfined aquifers within its scope. Another global international water law instrument is the UNECE Convention on the Protection and Use of Transboundary Watercourses and International Lakes, which provides more detailed provisions about the former and includes in its scope both confined and unconfined transboundary aquifers. Originally a regional convention, it was signed in 1992, entered into force in 1996 and its amendments opening it for accession to all UN Member States entered into force in 2013. In addition, non-binding instruments such as the 2008 Draft Articles on the Law of Transboundary Aquifers adopted by the UN International Law Commission (UN ILC) and annexed to UN General Assembly Resolution 63/124 (UNGA 2008) and Resolution 68/118 (UNGA 2013) which commends them to the attention of governments, as well as the UNECE (2012) Model Provisions on Transboundary Groundwaters and the 2000 Guidelines on Monitoring and Assessment of Transboundary Groundwaters (UNECE 2000), constitute valuable guidance tools specifically devoted to transboundary aquifers. These global instruments provide states with a general framework for cooperation, which can serve as a basis for the development of appropriate arrangements for the use and protection of groundwater resources, tailored to a particular transboundary aquifer and to the local settings.

At the regional level, existing legal frameworks that deal with groundwater include the SADC Revised Protocol on Shared Watercourses (SADC 2000) and the African Convention on the Conservation of Nature and Natural Resources, as well as the EU Water Framework Directive which aims to achieve by 2015 “good status” for all domestic and transboundary waters of the region in terms of quantity and quality and its 2006 Daughter Directive on the protection of groundwater against pollution and deterioration (Mechlem 2012).

Groundwater resources are included within the scope of several bilateral or multilateral surface water arrangements; however, only six agreements to date are specifically dedicated to transboundary aquifers, namely, the Genevese Aquifer, the Nubian Sandstone Aquifer, the North-Western Sahara Aquifer, the Iullemeden Aquifer, the Guaraní Aquifer and the Al-Sag/Al-Disi Aquifer. Among those, some agreements may remain generic (Guaraní Aquifer), while others may cover only certain aspects of transboundary aquifer cooperation (North-Western Sahara Aquifer System, Nubian Sandstone Aquifer System) (Groundwater Governance Project 2016a). Although only a few agreements exist at this stage, the number of transboundary aquifer agreements will undoubtedly increase with better knowledge and understanding of the resource. While international water law instruments dealing with transboundary aquifers are still scarce, the provisions of a number of other international law instruments may also prove useful in terms of groundwater governance such as global environmental treaties on carbon capture and storage (Mechlem 2012).

11.5 The Way Forward

11.5.1 A Shared Global Vision for 2030

Groundwater professionals of most countries are aware of the majority of the gaps and flaws in groundwater governance as depicted above. This is substantiated by the numerous activities intended to improve groundwater governance in their countries, but in many cases, there is no or insufficient progress or actions not addressing those governance aspects that are locally most critical. The aforementioned Groundwater Governance Project has developed a Global Vision to encourage and guide the international community in the endeavours to improve groundwater governance. It intends to be “a Vision of the World in 2030 in which countries have taken appropriate and effective action to govern their groundwater in order to reach globally shared goals of social and economic development and avoid irreversible degradation of groundwater resources and their aquifer systems” (Groundwater Governance Project 2016b). This requires “good governance” with at its heart an effective legal system, capable government agencies, well-designed policies, a structured process for implementing groundwater management plans and mechanisms to facilitate effective participation of stakeholders.

The Vision underlines the important role of groundwater around the world, the dependency of humans and ecosystems on it and the existence of significant threats to the groundwater resources. All these factors call for “good groundwater governance”, guided in particular by the following *working principles*:

- Groundwater should not be managed in isolation, but conjunctively as appropriate with other water sources to improve water security and assure ecosystem health.
- Groundwater quality and resources should be co-managed, and therefore groundwater management needs to be harmonised with land management.
- Effective groundwater governance requires co-governance of subsurface space.
- “Vertical integration” is required between national and local level in the elaboration and implementation of groundwater management and protection plans.
- Coordination should be established with the macro-policies of other sectors – such as agriculture, energy, health, urban and industrial development, and the environment.

11.5.2 A Framework for Action

To achieve the goals of the Shared Vision 2030, a Framework for Action has been developed (Groundwater Governance Project 2016c). It describes the main steps to be taken, provides guidance on planning and prioritising actions and is an urgent call for action to all who can make a difference: national and local governments,

international organisations, private sector, civil society, media, educational institutions and professional organisations – but also well-owners, groundwater users and concerned citizens everywhere. The main steps elaborated in the Framework for Action are:

- Understanding the context
- Creating a basis for governance
- Building effective institutions (laws, regulations, institutions)
- Making essential linkages
- Redirecting finances
- Establishing a process of planning and management

Groundwater governance is highly context-specific and depends on the hydrogeology, level of development and specific challenges related to the aquifer, as well as on the political leadership capacity to deliver the overall governance and macro-economic interests (Groundwater Governance Project 2016c). Action programmes for enhancing groundwater governance at the national and subnational levels therefore need to be optimally tuned to local conditions. The latter is a prerequisite for convincing decision-makers of the urgency of good groundwater governance and for creating among all relevant stakeholder groups the motivation and determination to participate.

The Shared Global Vision for Groundwater Governance 2030 and the Global Framework for Action to Achieve the Vision on Groundwater Governance call for strengthening groundwater governance. This call for action urges countries, districts, communities, companies, organisations and individuals to safeguard the groundwater resource that is essential to meet their common future objectives and sustainable development goals. This Framework for Action is designed to set in place the groundwater governance arrangements that will achieve this Vision (Groundwater Governance Project 2016c).

Acknowledgements The authors would like to thank a number of colleagues at UNESCO's International Hydrological Programme and its Groundwater Systems and Human Settlements Section – in particular, Alice Aureli and Marina Rubio for the support they provided throughout the process of preparing this chapter and Aurélien Dumont and José Alberto Gaona Currea for kindly reviewing the first draft. The authors additionally acknowledge funding from the GEF-supported project on Global Groundwater Governance; and author Robert Varady is grateful for support from the International Water Security Network sponsored by Lloyd's Register Foundation and by the Inter-American Institute for Global Change Research.

References

- Al-Zubari, W. K. (2013). Groundwater governance regional diagnosis in the Arab region. Groundwater governance – A global framework for action, GEF, UNESCO-IHP, FAO, World Bank and IAH. <http://www.groundwatergovernance.org>
- Braune, E., & Adams, S. (2013). Regional diagnosis for the sub-Saharan Africa region. Groundwater governance – A global framework for action, GEF, UNESCO-IHP, FAO, World Bank and IAH. www.groundwatergovernance.org

- Chilton, J., & Smidt, E. (2014). Diagnostic report UNECE region (2nd draft). Groundwater governance – A global framework for action, GEF, UNESCO-IHP, FAO, World Bank and IAH. <http://www.groundwatergovernance.org>
- Commission on Global Governance (CGG). (1995). The concept of global governance. In CGG (Ed.), *Our global neighborhood: The report of the Commission on Global Governance*. Oxford: Oxford University Press.
- De Gooijer, G., Lofgren, R., Granit, J., Jägerskog, A., Aureli, A., & Renck, A. (2009). Innovations in groundwater governance in the MENA region. Middle East North Africa Seminar Report from World Water Week 2008, Stockholm, 17–23 August 2008.
- European Community (EC). (2000). Directive 2000/60/EC of the European Parliament and of the Council establishing a framework for community action in the field of water policy [Water Framework Directive], (23 October 2000, entered into force 22 December 2000).
- European Community (EC). (2006). Directive 2006/118/EC of the European Parliament and of the Council on the protection of groundwater against pollution and deterioration [Groundwater Directive], (12 December 2006, entered into force 16 January 2007).
- Food and Agriculture Organization of the United Nations (FAO). (2011). <http://www.fao.org/wair-docs/ILRI/x5499E/x5499e03.htm>
- Garduño, H., Romani, S., Sengupta, B., Tuinhof, A., & Davis, R. (2011). India groundwater governance case study. Water Papers, Water Partnership Program, the World Bank.
- Gerlak, A. K., Megdal, S. B., Varady, R. G., & Richards, H. (2013). Groundwater governance in the U.S. Summary of initial survey results. University of Arizona, Tucson, AZ. <https://wrrc.arizona.edu/sites/wrrc.arizona.edu/files/pdfs/GroundwaterGovernanceReport-FINALMay2013.pdf>
- Groundwater Governance Project. (2016a). Global diagnostic on groundwater governance. Groundwater governance – A global framework for action, GEF, UNESCO-IHP, FAO, World Bank and IAH. <http://www.groundwatergovernance.org>
- Groundwater Governance Project. (2016b). Groundwater governance, a call for action: A shared global vision for 2030. Groundwater governance – A global framework for action, GEF, UNESCO-IHP, FAO, World Bank and IAH. <http://www.groundwatergovernance.org>
- Groundwater Governance Project. (2016c). Global framework for action to achieve the vision on groundwater governance. Groundwater governance – A global framework for action, GEF, UNESCO-IHP, FAO, World Bank and IAH. <http://www.groundwatergovernance.org>
- International Groundwater Resources Assessment Centre (IGRAC). (2008). *Guideline on: Groundwater monitoring for general reference purposes* (IGRAC report no. GP 2008–1). Delft: IGRAC.
- International Groundwater Resources Assessment Centre (IGRAC) & United Nations Educational, Scientific and Cultural Organization, International Hydrological Programme (UNESCO-IHP). (2015). Simplified version of the 2015 edition of “The Map of Transboundary Aquifers of the World” (2015 TBA map).
- Jellema, P. (2014). Personal communication; e-mail 7 April 2014. Toegepast Natuurwetenschappelijk Onderzoek (TNO) (Netherlands Organisation for Applied Scientific Research) – Geologische Dienst Nederland (GDN) (Netherlands Geological Survey).
- Jousma, G., & Roelofsen, F. J. (2004). *World-wide inventory of groundwater monitoring* (IGRAC report no. GP 2004–1). Delft: IGRAC.
- Kataoka, Y., & Shivakoti, B. R. (2013). Groundwater governance regional diagnosis – Asia and the Pacific region. Groundwater governance – A global framework for action, GEF, UNESCO-IHP, FAO, World Bank and IAH. <http://www.groundwatergovernance.org>
- Lautze, J., de Silva, S., Giordano, M., & Sanford, L. (2011). Putting the cart before the horse: Water governance and IWRM. *Natural Resources Forum*, 35(1), 1–8.
- Linton, J., & Brooks, D. B. (2011). Governance of transboundary aquifers: New challenges and new opportunities. *Water International*, 36(5), 13.
- Llamas, R. (2003). Lessons learnt from the impact of the neglected role of groundwater in Spain’s water policy. In A. S. Alsharhan & W. W. Wood (Eds.), *Water resources perspectives: Evaluation, management and policy* (pp. 63–81). Amsterdam: Elsevier Science.
- Margat, J. (2008). *Les eaux souterraines dans le monde*. Orléans/Paris: BRGM/UNESCO.

- Margat, J., & Van der Gun, J. (2013). *Groundwater around the world: A geographic synopsis*. Leiden: CRC Press/Balkema.
- Mechlem, K. (2012). Legal framework for sustainable groundwater governance. Groundwater governance – A global framework for action, GEF, UNESCO-IHP, FAO, World Bank and IAH. <http://www.groundwatergovernance.org>
- Megdal, S. B. (2012). Groundwater management. *The Water Report*, 104, 9–15.
- Megdal, S. B., Gerlak, A. K., Varady, R. G., & Huang, L.-Y. (2015). Groundwater governance in the United States: Common priorities and challenges. *Groundwater*, 52(1), 1–8.
- Moench, M., Burke, J., & Moench, Y. (2003). *Rethinking the approach to groundwater and food security*. Rome: FAO.
- Mukherji, A., & Shah, T. (2005). Groundwater socio-ecology and governance: A review of institutions and policies in selected countries. *Hydrogeology Journal*, 13(1), 328–345.
- Nowlan, L., & Bakker, K. (2010). Practising shared water governance in Canada: A primer. UBC program on water governance. Vancouver, BC. http://www.wateregovernance.ca/wpcontent/uploads/2010/08/PractisingSharedWaterGovernancePrimer_final1.pdf
- Ostrom, E. (1990). *Governing the commons: The evolution of institutions for collective action*. Cambridge: Cambridge University Press.
- Pahl-Wostl, C. (2007). Transitions towards adaptive management of water facing climate and global change. *Water Resources Management*, 21, 49–62.
- Puri, S., & Aureli, A. (Eds.). (2009). *Atlas of transboundary aquifers – Global maps, regional cooperation and local inventories* (UNESCO-IHP ISARM Programme). Paris: UNESCO.
- Shah, T. (2007). The new institutional economics of India's water policy. In: International workshop on African water laws: plural legislative frameworks for rural water management in Africa, Johannesburg, South Africa, 26–28 January 2005.
- Shah, T. (2009). *Taming the anarchy: Groundwater governance in South Asia* (p. 310). Washington, DC: RFF Book, Resources for the Future.
- Sharma, B., Villholth, K., & Sharma, K. (eds). (2007). Groundwater research and management: Integrating science into management decisions. In Groundwater governance in Asia Series, No 1, Proceedings of the IWMI-ITP-NIH Workshop, 8–9 February 2005, Roorkee, India.
- Siebert, S., Burke, J., Faures, J. M., Frenken, K., Hoogeveen, J., Döll, P., & Portmann, F. T. (2010). Groundwater use for irrigation – A global inventory. *Hydrology and Earth System Sciences*, 14, 1863–1880.
- Solanes, M., & Jouravlev, A. (2006). *Water governance for development and sustainability* (Recursos Naturales e Infraestructura). Santiago: CEPAL.
- Southern African Development Community (SADC). (2000). Revised protocol on shared watercourses, Windhoek [SADC Revised Water Protocol], (7 August 2000, entered into force 22 September 2003).
- Sugg, Z., Varady, R. G., Gerlak, A. K., & de Grenade, R. (2015). Transboundary groundwater governance in the Guarani Aquifer System: Reflections from a survey of global and regional experts. *Water International*, 40(3), 377–400.
- Taylor, R. G., Scanlon, B., Döll, P., Rodell, M., van Beek, R., Wada, Y., Longuevergne, L., Leblanc, M., Famiglietti, J. S., Edmunds, M., et al. (2013). Groundwater and climate change. *Nature Climate Change*, 3(4), 322–329.
- Theesfeld, I. (2008). A review on national groundwater policy instruments – Grasping institutional aspects for transboundary groundwater governance. In Proceedings of the 12th annual International Association for the Study of the Commons (IASC) Conference. Cheltenham, England. http://iasc2008.glos.ac.uk/conference%20papers/papers/T/Theesfeld_155301.pdf
- Theesfeld, I. (2010). Institutional challenges for national groundwater governance: Policies and issues. *Ground Water*, 48, 131–142.
- Tujchneider, O. (2013). Regional diagnostic, Latin America and the Caribbean. Groundwater governance – A global framework for action, GEF, UNESCO-IHP, FAO, World Bank and IAH. <http://www.groundwatergovernance.org>
- United Nations Convention on the Law of the Non-Navigational Uses of International Watercourses. (1997). Annexed to UNGA Resolution 229, Official Records of the UNGA, 51st session [UN

- Watercourses Convention], (New York, 21 May 1997, entered into force 17 August 2014). UN Doc A/Res/51/229.
- United Nations Economic Commission for Europe (UNECE). (1992). Convention on the Protection and Use of Transboundary Watercourses and International Lakes [UNECE Water Convention], (17 March 1992, entered into force 6 October 1996).
- United Nations Economic Commission for Europe (UNECE). (2000). Guidelines on monitoring and assessment of transboundary groundwaters. Lelystad, UNECE Task Force on Monitoring and Assessment, under the Convention on the Protection and Use of Transboundary Watercourses and International Lakes (UNECE Water Convention).
- United Nations Economic Commission for Europe (UNECE). (2012). Model provisions on transboundary groundwaters. ECE/MP.WAT/40.
- United Nations General Assembly (UNGA). (2008, December 11). Resolution 63/124 on the Law of Transboundary Aquifers. UN Doc A/RES/63/124.
- United Nations General Assembly (UNGA). (2013, December 16). Resolution 68/118 on the Law of Transboundary Aquifers. UN Doc A/RES/68/118.
- United Nations World Water Development Report (UN WWDR). (2015). *Water for people, water for life*. Paris: UNESCO Publishing.
- Van Steenberghe, F., & Shah, T. (2003). Rules rather than rights: Self-regulation in intensively used groundwater systems. In M. Llamas & E. C. Custodio (Eds.), *Intensive use of groundwater: Challenges and opportunities* (pp. 241–256). Lisse: Balkema.
- Varady, R. G., Van Weert, F., Megdal, S. B., Gerlak, A., Abdalla Iskandar, C., House-Peters, C., & with major editing by McGovern, E. D. (2013). Thematic paper no. 5: Groundwater policy and governance. Rome (April 2013): Global Environment Facility - FAO, p 47. Also, digest of thematic paper no. 5 (2013). Groundwater governance project: A global framework for action, GEF, UNESCO-IHP, FAO, World Bank and IAHS. <http://www.groundwatergovernance.org>
- Vermooten, S., & Kukurić, N. (2009). Collecting aggregated groundwater data to identify highly stressed aquifers worldwide. Trends and sustainability of groundwater in highly stressed aquifers. Proceedings of symposium JS.2 at the joint IAHS & IAH convention, Hyderabad, India, September 2009. IAHS Publ. 329, 2009.
- Wada, Y., Wisser, D., & Bierkens, M. (2013). Global modeling of withdrawal, allocation and consumptive use of surface water and groundwater resources. *Earth System Dynamics Discussions*, 4(1), 355–392.
- Wolf, A. (2007). Shared waters: Conflict and cooperation. *Annual Review of Environment and Resources*, 32, 241–269. Palo Alto: Annual Reviews.
- World Bank. (1991). *Managing development - The governance dimension*. Washington, DC: World Bank.
- Yoffe, S., Wolf, A., & Giordano, M. (2003). Conflict and cooperation over international freshwater resources: Indicators of basins at risk. *Journal of the American Water Resources Association*, 39(5), 1109–1126.
- Zhou, Y. (1994). Objectives, criteria and methodologies for the design of primary groundwater monitoring networks. In Proceedings of the conference on future groundwater resources at risk, Helsinki, Finland, 13–16 June 1994.

Open Access This chapter is distributed under the terms of the Creative Commons Attribution-Noncommercial 2.5 License (<http://creativecommons.org/licenses/by-nc/2.5/>) which permits any noncommercial use, distribution, and reproduction in any medium, provided the original author(s) and source are credited.

The images or other third party material in this chapter are included in the work's Creative Commons license, unless indicated otherwise in the credit line; if such material is not included in the work's Creative Commons license and the respective action is not permitted by statutory regulation, users will need to obtain permission from the license holder to duplicate, adapt or reproduce the material.



Chapter 12

Water Governance Futures in South Asia and Southern Africa: Déjà Vu All Over Again?

Douglas J. Merrey, Anjal Prakash, Larry Swatuk, Inga Jacobs, and Vishal Narain

Abstract This chapter explores the likely trends and outcomes in water governance by about 2030 in two regions: South Asia and Southern Africa. It addresses the question: What are the prospects for developing governance arrangements in the two regions that will lead to more positive outcomes in terms of sustainably improving people’s livelihoods while conserving natural resources? It examines this question through three “lenses”: (1) “beyond disciplines”, (2) “beyond scales” and (3) “beyond ‘institutional’ hardware to ‘human’ software”. The two regions are currently on different trajectories: the Southern African trajectory seems to be moving in a positive direction, in contrast with South Asia. The chapter discusses four factors that go far to explaining this divergence: (1) the contrasting roles of the hegemonic countries, (2) the level of intercountry “trust” that has emerged in the two regions, (3) the roles of civil society and NGOs and (4) the roles of external facilitators. The chapter emphasises the importance of developing the human software – the “soft skills” of communication and shared values complementing technical competence – as the most critical driver of successful water resource governance.

D.J. Merrey (✉)
Independent Consultant, Gainesville, FL, USA
e-mail: dougmerrey@gmail.com

A. Prakash
International Centre for Integrated Mountain Development (ICIMOD), Kathmandu, Nepal
e-mail: anjal.prakash@icimod.org

L. Swatuk
University of Waterloo, Waterloo, ON, Canada
e-mail: lswatuk@uwaterloo.co

I. Jacobs
Council for Scientific and Industrial Research (CSIR), Pretoria, South Africa
e-mail: ingajacobs30@gmail.com

V. Narain
Management Development Institute (MDI), Gurgaon, India
e-mail: vishalnarain@mdi.ac.in

Keywords South Asia • Southern Africa • Water governance • Transnational river basins • Problemsheds

12.1 Introduction

In the waning years of the past century and the early years of this twenty-first century, there have been predictions that competition for increasingly scarce water supplies will lead to famines, the breakdown of stressed societies, conflicts and even warfare among countries. Serious disagreements and threats are emerging over development of water resources. Water scarcity in North Africa and the Middle East threatens food security and economic growth¹. Upstream countries on the Nile Basin want to replace water-sharing rules imposed by the colonial powers with new rules they deem more equitable – creating alarm and consternation in downstream countries for whom the Nile waters is critical (Swatuk 2012). In addition, the international consensus and drive behind the integrated water resource management (IWRM) paradigm is now fraying. IWRM has been the basis for considerable progress in increasing scientific knowledge and understanding of water resource issues, sharing this knowledge widely among stakeholders and building networks and institutions for managing water effectively (see, e.g. www.cap-net.org); but it has inhibited investments, especially in underdeveloped river basins such as those in Africa (e.g. Giordano and Shah 2014).

On the other hand, partly as a result of the IWRM movement, there are important signs that sharing water resources can trigger cooperation among countries (Wirkus 2005). The idea of sharing the benefits of water resource development rather than seeking formulas for equitable sharing of the water resource itself offers an opportunity to achieve a higher net benefit – but this requires a high degree of trust among the parties (Grey and Sadoff 2007; Sadoff and Grey 2002). This principle of “benefit sharing” is the basis for the Nile Basin Initiative, the Mekong Commission and the SADC Protocol on water sharing, among others (Earle et al. 2010). Achieving a high level of trust and creating effective institutional arrangements to produce and share the benefits equitably is fundamentally an issue of water governance. This is proving extremely difficult to achieve. The decade of progress made in achieving cooperation among most of the Mekong countries is threatened by unilateral investments in dams by some upstream countries eager to achieve more rapid economic growth (Burton 2011; Grumbine et al. 2012; Houba et al. 2013). The progress made by the Nile Basin Initiative (NBI) is threatened by disagreements over the fundamental rules for sharing water resources and by upstream countries hungry for rapid hydroelectric and agricultural development.

¹ See, e.g. <http://www.un.org/apps/news/story.asp?NewsID=47181#.Uw9h-aOYbIU> (accessed 23 April 2014).

The water sector does not exist in isolation: for instance, the understanding of the water-energy-food-climate change nexus has grown recently (Bizikova et al. 2013; WEF 2011). This reflects a growing recognition that the challenges posed within each of these “sectors” (for want of a better term) interact in complex and dynamic ways with the others. Further, governance and management arrangements for the water sectors are embedded in larger political and institutional contexts. Mobilising water for agricultural production and using it productively, particularly on rain-fed fields, will be critical for achieving future food security. However, mobilising water for hydroelectric and other uses is also critical in many regions – and both compete with the use of water for agriculture and support agricultural water by reducing energy costs of pumping. Climate change is affecting all major river basins in ways that are complex and not easily predicted. Making water available for drinking and household uses, ensuring adequate water flows for environmental services and improving the productivity of fisheries are other critical challenges.

Given these interlinkages and interdependencies, what will water governance look like in the future? By “future” we mean approximately 2030, on the premise that crystal balls and forecasting models become totally opaque beyond a 15-year horizon. Defining “governance” is difficult: there are multiple competing formulations. For the purpose of this chapter, we define governance as referring to “all processes of governing [i.e. managing affairs], whether undertaken by a government, market, or network, whether over a family, tribe, formal or informal organisation, or territory, and whether through laws, norms, power, or language”. It relates to processes and decisions that seek to define actions, grant power and verify performance (Bevir 2013: 1). Most of those writings about “water governance” use the definition of the Global Water Partnership: “the range of political, social, economic and administrative systems that are in place to develop and manage water resources, and delivery of water services, at different levels of society” (Rogers and Hall 2003). Governance thus refers to the institutional systems and process through which decisions are made and implemented. It constitutes the processes through which control and authority are exercised in the allocation of water resources.

This chapter explores the likely trends and outcomes in water governance with a particular focus on cooperation and conflict over the management of water resources in two regions: South Asia and Southern Africa. In South Asia, the focus is on the governance of three very large-scale shared river basins, the Indus, Ganges and Brahmaputra, inhabited by nearly a billion mostly poor people. The Ganges and Indus basins are under growing stress in the context of a lack of appropriate water governance arrangements. South Asia has struggled to find ways to co-manage water resources to benefit everyone equitably in a context where there is much potential benefit to be achieved. Southern Africa is considered an example of relative success in developing ways to cooperate – but implementation is incredibly complex in systems that are smaller in terms of size and population but more water scarce than the South Asian basins. So the critical question is: *what are the prospects for developing governance arrangements in the two regions that will lead to more positive outcomes in terms of sustainably improving people’s livelihoods*

while conserving natural resources than achieved so far versus further deterioration and rising conflict?

We examine this question through three “lenses” which we characterise as “beyond disciplines”, “beyond scales” and “beyond ‘institutional’ hardware to ‘human’ software”. *Beyond disciplines* addresses the question of how to mobilise the diverse types of expertise productively to solve problems. It is based on the recognition that no single discipline is sufficient to address the emerging challenges of water resource governance and management. Addressing the governance challenges facing the water sector requires a diverse range of scientific expertise combined with a wide spectrum of actors – represented by the state, civil society and the private sector. Further, no amount of technical and scientific ingenuity is adequate if the solutions generated are not relevant to the specific socio-political and socio-economic contexts in which they are applied (Jacobs 2012).

Beyond scales examines how to define the “space” for transboundary water resource governance and management. Traditionally, there has been a tendency to prioritise the hydrological basin as the primary unit of analysis in water governance and its management. Recently, this notion has been broadened to include other socio-political and socio-economic communities with a stake in the resources: thinking has evolved from the watershed to the “problemshed” to the virtual and social basin (Mollinga et al. 2007). There is therefore a changing definition of international river basins – encompassing not hydrological boundaries alone but “lived in” social spaces, i.e. the sum of social practices and discourses that exist within the biophysical space.

The third lens, *beyond institutional hardware to human software*, enables us to examine the entry points to bring about a shift from institutional systems that favour the powerful at the expense of others, to more enlightened leadership and governance arrangements that can help achieve both greater social equity and environmental sustainability. The main focus of interventions, based on disciplines such as foreign relations, policy sciences and institutional economics, has been on engineering structural changes in institutions that change incentives and therefore behaviour and outcomes (North 1995). This emphasis may have led to a failure to recognise the equally critical importance of individuals’ mindsets and “soft skills” in bringing about change: while training and capacity building has emphasised enhanced technical skills, less attention has gone to how to enable individuals to champion and lead in intangible areas like building trust and fostering norms that guide behaviour in more productive ways. This is not an either-or choice; rather it is a matter of getting the balance right between building institutions and fostering the soft skills needed to make them work.

The next two sections discuss the water governance challenges and opportunities facing South Asia and Southern Africa. Section 12.4 draws on the discussion in these sections and tries to assess the prospects for alternative futures and their implications for the well-being of the people. The concluding section briefly characterises the wider implications of these cases.

12.2 South Asia: A Glass (More Than) Half Empty?

12.2.1 *The Emerging Water Governance Context*

Water governance in South Asia has changed dramatically in recent decades. The gap between governance and “government” has widened (Mathur 2009) as other actors have acquired stronger roles in the allocation of water resources. The locus of water policy-making has moved from the state to include other actors: partly through the dynamic of (formal and informal) markets, the private sector and civil society have created greater space for themselves (Narain et al. (2014)). State authority has been diluted at all levels. On the one hand, donors and funders play an increasing role in influencing the direction and nature of reforms; on the other hand, civil society organisations have also influenced water governance.

New discourses such as those of IWRM and neo-liberalism have penetrated the water sector. However, the regional relevance of the IWRM paradigm has been questioned, given both the apparent mismatch between the informal nature of the water economy and the emphasis on formal organisational structures envisaged under IWRM reforms and the lack of political edge in the way IWRM has been conceptualised (Kulkarni 2014; Mollinga et al. 2006; Shah and Van Koppen 2006). The neo-liberal paradigm has been criticised for its exclusion of the poor (Urs and Whittel 2009). The discourse on gender mainstreaming has gained prominence, even as the gap between rhetoric and practice has persisted (Kulkarni 2014; Joshi 2014; Ahmed 2008; Prakash et al. 2012).

During the 1980s and 1990s, disenchantment with the role of the state in the management of the region’s massive surface irrigation schemes led to demands for a greater involvement of users in irrigation management. In South Asia, this process is referred to as “participatory irrigation management” (PIM). However, several factors limited the effectiveness of the process, including limited attention to issues of design and technology in the handover of irrigation systems, reproduction of unequal power relations in the internal working of water users’ associations, limited attention to questions of rights and entitlements and powerful resistance within the bureaucracy (Narain 2008; Jairath 1999; Parthasarathy 1998). The debate on appropriate approaches to arrest groundwater depletion has continued, with “competitive deepening” identified as a major issue in some locations and climate change being recognised as another stressor, compounding the effects of groundwater depletion (Shah 2009, 2013). Falling water tables are seen as a serious threat to food security (Saleth 1996; Shah 2009, 2013).

South Asian water resource scholarship has thus recently experienced an upsurge (Mollinga 2008). Multiple voices are emerging in the water discourse; it is therefore necessary to create a space for dialogue among government, civil society and citizens (Lahiri-Dutt 2008; Narain et al. (2014)). In examining the opportunities for improved water governance and management, two scales are important: the growing potential for conflicts and cooperation across rural and urban uses and trans-boundary water conflicts, each of which is discussed below.

12.2.2 Rural–Urban Water Conflicts

Most of the rapidly growing South Asia cities have expanded by acquiring the land and water resources of peripheral regions, creating vast peri-urban zones (Narain et al. 2013). Since urban expansion is a gradual process of acquiring land and water from the peripheral regions, it has equity implications for those living at the periphery of large cities, as it raises questions for their land and water security. The usurpation of peri-urban water sources in South Asian countries has taken many forms (Narain et al. 2013). First, there are physical flows of water from the peri-urban to urban locations, for instance, through water tankers or the construction of canals to divert water from rural to urban uses. Second is the acquisition of village common property water sources to build urban infrastructure. Third is the encroachment upon the village commons. The fourth is the pollution of peri-urban water sources by urban and industrial waste.

Several policy and institutional issues are responsible for this phenomenon. The first is the linking of land and water rights. When access to water is tied to ownership of land, the process of land acquisition that characterises urban expansion leads to loss of access to water sources as well (Narain 2014). The second is the fragmented nature of urban planning and rural development that presents rural and urban water supply as distinct planning entities. Urban planners and policy-makers focus on the expansion of urban water infrastructure, overlooking its implications for rural water security. There is growing conflict around peri-urban water sources – both freshwater and wastewater (Gopakumar 2012; Narain 2014). The absence of appropriate forums or platforms for the integration of urban planning and rural development creates opportunities for conflicts over water, but there are also opportunities for cooperation. As urbanisation advances, the demand for platforms for negotiation and conflict resolution across rural and urban water supplies will become more visible.

An important water governance challenge in the region in the coming years will, therefore, be to develop appropriate institutions to integrate water supply provisions for urban and rural uses. This could take various forms: the evolution of multiple stakeholder platforms across rural and urban uses and the evolution of platforms to bring peri-urban residents face to face in dialogue with service providers. Current and on-going research in the region is expected to throw new light on opportunities for reducing conflict and encouraging cooperation in the management of peri-urban water insecurity.

12.2.3 Conflict and Cooperation in Transboundary Water Resource Management

The major transboundary rivers in South Asia are the Indus, Ganges and Brahmaputra. These rivers originate in the Hindu-Kush Himalayan region and are connected to the Tibet Autonomous Region of China. The Indus Basin connects Afghanistan, China,

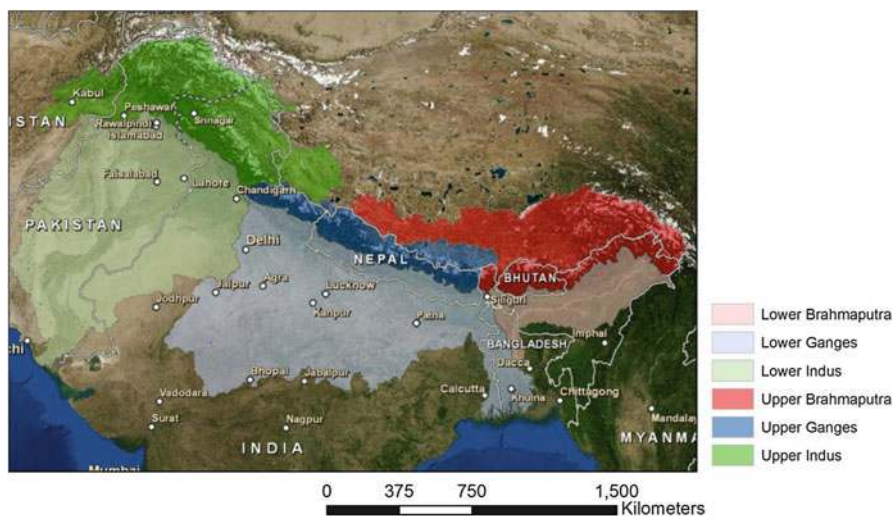


Fig. 12.1 Map of the Indus, the Ganges and the Brahmaputra rivers in South Asia (Source: Lutz and Immerzeel 2013)

India and Pakistan. Approximately 300 million people live in the Indus Basin, which covers an estimated area of 1.12 million km². The Indus is critical to the survival of Pakistan, one of the driest countries in the world (Briscoe et al. 2005). The huge Ganges, Brahmaputra and Meghna (GBM) Basin system stretches across five countries: Bangladesh, Bhutan, China, India and Nepal (Ahmad et al. (2001)). While Bangladesh and India share all three basins, China shares only the Brahmaputra and Ganges, Nepal only the Ganges and Bhutan only the Brahmaputra. Nepal is located entirely in the Ganges Basin and Bhutan entirely in the Brahmaputra (Salehin et al. 2011). It is estimated that at least 630 million people live in the GBM river basin (Aquastat 2011) (see Fig. 12.1).

Worldwide, studies have shown that in modern times, no wars have as yet been fought over water and over 145 water-related treaties have been signed on trans-boundary rivers (Wolf 1998). Nevertheless, conflict over water at local levels is common and the potential for interstate conflict over water is real². In South Asia, numerous challenges exist to managing the three major transboundary rivers (Prakash et al. (2013)). These challenges can broadly be divided into two, namely, biophysical and socio-political. On the biophysical side, Lutz and Immerzeel (2013) summarise the challenges in terms of cryospheric response to a changing climate in the Hindu-Kush Himalayan region. In essence, they conclude that the Indus runoff may change somewhat by 2050 (though the direction of change is uncertain), but the GBM runoff will not show major changes.

² See: <http://pacinst.org/issues/water-and-conflict/> and <http://www2.worldwater.org/conflict/timeline/> (accessed 8 September 2015).

The real challenges lie in the socio-political arena where conflicts are brewing. The Indus Water Treaty has often been held as a showcase where the two signatories, India and Pakistan, had gone through two wars, but the Treaty has functioned reasonably well (Biswas 1992). This notion recently came into question when Pakistan objected to India's Kishanganga project; Pakistan decided to go straight to arbitration without considering the other options available under the Indus Water Treaty (Chintan 2011). This issue illustrates the difficulties with static water treaties, since conditions change over time and the countries concerned find that treaties become increasingly out of tune with the new conditions (Biswas 2011). Salehin et al. (2011) document the status of cooperation in the GBM basin. They conclude that the lack of mutual trust and confidence among the co-riparian countries has played a major role in the long-standing disputes or conflicts surrounding trans-boundary rivers.

A lack of trust between the countries combined with the absence of a shared vision has led to a pattern of non-cooperation in the region. As Biswas (2011: 669) notes, "This pernicious mind-set has eroded goodwill and confidence, and has generated mutual mistrust and suspicion. The situation is further compounded by the failure of the political leaders to create public opinion in favour of formulating and implementing a vision for regional cooperation and development". Studies on trans-boundary water conflict and cooperation generally consider interstate relations over shared water resources without also considering intrastate relations. International water conflict and cooperation may be influenced by domestic politics and vice versa (Giordano et al. 2002). For example, the failure of India and Bangladesh to reach an agreement on the proposed Teesta River Treaty in 2012 was a result of opposition by the state government of West Bengal.

The major problem lies in the lack of understanding or acceptance of mutual benefits in co-management of transboundary rivers. Sharing of water is based on parties who give and take water and therefore is largely understood a win-lose game. Promoting peaceful cooperation for environmental management, benefit-sharing and sustainable use of transboundary freshwater resources is possible only if innovative approaches are used that bring together all sectors and actors whose actions affect the transboundary water body at regional, national and local levels (Earle et al. 2010). The development of a science-based diagnostic analysis is essential to identify the threats to the transboundary ecosystem and to break down the issues into manageable parts with the aim of developing a strategic action programme. The sharing of benefits from water use – whether from hydropower, agriculture, flood control, navigation, trade, tourism or the preservation of healthy aquatic ecosystems – is immense and therefore a mindset shift is needed.

12.2.4 The Future of Water Governance in South Asia

The gap between the potential benefits of cooperating to develop and manage shared water resources and the reality of continuing poverty, food insecurity, energy insecurity and resource degradation is immense and growing. We offer a few suggested

changes in governance arrangements that could lead to a more positive outcome by 2030.

First, the “space” for regional water management must be redefined. Discussions and agreements on river water (or benefit) sharing must move from being bilateral to being multilateral: to date, most of the diplomatic initiatives on river water sharing have been bilateral in nature. Multilateral discussions, including recognition of local competition for equitable access to water, could reduce the dominance of any single state leading to more equitable and legitimate agreements. Second, South Asian governance arrangements need to adopt a “co-management” and “benefit-sharing” perspective, rather than only sharing water. There is a dire need for co-management of transboundary rivers for mutual benefit, especially as climate change and human interventions affect water flows. This will require a more diverse range of expertise and inclusion of a wider set of actors to succeed. Third, hydropower and the creation of an integrated South Asian power grid offer a game-changing opportunity for regional prosperity and peaceful coexistence. The cooperation between Bhutan and India demonstrates the potential for such an integrated approach. Achieving such regional win-win partnerships by 2030 will be difficult but is not impossible. Achieving this game-changing state of affairs will require mobilising diverse types of expertise and facilitating the active engagement of multiple actors (“beyond disciplines”); changing mindsets from a hydrological to a problemshd paradigm (“beyond scales”); and implementing effective institutional arrangements while – most important – strengthening capacities for negotiation, dialogue and communication as well as technical skills and identifying effective champions with a regional vision (“beyond institutional hardware to human software”). Organisations operate in the manner they do as a result the behaviour of people who work within them (Senge et al. 2008). These steps will need to be accompanied by a process to create the institutional frameworks critical for long-term success.

12.3 Southern Africa: A Glass Half Full?

12.3.1 The Regional Context

Water resources are highly varied across Southern Africa. The region receives most of its water during the wet summer season (October to April), when rain arrives from the Indian Ocean. The majority of this water falls within 400 km of the east coast of the continent. In general, the region is better watered in the north and east and much drier in the south and west, except along the southern coasts of South Africa. According to Conley (1996: 17), “the Zambezi River carries more than ten times as much water, and the Zaire [Congo] River carries more than a hundred times as much water, as the Orange River in the south”. In addition, the region is prone to both drought and flood, sometimes occurring simultaneously (Chenje and Johnson 1996: 2). While it is often said that Southern Africa is “water scarce”, it should be

and expectations that cannot be erased, but which may not be adequately acknowledged in a state-building process. Thus, as Dovers (2001) points out, institutions better reflect the past than anticipate the future. Given their histories, “[i]nstitutions are both barriers to and opportunities for ecologically sustainable human development. Institutions can pervert or empower human potential” (Dovers 2001: 215). Path dependency is real.

12.3.2 Evolution of Regional Water Governance

It has been more than 20 years since the Southern African Development Coordination Conference (SADCC) became the Southern African Development Community (SADC). With regard to water resource governance and management, SADC member states have been engaged in significant institution building, at national and regional levels, over the past two decades. All member states have or have expressed their intention to revise their water laws, to reform their governance arrangements and to create new water management organisations. Most have attempted to bring their national laws, policies and procedures into line with fellow member states, all of which are informed by the Revised SADC Protocol on Shared Watercourses (referred to as the “SADC Protocol” from here on), and dominant global discourses concerning integrated water resource management, water integrity and water efficiency, to name only three of the many conceptual influences active in the region. These initiatives are supported by a seemingly never-ending flow of people, finance, technology and ideas from Europe and elsewhere in the world. It is a rather grand experiment with uneven results (Swatuk and Fatch 2013).

These mixed results are understandable. This is especially so when one considers the failure to factor into plans, policies and programmes the historical basis and contemporary manifestation of the politics of water resource access and use in post-colonial/post-apartheid Southern Africa. Put differently, Southern Africa comprises a set of unevenly developed states where access to water and land reflects profound socio-economic inequalities. To shy away from these facts is to guarantee poor water governance. Thus, to say that a triple-E (social equity, economic efficiency, environmental sustainability) bottom line is the aim of national/regional water governance is simply not enough (SADC 2011, 2012). The region must move beyond high-minded platitudes to improve practices and achieve better outcomes. This requires asking difficult questions regarding the relationship between existing governance structures and management practices and their role in, and relationship to, abiding conditions of widespread poverty and unequal access to and economically and environmentally unsustainable use of water. As with South Asia, demographic drivers – urban population growth, abiding rural poverty – and extensively shared international waters should concentrate the minds of decision-makers, particularly under the speculative cloud of the negative impacts of climate change.

Many good things have happened over the past two decades. The legal basis is mostly in place regarding fair and equitable use of the region’s resources, both

within states and among them. Most of the region's shared basins have some sort of governing architecture in place. At the centre of regional cooperation is the SADC Protocol, without which many of the joint fact-finding and knowledge-building exercises in the region's basins may not have been possible. Dramatic changes in South Africa's political landscape since the early 1990s were initially accompanied by sweeping changes to that nation's policies, laws and institutions. South Africa became a very active member of SADC, leading processes around issue areas such as devising national water policies, strategies and laws. South Africa's water reform spurred the wave of reforms experienced in neighbouring countries post-1990 as well.

However, like many developing countries, SADC states struggle with implementing many of their well-formed policies, laws and procedures. There are a wide variety of explanations regarding this relatively poor performance: human, financial and technological shortages, "poor governance" embedded in unequal states, tensions around the creation of new sources of authority such as catchment management agencies or councils and water user associations, resource capture facilitated by neoliberal approaches to resource management and persistent global economic crises forcing resource-extracting economies to "stick to what they know". Some critics have argued that rather than introduce a whole new set of structures, state actors should have worked with existing, already legitimate, forms of authority. Van Koppen et al. (2014) suggest that the nationalisation of water resources and the introduction of formal permit systems, while probably important in principle (particularly in highly unequal societies), have in fact facilitated further resource capture by the empowered and the undermining of local systems of governance.

Yet there are success stories: Namibia's basin management committees, particularly in the western-draining ephemeral Kuiseb river basin, show the real potential for ideal-typical IWRM-style systems to emerge (Manning and Seely 2005). Indeed, the role of Rand Water, South Africa's largest water services provider in the Greater Johannesburg Metropolitan Area, suggests that public-private partnerships can work given a particular set of parameters⁴. In the transboundary context, states have shown a willingness to cooperate, though not quite extending to striking what Litfin (1997) describes as "sovereignty bargains", such as those that typify the European Union. New modalities of decision-making have been successfully introduced; numerous multidisciplinary, transnational research and knowledge-generating projects and programmes are underway; and the important 14-year-old regional water research and education programme, WaterNet⁵, has been building the region's professional capacity. WaterNet is recognised as the water capacity-building arm of SADC, and its implementation through a set of regional universities and training institutions has promoted mutual understanding – even friendships – among regional water professionals. To be sure, some of these activities are being pushed by external actors, whose absence would quite possibly threaten the negotiation and bargaining processes. Much of this feels like one step forward, one step backward, yet

⁴Rand Water is a government-owned entity that operates autonomously, largely like a private firm.

⁵<http://www.waternetonline.org/> (accessed 8 September 2015).

if we are to realise the imagined sustainable water resource governance future of the region, it is important to see the glass as half full.

12.3.3 How to Fill a Glass that Is Half Full

A sustainable water governance future will require a firm technical and legal/institutional foundation, i.e. institutional hardware. But having adequate amounts of money, physical infrastructure (pipes and so on) and the right systems of delivery and oversight will only go so far in the absence of what we are calling “appropriate human software”. In our view, one key element is leadership – at all levels. Even those who have advocated for the role of institutions above individuals have conceded, as noted for South Asia, that the behaviour of individuals within organisations determines the outcomes. Indeed, the importance of individuals to the success or failure of effective water governance is under-researched despite being critically important (Kranz and Jacobs 2012). The role of the individual in relation to skills audits and occupational profiles needed for effective water management has been analysed in several disciplinary-specific analyses, particularly in education science. However, these have centred on human resource assessments of technical qualifications and their alignment with professional job descriptions in water and wastewater treatment. More research needs to be conducted on the role of the individual in actively addressing complex water-related challenges, in redefining how multiple sectors cooperate around these issues, and ultimately influencing socio-economic development at the regional level.

Part of the problem with water governance in the SADC and indeed SAARC regions is that political and economic power confers water security as a right upon the office holder or private actor, and subsequently, those whom they deem worthy. In the days leading up to the end of colonial/apartheid rule and for several years thereafter, leaders in Zimbabwe, Namibia and South Africa took decisions as if time was short and the needs of all citizens mattered. These countries are now many years into “independence” and the urgency – as well as most of the leaders – has evaporated. In the cases of Zimbabwe, Angola and Mozambique, a fundamental problem is that there has been little or no turnover at the top of the ladder, draining the life out of the system, particularly at the lowest levels of authority. Where will the vision and drive come from when the need for change is least apparent to those ostensibly responsible for the task?

One way to accelerate development from a water perspective is to train leaders that can speak different (technically specific) languages and who can convey and convince a critical mass of the appropriateness of a particular intervention. This speaks both to the role and need for individuals who are able to adopt a broader and more holistic mindset. But it may also include the identification of particular occupational or personality profiles for transboundary managers and policy-makers who are more predisposed to operate in this socially constructed landscape.

To build the necessary human software and to inhabit the existing institutional hardware, education matters. Present and future generations of leaders must be made to see that water is not an ordinary good (Savenije 2002). Since water infuses all things and is fundamental to the functioning of all elements of society, it must be mainstreamed throughout the region's information and educational systems. What should be avoided is the "crisis narrative" – though to be sure, there is a crisis and it is felt primarily by the poor – and what should be showcased is how everyone is downstream. Put differently, poor and misguided behaviour will eventually come back to haunt you. No matter how insulated political and economic leaders and their families feel, they are only one tweet away from ending up like Egypt's Hosni Mubarak. The growing number and seriousness of social protests around water supply delivery in South Africa, which has also become an important political issue, is an indicator of the danger.

Trust – social capital – also matters. Good governance depends upon state-civil society relations wherein state action acts as a feedback loop to civil society expectations. Every opportunity must be taken to draw political leaders into activities where political involvement is necessary to facilitate project or programme success. For example, in Botswana, President Ian Khama's role as patron of the Kalahari Conservation Society ensures environmental issues a place of importance at the highest levels of decision-making. Of course, such interactions should also acknowledge the existence of power relations, i.e. how individuals interact with each other and absorb information. If one actor is perceived to be powerful, other people in the conversation may feel too intimidated to speak. This dynamic needs to be carefully managed to foster fruitful dialogue. This point is particularly relevant for policy-makers operating at the regional level who have to contend with different levels of power purely as a result of where they come from, i.e. with some countries being more able to influence policy decisions because of socio-economic clout, military hegemony, human capacity and/or influential alliance. Where progressive systems are already in place, such as much of the SADC region, leadership and ethics must be one focus for filling a half-filled glass.

At the 2012 International Freshwater Conference, a question was asked in plenary on whether the push for basin-scale governance structures wasn't a mistake and that perhaps it made more sense to work from existing structures and imbue them with a "river basin sensibility". The panel, comprising senior government officials and former members of the water administration, was uniformly in agreement: the basin is the way forward. If this is the case, then perhaps we can approach the question in the opposite way: with a river basin governance framework in place, is it not important to (i) embed this level of authority within existing levels of authority in meaningful ways and (ii) imbue the river basin authority with a sense that water itself is highly fluid, moving in and out of the basin in a variety of forms (e.g. as virtual water) impacting a wide variety of actors, themselves external to the basin? What we are suggesting is a type of governance framework that emerges through a process Cleaver (2002, 2012) describes as *bricolage*: building on existing structures rather than creating new ones that may be regarded as a threat to existing authorities (Jonker et al. 2010; Merrey and Cook 2012). It has been suggested that river basin

governance would be more effective if the higher level institutions incorporated basic values and processes characterising local indigenous governance (Merrey 2009). In any event, it is clear that the new basin management regimes within states have stalled for this very reason. Future water governance will have to be flexible enough to draw in participants when needed; this will be a kind of networked governance not solely dependent upon the physical geography of the river basin.

Lastly, we wish to highlight the value and importance of moving beyond the water sector and beyond the pride of place held by physical/environmental scientists: engineers, hydrogeologists, biochemists and so on. Some years ago, Turton et al. (2007) described the importance of the government-science-society “*dialogue*”. Sustainable, equitable and efficient water governance will also require unpacking “*science*” to ensure that political, social and even philosophical/ethical dimensions are adequately captured. Most water problems are self-inflicted: they result from human interventions into natural processes, affecting the hydrological cycle among other ecosystem dynamics. People as groups and individuals are affected differently and therefore regard particular outcomes of these activities very differently. Decisions regarding use and management therefore are imbued with normative, ethical and subjective considerations. The questions asked, the problems addressed and the “*experts*” drawn upon reflect the particular constellations of forces that exist within a society at any one time (Swatuk 2010). It is imperative, therefore, that future water governance arrangements make adequate space for contested ideas and interests and the ways and means of accommodating these without violence. Many of the necessary elements are in place in the SADC region. The challenge, then, is to fill the glass, not draw down the fluid that is already there.

12.4 Conclusion: Prospective Futures of Water Resource Management

At present, governance structures, organised nationally and transnationally on a basin scale in both regions, presume that “*stakeholders*” can adequately represent themselves in formal settings where allocation, use and management decisions are taken. This is problematic in at least three ways. The first is where rural areas are divided in terms of large-scale, cash crop producers and small-scale producers (Southern Africa) or in terms of wealthy expanding urban centres and small-scale producers (South Asia). The former are few but economically and politically powerful. The latter are many, but poorly empowered, especially where water and land allocation and use decisions are concerned. The former commandeer the vast majority of blue water for irrigation or urban and industrial uses. The latter farm the worst land and depend heavily on the green water flow deriving directly from rainfall. The second is in urban areas divided between the rich few and the many poor. The former have in-house provision “*on tap*” and are able to supplement shortages in many ways. The latter often depend on on-plot or communal standpipes that may not be working or working only intermittently. The former have access to water-borne

sewerage systems that are well serviced. The latter make do with an array of often quite alarming “options”. Where resource-poor municipalities are forced to make choices, they have opted for privatising systems of delivery which too often reinforce the existing inequalities, delivering too little of poor quality to the urban poor. And the third is that dominant narratives and framing concepts such as “climate change-induced scarcity” and “closed basins”, to name but two, reinforce path dependencies, as the “haves” aim to hold onto what they have and to extend their water “rights” where possible (e.g. with large farmers shifting into “biofuels” as a means of extending holdings and profits). Taken together, if left unattended, these three factors will not only reinforce social inequity, economic inefficiency and ecological unsustainability; they also heighten the likelihood of conflict among “stakeholders” at a wide variety of scales: within the state, within the city, across the countryside and across state borders.

In other important ways, especially at the transnational level, South Asian and Southern African water governance arrangements are on what seem to be different trajectories. In South Asia, the governance glass is not only half empty but is not filling up. In Southern Africa, the governance glass is half full and there are prospects – though no guarantee – it will be fuller by 2030. Both regions have a regional association to promote cooperative development, the South Asia Association for Regional Cooperation (SAARC) and SADC. However, the SAARC website (<http://saarc-sec.org>⁶) does not refer to cooperation in management of water resources, while SADC has provided a forum for its members to agree on governance arrangements for shared water resources. In addition to the SADC Protocol, there are regional water strategies and plans as well as increasingly effective joint commissions for managing each of the major shared river basins. Both regions are dominated by countries with a British colonial past (though SADC has two Lusophone countries). While it is true that SADC’s scale in terms of area and population (approximately 250 million) is a fraction of South Asia’s, SADC does have more member countries (15); and although the river basins are smaller, there are more of them and most are “closed” – there is no more water to be allocated. Scale alone cannot explain their contrasting trajectories.

While more work would be needed for a full analysis of the roots of their differences, we suggest that their different histories – and not scale or ecology – explain their divergence. Here we discuss four factors: (1) the contrasting roles of the hegemonic power, (2) the different levels of “trust”, (3) the roles of civil society and other NGOs and (4) the roles of external facilitators.

Until the end of apartheid in the early 1990s, South Africa was at odds politically with most of its neighbours and regional countries. It did strike bilateral agreements for management or development of specific river basins, using its overwhelming power to ensure it got a good deal. After 1994, South Africa adopted a policy of collaboration with other countries in the region. It plays a critical role in driving the process of increasing regional partnerships through SADC in a wide variety of sectors, not only water. SADC can be seen as an example of expansion from a narrow

⁶ Accessed 8 September 2015.

river basin focus to a broader shared social basin or “problemshed” perspective. Nevertheless, we cannot push this point too far: concerns about South Africa’s intentions have been one factor retarding the development of the Limpopo Watercourse Commission (LIMCOM). South Africa is not a riparian on the largest regional basins, the Congo and Zambezi, where cooperation remains problematic; however, it does have a strong interest in expanding their hydroelectric potential.⁷ Agreements on how best to manage the Zambezi water resources will be a defining factor for regional development by 2030 (Swain et al. 2011).

In South Asia, the long-standing conflict between India and Pakistan overshadows all efforts to promote regional cooperation. In addition, India has never tried to play the role of the “benign hegemon” that South Africa deliberately tries to play; its role is more analogous to that of apartheid South Africa. India finds it difficult to share data and to support efforts to create governance structures that would enable shared development and management of water resources for mutual benefits. These differing roles may in part be a product of how local (i.e. within-country) water issues affect transboundary cooperation in South Africa and India. In India, states have considerable constitutional and political power over water development – and the country has struggled to resolve interstate conflicts. As the Teesta river case shows, Indian states can even veto international agreements. This cannot happen in South Africa: water resources are constitutionally and politically a central government subject; and the provinces are relatively weak entities. A critical determinant of the shape of water resource management by 2030 will be India’s role.

Related to this contrast in the role of the hegemon is the question of trust. Given the long history of apartheid in Southern Africa, it may seem surprising that the level of intercountry trust is higher than in South Asia. This is not universal – Mozambique is wary of the actions of its upstream neighbour South Africa, for example. Nevertheless, the seemingly interminable workshops and meetings at multiple levels, many facilitated by the regional Global Water Partnerships (GWP), have contributed greatly to creating a large degree of mutual understanding and strong personal relationships among civil servants, water professionals and civil society members⁸. Another major contributing factor is the role of WaterNet, a network of over 65 universities and training and research institutions with capacities in water management training and research. Through its professional interdisciplinary M.Sc. course, regional professionals spend time in other regional countries and develop strong personal ties as they work and study together; and regional institutions develop strong professional partnerships. The net result of the many regional workshops and joint training and research programmes is a cadre of professionals that combine “soft” skills with professional competence, linked into an effective personal network. These activities rest on a shared history of resistance to colonial rule and apartheid oppression. Put differently, the long history of warfare in the

⁷There are also speculative plans to divert Zambezi water south to South Africa, though this seems unlikely to happen.

⁸These are incidentally found at the highest level as well, as the leaders of some of the countries in the region had strongly supported the African National Congress when it was fighting apartheid.

region has helped strengthen interstate relations – an important foundation for facing shared current (e.g. drought/flood) and future (e.g. climate change-induced hydrological extreme variability) challenges. South Asia's history is quite different.

In South Asia, long-standing unresolved conflicts continue to dominate. Pakistan was carved from the eastern and western wings of British India in bloodshed; Bangladesh was created in a bloody civil war that involved India; and India is concerned about the influence of China on its neighbours. SAARC remains a weak entity, unable to overcome the mutual suspicions characterising relationships among the member countries. Civil society initiatives such as the SaciWATERS (South Asia Consortium for Interdisciplinary Water Resources Studies) initiative called "Crossing Boundaries" have brought some researchers in South Asian universities together. However, there are far fewer regional workshops and meetings (including World Bank's South Asia Water Initiative) than in Southern Africa – in part because of travel restrictions between Pakistan and India. The regional GWP is less effective than in Southern Africa; it lacks the convening power GWP-Southern Africa has earned. There is no equivalent of WaterNet.

This leads to the third significant factor: the roles of civil society organisations and regional NGOs. While within South Asian countries (especially India, Bangladesh and Nepal) civil society organisations have strong voices in the water sector, there are no effective NGOs working on South Asian regional water issues outside the GWP, and its convening power is weak. In Southern Africa, there are a number of regional NGOs with strong convening power. Examples include not only GWP-Southern Africa, but also the Food, Agriculture and Natural Resources Policy Analysis Network (FANRPAN). These organisations have teamed up, for example, on the Limpopo Basin and have also drawn in some of the key national NGOs and civil society organisations.

Finally, the fourth factor is the role of outside facilitators – especially donors. In Southern Africa, a number of European donors have played key roles not only in facilitating communication and agreements but in financing their implementation. This applies as well to WaterNet, FANRPAN and GWP. Indeed, these donors are so critical that they seem to have created a dependency on outside funding. If they suddenly withdrew, it is not clear how sustainable the regional water governance institutions would be. Nevertheless, without their support Southern Africa would not have reached its current level of cooperation and partnership, which importantly includes streamlining water-specific legal and institutional frameworks across the region, as well as building local and national capacity for such things as improved urban water supply, rural (economic and household) water provision and environmental management.

Donors have to date not been able to play such a significant facilitating role in South Asia, perhaps in part because of Indian resistance. We argue that in regions with long histories of conflict, having such an outside facilitator cum financier in the initial stages is crucial. The Nile and Mekong river basins are cases in point.

However, in addition to creating dependency, the donors may have retarded infrastructural development in Southern Africa. The donors have at times made

IWRM an end in itself, at the expense of implementing practical solutions (Giordano and Shah 2014). With their emphasis on environmental conservation and high levels of consultation with all stakeholders – driven by internal constituencies – they have been reluctant to finance major infrastructural development in the water sector beyond local water-supply systems.

Will the water resource glasses be fuller by 2030 than they are now? Both regions could benefit from regional cooperation based on sharing the benefits of water resource development, for example, through regional electricity networks. The prospects seem good in Southern Africa, if the countries can move from talking to investing and creating a more integrated regional economy based in part on shared management of water resources. The potential is great but prospects are less rosy in South Asia: there are growing challenges internally in providing water and power services. These could be addressed through effective regional cooperation. But without stronger regional networks, partnerships and institutions supported by external facilitators, South Asia may fail to take full advantage if its water resources to achieve better lives for its people by 2030.

Acknowledgements Anjal Prakash acknowledges the support received from the Asia Foundation to the project – Transnational Dialogue for Improved Water Governance of Brahmaputra River (<http://www.saciwaters.org/brahmaputra-dialogue/>) that facilitated his writing.

References

- Ahmad, Q. K., Biswas, A. K., Rangachari, R., & Sainju, M. M. (Eds.). (2001). *Ganges-Brahmaputra-Meghna region: A framework for sustainable development*. Dhaka: The University Press Limited.
- Ahmed, S. (2008). Gender and integrated water resources management in South Asia: The challenge of community-based alternatives. In K. Lahiri-Dutt & R. Wasson (Eds.), *Water first. Issues and challenges for nations and communities in South Asia* (pp. 185–206). New Delhi: Sage.
- Aquastat. (2011). Ganges-Brahmaputra-Meghna River basin. Food and Agriculture Organization of the United Nations. <http://www.fao.org/nr/water/aquastat/basins/gbm/index.stm>, Accessed 11 Mar 2014.
- Ashton, P. J. (2002). Avoiding conflicts over Africa's water resources. *Ambio*, 31(3), 236–242.
- Ashton, P., & Turton, A. (2009). Chapter 50: Water and security in sub-Saharan Africa: Emerging concepts and their implications for effective water management in the Southern African region. In H. G. Brauch, U. O. Spring, J. Grin, C. Mesiasz, P. Kameri-Mbote, N. C. Behera, B. Chourou, & H. Krummenacher (Eds.), *Facing global environmental change* (pp. 661–674). New York: Springer, Berlin.
- Bevir, M. (2013). *Governance: A very short introduction*. Oxford: Oxford University Press (quoted in Wikipedia). <http://en.wikipedia.org/wiki/Governance>
- Biswas, A. K. (1992). Indus water treaty: The negotiating process. *Water International*, 17(4), 201–209.
- Biswas, A. K. (2011). Cooperation or conflict in transboundary water management: Case study of South Asia. *Hydrological Sciences Journal*, 56(4), 662–670.
- Bizikova, L., Roy, D., Swanson, D., Venema, H. D., & McCandless, M. (2013). The water-energy-food-security nexus: Towards a practical planning and decision-support framework for land-

- scape investment and risk management. IISD Report (February). http://www.iisd.org/pdf/2013/wef_nexus_2013.pdf
- Briscoe, J., Qamar, U., Contijoch, M., Amir, P., & Blackmore, D. (2005). *Pakistan's water economy: Running dry*. Washington, DC: The World Bank.
- Burton, A. (2011, April). Mun River dam demands Mekong rethink. *Frontiers in Ecology and the Environment*, 9(3), 145. Published by Ecological Society of America. <http://www.jstor.org/stable/41149732>
- Chenje, M., & Johnson, P. (Eds.). (1996). *Water in Southern Africa*. Harare/Maseru: SARDC/SADC.
- Chintan, S. G. (2011). Transboundary river basins in South Asia: Options for conflict resolution. *International Rivers*. <http://www.internationalrivers.org/files/attached-files/transboundaryriverbasins.pdf>. Accessed 30 Mar 2014.
- Cleaver, F. (2002). Reinventing institutions: Bricolage and the social embeddedness of natural resources management. *European Journal of Development Research*, 14(2), 11–30.
- Cleaver, F. (2012). *Development through bricolage: Rethinking institutions for natural resources management*. London: Routledge.
- Conley, A. (1996). A synoptic view of water resources in Southern Africa. In Solomon, H. (Ed.), *Sink or Swim? Water, resource security and state co-operation*. IDP Monograph Series No. 6. Pretoria: Institute for Security Studies.
- Dovers, S. (2001). Institutional barriers and opportunities: Processes and arrangements for natural resources management in Australia. *Water Science and Technology*, 43(9), 215–226.
- Earle, A., Jagerskog, A., & Ojendal, J. (Eds.). (2010). *Transboundary water management: Principles and practice*. London: Earthscan.
- Giordano, M., & Shah, T. (2014). From IWRM back to integrated water resources management. *International Journal of Water Resources Development*, 30(3), 364–376. doi:10.1080/07900627.2013.851521.
- Giordano, M., Giordano, M., & Wolf, A. (2002). The geography of water conflict and cooperation: Internal pressures and international manifestations. *The Geographical Journal*, 168(4), 293–312.
- Gopakumar, G. (2012). *Transforming urban water supplies in India*. London: Routledge.
- Grey, D., & Sadoff, C. W. (2007). Sink or swim? Water security for growth and development. *Water Policy*, 9(6), 545–571.
- Grumbine, R. E., Dore, J., & Xu, J. (2012). Mekong hydropower: Drivers of change and governance challenges. *Frontiers in Ecology and the Environment*, 10(2), 91–98.
- Houba, H., Kim, H. P. D., & Xueqin, Z. (2013). Saving a river: A joint management approach to the Mekong River Basin. *Environment and Development Economics*, 18, 93–109.
- Jacobs, I. (2012). *The politics of water in Africa: Norms, environmental regions and transboundary co-operation in the Orange-Senqu and Nile Rivers*. New York: Continuum Books.
- Jairath, J. (1999). Participatory irrigation management: Experiments in Andhra Pradesh. *Economic and Political Weekly*, XX(13), A-2-10.
- Jonker, L. E., Swatuk, L. A., Matiwane, M., Mila, U., Ntloko, M., & Simataa, F. (2010). *Exploring the lowest appropriate level of water governance in South Africa* (WRC report no. 1837/1/10). Pretoria: Water Research Commission.
- Joshi, D. (2014). Women, water, caste and gender: The rhetoric of reform in India's drinking water sector. In V. Narain, C. G. Goodrich, J. Chourey, & A. Prakash (Eds.), *Globalization of water governance in South Asia* (pp. 35–52). New Delhi: Routledge.
- Kranz, N., & Jacobs, I. (2012). Leadership capacity in transboundary basins: The interface between institutions and individuals. In D. Gallagher, N. Christensen, & P. Andrews (Eds.), *Environmental leadership: A reference handbook*. Thousand Oaks: Sage. ISBN-10: 1412981506, ISBN-13: 978-1412981507.
- Kulkarni, S. (2014). Gender, water and well-being. In V. Narain, C. G. Goodrich, J. Chourey, & A. Prakash (Eds.), *Globalization of water governance in South Asia* (pp. 19–34). New Delhi: Routledge.

- Lahiri-Dutt, K. (2008). Introduction: Placing water first. In K. Lahiri-Dutt, & J. Wasson (Eds.), *Water first. Issues and challenges for nations and communities in South Asia* (pp. I–xlx). New Delhi: Sage.
- Litfin, K. T. (1997). Sovereignty in world ecopolitics. *Mershon International Studies Review*, 41(2), 167–204.
- Lutz, A. F., & Immerzeel, W. W. (2013). Water availability analysis for the Upper Indus, Ganges, Brahmaputra, Salween and Mekong River Basins – Final report. Future Water Report 127. http://www.futurewater.nl/wp-content/uploads/2013/10/FW_Final_Report_submitted.pdf
- Manning, N., & Seely, M. (2005). Forum for Integrated Resources Management (FIRM) in ephemeral basins: Putting communities at the centre of the basin management process. *Physics and Chemistry of the Earth*, 30(11–16), 886–893.
- Mathur, K. (2009). *From government to governance: The Indian experience*. New Delhi: National Book Trust.
- Merrey, D. J. (2009). African models for transnational river basin organisations in Africa: An unexplored dimension. *Water Alternatives*, 2(2), 183–204. www.water-alternatives.org
- Merrey, D. J., & Cook, S. (2012). Fostering institutional creativity at multiple levels: Towards facilitated institutional *bricolage*. *Water Alternatives*, 5(1), 1–19. www.water-alternatives.org
- Mollinga, P. P. (2008). Water, politics and development: Framing a political sociology of water resources management. *Water Alternatives*, 1(1), 7–23.
- Mollinga, P. P., Dixit, A., & Athukorala, K. (2006). *Integrated water resources management: Global theory, emerging practice, and local needs* (Water in South Asia, Vol. 1). New Delhi: Sage.
- Mollinga, P., Meinen-Dick, R. S., & Merrey, D. J. (2007). Politics, plurality and problems: A strategic action approach for agricultural water resources management reform. *Development Policy Review*, 25(6), 699–719.
- Narain, V. (2008). Crafting institutions for collective action in canal irrigation: Can we break the deadlocks? In V. Ballabh (Ed.), *Governance of water: Institutional alternatives and political economy* (pp. 159–173). New Delhi: Sage.
- Narain, V. (2014). Whose land? Whose water? Water rights, equity and justice in a peri-urban context. *Local Environment: The International Journal of Justice and Sustainability*. doi:10.1080/13549839.2014.907248.
- Narain, V., Shah Alam Khan, A., Sada, R., Singh, S., & Prakash, A. (2013). Urbanization, peri-urban water security and human well-being. A perspective from four South Asian cities. *Water International*, 38(7), 930–940.
- Narain, V., Goodrich, C. G., Chourey, J., & Prakash, A. (Eds.). (2014). *Globalization of water governance in South Asia*. New Delhi: Routledge.
- North, D. C. (1995). The new institutional economics and third world development. In J. Harriss, J. Hunter, & C. M. Lewis (Eds.), *The new institutional economics and third world development* (pp. 1–13). London: Routledge.
- Parthasarathy, R. (1998). *Reforms in irrigation management: Bottoms-up vs. top-down models* (GIDR working paper no. 104). Ahmedabad: Gujarat Institute of Development Research.
- Prakash, A., Singh, S., Goodrich, C. G., & Janakarajan, S. (2012). Introduction: An agenda for pluralistic and integrated framework for water policies in South Asia. In A. Prakash, S. Singh, C. G. Goodrich, & S. Janakarajan (Eds.), *Water resources policy in South Asia* (pp. 1–16). New Delhi: Routledge.
- Prakash, A., Singh, S., & Goodrich, C. G. (Eds.). (2013). *Informing water policies in South Asia*. New Delhi: Routledge.
- Rogers, P., & Hall, A. W. (2003). *Effective water governance* (Global Water Partnership Technical Committee (TEC) paper no. 7). Stockholm: GWP.
- SADC (Southern African Development Community). (2011). Regional strategic action plan on integrated water resources development and management (2011–2015). December 2011. SADC, Gaborone.
- SADC (Southern African Development Community). (2012). *Regional infrastructure development master plan, water sector plan*. Gaborone: SADC.
- Sadoff, C., & Grey, D. (2002). Beyond the river: The benefits of cooperation on international rivers. *Water Policy*, 4(5), 389–403.

- Salehin, M., Shah Alam Khan, M., Prakash, A., & Goodrich, C. G. (2011). Opportunities for trans-boundary water sharing in the Ganges, the Brahmaputra and the Meghna Basin. In India infrastructure report 2011, Oxford Publication, pp 29–43. <http://www.idfc.com/pdf/report/2011/Chp-3-Opportunities-for-Trans-boundary-Water-Sharing.pdf>
- Saleth, R. M. (1996). *Water institutions in India: Economics, law and policy*. New Delhi: Institute of Economic Growth, Commonwealth Publishers.
- Savenije, H. H. G. (2002). Why water is not an ordinary good, or why the girl is special. *Physics and Chemistry of the Earth*, 27, 741–744.
- Senge, P. M., Smith, B., Kruschwitz, N., Laur, J., & Schley, S. (2008). *The necessary revolution: How individuals are working together to create a sustainable world*. New York: Crown Publishing Company.
- Shah, T. (2009). *Taming the anarchy: Groundwater governance in South Asia*. Washington, DC: RFF Press.
- Shah, T. (2013). Climate change and groundwater: India's opportunities for mitigation and adaptation. In A. Prakash, S. Singh, C. G. Goodrich, & S. Janakarajan (Eds.), *Water resources policies in South Asia* (pp. 213–243). New Delhi: Routledge.
- Shah, T., & Van Koppen, B. (2006). Is India ripe for integrated water resources management? Fitting water policy to national development context. *Economic and Political Weekly*, 41, 3413–3421.
- Swain, A., Swain, R., Themner, A., & Krampe, F. (2011). *Climate change and the risk of violent conflicts in Southern Africa*. Pretoria: Global Crisis Solutions.
- Swatuk, L. A. (2002). The new water architecture in southern Africa: Reflections on current trends in the light of “Rio +10”. *International Affairs*, 78(3), 507–530.
- Swatuk, L. A. (2010). The state and water resources development through the lens of history: A South African case study. *Water Alternatives*, 3(3), 521–536. www.water-alternatives.org
- Swatuk, L. A. (2012). Water and security in Africa: State-centric narratives, human insecurities. In M. Schnurr & L. A. Swatuk (Eds.), *Natural resources and social conflict: Towards critical environmental security* (pp. 72–96). New York: Palgrave Macmillan.
- Swatuk, L. A., & Fatch, J. (2013). Water resources management and governance in Southern Africa: Toward regional integration for peace and prosperity. *Global Dialogue*, 15(2) (Summer-Autumn). <http://www.worlddialogue.org/content.php?id=564>
- Turton, A. R., Hattingh, H. J., Maree, G. A., Roux, D. J., Claassen, M., & Strydom, W. F. (Eds.). (2007). *Governance as a triad: Government-science-society in transition*. Berlin: Springer.
- Urs, K., & Whittel, R. (2009). *Resisting reform: Water profits and democracy*. New Delhi: Sage.
- Van Koppen, B., Van der Zaag, P., Manzungu, E., & Tapela, B. (2014). Roman water law in rural Africa: The unfinished business of colonial dispossession. *Water International*, 39(1), 49–62. doi:10.1080/02508060.2013.863636.
- WEF (World Economic Forum). (2011). *Global risks 2011* (6th ed.). Cologne/Geneva: WEF.
- Wirkus, L. (Ed.). (2005). *Water, development and cooperation – comparative perspective: Euphrates-Tigris and Southern Africa* (Bonn International Centre for Conversion (BICC) Paper 46). Bonn: BICC.
- Wolf, A. T. (1998). Conflict and cooperation along international waterways. *Water Policy*, 1, 251–265.

Open Access This chapter is distributed under the terms of the Creative Commons Attribution-Noncommercial 2.5 License (<http://creativecommons.org/licenses/by-nc/2.5/>) which permits any noncommercial use, distribution, and reproduction in any medium, provided the original author(s) and source are credited.

The images or other third party material in this chapter are included in the work's Creative Commons license, unless indicated otherwise in the credit line; if such material is not included in the work's Creative Commons license and the respective action is not permitted by statutory regulation, users will need to obtain permission from the license holder to duplicate, adapt or reproduce the material.

