

FREE FLOW

REACHING WATER SECURITY THROUGH COOPERATION



Contents

Acknowledgements.....	3
Foreword by Irina Bokova, Director-General, United Nations Educational, Scientific and Cultural Organization.....	4
Preface by Michel Jarraud, Chair of UN-Water and Secretary-General, World Meteorological Organization (WMO).....	5
Statement by Mr János Áder, President of the Republic of Hungary .	10
Statement by Mr Emomali Rahmon, President of the Republic of Tajikistan	11
Water security through science-based cooperation: UNESCO's International Hydrological Programme	12
<i>Blanca Jiménez-Cisneros, Alexander Otte, Miguel de França Doria, Giuseppe Arduino, Léna Salame, Siegfried Demuth, Anil Mishra, Alice Aureli</i>	

I WATER DIPLOMACY

Transboundary water cooperation.....	20
<i>Nick Bonvoisin, Secretary to the Convention on the Protection and Use of Transboundary Waters and International Lakes, and Co-Secretary to its Protocol on Water and Health, United Nations Economic Commission for Europe</i>	
Greater cooperation through water diplomacy and transboundary water management	24
<i>Julia Marton-Lefèvre, Patrick MacQuarrie, Alejandro Iza and Mark Smith, International Union for Conservation of Nature</i>	
From the Dead Sea to an Israel/Palestine Water Accord: 20 years of water diplomacy in the Middle East	28
<i>Gidon Bromberg, Nader Khateeb and Munqeth Mehyar, Co-Directors, EcoPeace/Friends of the Earth Middle East</i>	
Transboundary water diplomacy in the Mekong region	31
<i>Dr John Dore, Senior Regional Water Resources Sector Specialist, Australian Agency for International Development, Laos; and Dr Louis Lebel, Director, Unit for Social and Environmental Research, Chiang Mai University, Thailand</i>	
The Nile Basin Initiative: advancing transboundary cooperation and supporting riparian communities.....	35
<i>Abdulkarim H. Seid, Wubalem Fekade, Emmanuel Olet, Nile Basin Initiative</i>	

II TRANSBOUNDARY WATER MANAGEMENT

Cooperation over transboundary aquifers: lessons learned from 10 years of experience	40
<i>Kirstin I. Conti, PhD Fellow, International Groundwater Resources Assessment Centre</i>	
Sustaining transboundary water management by investing in community cooperation	45
<i>Benjamin Noury, Associate Director, Oxyo Water</i>	

Transboundary water management – why it is important and why it needs to be developed	49
<i>Anders Jägerskog, Stockholm International Water Institute and United Nations Development Programme Shared Waters Partnership</i>	

Cooperation on small rivers can make a difference	53
<i>Jeff Smith for the International Water Management Institute</i>	

Efficient and effective cooperation in the River Rhine catchment	57
<i>Dr J. Cullman, Federal Institute of Hydrology, Germany and Chairperson of UNESCO International Hydrology Programme; Eric Sprokkereef and Ute Menke, Ministry of Infrastructure and Environment, Rijkswaterstaat-CHR Secretariat, The Netherlands</i>	

Sharing water in Australia: a collaborative endeavour	61
<i>James Cameron, CEO, National Water Commission, Australia</i>	

Regional water cooperation in the Hindu Kush Himalayan region ...	65
<i>Arun B. Shrestha, Shahriar M. Wahid, Ramesh A. Vaidya, Mandira S. Shrestha and David J. Molden, International Centre for Integrated Mountain Development</i>	

The Mekong River Basin: practical experiences in transboundary water management	70
<i>Hans Guttman, Chief Executive Officer, Mekong River Commission Secretariat</i>	

Participation in the management of the Niger, Senegal and Congo river basins	74
<i>Christophe Brachet and Daniel Valensuela, Deputy Secretaries, International Network of Basin Organizations</i>	

The Murray–Darling Basin Plan: cooperation in transboundary water management	77
<i>Keryn Molloy, Senior Science Writer, Murray–Darling Basin Authority</i>	

Mankind on the shores of the Baikal: the transboundary ecosystem of Russia and Mongolia	81
<i>E. I. Lishiovannii and A. N. Matveev, Irkutsk State University, Russia; B. Bayartogtokh, Mongolian State University; and T. Villemin, University of Savoie, France</i>	

Libya's experience in the management of transboundary aquifers....	85
<i>Omar Salem, Senior Hydrogeologist, General Water Authority – Ministry of Water Resources, Libya</i>	

Transboundary groundwater resources management implemented in the Kumamoto region of Japan	88
<i>Tadashi Tanaka, Department of International Affairs, University of Tsukuba, Japan</i>	
Transboundary water management in the Zambezi and Congo river basins: a situation analysis.....	92
<i>Ngosa Howard Mpamba, Assistant Director, Water Resources Management and Christopher Chileshe, Director, Ministry of Mines, Energy and Water Development, Department of Water Affairs, Zambia</i>	

Interactive open source information systems for fostering transboundary water cooperation	96
<i>J. Ganoulis, Coordinator and Ch. Skoulikaris, Secretary, United Nations Educational, Scientific and Cultural Organization Chair/International Network of Water-Environment Centres for the Balkans</i>	

Contents

III

WATER EDUCATION AND INSTITUTIONAL DEVELOPMENT

Capacity development for water cooperation	100
<i>Dr Reza Ardakanian and Lis Mullin Bernhardt, UN-Water Decade Programme on Capacity Development</i>	
Coping with extreme weather and water-related disasters	103
<i>Kaoru Takara, Disaster Prevention Research Institute, Kyoto University, Japan</i>	
The Regional Centre for Training and Water Studies of Arid and Semi-arid Zones	107
<i>Gamal Shaker, General Manager, Regional Department and Rasha El Gohary, Associate Professor, Development and Monitoring Department, Training and Human Development Sector, Ministry of Water Resources and Irrigation</i>	
Sustainable water education as a solution to global water challenges	111
<i>Yoonjin Kim, Project Manager, International Affairs, Korea Water Forum</i>	
Long-term planning investments paying dividends: the Colorado River Basin Water Supply and Demand Study.....	115
<i>Carly Jerla, Co-Study Manager and Ken Nowak, Bureau of Reclamation; Kay Brothers, Co-Study Manager, Southern Nevada Water Authority consultant; Armin Munevar, CH2M Hill; Les Lampe, Black & Veatch; David Groves and Jordan Fischbach, RAND Corporation</i>	
HydroEX International Centre – an example of water cooperation	119
<i>Tânia Brito, Director of Research, Richard Meganck, Romes Lopes, HydroEX International Centre</i>	
Application of water directives in small settlements	123
<i>Professor Jovan Despotovic, University of Belgrade Faculty of Civil Engineering and Serbian National Committee for the United Nations Educational, Scientific and Cultural Organization International Hydrological Programme; and Ljiljana Jankovic, CEng, University of Belgrade Faculty of Civil Engineering</i>	
From China to Uganda: educating and empowering people to take action.....	126
<i>Dennis Nelson, President and CEO; John Etgen, Senior Vice President; Nicole Rosenleaf Ritter, Communications Manager, Project WET Foundation</i>	
Speaking so that people understand: integrated water resources management in Guatemala	130
<i>Joram Gil, United Nations Educational, Scientific and Cultural Organization Chair in Sustainable Water Resources, Guatemala</i>	
Water and development: a history of cooperation in the Dominican Republic.....	134
<i>Fernando Rivera Colinton, Researcher, Centre for the Sustainable Management of Water Resources in the Caribbean Island States, National Water Research Institute (INDRHI)</i>	

Integrated water resources management in Peru through shared vision planning.....	136
<i>Guillermo Mendoza and Hal Cardwell, International Center for Integrated Water Resources Management, Institute for Water Resources of the US Army Corps of Engineers; and Pedro Guerrero, Project for Modernization of Water Resources Management, National Water Authority of Peru, Ministry of Agriculture of Peru</i>	
Education and training for hydrology and water resources development and management in India	140
<i>Rakesh Kumar and R. D. Singh, National Institute of Hydrology, India</i>	
Water education and cooperation initiatives at the National Water Resources Institute, Nigeria.....	144
<i>Dr Olusanjo A. Bamgboye, Executive Director/Chief Executive and Dr Omogbemi O. Yaya, Chief Lecturer, National Water Resources Institute, Kaduna, Nigeria</i>	
Sustainable management of lakes in Malaysia	148
<i>Zati Sharip, Senior Research Officer, Research Centre for Water Quality and Environment; Saim Suratman, Director, Research Centre for Geohydrology; and Ahmad Jamalluddin Shaaban, Director General, National Hydraulic Research Institute of Malaysia, Ministry of Natural Resources and Environment, Malaysia</i>	
Free open source software as a tool for water cooperation.....	152
<i>Cicero Bley, Coordinator, International Centre on Hydroinformatics</i>	

IV

FINANCING COOPERATION

Regional cooperation in the water and sanitation sector: Latin America and the Caribbean	156
<i>Miguel Campo Llopis, Anamaria Nunez and Jorge Ducci, Inter-American Development Bank</i>	
Poverty reduction and economic transformation through water cooperation.....	159
<i>Sering Jallow, Director, Water and Sanitation Department and African Water Facility, African Development Bank</i>	
WaterCredit: solving the global water crisis through community collaboration, government engagement and economic stimulation	163
<i>Gary White, CEO; Stephen Harris Jr, Grants Manager; and Rosemary Gudelj, Manager of Public Affairs, Water.org</i>	
Governance for cooperation and successful watershed conservation strategies: the Water Funds case	167
<i>Vidal Garza, Carlos Hurtado, Priscilla Treviño and Ilsa Ruiz, FEMSA Foundation</i>	

Contents

V

LEGAL FRAMEWORK AT THE NATIONAL/ INTERNATIONAL LEVEL

Integrated water resource management – combining perspectives
from law, policy and science 172

*Andrew Allan, Susan Baggett, Michael Bonell, Geoffrey Gooch, Sarah Hendry,
Alistair Rieu-Clarke and Chris Spray, Dundee Centre for Water Law, Policy and
Science, University of Dundee, Scotland*

Community benefits achieved through developing legal
frameworks at domestic and transboundary levels 176

Stefano Burchi, Chairman, Executive Council, International Association for Water Law

New approaches to planning and decision-making for fresh water:
cooperative water management in New Zealand 178

*Clive Howard-Williams, Chief Scientist, National Institute for Water and
Atmospheric Research, Christchurch; Alastair Bisley, Chairman, Land and Water
Forum, Ministry for the Environment, and Ken Taylor, Director Investigations and
Monitoring, Canterbury Regional Council, New Zealand*

The US-Mexico institutional arrangement for transboundary
water governance 182

*Polioproto F. Martinez-Austria and Luis Ernesto Derbez, University of Las Americas
Puebla, Mexico; and Maria Elena Giner, Border Environment Cooperation
Commission, Mexico-United States*

VI

WATER COOPERATION, SUSTAINABILITY AND POVERTY ERADICATION

Managing water: from local wisdom to modern science 188

Ignasius D. A. Sutapa, Executive Secretary, Asia Pacific Centre for Ecohydrology

Water for life: inspiring action and promoting best practices
in local cooperation 192

*Joséfin Maestu and Pilar Gonzalez-Meyau, United Nations Office to Support the
International Decade for Action 'Water for Life' 2005-2015/UN-Water Decade
Programme on Advocacy and Communication*

International water cooperation 196

*Kitty van der Heijden, Ambassador, Sustainable Development and Director,
Department for Climate, Energy, Environment and Water, Ministry of Foreign
Affairs, The Netherlands*

Cooperating to manage liquid waste in the Okavango
Delta Ramsar Site 199

*Michael Ramaano, Project Manager, Global Water Partnership Botswana
Secretariat; Nkobi Mpho Molelele, Project Manager, Okavango Research Institute*

Water cooperation in Korea 203

*Boosik Kang, Dept. of Civil & Environmental Engineering, Dankook University
and Korea Water Resources Association*

Water expertise and cooperation: Hungary's international policy... 207
*Dr Gábor Baranyai, Chair of Organizing Committee, Budapest Water Summit, and
Deputy State Secretary, EU Sectoral Policies, Ministry of Foreign Affairs, Hungary*

Assessment of Lebanon's shared water resources and the need
for effective cooperation..... 211

*Amin Shaban, Talal Darwich and Mouin Hamze, National Council for Scientific
Research, Beirut, Lebanon*

Alternative water resources in agriculture for improving
production and poverty reduction 215

*Shoaib Ismail, Ian McCann, Shabbir Shahid, Fiona Chandler and Mohamed Amrani
International Center for Biosaline Agriculture, Dubai, United Arab Emirates*

Managing water, sustainability and poverty reduction through
collective community action 218

*Suhas P. Wani, K.H. Anantha and William D. Dar, International Crops Research
Institute for the Semi-Arid Tropics*

A blueprint for sustainable groundwater management in
Balochistan, Pakistan 222

*Shahbaz Mushtaq, Kathryn Reardon-Smith and Roger Stone, Australian Centre for
Sustainable Catchments, University of Southern Queensland, Australia; and Syed
Mohammad Khair, Balochistan University of Information, Technology, Engineering
and Management Sciences, Quetta, Pakistan*

Water cooperation – the Brazilian case 225

*Paulo Augusto Cunha Libânio, Water Resources Specialist,
National Water Agency, Brazil*

Environmental rehabilitation of the Lake Pátzcuaro watershed,
Michoacán, Mexico 229

*Miguel A. Córdova, Appropriate and Industrial Technology Subdivision Head,
Mexican Institute of Water Technology and Ramón Pérez Gil Salcido, Director,
Water Program, Gonzalo Río Arronte Foundation*

Suez Environnement's contribution to water cooperation issues:
the case of Algiers 233

Jean-Louis Chaussade, CEO, Suez Environnement

Preparing Denmark for climate changes 237

Jan Toibner, Aarhus Water Ltd.

Developing community water services and cooperation in Finland
and the South 240

*Tapio S. Katko, UNESCO Chair in Sustainable Water Services, Tampere
University of Technology; and Antti Rautavaara, Senior Water Advisor,
Ministry for Foreign Affairs*

Examples of cooperation in the Czech Republic flood forecasting
and information service 245

*Jan Danhelka, Eva Soukalova and Lucie Brezkova, Czech Hydrometeorological
Institute; and Jan Cernik, Czech Development Agency*

Wetland cooperation is taking care of water 248

Tobias Salathé, Senior Advisor, Ramsar Convention Secretariat

Better late than never 252

Dr Claudine Brelet, HDR

Contents

VII

ECONOMIC DEVELOPMENT AND WATER

Water cooperation for sustainable utilization: Lake Naivasha, Kenya	256
<i>Professor David M. Harper, Dr Nic Pacini, Dr Caroline Upton, Dr Ed H. J. Morrison, Mr Richard Fox, and Mr Enock Kiminta</i>	
Securing Australia's groundwater future	260
<i>Professor Craig T. Simmons, Director, National Centre for Groundwater Research and Training, Australia; and Neil Power, Director, State Research Coordination, Goyder Institute for Water Research, South Australia</i>	
Advancing sustainable groundwater management in Abu Dhabi, United Arab Emirates	263
<i>Dr Mohamed Yousef Al Madfaei, Executive Director, Integrated Environmental Policy and Planning Sector; Eva Ramos, Director, Environmental Analysis and Economics; and Hessa Abdelsattar Banijabir, Environmental Analyst, Environment Agency-Abu Dhabi</i>	
Water resources management as an engine for economic growth in the Republic of Korea	267
<i>Kyung-Jin Min, Director and Sunhyo Hong, Researcher, Research Center for Water Policy and Economy, K-water</i>	
PUB Singapore's efforts in advancing water cooperation	271
<i>Ms Quek Ai Choo, Deputy Director; Mr Bernard Tan, Senior Assistant Director; Mr Yeo Sheng Wei, Senior Manager; Ms Nawwar Syahirah, Communications Executive, PUB, Singapore</i>	
Towards water sensitive cities: a three-pillar approach	275
<i>Tony H. F. Wong, Cooperative Research Centre for Water Sensitive Cities</i>	
Integrated urban water frameworks for emerging cities in sub-Saharan Africa	279
<i>Kala Vairavamoorthy, Seneshaw Tsegaye and Jochen Eckart, Patel College of Global Sustainability, University of South Florida, USA</i>	
Water resources management on the island of Crete: lessons learned	283
<i>E. Baltas, Associate Professor, School of Civil Engineering, National Technical University of Athens; and O. Tzoraki, Assistant Professor, School of Environment, University of Aegean</i>	

VIII

INTERNATIONAL COOPERATION ON WATER SCIENCES AND RESEARCH

Understanding the Global Water System for Water Cooperation ...	288
<i>Sina Marx and Anik Bhaduri, Global Water System Project, International Project Office, Bonn, Germany</i>	
A use-inspired approach to sustainable water management.....	291
<i>Omar Osman, Vice-Chancellor; Kamarulazizi Ibrahim, Director, Professor; Kanayathu Koshy, Professor of Sustainability, Centre for Global Sustainability Studies; Ismail Abustan, Professor, School of Civil Engineering, Universiti Sains Malaysia</i>	

KEI's international collaboration on water-related research	295
<i>Tae Ho Ro, Eulsang Cho and Jun Hyun Park, Korea Environment Institute</i>	
Ecohydrology – transdisciplinary sustainability science for multicultural cooperation	299
<i>Professor Macej Zalewski, Katarzyna Izydorczyk, Iwona Wagner, Associate Professor Joanna Mankiewicz-Boczek, Magdalena Urbaniak, and Wojciech Fr tczak, European Regional Centre for Ec hydrology, Polish Academy of Sciences</i>	
Sharing water observations: turning local data into global information	304
<i>Dr Harry Dixon, Professor John Rodda and Professor Alan Jenkins, Centre for Ecology and Hydrology, UK; Professor Siegfried Demuth, United Nations Educational Scientific and Cultural Organization; and Ulrich Looser, Federal Institute of Hydrology, Germany</i>	
International cooperation on water sciences and research.....	308
<i>Raya Marina Stephan, Chair, Publications Committee and Tom Soo, Executive Director, International Water Resources Association</i>	
The Eco-Smart Waterworks System.....	311
<i>Soo Hong Noh, Centre for Eco-Smart Waterworks System, Yonsei University</i>	
Water and Livelihoods Initiative: scientific cooperation and collaboration across North Africa and the Middle East.....	315
<i>C. King, Water and Livelihoods Initiative; S. Christiansen, Director, Office of Water Resources and Environment, United States Agency for International Development; T. Oweis, Director, Integrated Water and Land Management Program; and B. Dessalegn, Communication and Project Management specialist, International Center for Agricultural Research in the Dry Areas</i>	
Water for sustainable development and adaptation to climate change	319
<i>Milan Dimkic, Miodrag Milovanovic and Radisav Pavlovic, Jaroslav Cerni Institute for the Development of Water Resources, Serbia</i>	
Cooperation on water sciences and research.....	322
<i>Christophe Cudennec, Gordon Young, Hubert Savenije, International Association of Hydrological Sciences</i>	
Ten years of awarding innovation	325
<i>Abdulmalek A. Al Alshaiikh, General Secretary, Prince Sultan Bin Abdulaziz International Prize for Water</i>	
Notes and References	328