



IWRA *Update*

Newsletter of the International Water Resources Association

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MESSAGE FROM THE PRESIDENT



**Dear IWRA Members, Colleagues
and Friends of Water,**

It is with great pleasure that I write to present this edition of *IWRA Update* to kick off the XVth World Water Congress, held from 25 to 29 May in Edinburgh, Scotland. The theme of this year's Congress is "Global Water, a resource for development: Opportunities, Challenges and Constraints". It aims to highlight water as an important development vector that traverses different sectors and crosses geo-political lines. This year's Congress is an especially timely and important event given the context of 2015's shift from the UN Millennium Development Goals towards the Sustainable Development Goals. I would particularly like to thank the Scottish Government, the Local Organising Committee chaired by Jon Rathjen and the International Scientific Committee chaired by Cecilia Tortajada for the excellent preparations. We are pleased to announce that there will be 58 parallel sessions, 37 special sessions, 228 posters and over 260 oral presentations over the course of the Congress. There will also be several important side events such as Hydronation and the 5th Meeting of the OECD Water Governance Initiative. In addition to thematic sessions, an exciting social programme has been proposed highlighting the beauty of Edinburgh and the innovations of the Scottish Government and their partners.

During each Congress, IWRA presents awards to individuals and organisations for their contributions to improving the future of water resources management. This year I would like to congratulate Prof. V.P. Singh, winner of the 2015 Crystal Drop Award; and Prof. Rabi Mohtar, winner of the 2015 Ven Te Chow Memorial Award; as well as the winners of the IWRA Best Paper and Honourable Mention awards. I would also like to note that the Congress shall recognise the contributions to

its success and to water resources management and innovation made by the Scottish Government and also by Dr. David Korenfeld Federman.

The first half of this year has been an especially busy one for IWRA. We played a very active role in the thematic process of the 7th World Water Forum where IWRA coordinated the Design Group on "Ensuring Water Quality from Ridge to Reef" in addition to organising our own thematic session on "water quality: smarter use for water security". IWRA also participated in many other sessions and high level panels on topics ranging from Source to Sea Management to IWRM to Green Growth. I am also pleased to announce that during the Forum, I was able to sign an agreement with Roberto Olivares, Director General of ANEAS, to host the next World Water Congress in Mexico in 2017. Earlier this month, the IWRA Executive Board successfully held its 8th meeting via videoconference to discuss the World Water Congress and other important matters.

IWRA looks forward to contributing to important agendas that shall be set throughout this year such as the Sustainable Development Goals. I am honoured that IWRA is playing its part by mobilising the global knowledge community and providing linkages between science and policy. The Congress is an excellent platform for advancing water resources management into the future. I am looking forward to meeting members, experts, professionals, water friends and stakeholders in Edinburgh!

Best regards,

Dogan Altinbilek
IWRA President

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XVITH WORLD WATER CONGRESS ORGANISATION ANNOUNCED



During the 7th World Water Forum, IWRA President Prof. Dogan Altinbilek signed a memorandum of agreement with Mr. Roberto Olivares, Director General of the National Association of Water and Sanitation Companies of Mexico (ANEAS), to organize the XVIth World Water Congress in the Riviera Maya, Mexico in 2017. A Mexican delegation will be attending the XVth World Water Congress to introduce the XVIth World Water Congress. The Scottish organiser will pass on the baton to the Mexican delegation during the Closing ceremony, on Friday 29 May.



IWRA EXECUTIVE BOARD MEETING

The IWRA Executive Board shall hold its 9th meeting in Edinburgh on Sunday 24 May, one day before the XVth World Water Congress.



PROF. ROSSI HONOURED AS PROFESSOR EMERITUS

Giuseppe Rossi, Chair of the Award Committee of the Executive Board has become Professor Emeritus of the University of Catania (Italy). Stefania Giannini, Minister of Public Education, University and Research issued the decree on 26 January 2015.



IWRA YOUNG PROFESSIONALS WORKSHOP AT CONGRESS

The IWRA Student/Youth Professional Working Group is organising a young professionals workshop (Special Session 38) on Wednesday 27 May at 16:45 at the World Water Congress. The panel will discuss future

water challenges and the Sustainable Development Goals. We invite members and in particular Student and youth professional members to join us!

More information can be found on the Congress programme:
worldwatercongress.com/programme-information/

MESSAGE FROM THE IWRA STUDENT CHAPTER AT UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN (UIUC): INTRODUCING THE FUTURE OF WATER INNOVATION.



The IWRA Student Chapter at UIUC was created in 2001 by graduate students at the Ven Te Chow Hydrosystems Laboratory, which is affiliated with the Civil and Environmental Engineering Department. Our student chapter is a registered student organization (RSO) of the university. Each year, chapter members participate in an election to vote for the president, the treasurer and other officers in charge of specific tasks for one year. The chapter is mainly funded by the Department of Civil and Environmental Engineering and is supported by the Hydrosystems Laboratory, with occasional fundraisers organized by the student members of the chapter.

In the beginning, the student chapter was mainly involved in organizing social events and activities for the Hydrosystems Laboratory. However, in recent years, the chapter's focus has gained a broader perspective. The chapter is still involved in organizing Hydrosystems Laboratory events, but now also tries to reach out to a larger community, particularly through the Illinois Water Day, an annual event we hope to make a new tradition. The Illinois Water Day, established in 2014 following the spirits of the United Nations' World Water Day, has been a way for us to reach out, not only to the students from other programs and departments, but also to different university organizations and also to the broader community of Urbana-Champaign.

Moreover, our student chapter organizes professional development seminars, supports community activities and publishes a biannual newsletter called "Water".

For more information, contact: Majid Shafiee-Jood, PhD Candidate, President of the Illinois IWRA student chapter (2014-2015), Ven Te Chow Hydrosystems Lab., Department of Civil and Environmental Engineering, University of Illinois at Urbana Champaign at:
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HORI FUND AWARDEES

IWRA would like to congratulate the recent awardees of the Toyoko and Hiroshi Hori Education Fund Grant: Mr. Hani Al-Koli from the Sana'a Water and Sanitation Local Corporation (Republic of Yemen); Mr. Taha AL-Washali from the National Water supply and Sanitation Authority (Republic of Yemen); and Miss Samah Mahmood Abdo Saif from the Ministry of Water and Environment in Yemen (Republic of Yemen).

The Toyoko and Hiroshi Hori Education Fund provides support for IWRA memberships for promising scholars from developing economies, especially those designated by the OECD as least developed. Grants for memberships, including subscriptions to Water International, are for one year, renewable up to a maximum of three years. Current members of the IWRA are invited and encouraged to recommend candidates.

We invite you to find out more by visiting our website:

www.iwra.org/index.php?mainpage=164&page=230&subpage=

ACTION PLATFORM FROM SOURCE TO SEA MANAGEMENT

IWRA is a member of the Steering Committee of the Action Platform for Source to Sea Management. IWRA has created a working group consisting of Henning Bjornlund, Naim Haie, Raya Stephan and Tom Soo. The platform aims support integrated and innovative approaches to governance and management from source to sea. The platform is chaired by Dr. Torkil Jonch Clausen and the secretariat is hosted by the Stockholm International Water Institute.

The platform held a thematic session during the 7th World Water Forum on 14 April 2015 entitled « Green investment for blue economy - managing sources for coastal and marine water quality improvements » (a sub-session of the 3.3. Thematic session coordinated by IWRA).

A special session shall also be held during the XVth World Water Congress in Edinburgh on Wednesday 27 May from 14:45-16:15. The session is entitled "The salty dimension of water governance - the link between upstream management and downstream impacts". This session will discuss the current barriers and opportunities at global and local scale where water governance can take a step further to ensure sustainable investments in the source-to-sea continuum.

MAJOR €1 MILLION STUDY AIMED AT INCREASING RESOURCE EFFICIENCY IN THE IRISH DAIRY PROCESSING SECTOR



DairyWater project research team, December 2014. L-R Dr. Jamie Goggins, Dr. Alessia Stocca, Prof. Xinmin Zhan, Prof. Alan Dobson, Dr. Zaki Asam, Prof. Liwen Xiao, Fei Gao, Emma Tarpey, Dr. William Finnegan, Prof. Neil Rowan, Kelly Fitzhenry. Missing: Dr. Eoghan Clifford, Dr. Song Miao

The abolishment of milk quotas in 2015 is expected to result in a 50% increase in milk production in Ireland by 2020. This increase in the volume, of milk being processed along with stringent measures on emissions from the industry, and growing commercial drive for operational efficiencies is driving the need for innovative technological and operational solutions within the dairy processing industry. In this context DairyWater, a new multi-stakeholder research project, is developing innovative solutions for the efficient management of

water consumption, wastewater treatment and the resulting energy use within the country's dairy processing industry. This project has the potential to position Ireland at the forefront of European, or indeed international, research in this sector as it strives to make the Irish dairy processing industry more efficient and environmentally sustainable by reducing carbon footprints, energy and water use. DairyWater is led by Prof. Xinmin Zhan in Civil Engineering, College of Engineering and Informatics and the Ryan Institute at NUI Galway. The project also involves leading research groups at UCC, Trinity College Dublin, Athlone IT and Teagasc. The primary goal of the study is to efficiently and effectively treat wastewater effluent from dairy processing plants using a range of innovative biological, nanomaterial-based and disinfection technologies. In parallel, the efficient use of water (and resulting energy costs) within the plants is also being explored. The four-year project has received €1 million funding from the Irish Department of Agriculture, Food and the Marine.

For further details and to follow the progress of the project visit: www.dairywater.ie

XVth World Water Congress



*XVth World Water Congress: Edinburgh, Scotland
25 - 29 May 2015*

*“Global Water, a Resource for Development:
Opportunities, Challenges, and Constraints”*

The XVth World Water Congress will be held from 25 to 29 May in Edinburgh, Scotland in partnership with the Scottish Government. The main theme encompasses the essential role water plays in eradicating poverty whilst ensuring consideration and conservation of the environment. Both developing and developed countries encounter a vast array of challenges in meeting water-related demands particularly when confronting growing populations and intensifying complexities in the agricultural and industrial sectors. Despite the importance of water in securing sustainable socio-economic development, it is not a key factor in development projects and is absent in many political agendas. The XVth World Water Congress strives to promote water's importance in economic, social and environmental development by bringing together professionals from different areas of expertise to work together to identify challenges faced by the water sector, and solutions to ensure future sustainability.

The Congress has brought together researchers, professionals, decision-makers and water stakeholders from all over the world. Over the course of the Congress, 58 parallel sessions and 37 special sessions shall be held; and 228 poster and over 260 oral presentations shall be made. It shall also host several important side events such as Hydronation and the 5th Meeting of the OECD Water Governance Initiative. It is the premier multi-disciplinary meeting place for the world's water scientific and knowledge community to exchange, debate and advance important issues in this important year where the UN Sustainable Development Goals will be decided.

**You can consult the full Congress Programme on:
worldwatercongress.com/full-congress-programme-is-launched/**

IWRA Stand

IWRA will hold a permanent stand in the exhibition hall during the XVth World Water Congress. We encourage members and networks to meet there to discuss, find out more information about the association or just have a coffee break!

Local Organising Committee - Jon Rathjenn Team Leader, Water Industry Team, Scottish Government - Professor Bob Ferrier, Director of Research Impact, The James Hutton Institute - Professor Gareth Pender FREng, FRSE, Professor of Environmental Engineering - Heriot Watt University Edinburgh - Barbara Barbarito, Business Strategy and Policy Manager Scottish Water - John McAleese PhD, Business Partnerships Manager, Research Strategy & Innovation Office, University of Glasgow - Dr Alistair Rieu-Clarke, Reader in International Law, Dundee Centre for Water Law, Policy and Science (under the auspices of UNESCO), University of Dundee

International Scientific Committee: CHAIR: Dr. Cecilia Tortajada, President of the Third World Centre for Water Management, Mexico - COMMITTEE: Mr. Jon Rathjenn, Team Leader, Water Industry Team, Scottish Government, Edinburgh, Scotland - Dr. Emmanuel M. Akpabio, Lecturer, Department of Geography & Regional Planning, University of Uyo, Nigeria - Dr. Eugenio Barrios, Director, Water Programme, WWF-Mexico - Dr. Marius Claassen, Research Group Leader, Council for Scientific and Industrial Research (CSIR), Pretoria, South Africa - Dr. Anthony Cox, Head of Division, Environment Directorate, OECD, Paris, France - Dr. David Brooks, Associate, IISD's Natural and Social Capital program, Canada - Prof. Gabriel Eckstein, Professor of Law, Texas A&M University School of Law and Treasurer, IWRA - Dr. James Horne, Principal, James Horne and Associates and Visiting Fellow, Australian National University - Dr. Elcin Kentel, Associate Professor, Middle East Technical University, Ankara, Turkey - Prof. Lilian del Castillo-Laborde, Professor, Buenos Aires University, Argentina - Dr. David Molden, Director General, International Centre for Integrated Mountain Development, Kathmandu, Nepal - Prof. Mikiyasu Nakayama, Head and Professor, Department of International Studies, Graduate School of Frontier Sciences, University of Tokyo, Tokyo, Japan - Prof. James Nickum, Editor-in-Chief, Water International, Tokyo, Japan - Dr. Markus A. Palenberg, Director, IFDS - Institute for Development Strategy, Munich, Germany - Prof. Gareth Pender, Head of School, Environmental Engineering, Institute for Infrastructure and Environment, Heriot Watt University, Edinburgh, Scotland - Mr. Pua Aik Num, Chief Specialist of Water Treatment, Public Utilities Board, Singapore - Dr. Ahmet Saatci, President, Turkish Water Institute, Istanbul, Turkey - Prof. Christopher Scott, Professor and Distinguished Scholar, University of Arizona, Tucson, USA; and Chair, XIV IWRA Congress (Recife, 2011) - Dr. Kai Wegerich, Senior Researcher, International Water Management Institute, Addis Ababa, Ethiopia - Dr. Jun Xia, Dean, Research Institute for Water Security (RIWS), Wuhan University, Wuhan, China - Prof. Jaeeung Yi, Professor, Ajou University, Suwon, Korea



Opening the world Water Congress

IWRA President Professor Dogan Altinbilek shall kick off this year's Congress at the Opening Plenary entitled «Global Water: a resource for development - opportunities, challenges and constraints. The session shall include distinguished speakers from Scotland and international organisations. We invite you to attend the opening which shall be held on Monday 25 May at 09:15 at the EICC - Pentland Full Suite Level 3.

IWRA Awards

At each Congress IWRA presents awards to showcase excellence and scientific innovation in water resource management.

Ven Te Chow Memorial Award

IWRA has established a Ven Te Chow Memorial Lecture program to honor its first president, as well as provide for an outstanding lecture at its Congresses. The 2015



laureate, **Professor Rabi Mohtar** is a TEES Endowed Professor at Texas A&M University, Founding Executive Director of the Qatar Environment and Energy Research Institute (QEERI), member of the Qatar Foundation Research and Development and inaugural Director of the Global Engineering Programs, Purdue University,

West Lafayette, Indiana. Mohtar's research addresses global resource challenges: development of the Water-Energy-Food Nexus framework linking science to policy; characterisation of the soil-water medium using thermodynamic modeling; efficacy of non-traditional water using physical-based methodologies; and applications for sustainable, integrated water management. Distinguished Alumni of the American University of Beirut (2014) and recipient of the Kishida International Award (2010), Mohtar serves on the World Economic Forum Global Agenda Councils on Water Security and Climate Change (2009-2014), and board of governors of the World Water Council (2012-present)

[<http://wefnexus.tamu.edu/>].

The Ven Te Chow Memorial Award and Lecture will be delivered on Thursday 28 May (14:45-16:15).

Crystal Drop Award

The IWRA Crystal Drop is awarded to individuals or organisations in recognition of their laudable contribution to the improvement of the world's water situation. The 2015



laureate, **Professor V.P. Singh** is a Distinguished Professor and Caroline and William N. Lehrer Distinguished Chair in Water Engineering at Texas A & M University. He received his B.S., M.S., Ph.D. and D.Sc. degrees in engineering. He is a registered professional engineer, a registered professional hydrologist, and an Honorary diploma

of ASCE-AAWRE. He has published more than 780 journal articles; 24 textbooks; 55 edited reference books; 80 book chapters; and 303 conference papers in the area of hydrology and water resources. He has received more than 70 national and international awards, including Arid Lands Hydraulic Engineering Award, Chow Award, Torrens Award, Norman Medal, and EWRI Lifetime Achievement Award, from ASCE; Linsley Award and Founder's Award, from AIH; and three honorary doctorates. He is a Distinguished Member of ASCE, and a fellow EWRI, AWRA, IWRS, ISAE, IASWC and IE and a member of 10 international engineering academies. He has served as President of the American Institute of Hydrology (AIH).

The Crystal Drop Award will be presented during the Opening Ceremony, on Monday 25 May (9:15-10:45).

Best Paper Award

The winning papers are selected yearly from all papers published in the official journal of IWRA, *Water International* (WI). Nomination is made by a jury of the Editorial Board and vetted through the Awards Committee of IWRA. IWRA is honoured to announce the following winners :

2013:

Two Best Paper Awards were given to:

- Hans Komakech and Pieter van der Zaag for the article «Polycentrism and pitfalls: the formation of water users forums in the Kikuletwa catchment, Tanzania»
- Karen G. Villholth for the article «Groundwater irrigation for smallholders in Sub-Saharan Africa – a synthesis of current knowledge to guide sustainable outcomes».

Two Honourable Mentions were awarded:

- David B. Brooks, Julie Trottier and Laura Doliner for the article "Changing the nature of transboundary water agreements: the Israeli-Palestinian case"

XVth World Water Congress

- Salman M. A. Salman for the article "The Nile basin cooperative framework agreement: a peacefully unfolding African spring?"

2012

The 2012 Best Paper was awarded to Suvi Sojamo, Martin Keulertz, Jeroen Warner and John Anthony (Tony) Allan for the article «Virtual water hegemony: the role of agribusiness in global water governance» (in *Water International*, volume 37, issue 2, 2012)

Two papers were awarded Honourable Mention:

- Tim Foster, Rob Hope, Mike Thomas, Ilana Cohen, Aaron Krolkowski and Cliff Nyaga for the article «Impacts and implications of mobile water payments in East Africa»
- Christina Leb for the article «The right to water in a transboundary context: emergence of seminal trends»

2011

Two Best Papers were awarded to:

- Xueliang Cai, David Molden et al. for the article "Producing more food with less water in a changing world: assessment of water productivity in 10 major river basins"
- Gabriel E. Eckstein for the article "Managing buried treasure across frontiers: the International Law of Transboundary Aquifers."

An Honourable Mention was awarded to:

Andrea K. Gerlak, Robert G. Varady et al. for the article "Hydrosolidarity and beyond: can ethics and equity find a place in today's water resource management?"

Recognition for Excellence in Water Resources Management and Leading Innovation

IWRA works with various stakeholders throughout the world and seeks to recognise excellence in water resources management and leading innovation amongst its partners. This year, IWRA is honoured to present awards to recognise two distinguished recipients: the Scottish Government and Dr. David Korenfeld Federman. The award ceremony shall be held at the closing session, on Friday 29 May (11:15-12:45).

Social Programme



The XVth World Water Congress has some exciting events that highlight the beauty and rich history of Edinburgh :

Monday 25 May - 17:30-19:00: Drinks Reception
Location: EICC- Lennox Suite Level -2 Concourse

Tuesday 26 May - 19:00-21:00: Scottish Reception at Edinburgh Castle, Location: Edinburgh Castle

Thursday 28 May - 19:00-23:30: Gala Dinner,
Location: National Museum of Scotland

In addition to these planned social events, there are other partner programme events. More information is available on the website:

worldwatercongress.com/social-programme-and-accompanying-guests-information/

Technical Visits



Three unique technical visit opportunities are available to Congress delegates at diverse locations demonstrating innovative approaches to sustainable water resource management in Scotland, all within easy reach of the Congress venue. To read more about these technical visits, or to book a spot, visit:

worldwatercongress.com/technical-visits/

THE PAST : SETTING THE SCENE AND MOBILISING ACTION

The signature event of the International Water Resources Association (IWRA) is the World Water Congress, which has been held every three years since 1973. These were organised to bring together water experts from various backgrounds to present cutting-edge research in the water sector and discuss current and future challenges. The inaugural World Water Congress was held in 1973 in Chicago, Illinois, USA and brought together participants from over 62 countries.

PREVIOUS WORLD CONGRESSES

IST WORLD WATER CONGRESS

Venue: Chicago, Illinois, U.S.A. Date: 24 – 28 September, 1973
 Theme: Importance and Problems of Water in the Human Environment in Modern Times.

IIND WORLD WATER CONGRESS

Venue: New Delhi, India Date: 12 – 16 December, 1975
 Theme: Water for Human Needs.

IIIRD WORLD WATER CONGRESS

Venue: Mexico City, Mexico. Date: 23 April, 1979
 Theme: Water for Human Survival.

IVTH WORLD WATER CONGRESS

Venue: Buenos Aires, Argentina Date: 5 – 9 September, 1982
 Theme: Water for Human Consumption: Man and his Environment.

VTH WORLD WATER CONGRESS

Venue: Brussels, Belgium Date: 9 – 15 June, 1985
 Theme: Water Resources for Rural Areas and their Communities.

VITH WORLD WATER CONGRESS

Venue: Ottawa, Canada Date: 29 May – 3 June, 1988
 Theme: Water for World Development.

VIITH WORLD WATER CONGRESS

Venue: Rabat, Morocco Date: 13 – 18 May, 1991
 Theme: Water for Sustainable Development in the 21st Century.

VIIITH WORLD WATER CONGRESS

Venue: Cairo, Egypt Date: 13 – 18 May, 1994
 Theme: Satisfying Future National and Global Water Demands.

IXTH WORLD WATER CONGRESS

Venue: Montreal, Canada Date: 1 – 6 September, 1997
 Theme: Water Resources Outlook for the 21st Century: Conflicts and Opportunities.

XTH WORLD WATER CONGRESS

Venue: Melbourne, Australia Date: 12 – 16 Mars, 2000
 Theme: Sharing and Caring for Water.

XITH WORLD WATER CONGRESS

Venue: Madrid, Spain Date: 5 – 9 October, 2003
 Theme: Water Resources Management in the 21st Century.

XIITH WORLD WATER CONGRESS

Venue: New Delhi, India Date: 22-25 November, 2005
 Theme: Water for Sustainable Development, Towards Innovative Solutions.

XIIITH WORLD WATER CONGRESS

Venue: Montpellier, France Date: 1-4 September 2008
 Theme: Global Changes and Water Resources

XIVTH WORLD WATER CONGRESS

Venue: Porto de Galinhas, Brésil Date: 25-29 September 2011
 Theme: Adaptive Water Management : Looking to the Future

The following timeline outlines the World Water Congresses, their dates, and themes.

THE FUTURE

XVth World Water Congress
 Riviera Maya, Mexico



The next World Water Congress will be held in 2017 in the Riviera Maya, Mexico in partnership with the National Association of Water and Sanitation Companies of Mexico (ANEAS).



SPECIAL SERIES **ON THE THEMES OF THE** **XVth WORLD WATER CONGRESS**



WATER ALLOCATION AMONG COMPETING USES AND USERS: MOVING FROM STUDY TO ACTION

JAMES HORNE
Australian National University

Research on water allocation among competing uses and users has been detailed and persistent (some of the recent debates are noted in Bjornlund (2014)). But the problem being addressed over the decades of how to allocate water continues to reappear.

Over 50 years ago, writing about the United States, John Timmons wrote: “The use of water, increasingly strategic to national, regional, state and community economic development, is afflicted with many confusions, uncertainties and conflicts. These problems arise from the rapidly increasing demands for water and are characterized by the necessity of making decisions of allocating limited amounts of water among competing uses and competing users” (Timmons, 1956, p.1244). In a preface to an excellent new OECD study on water resources allocation, Angel Gurría expressed very similar sentiments in relation to OECD member and key partner countries: “Competition to access water resources is increasing as a result of population growth, economic development and climate change. As such competition intensifies, the issue of how governments allocate water between uses and users is rising on the policy agenda” (OECD, 2015, p.9).

Against this background, the many papers examining aspects of this increasing pressure on established water allocation systems constitute a rich theme of the 2015 WWC. Over time, many such systems around the world have

been found increasingly wanting, and governments and communities have been slow to respond. Some of these systems have applied to cities, some to regions, and some to countries and cross border arrangements.

Presenters will be exposing new cases looking at how regulations can undermine fairness when they were originally introduced to do exactly the opposite, how legal doctrine can affect the right to extract water in unexpected ways, and at the role of markets in increasing efficiency. A number of case studies examine how regulations and legislation have been imposed on existing property rights, affecting environmental outcomes, but in the process raising questions around how best to protect the environment as competition for water resources intensifies.

A common thread in these papers is that in each example being raised something important has changed. The plethora of case studies to be exposed in Edinburgh will let us look at not only aspects of allocation processes that have worked at some point, but at where they now have been found wanting, and at what is preventing their reinvigoration. Put directly: what are the key impediments to putting in place a reinvigorated allocation system that serves users and potential users better than what is currently in place?

A challenge is to make some sense of this detail and to facilitate taking the analysis forward into proposals that government can implement, which will serve better the society in which the

revised water allocation system operates. The new OECD study provides at a general level starting point checks for existing allocation systems. Do the case studies tell us anything in general about priorities of governments or different levels of administration? Or are they simply reflective of the social economic and environmental choices being made in different parts of the world? One ongoing tension the world over is increased competition for water resources between the environment and development, with the former often losing out. To many who have no access to acceptable quality drinking water, the plight of the environment will seem a largely irrelevant issue. To others, it will be a central issue.

Does how we resolve these questions affect the sustainability of development? How important is sequencing of actions in the reform or transformation process? What are the political and social impediments to transforming allocation systems so they better address the needs of the affected community? At what level do generalized lessons add value? How do the WWC case studies help us think about these questions?

There are few new questions in the water allocation space but one of the most persistent issues is the value and form of proposals to reinvigorate and revitalise existing water allocation arrangements. Helping to test these proposals and then to help put in place concrete actions to achieve them will add real value. ●

References

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- Timmons, J. F. (1956). Theoretical Considerations of Water Allocation among Competing Uses and Users. *Journal of Farm Economics*, 38(5), 1244-1258.



NON-CONVENTIONAL SOURCES OF WATER: TREATED REUSED WATER FOR DIRECT AND NON-DIRECT POTABLE USE

CECILIA TORTAJADA

Senior Research Fellow, Institute of Water Policy Lee Kuan Yew School of Public Policy, Singapore

An increasing number of governments and water operators are increasingly promoting the use of non-conventional sources of water for the domestic, industrial and agricultural sectors. This makes necessary to advance not only related science and technology, but, mostly for the domestic sector, knowledge on global trends of water reuse policies for direct and non-direct potable use, how they are expected to change over time within a framework of water scarcity and their public acceptance. The final objective would be to understand the potential that water reuse has for direct and non-direct potable use with the objective to expand water supply sources through reuse of municipal wastewater.

In Australia, several jurisdictions have introduced water recycling 'targets', aimed to promote recycled water as an alternative to other options. The Commonwealth Government announced a national wastewater recycling target of 30% by 2015. Direct Potable Use (DPR) is technically feasible and can safely supply potable water directly into the water distribution system, but advanced water treatment plants are complex and need to be designed correctly and operated effectively with appropriate oversight. Current Australian regulatory arrangements can already accommodate soundly designed and operated DPR systems¹. The use of recycled water for drinking purposes is subject to numerous guidelines including those at a National Level². National Water Initiative (NWI) maps out Australia's water use and management objectives and actions that each party takes. It is based on 1994 COAG Water Reform Framework³.

The elements contributing to the public demise of these projects include lack of trust in the institutions charged with delivering the projects. Evidence suggests that factors including timely communication with stakeholders, transparency in the projects' process and fairness in the way in which it is implemented are critical. Role that public interest groups have is also important, e.g. those opposed to the concept of drinking recycled water such as 'Citizens

against drinking sewage' (CADS). CADS were first present in an early Queensland indirect potable reuse proposal for the area of Maroochy. The Maroochy case was complicated by CADS perceiving a lack of adequate consideration for stakeholders in the consultation process, and feeling that the process was not transparent.

In United States, all the DPR projects are looking to California's Orange County Water District Groundwater Replenishment System (GWRS) as a road map for their own facilities. The system is an indirect potable reuse system that takes highly-treated wastewater that would have otherwise been discharged into the Pacific Ocean purifies it to exceed state and federal drinking water standards and puts it into the Water District's percolation basins in Anaheim, where it is naturally filtered through sand and gravel before returning to the drinking water system. Even though the system uses an environmental buffer, the water is near distilled quality when the treatment process is complete and could potentially be consumed directly. The facility can produce up to 70 million gallons of high-quality water every day and provides 20 percent of the total water supply to the district's 19 municipal water agencies and 2.4 million residents.

There is currently no national regulation for water reuse or for the application of reclaimed water as a drinking water supply; every state is devising its own regulatory framework for the practice. All water sources have varying levels of chemical and/or microbial contaminants in them, and the Safe Drinking Water Act requires conformance to primary and secondary standards before they can be used as drinking water. When considering reclaimed water as a source, engineers must be additionally cautious about monitoring because of the higher concentrations of pathogens and trace organic chemicals in water from sewage. It is suggested that a multi-barrier approach be coupled with monitoring of water standards, with technology that can alert operators in real-time if the quality of the processed water falls outside of

acceptable standards. Analytical instruments for inline monitoring continue to improve, allowing operators to quickly stop or divert water if something goes wrong.

In 2010, then-Governor Arnold Schwarzenegger signed a bill that in part required the California Department of Public Health (CDPH) to investigate the feasibility of developing uniform water recycling criteria for DPR and to provide a final report on that investigation to the legislature by December 31, 2016. In 2012, the WRRF and WaterReuse California launched a fund raising initiative to support research for the DPR. This initiative is reported to have raised \$4 million from 30 different water and wastewater agencies⁴.

A number of very large Californian cities such as San Diego, Los Angeles and Sacramento are actively considering the development of DPR schemes as a major contributor to future water supplies. Major changes to regulation (such as the California Water Code⁵) have been implemented to facilitate these potential projects. This has been accompanied by significant research efforts on the part of the US water industry to address a number of key issues including enhanced treatment process reliability, regulatory requirements and issues related to public perception and acceptance.

In terms of research on public acceptance, the main limitation is that most studies investigate factors hypothesized to be associated with acceptance of water from alternative sources in isolation from one another, thus risking that the association is over-interpreted. The success of future direct potable reuse projects is dependent on potential consumer acceptance. All of the other problems associated with potable reuse may be resolved, i.e., public health concerns, but the issue of public acceptance remains. Factors that promote direct potable reuse are water shortage areas, gradual introduction of water reuse and unity among professionals and experts in terms of reuse. One promising strategy incorporates the principles of applied behavioral analysis and social marketing to achieve results.

Demand will drive acceptance of DPR, on a case-by-case basis. "The public water supply industry are not interested in pushing potable reuse but are interested in creating a framework so that those communities that have no other water supply alternatives can do it safely and

reliably.» (Carpenter, PE, vice president of the Water Resources & Reuse Group at Carollo Engineers in Phoenix).

In Windhoek, the first reclamation plant started to operate in 1968 with a capacity of 4,800 m³/d. In September 2002, the New Goreangab Reclamation Plant (NGRP) was commissioned having a 21,000 m³/day capacity. The old plant is now treating effluents for irrigation of parks and sports fields. Efforts to introduce wastewater reclamation for potable water have failed in many cities around the world with the perception of reclaiming drinking water from municipal secondary effluent generally unacceptable to the public. Experience in Windhoek showed that with persistent, well-designed and targeted marketing, this perception can be changed. The population of Windhoek generally takes pride that they are the only city in the world where direct potable water reuse is practiced.

In Singapore, reuse water (known as NEWater) for non-direct potable and industrial uses represents one of the fourth sources of water for the city-state. Currently, the two unconventional water sources – NEWater and desalinated water - supply up to 30% and 25% of total demand for the city-state respectively. NEWater is pumped to the reservoirs for non-direct potable use, but primarily supplied to the industries and commercial buildings for non-potable uses. There are plans to augment the capacities of NEWater and desalinated water to supply up to 80% of Singapore's total water demand by 2060⁶.

In all cases, monitoring is an integral part of water reclamation to ensure the safety of the drinking water supplies and to maintain public trust. It covers the full water cycle.

Finally, roles and responsibilities must be carefully considered when determining the respective functions of government and the private sector, particularly for recycling proposals with significant human contact such as residential third pipe systems and direct and indirect potable reuse. The public also has a very important role to play. Public acceptance remains an important and sometimes-difficult issue for all planned potable water projects. However, there is evidence that suggests that acceptance is increasing generally and can be fostered by effective engagement and communication programmes⁷. ●

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- 3- Executive Overview, The National Water Initiative – securing Australia's water future: 2011 assessment, p.3
- 4- <http://www.waterworld.com/articles/print/volume-29/issue-9/editorial-features/battling-water-scarcity.html>
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■ LATEST ACTIVITIES



7th World Water Forum

DAEGU & GYEONGBUK, REPUBLIC OF KOREA
12 - 17 APRIL 2015

This major international event brought together many global stakeholders and experts of the water sector. Led by IWRA President, Prof. Dogan Altinbilek, several Board officers, staffs and members played a particularly active role during the week. IWRA participated in several themes including Green Growth, IWRM, SPI, the Science-Policy Interface and Governance. In addition, IWRA coordinated Design Group 3.3 with the theme, “Ensuring Water Quality from Ridge to Reef” and was leader for the sub-session 3.3.1. «Water Quality: Smarter Use for Water Security».



Closing Ceremony and Daegu & Gyeongbuk Implementation Consensus



President Dogan Altinbilek and Director Patrick Lavarde at the World Water Forum



Sub-session of the IWRA led theme on water quality

Hong Kong University Public Policy Seminar

Executive Director, Tom Soo gave a presentation on «Shaping the Global Water Discourse» on 21 April at Hong Kong University.

For more information visit the web page:
www.socsc.hku.hk/pppl/tsoo/



IWRA 8th Executive Board Meeting

The Executive Board held a meeting by videoconference on 7 May.



Illinois Water Day 2015

CHAMPAIGN, ILLINOIS, USA
10 APRIL 2015

The International Water Resources Association (IWRA) Student Chapter at the University of Illinois at Urbana-Champaign (UIUC) organized the 2nd annual Illinois Water Day (IWD). More than 100 people, including but not limited to professors, researchers, students and concerned individuals, participated in different parts of the event and created a unique environment to learn, teach and discuss local water issues. IWD 2015 was organized as a “Let’s Talk about Water” (LTAW) event. LTAW program, supported by CUAHHSI, promotes using films for water science education. Considering the importance of agriculture in the Midwest and its impacts on the freshwater resources, we decided to show the documentary “Cowspiracy: The Sustainability Secret” which explores the detrimental impacts of animal agriculture on the environment, and criticizes the policies and perspectives of environmental organizations on this issue. A panel discussion followed the screening of the documentary with four experts from different local organizations with different backgrounds. The panel discussion was moderated by Linda Lilienfield, who is the creator and project coordinator of LTAW. The audience also engaged in the discussion by sharing their own takes on the movie and their stories. The last part of the IWD 2015 was a poster session that was focused on the theme of Water and Sustainability. More than 25 posters being presented by graduate and undergraduate students, local non-profits and state organizations together with live and interactive discussions created a unique experience for participants with different backgrounds to discuss about local water challenges.



More Photos of the event available at:

www.facebook.com/IllinoisWaterDay

Video of the Panel Discussion available at:

<http://bit.ly/10caEzc>

More information about Illinois Water Day:

waterday.illinois.edu

Contact Fernanda Maciel (maciely2@illinois.edu) or Majid Shafiee-Jood (Shafiee2@illinois.edu) for further information.

■ UPCOMING EVENTS



5th Meeting of the OECD Water Governance Initiative

EDINBURGH, SCOTLAND
26 MAY 2015

OECD Water Governance Initiative (WGI) 5th Meeting will be held in Edinburgh in parallel with the XVth World Water Congress. The WGI is an international multi-stakeholder network of members from the public, private and non-profit sectors, gathering twice a year to share good practices in support of better water governance. The objectives of this initiative include: 1) Advise governments 2) Provide a technical platform 3) Provide a consultation mechanism 4) Support governance targets and 5) Contribute to the OECD Principles and Indicators on Water Governance.

More information and the agenda of this event can be found on the OECD web page at: www.oecd.org/gov/regional-policy/water-governance-initiative-meeting-5.htm



High-Level International Conference on the Implementation of the International Decade for Action "Water for Life", 2005-2015

DUSHANBE, REPUBLIC OF TAJIKISTAN
9-11 JUNE 2015

The Government of the Republic of Tajikistan is hosting the High-Level International Conference on the Implementation of the International Decade for Action "Water for Life" (2005- 2015) to further efforts to achieve sustainable development of water resources. The main objective of the conference is to summarize and critique the progress of reaching the decade goals and to develop recommendations in order to reach these goals.

To read more about the Conference, visit: waterforlifeconf2015.org/eng/



International Association for Hydro-Environment Engineering and Research World Congress 2015

THE HAGUE, NETHERLANDS
28 JUNE - 3 JULY 2015

The 36th IAHR World Congress will be held on June 28 - July 3 at The Hague in the Netherlands. The themes of the Congress are: managing deltas, hydro-environment, sediment management and morphodynamics, water engineering, flood risk management and adaptation, water resources and hydroinformatics, and extreme events, natural variability and climate change.

For more information, visit: www.iahr2015.info



Stockholm World Water Week 2015

STOCKHOLM, SWEDEN
23-28 AUGUST 2015

This year is the silver jubilee year for World Water Week and the Stockholm Water Prize and the theme is "Water for Development". 2015 World Water Week will consist of over 160 events and 8 workshops. During the events, the most relevant topics relating to "Water for Development" will be discussed. These include: Financing, SDGs, Integrity, Gender issues, Climate Change, Energy, Sanitation, Food, Conflict Resolution, Water Management, etc.

The program, which was released in April, can be found here: programme.worldwaterweek.org

For more information, visit: www.worldwaterweek.org



ICID 2015

MONTPELLIER, FRANCE
11 - 17 OCTOBER 2015

The ICID (International Commission on Irrigation and Drainage) Conference on "Innovate to improve irrigation performance" will be held in Montpellier. Organised by AFEID (the French Chapter of ICID), the three main themes are:

- Drip irrigation for water saving: the winning formula?
- What potential for wastewater use in agriculture?
- What governance for groundwater use in agriculture?

For more information visit:

icid2015.sciencesconf.org/?lang=en



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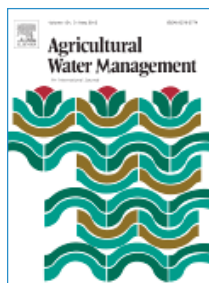
40TH ANNIVERSARY



This year IWRA celebrates the 40th anniversary of Water International. Water International is the official peer reviewed journal of the Association published by Taylor & Francis. It is a leading source of information on international water resources research and policy. Water International articles and technical notes focus on water management, policy and governance based on rigorous scholarship for a broad, interdisciplinary audience. The journal also keeps members up-to-date and connected to a network of scholars and practitioners throughout the world by publishing conference highlights, book reviews and dialogues and member information on elections and constitutional revisions.

PUBLICATIONS

PUBLICATIONS BY IWRA MEMBERS AND PARTNERS



Achieving ethical responsibilities in water management. A challenge

By: Prof G. Rossi

Agricultural Water Management

147(2015) 96-102

To read the full article, visit:

www.sciencedirect.com/science/article/pii/S0378377414002303



Water governance across competing scales: Coupling land and water management

By Katherine A. Daniell

& Olivier Barreteau

Incorporating water resources in integrated urban and regional planning

By Claudia L. Baldwin and Paul J. Jeffrey

Journal of Hydrology

Volume 519, Part C,

Pages 2367-2660

27 November 2014

To read the papers, visit: www.sciencedirect.com/science/journal/00221694/519/supp/PC

PUBLICATIONS



Offshore Aquifers

By: Renee Martin-Nagle

The Environmental Forum

Volume 32, Number 3,

May/June 2015

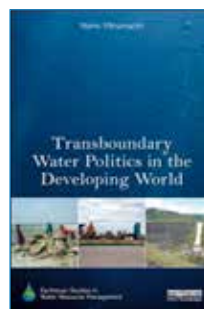
Scientists have predicted that continental shelves around the globe shelter aquifers containing fresh, brackish, and/or slightly saline water. Meanwhile, reports of water scarcity appear with increasing frequency from every continent. As the human population rises rapidly to 8 billion, more water will be needed to provide food and sustain life, and sources of water that were once considered to be economically or technically unfeasible may become increasingly attractive. Should offshore aquifers be found to contain supplies of water suitable for extraction, many issues relating to governance will have to be addressed and resolved, especially where the offshore aquifer lies under boundaries of two or more states.

For example, customary rules and practices regarding multiple owners of land-based aquifers are fairly clear – states have sovereign rights to the rock formation within their territory but not necessarily to the water itself, water that is withdrawn must be used reasonably and fairly, no user should subject the water source to significant harm, and states should share technical data regarding the aquifer and its liquid treasure. But should land-based rules be applied to a marine-based resource? Should laws of the sea be applied instead? Should rules applicable to offshore drilling for oil and gas, or offshore mining for seabed minerals, serve as precedents? In addition to governance issues, other questions will arise. How can marine ecosystems be preserved during the extraction process? How should water that currently serves no human purpose be fairly allocated?

To read the full article, visit:

www.iwra.org/doc/Offshore_Aquifers.pdf

For more articles from this issue, visit the Environmental Law Institute website: www.eli.org



Transboundary Water Politics in the Developing World

By: Naho Mirumachi

Dr. Naho Mirumachi, King's College London & IWRA Water International Associate Editor has just published her new book 'Transboundary Water Politics in the Developing World' (Routledge) This book examines the political economy that governs the development and management of international transboundary river basins. Moving away

PUBLICATIONS

from simplistic analyses of river basins in conflict or cooperation, the author proposes a new analytical framework (the Transboundary Waters Interaction Nexus (TWINS)) to understand riparian interactions, based on the coexistence of conflict and cooperation. The book draws on detailed case studies from the Orange-Senqu River basin in Southern Africa, Ganges River basin in South Asia and the Mekong River basin in Southeast Asia, but also refers to other examples from the developing world.

A 20% discount on orders placed directly to the Publishers is offered: enter the discount code DC365 at the check out on the Routledge web site to obtain the 20% discount.

To learn more or to purchase a copy, visit:

www.routledge.com/books/details/9780415812955/



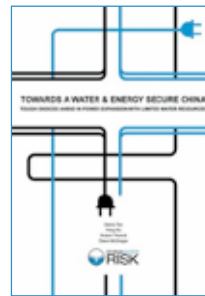
Seeing «Invisible Water»: challenging conceptions of water for agriculture, food and human security

By: Larry Swatuk, Meghan McMorris, Charmaine Leug, and Yuyan Zu
The Canadian Journal of Development Studies - Volume 36, No. 1

DOI: 10.1080/02255189.2015.1011609

Climate change and variability combined with increasing population shape a discourse of “water crisis”, with a heavy emphasis on scarcity, particularly in the Global South. The primary metric used is freshwater availability, defined as annually available surface and groundwater. We challenge the accuracy of this metric and introduce the concepts of green water and virtual water. Applied to the case of cotton production in Uzbekistan, we show that there is enough water and land for food security for all. Shortages are most often the result of decision-making based on narrow economic criteria rather than satisfaction of basic human needs.

To read the article, visit: www.tandfonline.com/doi/full/10.1080/02255189.2015.1011609



Towards A Water & Energy Secure China - Tough choices ahead in power expansion with limited water resources China Water Risk

Hong Kong based non-profit initiative, China Water Risk, published a report titled «Towards A Water & Energy Secure China». The report was launched at the 7th World Water Forum in their session co-hosted with China International Water Law Center of Xiamen University led by Prof. Patricia Wouters. China, being one of the most water-stressed countries globally, is facing serious water challenges, meanwhile incubating innovative solutions to these issues. The report explores strategies towards water and energy security in China as well as provides an overview of water risk exposure across China’s power landscape, and hopes to inspire more practical research and projects on the nexus.

To read the report, visit: chinawaterrisk.org/notices/towards-a-water-energy-secure-china/



World Water Development Report 2015: Water for a Sustainable World UN Water

The World Water Development Report (WWDR) is an annual and thematic report that focuses on different water issues each year and aims to provide decision-makers with the tools to implement sustainable use of our water resources. In addition the WWDR showcases regional aspects, hotspots, examples and stories, making the report relevant to a broad range of readers, at different levels and in different geographical areas. The 2015 edition of this report was published on 20 March 2015 with the theme, “Water for a Sustainable World”.

To read more about this year’s WWDR, or to download the full text, visit: www.unwater.org/publications/publications-detail/en/c/281166/

Integrated water resource management - a new way forward

A discussion paper of the World Water Council task force on IWRM.

By Mark Smith and Torkil Jønch Clausen

To read the article, visit: http://cmsdata.iucn.org/downloads/iwrm_a_new_way_forward.pdf

25 - 29 May 2015



World Water Congress XV

International Water Resources Association (IWRA)
Edinburgh, Scotland

GLOBAL WATER, A RESOURCE FOR DEVELOPMENT : OPPORTUNITIES, CHALLENGES AND CONSTRAINTS

- **Global challenges for water governance**
- **Valuing water: monetary and non-monetary dimension**
- **Management of water resources**
- **Transboundary river basins and shared aquifers**
- **Revisiting water paradigms**
- **Non-conventional sources of water**
- **Water law at the national and international levels**
- **Key vulnerabilities and risks**
- **Water allocation among competing uses and users**



www.iwra.org

www.worldwatercongress.com

DATES | 25 - 29 May 2015

VENUE | Edinburgh International Conference Centre, Edinburgh, Scotland

ORGANISERS | International Water Resources Association & Scottish Government



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