

## JORNADAS DOCTORALES - INSTITUTOS DE INVESTIGACIÓN:

### 2<sup>nd</sup> Workshop Water-Energy-Food Nexus

Date: 2-3 June 2020

Location: Zoom Video Online Workshop

#### RESUMEN

The Organisation for Economic Co-operation and Development (OECD) estimates that by 2050 the world's population will have risen to 9 billion. Similarly, by then global food production is expected to increase by 60%, global energy consumption is projected to grow by 80% and global water demands are estimated to increase by 55%, which may affect land use patterns. Given these outlooks, the security of water, energy and food is becoming increasingly important on policy agendas worldwide.

Agriculture is the largest consumer of the world's freshwater resources, and more than one quarter of the energy used globally is expended on food production and supply, while 1/3 of all food produced globally is lost or goes to waste. On the other hand most of the energy mix requires water for functioning: 95 percent of world's electricity generation would cease to exist in the absence of water, fossil fuel production and the growing practice of shale gas extraction – or 'fracking' are also highly water intensive, as is biofuel production. The linkages between these domains require an integrated approach to ensuring water, energy and food security, and sustainable agriculture and energy production across the globe.

The 2030 Agenda, with its 17 Sustainable Development Goals, 169 targets and 232 indicators, is the blueprint to a more sustainable, fair and equitable world. It is the first global agreement that recognizes the interlinkages among the concerned sectors and suggests ways to address them.

The workshop aims to provide an overview of the state-of-the-art, gaps and advances on the water-food-energy research to the entire scientific community, but particularly to PhD students. What is the state of the art on the water-energy-food nexus at a global and local scale? What are the future perspectives on this matter? These are some of the questions to be addressed. There will be a training session for PhD students on water footprint assessment and its application to the water-energy-food nexus and a call for papers for PhD students and early career researchers, who will be able to present their work and receive constructive feedback.

#### TUESDAY, JUNE 2

16:00-16:10

Opening

**María José Beriain**, Director IS-FOOD, UPNA

**Pablo Arocena**, Director INARBE, UPNA

- 16:10-16:30** A tribute to Arjen Hoekstra  
**Toni Allan**, King's College London, UK  
**Ramón Llamas**, Real Academia de Ciencias Exactas, Físicas y Naturales, Spain  
**Joep Schyns**, University of Twente, The Netherlands
- 16:30-18:30** Accepted papers presentation
- Virtual water trade of maize produced in Buenos Aires, Argentina  
**María Macarena Arrien**, PhD candidate, UNICEN, **Corina Iris Rodriguez**, Researcher, UNICEN, CONICET
- Advanced use of Remote Sensing tools for irrigation water control. The case of the Benalup aquifer (Spain)  
**Alex Fernández-Poulussen**, GSI, **Mercedes Vélez-Nicolas**, PhD candidate, University of Cádiz, Santiago García-López, Professor, University of Cádiz
- The paradox of vulnerable groundwater irrigation for food-export in Sicily: The case of pachino tomatoes and the Italian virtual water hegemony  
**Francesca Greco**, PhD candidate, King's College London
- Water-energy-food nexus case - global lignocellulosic biofuel production  
**Bunyod Holmatov**, PhD candidate, University of Twente, **Joep Schyns**, Researcher, University of Twente, **Maarten S. Krol**, Professor, University of Twente, **Winnie P. Gerbens-Leenes**, Professor, University of Groningen, **Arjen Y. Hoekstra** †, Professor, University of Twente
- Improving water-food-energy nexus productivity under sustainable agricultural practices: A case study for Urmia Lake Basin  
**Fatemeh Karandish**, Researcher, University of Twente, **Abdullah Darzi-Naftchali**, Professor, Sari Agricultural Resources and Natural Resources University
- Spatial estimation of green water using satellite data  
**Paula Olivera Rodriguez**, PhD candidate, UNCPBA, **Mauro E. Holzman**, Researcher UNS, **Rául E. Rivas**, Researcher, CIC-IHLLA
- Citizen attitudes towards groundwater and climate change. Implications for resource management at local scale  
**Mercedes Vélez-Nicolás**, PhD candidate, University of Cádiz, **Santiago García-López**, Lecturer, University of Cádiz, **Álex Fernández-Poulussen**, GSI
- 18:30-18:50** Water footprint research in Navarra  
**Maite M. Aldaya**, IS-FOOD, UPNA
- 18:50-19:10** Water for energy in Spain  
**Diego Sesma-Martín**, UPNA
- 19:10-20:00** Roundtable: Perspectives from Spain  
Moderator, **Mar Rubio**, INARBE  
- **Ignacio Cazarro**, ARAID - University of Zaragoza  
- **Alberto Garrido**, UPM  
- **Eva García-Balaguer**, Observatorio Pirenaico del Cambio Climático  
- **Josefina Maestu**, MITECO

## WEDNESDAY, JUNE 3

- 16:00-16:45** Water footprint research evolution  
**Mesfin Mekonnen**, Water for Food Institute, University of Nebraska, USA
- 16:45-17:30** Virtual water transfers of the US electric grid  
**Christopher Chini**, University of Illinois, USA
- 17:30-18:15** Analyzing the economic value of thermal power plant cooling water consumption  
**Ashlynn Stillwell**, University of Illinois, USA
- 18:15-19:00** Assessment of California's Water Footprint  
**Julian Fulton**, California State University, USA
- 19:00 – 19:10** Conclusions and closing  
**Mar Rubio**, INARBE, UPNA

Registration required: <https://forms.gle/ktJT2D28PpyE4WJH9>

### KEYNOTE SPEAKERS' BIOS

#### Mesfin Mekonnen

Dr. Mesfin Mergia Mekonnen is Research Assistant Professor at the Water for Food Institute of the University of Nebraska. Mekonnen is interested in understanding the interactions of human and natural systems in determining the sustainability of freshwater resources. His specialties include, water footprint assessment, water scarcity, water management, crop water use modeling, spatial modeling and water for energy. Prior to joining WFI, Mekonnen worked as a postdoctoral researcher at the University of Twente in The Netherlands where he developed research experience modeling water use in crop and animal production, and assessing global water scarcity. He holds a doctoral degree in water engineering and management from University of Twente. He also holds a master's degree in renewable energy from the University of Oldenburg, Germany, and a master's degree in environmental science and technology from UNESCO-IHE. He earned bachelor's degrees in economics and chemical engineering, both from Addis Ababa University.

#### Julian Fulton

Dr Julian Fulton is Assistant Professor at the California State University. Julian's interests lie in the relationships between water use and economic development, focusing on modeling and governance. Mr. Fulton's previous research includes water use in the transportation sector, conservation strategies among California utilities, and European flood management policy. He completed a Fulbright Fellowship in the Netherlands and holds an M.S. in Civil and Environmental Engineering and a B.A. in International Development Studies and PhD from the University of California at Berkeley.

### Christopher M. Chini

Dr. Christopher M. Chini is an assistant professor of engineering management at the Air Force Institute of Technology in Dayton, OH. His research focuses on the urban energy-water nexus, climate adaptation, and infrastructure resilience. He uses concepts from a wide variety of fields including urban metabolism, embedded resource accounting, and hydrology to advance understanding of systems. Dr. Chini is particularly interested in assessing the sustainability and resilience of resource and infrastructure systems in the built environment. Currently, his research is focused on bringing an understanding of climate impacts on infrastructure systems within the U.S. Department of Defense through the lens of water and energy concerns. Christopher graduated from Texas A&M University with a B.S. in Civil Engineering and M.S. in Civil Engineering in 2015 and his Ph.D. in Civil Engineering in 2018 from the University of Illinois.

### Ashlynn S. Stillwell

Dr. Ashlynn S. Stillwell is an Associate Professor and the Elaine F. and William J. Hall Excellence Faculty Scholar in Civil and Environmental Engineering at the University of Illinois at Urbana-Champaign. Her research focuses on creating sustainable water and energy systems in a policy-relevant context, including projects on urban water and energy sustainability, water impacts of electric power generation, and green storm water infrastructure. She earned a B.S. in Chemical Engineering from the University of Missouri (2006), and an M.S. in Environmental and Water Resources Engineering (2010), M.P.Aff in Public Affairs (2010), and Ph.D. in Civil Engineering (2013) from The University of Texas at Austin.

### Organisers:

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