Water-Energy-Food Nexus Symposium 2025

Date: 6 November 2025, 15:00-17:30 CET

Location: Zoom event with pre-registration at:
https://unavarra.zoom.us/meeting/register/JiJGRpWyRdK_WrM63MNLKQ

Theme: ***Cross-nexus solutions***

Involved institutions: Water Footprint Network (WFN), University of Twente (UT), Institute for Sustainability & Food Chain Innovation (ISFOOD) and Institute for Advanced Research in Business and Economics (INARBE) of the Public University of Navarra (UPNA) and University of La Rioja (UR).

Organisers: Gautamee Baviskar (g.s.baviskar@utwente.nl), Pedro Silva (p.g.camaradasilva@utwente.nl), Oleksandr Mialyk (o.mialyk@utwente.nl), Maite M. Aldaya (maite.aldaya@unavarra.es), Diego Sesma-Martín (diego.sesmam@unirioja.es).

Summary
The OECD projects global population will reach 9 billion by 2050, driving unprecedented resource demands: water needs increasing by 55%, energy consumption by 80%, and food production requirements by 60%. These interconnected pressures will fundamentally reshape land use patterns and intensify competition for finite resources, making Water-Energy-Food (WEF) nexus approaches essential for sustainable development.

This symposium presents cutting-edge research on WEF nexus science, examining critical knowledge gaps and emerging solutions. Distinguished keynote speakers and leading early-career researchers will address key themes including resource interlinkages and biodiversity implications, technological innovations and policy frameworks, multi-level governance challenges, and pedagogical strategies for training the next generation of sustainability scientists

Agenda

15:00 - 15:05	**Welcoming words** Rick Hogeboom, University of Twente, WFN
15:05 - 16:00 *Keynote*	**Keynote** **IPBES Nexus Report on Interlinkages between Biodiversity, Water, Food, and Health in the context of Climate Change** Paula Harrison, UK Centre for Ecology & Hydrology **Moderator:** Maite M. Aldaya, ISFOOD - Public University of Navarra
16:00 - 17:00 *Early career scientist Pitch Presentation and panel discussion*	**4 pitch presentation** **5 min pitch + 40 Q/A (if time left, we open for the audience)** **Conditions enabling effective stakeholder interaction for policy coherence in the Water-Energy-Food-Ecosystem Nexus** Caro Mooren, Utrecht University **Planting the Seeds of Success: Engaging Youth in Agriculture through Board Games and Simulations** Elizabeth Ehi Ogar, Purdue University **Machine learning for building smart index insurance contracts: trade-offs between model performance and policy efficiency** Marcos Roberto Benso, University of São Paulo **Is Improving Still Best? Lessons from Carbon, Biodiversity, and Water Offsetting** Felice Diekel, University of Twente **Panelists** Paula Harrison, UK Centre for Ecology & Hydrology Mar Rubio, INARBE-Public University of Navarra Bunyod Holmatov, International Water Management Institute (IWMI) Christof Brandtner, EM Lyon **Moderator:** Pedro Silva, University of Sao Paulo / University of Twente
17:00 - 17:25	**Keynote** **Current Trends in FEW Nexus Education Research: Facilitating Future Systems Thinkers** Chelsie Romulo **Moderator:** Diego Sesma-Martín, University of La Rioja
17:25 - 17:30	**Closing session** Daniel Chico, EVREN **Moderator:** Diego Sesma-Martín, University of La Rioja

Keynote and panel members

Dr. Paula Harrison

Paula Harrison is Principal Natural Capital Scientist and Professor of Land and Water Modelling at the UK Centre for Ecology & Hydrology, and Co-Director of the Centre for Excellence in Environmental Data Science. An internationally recognized expert in scenarios and modelling, she specializes in working across sectors and disciplines to integrate diverse sources of knowledge for supporting evidence-based holistic decision-making.
Paula serves as Co-Chair of the IPBES Nexus Assessment on interlinkages between biodiversity, water, food, health and climate change. She was also a member of the IPBES Scenarios and Models Task Force contributing to the development and testing of the Nature Futures Framework. She has led numerous large-scale transdisciplinary projects on natural capital, ecosystem services, climate change impacts and adaptation, pathways to sustainable futures, and integrated modelling platforms.

Dr. Mar Rubio-Varas

Dr. Mar Rubio-Varas is Professor of Economic History at the Economics Department of Universidad Pública de Navarra (UPNA) and a research fellow at the Institute for Advanced Research in Business and Economics (INARBE). Her research spans Economic and Business History, Energy Economics, and Environmental Economics.
She holds a PhD and master's degree from the London School of Economics and graduated in Economics from Universidad Carlos III de Madrid. Her academic training includes a year as a Fulbright Research Scholar at UC Berkeley's Economics Department. Her research focuses on long-term relationships between energy consumption and the economy, energy dependence, the transition to a low-carbon economy, and the water-energy nexus. For over a decade, she studied Spain's nuclear program's economic and financial history. Since 2023, she has been leading research on renewable industry development in Navarra and other European regions. Her publications appear in *Ecological Economics*, *Journal of Contemporary History*, *Energy Policy*, and *Economic History Review*, among others.

Dr. Bunyod Holmatov

A leading expert in the Water-Food-Energy (WFE) Nexus, Dr. Bunyod Holmatov's work is distinguished by its focus on translating complex theory into practice. He leads a research group at the International Water Management Institute (IWMI) in Sri Lanka, where he specializes in operationalizing the nexus approach to create sustainable, on-the-ground solutions in developing countries. His academic background includes a postdoctoral fellowship and a Ph.D. in Civil Engineering from the University of Twente in the Netherlands, as well as a professional master's degree from Yale School of the Environment

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Dr. Christof Brandtner

Christof Brandtner is Associate Professor of Social Innovation at emlyon business school, a Fellow in the Canadian Institute for Advanced Research's program on Innovation, Equity, and the Future of Prosperity, and a co-founder of the Civic Life of Cities Lab. His research examines the emergence, diffusion, and implementation of social innovations—organizational practices and policies aimed at making cities and communities more sustainable and prosperous. This research has appeared in leading journals in organizational theory and sociology, including the *American Journal of Sociology*, the *American Sociological Review*, *Social Forces*, and *Organization Studies*, and won multiple awards from the American Sociological Association. His book "Cities in Action: Organizations, Institutions, and Urban Climate Strategies" is forthcoming from Columbia University Press in 2026. He holds a PhD and MA in Sociology from Stanford University and a BSc from the Vienna University of Economics and Business.

Dr. Chelsie Romulo

Dr. Chelsie Romulo is a professor in Environmental and Sustainability Studies at the University of Northern Colorado, USA. Her research spans several resource management contexts but consistently seeks to understand what works and why to explain what contextual characteristics result in impacts and outcomes. She is currently PI of an NSF IUSE grant using machine learning techniques to develop assessment to understand how students learn complex sustainability topics in the Food-Energy-Water-Nexus. Dr. Romulo also chairs the Postsecondary Working Group for the National Collaborative for Food-Energy-Water Nexus Education (NC-FEW), which serves as a networked improvement community through which to systemically foster and understand STEM and Food, Agriculture, Natural resources, and Human sciences (FANH) teaching and learning about the FEW-Nexus. As chair, she leads the co-production of knowledge among scholars and practitioners who study and teach FEW Nexus topics in higher education.

Pitch presentation summary

Conditions enabling effective stakeholder interaction for policy coherence in the Water-Energy-Food-Ecosystem Nexus.
Caro Mooren

The Water-Energy-Food-Ecosystem nexus governance approach offers a framework aimed at fostering cross-sectoral collaboration and coordination by exploiting synergies and reducing trade-offs between sectors, ultimately supporting sustainable natural resource management. Policy coherence is a key indicator of successful nexus governance as it reflects how conflicts between different policy domains and their sectoral goals are managed. To promote coherent nexus policies, participatory approaches are often recommended, though their effects remain debated. Drawing on insights of two transboundary case studies, this presentation will showcase which conditions for stakeholder interaction positively influenced the formulation of a policy mix with coherence ambitions. Specifically, it presents 11 conditions structured around 4 main questions: 1) What are starting conditions for participation? 2) Who is involved? 3) How do these actors interact? and 4) When should they interact? These conditions can be used to design future participatory processes aiming to enhance policy coherence

Planting the Seeds of Success: Engaging Youth in Agriculture through Board Games and Simulations
Elizabeth Ogar

The presentation will explore the innovative use of board games and simulations as educational tools to motivate young people to pursue careers in agriculture. The talk will focus on the implementation of gamified learning tools, highlighting their effectiveness in increasing youth engagement, and improving understanding of agricultural concepts from my experience. I will provide practical recommendations for integrating similar strategies into educational curricula to foster a new generation of agricultural leaders, thereby addressing challenges within the Water-Energy-Food Nexus.

Machine learning for building smart index insurance contracts: trade-offs between model performance and policy efficiency
Marcos Benso

Machine learning models have increasingly been applied to develop smart contracts that safeguard farmers against climate extremes such as heatwaves, droughts, and excessive precipitation. By designing smart contracts, it becomes possible to address the challenge of designing multi-hazard policies within index insurance schemes. However, the efficiency of these contracts has received comparatively less attention. In this presentation, I will demonstrate how machine learning can be used as a tool to create smart contracts and highlight an unexpected behavior of such models: the most accurate model in terms of predictive performance does not necessarily lead to the most efficient insurance policy. To explore this, we tested a range of machine learning algorithms, from traditional approaches to state-of-the-art methods, across different policy scenarios. I will present both model performance metrics and indicators of insurance policy efficiency, discussing their trade-offs and implications for climate risk management in agriculture.

Is Improving Still Best? Lessons from Carbon, Biodiversity, and Water Offsetting
Felice Diekel

Offsetting practices have evolved along separate policy, disciplinary, and methodological lines, with different types of offsets often treated in isolation. Examining their development through a comparative scoping review of carbon, biodiversity, and water offsetting reveals, besides the differences in levels of development, shared features as well as diverging themes. Ideas to pool or loop offsets highlight growing attention to intersecting practices, while the literature hints at the true underlying complexity across different environmental foci. This raises a critical question: should we continue to improve offsets?