



## **The Water-Energy-Food Nexus: Issues and Approaches in the UK and Overseas**

Part 1 - Wednesday 15 February 2023

**11:00 – 12:00 GMT**

On-line via ZOOM

and

Part 2 - Friday 24 February 2023

**14:00 – 17:00 GMT**

ICE, One Great George Street, London, SW1P 3AA

### **SPEAKERS:**

#### **Part 1**

**Prof Sylvester Mpandeli**, Executive Manager, Water Utilisation in Agriculture, WRC, South Africa

#### **Part 2**

**Prof Ian Holman**, Head, Centre for Water, Environment and Development, Cranfield University

**Richard Thompson**, Deputy Director, Water Management and Investment, Environment Agency

**Dr Brendan Bromwich**, Principal Civil Engineer, Mott MacDonald

Water, energy and food are essential for human well-being. Water, energy and food systems are interlinked with land, climate and ecological systems. Global demands for food, water and energy are projected to increase against a background of decreasing water availability due to a combination of increasing abstractions (mainly for agriculture) and climate change, spiralling energy costs and the threat of land degradation. Management of competing demands involves identifying trade-offs and synergies among interlinked systems in order to achieve a balanced sustainable development.

The global community is well aware of water-energy-food challenges, but has often addressed them in isolation, within sectoral limits. At the country level, fragmented sectoral responsibilities, lack of coordination, and inconsistencies between legal and regulatory frameworks has led to misaligned benefits and stress on natural resources.

A Water-Energy-Food (and increasingly Environmental) Nexus approach is reported to offer a means of analysing and managing competing demands on limited resources in an integrated manner. The meeting will explore what is meant by a nexus approach and will highlight examples of integrated analysis aimed at managing trade-offs and optimising outputs.

Talks will be given by speakers who are working on issues using an integrated or nexus approach.

This event is presented in two parts:

#### **Price (Parts 1 and 2)**

Free of charge



### **Programme Part 1, 15 February 2023 via Zoom (all times are GMT)**

|       |  |
|-------|--|
| 10:45 | <b>Participants gather in Zoom ‘waiting room’</b>  |
| 11:00 | <b>Welcome and Introduction</b><br>Dr Ian Tod (IWF Chair)  |
| 11:10 | <b>The evolution of Water-Energy-Food Nexus research in South Africa: 10 years of research development and future vision</b><br>Professor Sylvester Mpandeli, Executive Manager: Water Utilisation in Agriculture, Water Research Commission (WRC), South Africa, and Vice President, International Commission on Irrigation and Drainage (ICID) |
| 11:50 | Q&A  |
| 12:00 | Close of meeting   |

### **Programme Part 2, 24 February 2023 at ICE**

|              |   |
|--------------|---|
| 13:30        | <b>Registration, Tea and Coffee</b>   |
| 14:00        | <b>Welcome and Introduction</b><br>Dr Ian Tod (IWF Chair)   |
| 14:10        | <b>The water-energy-food nexus in a changing future – insights from integrated regional modelling</b><br>Prof Ian Holman, Head of the Centre for Water, Environment and Development and Professor of Integrated Land and Water Management, Cranfield University |
| 14:50        | <b>Cross-sector water resources planning in England: The Environment Agency’s National Framework for Water Resources and beyond</b><br>Richard Thompson, Deputy Director, Water Management and Investment, Environment Agency                                   |
| <b>15:30</b> | <b>Tea and coffee</b>   |
| 16:00        | <b>Water, environment, infrastructure and finance – how systems perspectives help</b><br>Dr Brendan Bromwich, Principal Civil Engineer, Mott MacDonald  |
| 16:40        | Concluding discussions  |
| 17:00        | Close of meeting  |

### **Abstracts**

#### **Prof Sylvester Mpandeli- The evolution of Water-Energy-Food Nexus research in South Africa: 10 years of research development and future vision**

South Africa, through the Water Research Commission (WRC), has spearheaded research on the water-energy-food (WEF) nexus to inform policy and decision-making related to (i) WEF securities, (ii) sustainable natural resources management, and (iii) socio-economic development. Climate change has increased water-related risks for South Africa as a water-scarce country. It is also driving land degradation. Concurrently, addressing the challenges of poverty, unemployment and inequality depends on realising WEF securities in a manner that is sustainable for both people and the planet. Within this context, the WEF nexus research, development and innovation have been conceptualised as a transformative approach to achieving socio-economic development. The talk will describe the process of developing the WEF Nexus approach among sector stakeholders and the research undertaken to develop conceptual and state-of-the-art position papers and analytical tools and metrics for assessing WEF nexus trade-offs and synergies. The vision is, through partnership, to support the transition of the WEF nexus from theory to practice through supporting capacity and curriculum development,



development of tools, and broadening the WEF nexus to include explicit linkages to environment and health.

**Biography.** Prof Sylvester Mpandeli (PhD) is an Executive Manager: Water Utilisation in Agriculture at the Water Research Commission (WRC), South Africa. He is an Adjunct Professor at the Faculty of Science, Engineering and Agriculture at the University of Venda. He was the Chairman: African Regional Working Group of the International Commission on Irrigation and Drainage (ICID) and also the Deputy Chairman: South African National Committee on Irrigation and Drainage (SANCID) from 2013 to 2017. He represents the South African Regional Irrigation Association (SARIA) at the International Executive Council of ICID. Prof Mpandeli was elected Vice President of the ICID in July 2022.

### **Prof Ian Holman - The water-energy-food nexus in a changing future – insights from integrated regional modelling**

Society's use of water, energy and land will continue to change into the future as a consequence of climate and socio-economic change. Such future changes can be described by the latest generation of socio-economic (so-called Shared Socioeconomic Pathways or SSPs) and climate (Representative Concentration Pathways or RCPs) scenarios. This presentation will explore the consequences of the RCPs / SSPs for land and water based on simulations using a European-scale integrated modelling platform (the Integrated Assessment Platform 2 or IAP2). The IAP2 consists of a suite of ten interlinked sectoral models representing agriculture, forestry, biodiversity, water resources, fluvial and coastal flooding and urban development within a web-based platform. The presentation will discuss the potential effectiveness of adaptation within the range of futures described by the SSP-RCPs and the inevitable limitations regarding irrigation and drainage within modelling.

**Biography.** Ian Holman is Professor of Integrated Land and Water Management and Head of the Centre for Water, Environment and Development at Cranfield University. His research over the past 25 years has taken an interdisciplinary perspective to sustainable land and water resource management, agricultural modelling, drought risk management and climate change impacts and adaptation in the UK, Europe and internationally. Reuters named him in their recent (2021) list of the world's top climate change scientists.

### **Richard Thompson – Cross-sector water resources planning in England: The Environment Agency's National Framework for Water Resources and beyond**

The Environment Agency has a duty to secure the proper use of England's water resources, alongside protecting and enhancing the natural environment. The challenges are clear; the climate emergency, population growth, and the need to transition to low carbon energy will all add pressure to existing demand for fresh water. Together with these future pressures, we need to tackle legacy unsustainable abstraction and enhance environmental value. Our aim is for a resilient environment that will support sustainable water supplies and ensure that the country has effective water security to help enable food and energy security.

This talk will outline the challenges from the perspective of England's environmental regulator, starting with existing sectoral demand for water, the current water availability status of catchments in England, and some insights from the 2022 drought. The presentation will then cover the new approaches to water resources planning in the 2020 National Framework for Water Resources and our expectations for the new regional water resources plans. Finally, the talk will look to the future and how the National



Framework will be refreshed to improve planning for resilient water supplies in agriculture, energy and industry alongside public water supply, and outline how water resources planning forms part of an integrated approach to managing the water system.

**Biography.** Richard Thompson is an environmental scientist with over 20 years' experience in the environmental sector. Currently Deputy Director for Water Management and Investment at the Environment Agency, he oversees a department leading the EA's management of water resources in England, including strategic water planning. Richard has previously led the Environment Agency's work on the Water Framework Directive and integrated water management. Richard is a Chartered Environmentalist and a member of the Chartered Institute of Water and Environment Management.

### **Dr Brendan Bromwich - Water, Environment, Infrastructure and Finance – how Systems Perspectives Help**

Across government the adoption of a systems perspective is advocated as a means of bridging siloes, achieving greater impact and driving efficiency. But what does it mean? And how is it applied? In collaboration with CECAN, Imperial College and North Star Transition, Mott MacDonald have taken a leading role in applying systems approaches to create joined up analysis of multi-sector systems – such as Water Resources South East's multi-sector resilience plan, integrated water management for the OxCam Arc and for the Greater London Authority, and to integrate food, health and environment planning in Wales. A new working paper from Imperial College, Mott MacDonald and the Environment Agency sets out a systems approach to regional water planning drawing on experience gained across these projects.

**Biography.** Dr Brendan Bromwich leads on Systems approaches for Mott MacDonald's Water Consultancy Division. He regularly collaborates with Defra, the Environment Agency, water companies and regional government to develop workable systems approaches to water, environment and infrastructure. Previously he worked for the UN Environment Programme on post-conflict reconstruction and peace-building relating to the environment. His publications include co-editing the Oxford Handbook of Food, Water and Society, co-authoring the Hydraulic Design of Side Weirs and numerous publications on environmental governance, conflict and peacebuilding.