



OPEN ACCESS

EDITED AND REVIEWED BY
Mariele Evers,
University of Bonn, Germany

*CORRESPONDENCE
Mohammad Al-Saidi
✉ malsaidi@qu.edu.qa

SPECIALTY SECTION
This article was submitted to
Water and Human Systems,
a section of the journal
Frontiers in Water

RECEIVED 16 December 2022
ACCEPTED 28 December 2022
PUBLISHED 09 January 2023

CITATION
Al-Saidi M, Daher B and Elagib NA
(2023) Editorial: (10 years)
Water-Energy-Food nexus: Towards
knowledge synthesis, action
prioritization and revitalization of
security debates.
Front. Water 4:1125534.
doi: 10.3389/frwa.2022.1125534

COPYRIGHT
© 2023 Al-Saidi, Daher and Elagib. This
is an open-access article distributed
under the terms of the [Creative
Commons Attribution License \(CC BY\)](#).
The use, distribution or reproduction
in other forums is permitted, provided
the original author(s) and the copyright
owner(s) are credited and that the
original publication in this journal is
cited, in accordance with accepted
academic practice. No use, distribution
or reproduction is permitted which
does not comply with these terms.

Editorial: (10 years) Water-Energy-Food nexus: Towards knowledge synthesis, action prioritization and revitalization of security debates

Mohammad Al-Saidi^{1*}, Bassel Daher^{2,3,4} and
Nadir Ahmed Elagib⁵

¹Center for Sustainable Development, College of Arts and Sciences, Qatar University, Doha, Qatar, ²Texas A&M Energy Institute, Texas A&M University, College Station, TX, United States, ³Department of Biological and Agricultural Engineering, Texas A&M University, College Station, TX, United States, ⁴Bush School of Government and Public Service, Institute for Science Technology and Public Policy, Texas A&M University, College Station, TX, United States, ⁵Faculty of Mathematics and Natural Sciences, Institute of Geography, University of Cologne, Cologne, Germany

KEYWORDS

Water-Energy-Food nexus, resource security, regional studies, environmental policy, sustainability agenda, sustainable development

Editorial on the Research Topic

(10 years) Water-Energy-Food nexus: Towards knowledge synthesis, action prioritization and revitalization of security debates

The Water-Energy-Food nexus (WEF nexus) has emerged as a colossal environmental debate on how to improve the sustainability and resilience of resource systems. This debate has been inclusive of different disciplines and methodological approaches that have improved our understanding of the tight interconnectedness between the resource systems, and have highlighted the need for great coordination across the respective sectors. Following a decade of growing global attention toward WEF nexus-related challenges and opportunities, particularly after the Bonn Conference and World Economic Forum in 2011, the resulting body of academic literature has coined an area of study that mainly relies on decision support tools, models, simulations, stakeholder engagement, and policy analyses for guiding integrative resource planning, governance and policy-making across the WEF sectors. However, 10 years is a short period in the lifespan of a useful paradigm for sustainability, resource security or integrated management-as the WEF nexus is often understood to be. One can expect the WEF nexus to continue motivating a fruitful knowledge production, resulting in innovative perspectives that will arguably have wider implications for our understanding of resource security as well as the global sustainability agenda.

This Special Topic invited scientists and experts to provide contributions that synthesize key lessons learned from the WEF nexus literature, expand current knowledge

through innovative, cross-cutting approaches, present salient cases or provide policy-relevant reviews. The resulting set of seven highly interesting articles can be introduced in the following three subsets: (1) reviews of the WEF nexus interim insights; (2) examples of emerging topics; (3) policy-relevant integrated frameworks.

First, the WEF nexus debate has been dynamic and it seems to have evolved pluralistically. [Lazaro et al.](#) analyzed the evolution of the WEF nexus topics, and found that the WEF nexus is integrating more topics, methods and disciplines. Interestingly, they showed different clusters of WEF nexus topics, and how they evolved in different times, e.g., how the urban nexus and climate change topic was influenced by the IPCC report. [Taguta et al.](#) provided a systematic review of the WEF nexus that shows a dynamic process of developing more dedicated WEF nexus tools. However, since many of these tools are unreachable, accessibility and availability are deemed important considerations. The authors also provided valuable recommendations for improving these tools, e.g., through improving geospatial capabilities. In the same line of synthesizing WEF nexus knowledge, [Dalla Fontana et al.](#) called for more holistic analyses through addressing essential questions in WEF nexus related research projects. Tackling questions, which are often addressed separately in current research endeavors, produce more actionable knowledge. They include common questions about the purpose of the research, nature of interactions or the involved stakeholders, and vital considerations regarding the spatial and temporal scales of interactions.

Second, this Research Topic included examples of emerging WEF nexus topics and critical appraisals of classical ones. [Endo et al.](#) showed how geothermal hot spring resources in Japan are incorporating multifaceted interactions between the generated heat or steam, nutrients, drainage, land and coastal ecosystems. Their application calls for developing more nexus-specific tools for specific local-level problems that are addressed by government policy-making. [Müller-Mahn et al.](#) revisited the issue of dams and analyzed the Blue Nile Basin in Ethiopia from a political ecology perspective. They criticized the conventional nexus thinking in terms of overemphasizing (water-centric) technical solutions, and called for broadening the analysis to incorporate social complexity of hydro-developmental policies. For the authors, incorporation of this complexity in WEF nexus analyses means investigating political and social consequences at the local level as well as contradictions between the interests of local communities and interests of stakeholders at other levels.

Third, this Research Topic included valuable contributions that reiterate the need for more integrated frameworks. [Akinsete et al.](#) presented a WEF nexus framework for integrating several models from the economic, social, environmental, and policy domains. This framework puts a large emphasis on the human element and the

socio-anthropological aspects of the nexus. [Alamanos et al.](#) proposed a framework that promotes systems thinking and systems innovation as viable approaches for modeling the WEF nexus. Their framework, which was applied to the Thessaly region in Central Greece, benefits from participatory co-development by involving relevant stakeholders.

The Research Topic aimed at showcasing the global dissemination of the WEF nexus debate after 10 years since the 2011 Bonn Conference. Through this collection and other paper collections produced in 2021 and 2022, it has become clear that the WEF nexus is resembling a “salad bowl” of different tools, topics, disciplines and perspectives. This reiterates one aspect of this WEF nexus as an open platform for debating pathways to better understand the increasingly interrelated resource systems and for achieving water, energy and food securities now and in the future. The contributions in this Research Topic have all acknowledged the positive contributions of the WEF nexus debate with regard to encouraging innovation of tools and the refinement of policies for achieving resource securities and the wider sustainable development agenda, including the climate change and Sustainable Development Goals (SDGs) agendas.

The WEF nexus debate is expected to be part of growing trends within the coming decades including migration, climate change, and urbanization, among others. Relevant topics that this Special Topic could not attract include WEF nexus security issues (e.g., risks, threats, disruptions, and resilience) or development issues, such as equity, access and vulnerabilities. Besides, the evolution and implementation of the WEF nexus approach in the developing and the least developed countries is a topic expected to grow in the future.

Finally, the editorial team of this Research Topic would like to thank all the contributing authors and reviewers for the collaborative work and the appreciated efforts in producing this timely collection. We hope that the published contributions will inspire future applications, and benefit an already rich WEF nexus debate.

Author contributions

All authors listed have made a substantial, direct, and intellectual contribution to the work and approved it for publication.

Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Publisher's note

All claims expressed in this article are solely those of the authors and do not necessarily represent those of their affiliated

organizations, or those of the publisher, the editors and the reviewers. Any product that may be evaluated in this article, or claim that may be made by its manufacturer, is not guaranteed or endorsed by the publisher.