

Incorporating *Ecosystems* in the Water-Energy-Food Nexus: Current Perspective and Future Directions

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Integrated approaches for managing natural resources are needed to meet the increasing demand for freshwater, energy and food, while, in parallel, mitigating and adapting to climate change, maintaining the integrity of ecosystems, and ensuring equitable access to resources. The Water-Energy-Food (WEF) Nexus has been proposed as a cross-sectoral approach to understand, analyse, and manage the complex trade-offs and exploit synergies that arise among these resource sectors. Although not initially included as a component of the Nexus, the importance of ecosystems in supporting water, energy and food security is increasingly recognised by the Nexus community of researchers and practitioners. However, attempts to conceptually integrate Ecosystems into the Nexus have yet to converge into a common framework. A group of natural resources management researchers, system thinkers and ecosystem services experts from the European network COST Action CA20138 NEXUSNET have compiled and investigated the various approaches for integrating ecosystems in the WEF Nexus. By combining literature analysis with interdisciplinary workshops – one of which was held in a hybrid format (in person and online) at the University of Oulu, Finland, in September 2022 – we reveal a multiplicity of concepts utilised to represent, partially or fully, ecosystems in the Nexus, namely “*natural environment*”, “*ecosystem services*” and “*biodiversity*”. Disparity was also found in the role attributed to ecosystems in the Nexus framework, being it an underlying layer from which resources for Nexus sectors are extracted or the pillar of an expanded Nexus system – *i.e.*, the WEF-Ecosystems Nexus. Through this collaborative effort, we present possible advantages and disadvantages of adopting differential WEF-Ecosystems Nexus approaches, highlighting their potential complementarity and integration to support future advancement of Nexus research. In the oral presentation, we will show our preliminary findings and encourage the exchange of ideas and feedback from the different scientific disciplines present at the CEMEPE Conference.

Keywords: COST Action; ecosystems; interdisciplinarity; WEF Nexus