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To whom it may concern,

The interdisciplinary nature of sustainable development is well evidenced through the 2030 agenda, its 17 Sustainable Development Goals (SDGs) and their related targets. The strong interconnection between SDGs and their underlining systems, calls for holistic Nexus approaches to assess the impact that an action taken towards an aspect of sustainable development (e.g. ease water scarcity) may have in its interconnected systems (e.g. energy and food systems). To contribute towards the implementation of Nexus approaches aligned with sustainable development, we developed a water-energy-food Nexus assessment to capture the potential of treating and reusing wastewater in agricultural irrigation. This approach sheds light on synergies and trade-offs for potentially affected SDG targets and natural resources. The methodology was applied to the North Western Sahara Aquifer System (NWSAS) in an attempt to explore potential solutions to ease water scarcity on the region, which has been highly affected by climate change and groundwater over-exploitation.

To the best of our knowledge, the implications of reusing treated wastewater for agricultural irrigation have never been explored from a Nexus perspective (i.e. accounting for effects on interconnected systems as energy, water resources and food production). In addition, the use of Geographic Information Systems (GIS) coupled with a proposed Levelized Cost of Water (LCOW) methodology, enables the evaluation of broad areas and provides flexibility on the selection of high to low resolution data depending on the level of detail needed. The methodology aims at providing a starting point for decision-makers, who will direct further analysis of specific wastewater treatment and reuse projects. This could lead to collaborative cross-sectoral action to strengthen synergies or mitigate trade-offs, moving beyond siloed thinking and taking holistic approaches in pursuit of the 2030 UN Agenda for Sustainable Development.

Moreover, the findings revealed for the NWSAS are aligned with the latest efforts undertaken in the region to achieve transboundary cooperation and achieve a sustainable management of the aquifer. Furthermore, this paper extends the findings made by Almulla et al. [1], previous efforts taken by the Sahara and Sahel Observatory (OSS) [2, 3] and current ongoing research in transboundary basins undertaken by the United Nations Economic Commission for Europe (UNECE).

Yours faithfully,

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## References

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