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Evaluating the Water Ecosystem Services Footprint to support agricultural water management in Central Italy: a watershed scale approach

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The application of Water-related Ecosystem Services (WES) concept in water resources planning can support the development of productive activities and, at the same time, sustain local ecosystems. Gaining insights into the ecohydrological behavior of a basin and the anthropogenic pressures on the available water resources requires the spatial explicit evaluation of WES for the identification of the strategies to explore the sustainable coupling of biosphere and anthroposphere. By integrating hydrological modelling and Water Footprint (WF) analysis, this study aims at evaluating a Water Ecosystem Services Footprint (WESF) associated with the agricultural sector analyzing both the supply and demand of WES.

Combining the evaluation of WES demand, determined by the agricultural sector using the WF assessment methodology and the quantification of WES supply by applying the Soil Water Assessment Tool (SWAT), the proposed methodology introduces green, blue, and gray WESF indicators to identify the main hotspots connected to the agricultural production. The methodology is applied to a specific case study in the upstream part of the Arno River basin (Central Italy).

WESF represents an operative tool to look at agricultural water management from an ecosystem-based perspective, introducing a useful approach that potentially can be extended to different sectors. The results allow the evaluation of WESF spatial pattern, identifying the most critical areas in the catchment and supporting a stronger integration of water management with ecosystems conservation.

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