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A multicriteria assessment method to compare scenarios of water management in agricultural landscapes

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Abstract: In the Aveyron watershed (South-Western France), where the agricultural economy mainly relies on irrigated productions (maize and fruits), engaging changes in quantitative water management is socially challenging. The watershed suffers from a structural misbalance between the water demand and the water offer, and recurring crises in the low-flow period lead to emergency restrictions of use. This situation tenses competing stakeholder positions and erodes the social-ecological system's resilience. Characterizing and valuing options for change can support decision-making. Nonetheless, the various expert assessments that flourished as answers to political incentives for a better management of watershed did not succeed in bringing out socially-accepted solutions. We hypothesize that expert judgments (alone) cannot frame problems that also arise from colliding values and interests. Hence we built a spatialized multi-actor multi-criteria assessment method in order to map out matches and mismatches between the people involved and between the stakes relevant to them. This method proceeds through various steps: 1) Problem structuring: relevant stakeholders are identified; criteria and scenarios are defined following a bottom-up approach; 2) Definition and evaluation of a set of indicators for each scenario, using mainly model simulations of water management; 3) Mapping out stakeholder judgments; 4) Collective deliberation over the socially-relevant option(s) for change. A specificity of the method lies in the way stakeholder judgments are elicited and represented (step 3). Indicators constitute arguments that stakeholders can combine to express their judgments. Stakeholders map out where one scenario is acceptable to them and where it is not (spatialized judgments). In addition, they can define places of special importance for each criterion (spatialized weights). Integrating those maps would help change the focus from "which scenario is the best" to "where does a scenario bring out conflicts and where is it consensual option". We expect such a transformation to favour social learning and the design of new technical and organizational solutions for watershed management.

Keywords: Quantitative water management; Irrigated agriculture; Spatial multi-criteria assessment; Collective deliberation