

A participatory mental modelling approach to enhance policy coherence within the Water-Energy-Land nexus

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1. BACKGROUND

The strong interlinkages and interdependences of the resources water, energy and land (WEL nexus) are particularly relevant in semi-arid and arid regions, where competing demands for water, renewable energy, and land exist. Socio-economic and environmental developments, such as climate change may reinforce or alleviate tensions between competing demands. Thus, a cross-sectoral and multi-level perspective is required to reduce trade-offs and harness synergies between ecological and economic objectives, and to strengthen policy coherence. Recent meta-analyses have identified a knowledge gap in stakeholders' perspectives on the WEL nexus and have suggested to complement existing studies with a qualitative social sciences approach.

2. AIMS

We aim to explore how stakeholders from the WEL sectors perceive interlinkages and interdependencies within the WEL nexus of the case study region Seewinkel in Austria, and which measures they perceive relevant to respond to socio-economic and environmental challenges. Moreover, we aim to reveal and analyze trade-offs and synergies of relevant measures including agricultural and water policies.

THE SEEWINKEL REGION

The Seewinkel region is a semi-arid agricultural production region of about 45,000 ha in East Austria, where multiple conflicting demands for land and water use exist, e.g. settlements, agricultural production, renewable energy production, agricultural irrigation, and nature conservation particularly in the regional national park "Nationalpark Neusiedler See-Seewinkel".

3. METHOD

We apply a multi-step mental modelling approach. In regular interactions with relevant stakeholders, we survey their perceptions of the regional WEL nexus including major interlinkages and interdependencies as well as their appraisal of existing and pending measures and policies to reduce conflicts in land and water use. These perceptions are analyzed by means of a qualitative context analysis, which allows to complement perceptions with context material such as regional reports and policy documents. System components of the regional WEL nexus and its interlinkages are illustrated in a comprehensive cross-sectoral mental map. Additionally, potential trade-offs and synergies of relevant measures and policies are analyzed and illustrated.

4. PRELIMINARY RESULTS

Stakeholders of the regional WEL sectors share the common objective of preserving a high standard of regional groundwater quantity and quality. To achieve this objective, they suggest different measures and policies, such as external supply of irrigation water or the cultivation of thermophilic plants. Nevertheless, each sector prioritizes its own interests, which highlights the importance of a nexus-perspective to reduce trade-offs and harness synergies of measures and policies. The application of a participatory mental modelling approach allows to (i) gain a cross-sectoral perspective on the WEL nexus, and (ii) to foster a sustainable use of limited resources by enhancing policy coherence across sectors and scales.

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