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Daimler und Benz Stiftung

Anticipating synergetic water uses in future irrigation - what challenges do we face in South-Western Germany?

Janina Moschner – 26th Sep 2024

CSU Water Symposium

Panel 2: Ag / Urban Water Reconsiliation

University of Stuttgart

JÜLICH Forschungszentrum

TECHNISCHE UNIVERSITÄT BERGAKADEMIE FREIBERG
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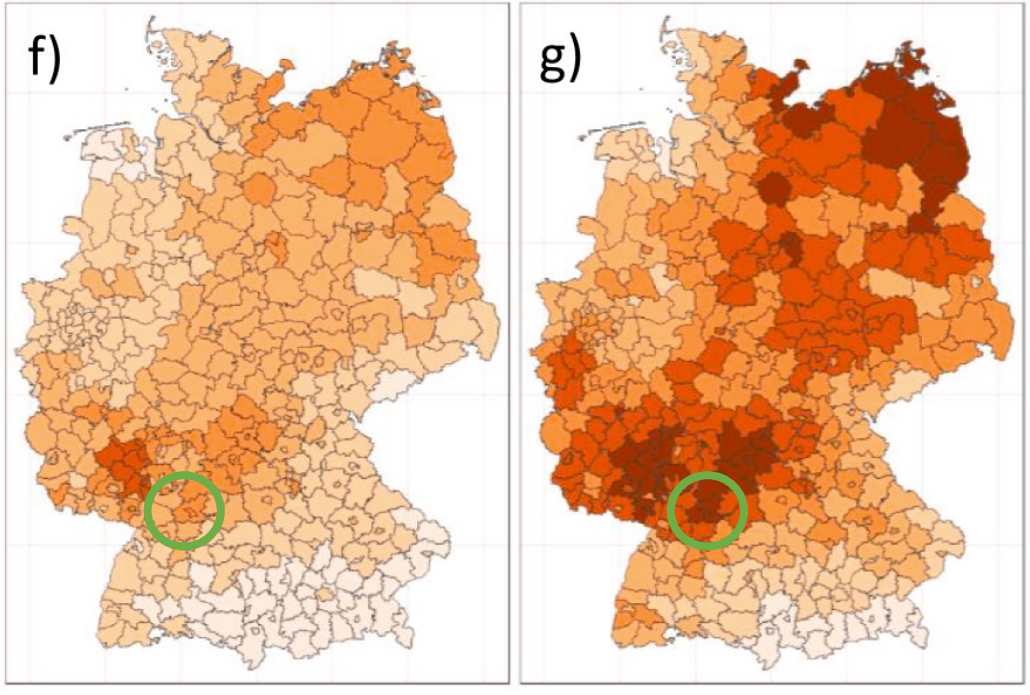
Overview

1. **Conditions for future water conflicts in Germany**

2. **Policy-Mix-Scenario building with Cross-Impact Balances (CIB)**
   1. Challenges in South-Western German future irrigation
   2. Potential synergetic policy-mixes (preliminary selection)

3. **Outlook**

1. Conditions for future irrigation water policies in Germany



Theoretical irrigation requirements (mm/year) for near-normal and dry years, drawn from McNamara et al. 2024

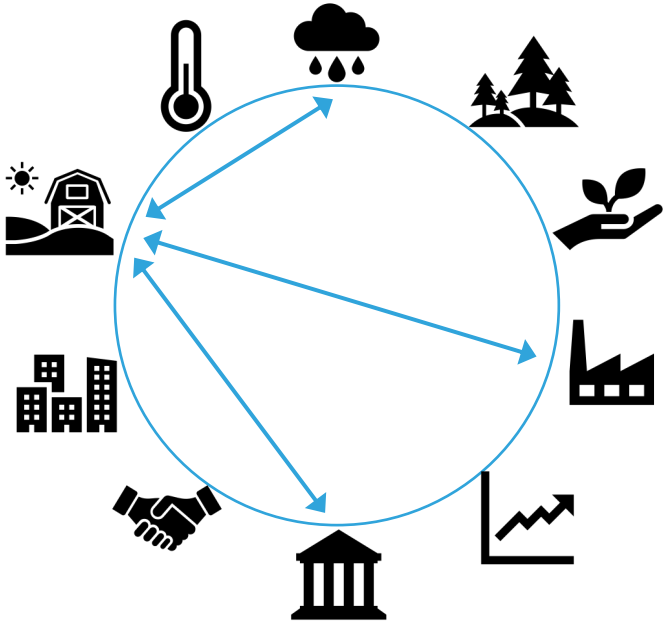
- **Risk factors:**
- Climate change
- Increasing demand
- Decreasing qualities
- Unsustainable use
- Poor resource management

Low water retention capacity of the soil

- …

1. Conditions for future irrigation water policies in Germany

- **Identifying scenario spaces with cross-impact balances (CIB) considering the 10 context factors with various alternative developments** (Kosow et al. forthcoming)
  - *How do they influence future water conflicts?*
  - *How do they interrelate?*



- **Selecting three diverse locally distinct scenarios**
  - Environment and society in crisis
  - Growth through adaption to climate change
  - Sustainable transformation

- **Method by Weimer-Jehle 2006, more on: https://www.cross-impact.org**

2. Policy-Mix-Scenario building with CIB

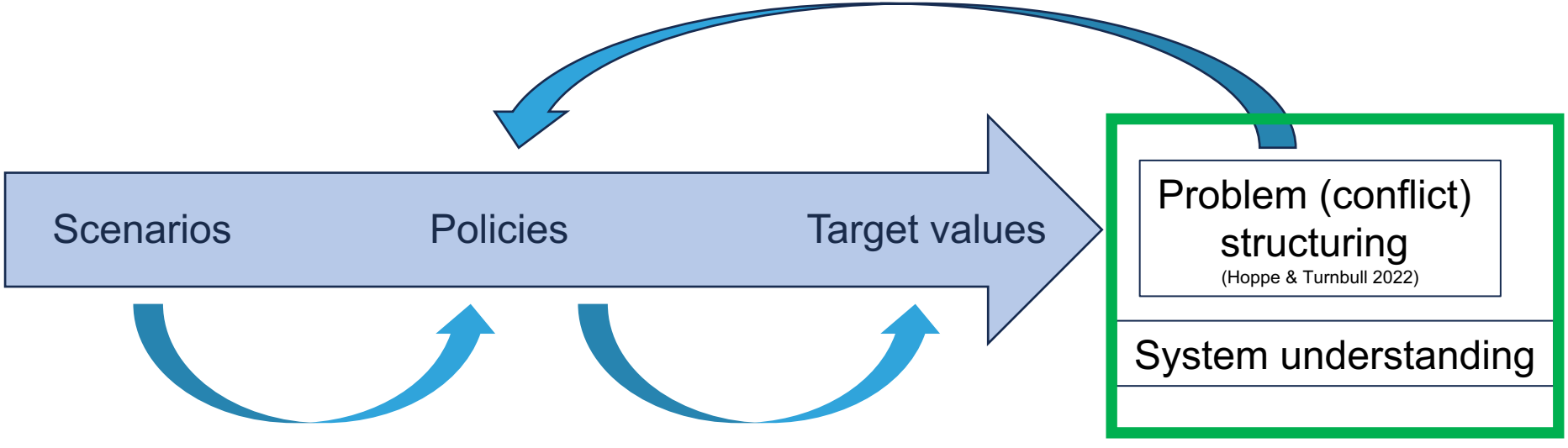


Figure 1: Effective direction in CIB policy-mix scenario model. Elements and influence diagram. Effects on problem structuring and system understanding by re-iterating process.

2.1 Challenges in South-Western German future irrigation

- Insufficient and unreliable data availability
- High system complexity and future uncertainty
  - Contrasted by siloed policies

- Different degrees of agency among actors
- Need for cooperation in the most effective measures

- Authorities not responsive but at the center of most policies
- Shifting responsibility and governance positions

2.2 Potential synergetic policy-mixes (preliminary selection)

- **Locally anchored policies are conditions for effective synergies, i.e.**
  - cross-sectoral water re-use, i.e. industry & agriculture / urban greens
  - restoring ecosystem services, i.e. agriculture & environmental organisations
  - rainwater harvesting / infiltration, i.e. agriculture / urban greens & authorities
  - a balance between using schemes and societal prioritisation, incl. control, i.e. authorities and politics (cross-sectoral and multi-level)

3. Outlook

- **Future water conflicts are complex, uncertain, and potentially conflictive**
- **Need for sustainable practices in all sectors**
- **Strong need to clarify responsibility and governance tasks**
- **Openness to diverse future developments for robust and synergetic policy-mixes**
  - Participatory modelling
  - Nodal point identification
  - Serious gaming

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Contact:
Janina Moschner janina.moschner@zirius.uni-stuttgart.de

Project website:
https://www.zuwako.de/

Method website:
www.cross-impact.de

Thanks for your interest!

Universität Stuttgart

zirius
Zentrum für Interdisziplinäre Risiko- und Innovationsforschung

Sources

- *Brauner, S., Moschner, J., Brumme, A. & Hölzlberger, F. (submitted). More than chair circles? - Serious games related to water governance and their potential effects on policy design.*
- *Head, B. W. (2022). The Rise of 'Wicked Problems'—Uncertainty, Complexity and Divergence. In: Wicked Problems in Public Policy: Understanding and Responding to Complex Challenges (pp. 21-36). Cham: Springer International Publishing.*
- *Hoppe, R. & Turnbull, N. (2022). The politicality of problem structuring. Conference Paper IWPP3: Politics Behind Problem Structuring.*
- *Kosow, H., Weimer-Jehle, W., León, C. & Minn, F. (2022). Designing synerge3c and sustainable policy mixes – a methodology to address conflictive environmental issues. Environmental Science and Policy, 130, 36-46*
- *Kosow, H., Brauner, S., Brumme, A., Hauser, W., Hölzlberger, F., Moschner, J., Rübbelke, D., Vögele, S. & Weimer-Jehle, W. (submitted). Uncharted water conflicts ahead: mapping the scenario space for Germany in the year 2050.*
- *McNamara, I., Flörke, M., Uschan, T., Baez-Villanueva, O. & Herrmann, F. (2024). Estimates of irrigation requirements throughout Germany under varying climatic conditions. Agricultural Water Management 291*
- *Sigel, K., Klauer, B. & Pahl-Wostl, C. (2010). Conceptualising uncertainty in environmental decision-making: The example of the EU water framework direc3ve. Ecological Economics, 69, 502-510*
- *Russo, T., Alfredo, K. & Fisher, J. (2014). Sustainable water management in urban, agricultural, and natural systems. Water, 6, 3934-3956*
- *Weimer-Jehle W. (2006). Cross-Impact Balances: A System-Theore3cal Approach to Cross-Impact Analysis. Technological Forecasting and Social Change, 73:4, 334-361*