

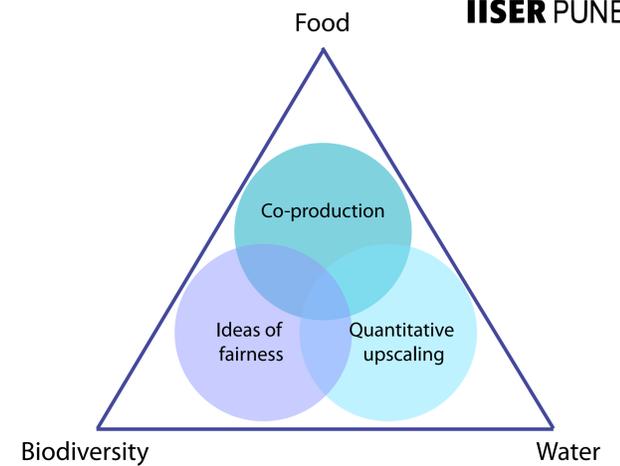
Transdisciplinarity in practice: the food-water-biodiversity nexus and its fairness in the Upper Bhima Basin

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Motivation

In fairSTREAM, we propose a transdisciplinary research approach using a combination of qualitative and quantitative systems tools to explore challenges related to food, water and biodiversity (FWB), their cross-sectoral interlinkages and emerging aspects related to fairness in the Upper Bhima Basin (India). We do so by co-producing qualitative storylines with local stakeholders (e.g., farmers, NGOs, water managers, politicians) to address issues at and future developments of the FWB-nexus.



Study Site

The upper Bhima Basin is a dynamic landscape that supports a flourishing industrial sector, a large agricultural area and rich biodiversity. The Basin's water is subject to various growing sectoral demands, including for drinking water and irrigation (Pavelic et al., 2012). Forest and non-timber products are essential for the livelihoods of tribal communities living near forested areas of the catchment. These are extracted for various purposes, including for medicinal plants, food and fuelwood.



Approach

FairSTREAM will combine qualitative and quantitative methods to elicit stakeholder views and co-produce knowledge. We are 1) co-producing knowledge with stakeholders to articulate divergent views on challenges and opportunities at the FWB nexus (Work Packages 1, 2, 3 and 5) and 2) analysing how the effects of decisions propagate through the system both qualitatively (by understanding the relation between stakeholders and their environment) and quantitatively (through an ABM that directly represents stakeholders coupled to a hydrological and biodiversity model) (Work Packages 3, 4 and 5).

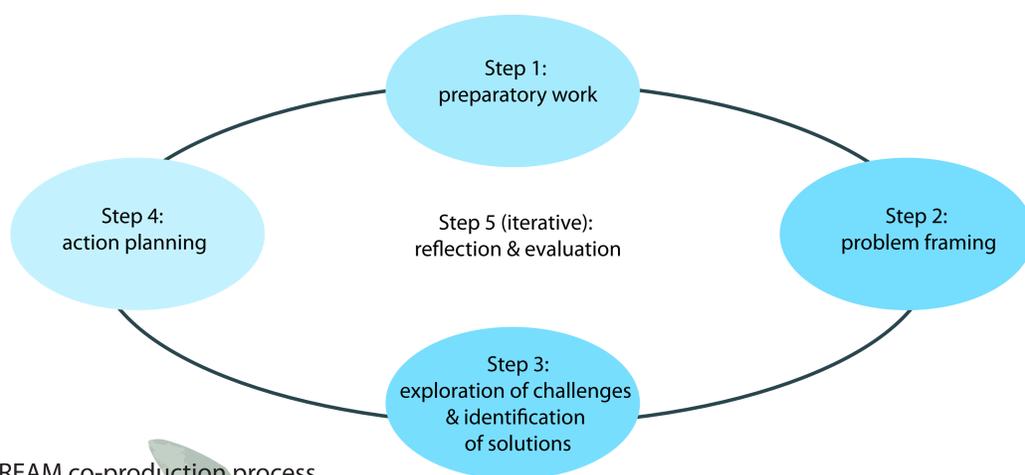


Figure 2: fairSTREAM co-production process

Expected results

- * Evaluate retrospective stakeholder engagement cases and expand these to account for procedural and outcome fairness in policy scenarios and deliberations
- * Design and test a systems-informed stakeholder knowledge co-production process in the Bhima basin with the purpose of developing fair and sustainable policy options for the FWB nexus

- * Translate and quantify co-produced narratives to build large-scale quantitative simulations based on an ABM, to in turn inform co-production processes
- * Develop narratives including a collection of measures (e.g., policies, infrastructural measures) which promote sustainable and fair development of the Bhima Basin

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References and picture credits

1. de Bruijn, J.A., Smilovic, M., Burek, P., Guillaumot, L., Wada, Y., and Aerts, J.C.J.H.: GEB v0.1: A large-scale agent-based socio-hydrological model – simulating 10 million individual farming households in a fully distributed hydrological model, EGUSphere [preprint], <https://doi.org/10.5194/egusphere-2022-664>, 2022 ; 2. Johannesson, P., Zhemchugova, H., & Hanger-Kopp, S. (2022). An Ontological Analysis of Justice. Proceedings of the 16th International Workshop on Value Modelling and Business Ontologies (VMBO 2022), June 06–10, Leuven, Belgium ; 3. Pavelic, P., Patankar, U., Acharya, S., Jella, et al. (2012). Role of groundwater in buffering irrigation production against climate variability at the basin scale in South-West India. Agricultural Water Management. 103. 78-87. 10.1016/j.agwat.2011.10.019.

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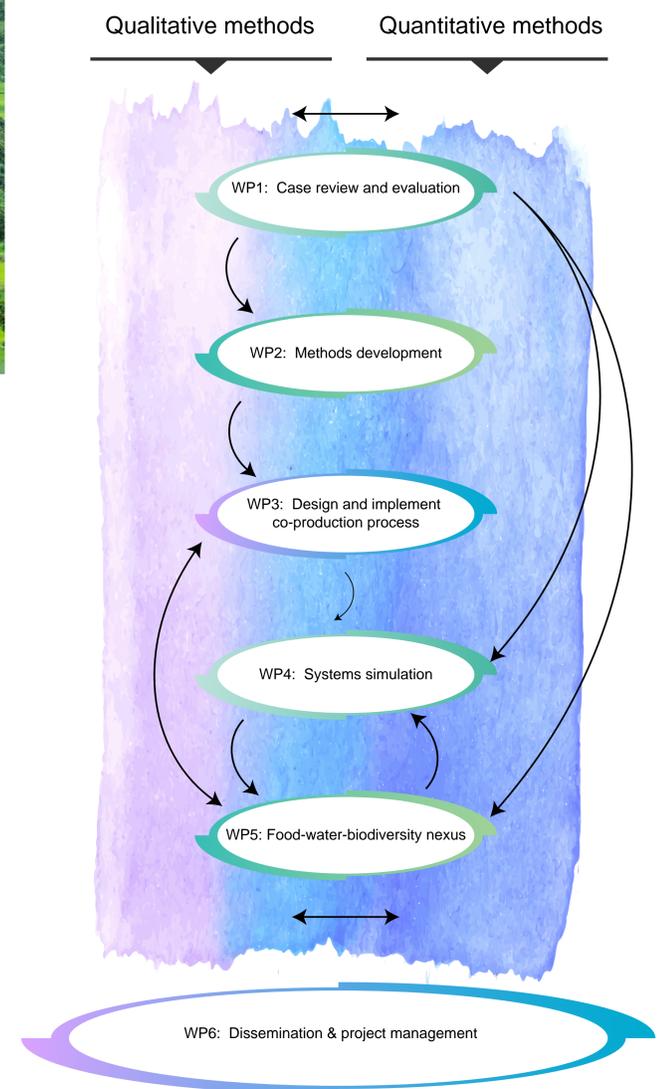


Figure 1: fairSTREAM Work Package structure