Science for Solutions decade: HELPING
Hydrology Engaging Local People IN one Global world
IAHS Scientific Decade 2023-2032
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Details of the Working Group – Effective Aquifer Governance for Agriculture

Describe the work and how your suggested working group will contribute to the goal(s): The suggested working group, "Effective Aquifer Governance for Agriculture," aims to contribute to the goals of the theme, which include understanding local hydrological processes, understanding differences and similarities between regions, and promoting recognition when implementing general policy at the local level. By focusing on these goals, the working group seeks to advance empirically informed theory on how local social and environmental processes determines the effectiveness, resilience, and adaptability of groundwater self-governance policies, particularly in the face of social or environmental disturbances. Through the examination of local design and stakeholder-driven groundwater governance policies of diverse regions, the working group will explore how these dynamic systems respond and adapt to exogenous shocks such as climate change and market fluctuations. Ultimately, the working group's efforts will contribute to the development of new knowledge by comparing diverse regions and self-governance policies that addresses how heterogeneities in aquifer properties faced by individual actors and policies collectively shape the system-level outcomes of integrated socio-environmental systems.

Describe the methods you will use to achieve the goal(s): To achieve our goals, the working group will employ diverse social and environmental data that will inform the development of an integrated modelling framework that combines process-based crop growth and groundwater models with an agent-based irrigator decision-making model. This approach will enable a comprehensive evaluation of groundwater conservation groups formed by irrigators within diverse regions. The integration of these models will lead to the creation of a flexible, open-source Crop-Hydrological-Agent Modelling Platform (CHAMP), which will enhance understanding of aquifer governance and its impact on socio-environmental systems.

Describe the (a) short-term, (b) the long-term and (c) the ultimate results you hope to achieve:
a) We aim to comprehensively evaluate groundwater conservation groups formed by irrigators across the US. This evaluation will provide insights into the effectiveness of current groundwater self-governance regimes and their response to social or environmental disturbances.

b) Our goal is to integrate the social and environmental model components into CHAMP. This platform will serve as a valuable tool for understanding the complex interactions between hydrological processes, regional differences, and stakeholder-driven policies.

c) Through our research and modelling efforts, we hope to contribute to the development of new knowledge regarding the role of aquifer heterogeneities and individual actors' actions in shaping system-level outcomes in integrated socio-environmental systems. This knowledge will aid in the development of effective aquifer governance strategies worldwide, ultimately leading to more sustainable and resilient agricultural practices.

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