



Tropentag, September 10-12, 2025, hybrid conference

“Reconcile land system changes
with planetary health”

Social and institutional factors shaping farmers’ adaptation to groundwater depletion in Madhya Pradesh, India

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Abstract

Indian agriculture depends heavily on groundwater for irrigation, resulting in overextraction and declining water tables. Community-led, decentralised groundwater management offers a promising solution, though its effectiveness varies regionally. Locally adapted strategies based on contextual research are essential. This thesis contributes to this effort by exploring the social and institutional factors influencing irrigation and water use, focusing on how different social groups’ capacities and vulnerabilities differ in adapting to groundwater depletion and contributing to irrigation water conservation. It identifies key action arenas and patterns of interaction related to water management and proposes measures that promote both water conservation and equity. Conducted in the Nimar Valley, Madhya Pradesh, the thesis used a qualitative approach, combining Ostrom’s Institutional Analysis and Development (IAD) framework with a Capabilities and Vulnerabilities Approach (CVA). Data were collected through 12 structured farmer interviews, five focus group discussions, and six expert interviews. Four social groups were analyzed: two tribal groups (rainfed and irrigating) and two non-tribal groups differentiated by landholding size. Findings revealed notable differences between tribal and non-tribal groups, particularly in material and motivational vulnerabilities, while capabilities were more similar. Rainfed farmers were especially disadvantaged, with limited access to water, electricity, support, and decision-making, despite higher farm diversification. Although farmers were generally motivated to conserve water, efforts were hindered by low awareness of groundwater depletion and limited knowledge of conservation practices. Removing barriers to welfare schemes and improving training could better equip disadvantaged farmers to support sustainable resource use. Participatory water management structures existed but were often weakened by dynamics such as social exclusion or corruption. Water User Associations (WUAs), largely inactive in the area, should be revitalized, with decision-making strengthened through anti-oppressive practices and improved community inclusion. Raising awareness of groundwater depletion and enhancing extension services could further support conservation adoption. Water policies should be holistic by supporting diverse practices, addressing income inequality, avoiding rebound effects, and linking local efforts to watershed-level management. Future research should explore gender dynamics and the role of non-organic farmers. Overall, this thesis highlights the importance of equity, participation, and context-specific approaches in sustainable irrigation water management.

Keywords: Capacity and vulnerability, groundwater depletion, institutional analysis and development, participatory water management, social equity

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