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Impact and drivers of informal water markets in irrigation regions in India

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Significant water supply-demand gaps are projected in many regions of India under current scenarios. The government is considering and implementing different measures to support a sustainable water resources management in irrigated agriculture, e.g. incentives to reduce water abstractions, decreasing energy subsidies, metering, effective water pricing or community-based water management. Also, informal water markets are widespread in India; however, their impacts are largely unknown and under-researched due to a paucity in related data. We analyse the development and determinants of farmers' water purchasing behaviour and related expenditure using a large representative household survey for India over two years. In addition, we merged district level average statistics for precipitation, temperature and groundwater storage with the survey data. Modelling results show that, after accounting for several control variables, irrigation water purchases were more likely where groundwater levels were already low, farmers have a diversified access to water sources but no access to public piped drinking water supply. Particularly in groundwater irrigation areas, purchases were also more likely where: a) conflicts are prevalent within the village; b) families solve (water supply) conflicts individually; c) farmers are not members in a cooperative; and d) farmers have low confidence in State or village governments. Increased expenditure (INR/acre) for irrigation water was associated when purchasing mainly from private as compared to government tubewell owners. There is a need for future research to examine this dataset at local spatial scales and per different irrigation types. This is reflected in the different results for the state-specific models. Overall, results highlight the severity of the state of India's groundwater resources, local community cohesion issues and the need for better regulation and monitoring in water management, e.g. with regards to informal water markets and agricultural subsidies, to better serve local farming communities and the environment. At the same time, different water-related policies need to take into account the effects of multiple implemented measures as well as the existence of informal water markets.