



## **Targeting groundwater conservation efforts to support agricultural drought resilience**

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Depletion of groundwater is a critical policy issue in many irrigated agricultural systems worldwide. An important question for water managers is where and when management efforts should be targeted to maximize benefits from conservation. In this study, we evaluate how the value and effectiveness of groundwater conservation measures is affected by the timing of regulatory intervention along an aquifer's depletion pathway. We develop a new integrated modelling framework, which captures realistically the effects of both pumping costs and well yields on production risk and farmers' irrigation decision-making. Through an application to the High Plains Aquifer in the United States, we demonstrate that there is a range of aquifer conditions within which regulating groundwater use will deliver long-term economic benefits for farmers by slowing reductions in well yield and extending the usable lifetime of the aquifer for irrigated production. These findings provide new insights about the economic value of groundwater resource, and, significantly, can be used to help policymakers target conservation efforts to maximize the capacity of limited groundwater resources to buffer production against risks from drought and climate change.