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A Web-Based Framework to Support Regional Groundwater Sustainability

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Abstract: Water managers face the daunting task of managing freshwater resources in the face of industrialization and population growth. As surface water resources become fully allocated, increased groundwater use can fill the void, particularly during periods of drought. Improper groundwater management can result in reduced water quality, land subsidence, increased pumping costs, and in some cases, the complete exhaustion of an aquifer and the loss of groundwater as a buffer during times of drought. Assessing the long-term impact of various groundwater management decisions can be difficult and costly, and therefore many decisions are made without sufficient analysis. Sustainable groundwater management that balances short- and long-term needs requires access to groundwater data and simulation tools to assess potential water use scenarios and their associated impact. Advancements in the acquisition and dissemination of Earth observations, coupled with advances in cloud computing, web apps, online mapping, and visualization provide a unique opportunity to deliver tools and actionable information to groundwater managers to assist them in addressing global and regional challenges and opportunities. We review the challenges facing water managers and the complexities of assessing sustainability and balancing competing interests and water rights conflicts. We describe a multi-faceted solution featuring a suite of modeling systems including conventional groundwater models and a new set of web-based groundwater modeling tools. This collection of tools allows proper science to be used for groundwater management decisions without putting undue cost and time burdens on water managers and decision makers.

Keywords: *Groundwater; Sustainability; Decision Support; Web Apps*