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Water trading to maximize food security production levels case study: The lower Tigris-Euphrates

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In arid regions where irrigation is important, food security through domestic grain production is tied to the supply and efficient use of water. Ongoing climate change and variability continues to compel the search for science-informed water management policies to protect food security. Much research has examined climate-related impacts on food security, but little has systematically examined flexible water right systems for protecting food security. This research addresses that gap by examining the performance of alternative water right systems that could protect food security while adapting to ongoing water supply fluctuations. It is based on a case study of water supply shortages in Iraq, where food grain shortages have been experienced periodically over a long history as a consequence of those shortages. It examines alternative water allocation rules for adapting to drought while protecting food grain security in the lower Tigris-Euphrates Basin, Iraq. The most widespread method for sharing water shortages when they occur in Iraq is an upstream priority water allocation system. An alternative method for adapting to reduced supplies is the market system for trading water. This alternative water shortage sharing system is reviewed for its performance for sustaining domestic food grain security. It does so by formulating a national scale farm income maximization framework to assess the performance of three water shortage sharing methods under each of two potential food subsidy programs based on how each contributes to protecting national food security. Surprisingly, the unrestricted water trading outperforms an upstream priority system, the customary way of sharing water shortages in Iraq. Results point to the importance of carefully designed rules for allocating water shortages to ensure food grain security in the world's irrigated regions where drought and climate warming pose growing challenges.

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