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Optimal demand reponse to water pricing policies under limited water supply in irrigation: a case study

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Due to climate change, extreme weather conditions such as droughts may have an increasing impact on irrigated agriculture. To cope with the higher demand of water, a new decision support framework is developed which focuses on an integrated management of both irrigation water supply and demand. For modeling the regional water demand, local stochastic water demand functions are used which are derived from optimized agronomic response on farms scale. These functions take into account different soil types, crops, stochastically generated climate scenarios considering different economic conditions, e.g., variable and fixed costs. This generic approach enables the consideration of both multiple crops at farm scale as well as of the aggregated response to water pricing at a regional scale for full and deficit irrigation systems. Within the SAPHIR (SAxonian Platform for High Performance IRrigation) project a prototype of a decision support system is developed and applied for a case study in Saxony which helps to evaluate combined water supply and demand management policies on a regional level.