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Research in South Africa

**Addressing sectoral water values in an integrated hydro-economic water modeling framework: Olifants river basin**

Water scarcity is a major constraint to socio-economic development in South Africa. The Olifants basin, which is one of the 19 WMAs faces a serious water scarcity, with water deficits occurring in most years. The scarcity of water has led to intense competition for the resource among uses and between upstream and downstream uses and has had an impact on household food production and food security of the poor rural households who rely on agriculture for their livelihood. Against this background, economic and water demand management strategies that create incentives for improving water use efficiency after satisfaction of the basic human needs and ecological requirements have been identified as possible solutions to increasing water scarcity in South Africa. These include water valuation for efficient water use and water pricing that reflects scarcity and quality of the resource. Assessment of some demand management approaches that can alleviate water scarcity such as virtual water trade and inter-basin water transfers have also become essential, as is water quality in that context. Wastewater reuse has the potential to alleviate freshwater scarcity and can improve water use efficiency and food security. Though there are a number of water valuation studies done in South Africa, they do not take into account water quality. In addition, there is need to adopt a more holistic approach which considers the potential for virtual water trade and wastewater reuse and assess implications on the economy and on different water users and water quality. Accordingly, this study attempts to address this knowledge gap by assessing the value of water for different uses and their impacts on water quality with the aim of improving food production. The study will evaluate the potential for addressing water scarcity through virtual water trade and wastewater treatment and re-use in the Olifants basin and give recommendation on how to improve crop production and food security without exacerbating water scarcity for other competing water needs.