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Hydrology and Earth System Sciences
Discussions

Interactive comment on "Socio-hydrologic modeling to understand and mediate the competition for water between agriculture development and environmental health: Murrumbidgee River Basin, Australia" *by* T. H. M. van Emmerik et al.

Anonymous Referee #1

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Socio-hydrologic Modeling to Understand and Mediate the Competition for Water between Agriculture Development and Environmental Health: Murrumbidgee River Basin, Australia By T.H.M. van Emmerik et al.

In the paper, the authors proposed a framework to model the human-river system by coupling five subsystem: hydrology, population, ecology, irrigation and environmental awareness, and used the Murrumbidgee River system downstream of Wagga Wagga

as a case study. It's a interesting and ambitious paper. However, the method, data used, results and conclusions presented in the paper are not publishable materials.

Modeling approach The five state variables representing the sub-systems are related. However, they are acting in different spatial and temporal scales, for example, the environmental awareness is very broad, and is effected by national and international environmental campaigns, and can't be modelled as the degree of wetland stress. Population dynamics are mainly affected by the State and Commonwealth policy, and is not the results of available resources (water and land). In addition, the human settlement change within the system (as described as moving downstream/upstream) contributes very little to population dynamics. These variables, in particular, technology, can't modeled as internal within the same system. On contrast, many of the endogenous variables such as technology should be external drivers. One of the two drivers, discharge at Wagga, is not an appropriate forcing. Discharge at wagga was determined by the Water Share Rules endorsed by the Water Minister - a decision based on water requirements from agriculture, domestic water supply and environmental needs. It should be an internal variables, at least in normal years (i.e. during flood, it's a product of rainfall-runoff).

On what assumption did the authors select the initial conditions for the five state variables?

How did the authors select the thresholds?

What are the calibration procedures - the degree of freedom is obviously large?

Data Where are the data (fig 6) come from? Is it true that over 50% of water allocated for rice production? Does the population - irrigation area relationship show pendulum swing?

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 11, 3387, 2014.