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Hydrology and Earth System Sciences
Discussions

Interactive comment on "WHAT-IF: an open-source decision support tool for water infrastructure investment planning within the Water-Energy-Food-Climate Nexus" *by* R. Payet-Burin et al.

Anonymous Referee #2

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In this article, an integrated water resource system model is developed to represent Water-Energy-Food-Climate Nexus. The paper is well written. I recommend publication of this paper with moderate revisions. My comments are as below: 1) It is not clear if this is an integrated water resource system model or a decision-support-tool. For instance, as the authors also mentioned decision-support-tools should provide a discussion platform to be used by different stakeholders. It is not clear how the developed model in this manuscript can achieve this goal. How user-friendly is this tool? Does it have a Graphical User Interface? 2) The literature on decision-support-tools should

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be enriched. For example, see McIntosh, B. S., Ascough II, J. C., Twery, M., Chew, J., Elmahdi, A., Haase, D., ... & Chen, S. (2011). Environmental decision support systems (EDSS) development–challenges and best practices. Environmental Modelling & Software, 26(12), 1389-1402. 3) The novel contribution of this paper is not clear. 4) The authors discuss that the model captures Water-Energy-Food-Climate Nexus (shown in Figure 1). However, it is not clear how the developed model captures dynamic relationships among these elements. I suggest authors show graphically feedback loops within individual and among system elements. This can help understanding the model structure. 5) The nice part of this work is that the model is open source. However, the information on this feature needs more elaboration. How can users apply this model? What are the steps? What is the list of inputs to the model? 6) The model addresses the questions of "what-if" and "what is the best?" as it is an optimization model. Then why only "what-if" is used in the title? 7) The agricultural model needs more explanation and just referring to FAO methods is not enough. Is there any soil-moisture model? 8) The paper is really long and should be shortened.

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