

Interactive comment on “Modeling global water use for the 21st century: Water Futures and Solutions (WFaS) initiative and its approaches” by Y. Wada et al.

Anonymous Referee #1

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Article aims to estimate the future sectoral water use over various scenarios. It provides the first multi-model analysis of global water use for the 21st century. I found the article well written and I recommend of publication after the following comments and remarks are addressed.

1. While this is the first multi-model analysis of future water use, there are some multi-model assessments dealing with future water availability and water stress. It might be good to give a reader brief overview of these existing multi-model achievements in the introduction. And clearly state how this article uses the experiences from those, and how it extends those. Particularly the Schewe et al (2014) who assess the future water stress with model ensemble, and thus including future water use of multiple models

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2. Existing studies vs this study

a) Authors provide good overview of the available studies estimating irrigation water demand (Table 1). It would be very good if you could include the set up of this study to that table

b) Table 2 provides information for domestic withdrawals; please highlight the models used in this study

c) Would it be possible to provide similar table for industrial water use sector too (existing vs this study)?

3. Consistency with terminology:

a) under Section 2.1.2 you first state that WRCI is total crop water requirement, and then when you list the variables in more details, you use terminology Irrigation cropping intensity. Please be consistent throughout the article with this term and all others too. Moreover, maybe you could consider introducing the variables in order you list them under the Eq 1.

b) In Section 2.2 you divide Industrial water use for electricity and manufacture. In results you use only term industrial water use. This is fine and consistent, but consider in reminding the reader at the beginning of Section 4.1 that Industrial water use includes both energy and manufacture, as it is not obvious from the name.

4. Irrigation:

a) I was a bit disappointed that authors were not able to provide future scenarios for irrigation water withdrawals. As it is by far the largest water consumer, it might be good to include to the discussion what is needed in future research that these scenarios could be produced

b) there are some interesting new articles published in irrigation field, and you might want to consider of including these to your article: Jägermeyer et al (2015;

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10.5194/hess-19-3073-2015) assess the impact of enhanced irrigation efficiency on water use; Siebert et al (2015; 10.5194/hess-19-1521-2015) provide most up-to-date dataset for global AEI.

5. Energy; do the models include hydropower energy production under the energy water withdrawals? If not, this might be good to mention and justify why not, as evaporation from reservoirs is notable in many large reservoirs.

6. HE scenarios:

a) Would be good if you could add global population for each HE scenario to Table A1

b) How do the HE scenarios include the increase in food demand in the future and related factors (diet change, food waste, etc)?

7. Discussion: consider of including couple of sub-sections, those might help to structure that a bit

8. HE classification: could you briefly summarise in the article how the 'economic coping capacity' and 'hydrological complexity' are calculated for Fig A1?

9. Figures: there is different logic between the global and regional figures. In global ones (Fig 2 & Fig 4) you group the results by SSPs, once in regional ones (Fig 3&5) you group them by models. Is there a justification for that?

Minor comments:

- Page 6423, line 10-12: the sentence seems to be a bit out of place; it is not clear whether it refers to PCR-GLOBWB, all the models used in the paper or models in general

- Page 6425, line 25: sentence starting "IE is available. . ." is repetition from page 6427, line 20. It fits better there, and should be deleted from page 6425.

Interactive comment on Geosci. Model Dev. Discuss., 8, 6417, 2015.

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