

Interactive comment on “Global scenarios of irrigation water use for bioenergy production: a systematic review” by Fabian Stenzel et al.

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The paper provides a synthesis of previous studies on the global scenarios that estimate bioenergy production in the future and their associated water footprints. The topic is definitely timely and highlights the importance of tracking bioenergy water demands in global hydrologic models in the future.

I have the following moderate comments:

The authors call out the distinction between withdrawal and consumption, then decide to call them either water requirements or water demand. To me this is very confusing. Combining both would mix up between two very different quantities, which makes some of the comparisons across studies unfair. I would suggest that authors keep that

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distinction throughout the analysis and show the results for each variable separately, the same way they have dealt with blue water and green water separately

Some of the assumptions made by the authors to tease out some of the variables shown in Figure 3 might lead to errors in the interpretation of previous assessments (also section 2.2). Given that there are only 16 studies and many by the same research group, have the authors attempted to reach out to these teams to see if they can offer the necessary data from these studies?

A better approach might have been a model inter-comparison exercise with a set of harmonized scenarios and some sensitivity analysis around some key parameters would have been a much more effective approach to address the outlined questions. Obviously, I am not expecting the authors to restructure their approach and take on such an endeavor, but I think highlight the need for such an effort might be another take away message from this study.

How does the study handle multiple studies using the same model/approach? For example, the GCAM study is relatively old, and I have seen recent studies where the biomass irrigation requirements are much smaller than their 2014 study, since water demand is constrained by water availability in some more recent studies. <https://agupubs.onlinelibrary.wiley.com/doi/full/10.1029/2018WR023452>
<https://gmd.copernicus.org/articles/12/677/2019/#&gid=1&pid=1>

The paper is generally well written, although on occasions, the text becomes somewhat redundant (e.g., omit the paragraph (lines 76-80) or move to later section) and some of the descriptions could benefit from summarizing the results in tabular form (especially in the case of section 3.2 on study differences). I would also suggest that the discussion section is structured in a way to be more aligned with the four science questions that were articulated at the end of the intro section. For instance, it is not clear which section addresses the 3rd question.

Figures 1 and 2 don't really add much value, so I would suggest that you move these

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to the supplementary section. I was going to suggest that you move figure S1 to come as the first figure in the paper and before you show figure 3, but I would suggest that you include a table instead similar to Table A1 (without the title of the paper column), and with the addition of the details shown in figure S1.

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