Comments on Physical versus economic water footprints in crop production a case study for China by Yang et al.

Summary

The manuscript evaluates the physical and economic Water Footprint of 14 crops categorised into cash and grain crops, between 2001 to 2016 over 31 provinces in China. A good background of existing studies is covered and it is shown what the added value of this study can be. However, I believe that there are some aspects that are clearly described or discussed. The methodology and discussion of the results needs to be clearly structured and expanded prior to acceptance of the paper.

General comments

1. In the methodology, split the models used in the analysis from the equations and calculation used to for PWF and EWF. Have a separate section prior to the calculations for the data and models used in the study and then move onto the calculations of the PWF and EWF which are a results of these results. This would include the AquaCrop model, the WF calculation frame and mode of soil water dynamic balance. Also would include a description of the national statistical data used. Otherwise, it is a little difficult to follow. You should also specifically show your equations for ETb and ETg.
2. You also state several times that the PWF and EWP together provide a measurement to analyse the synergy between water consumption of crop production and economic value creation, can you please explain how this happens in the introduction. And also explain why it is important.
3. You should also define what is blue and green water. Also why is green water rainfed and both blue and green water considered in irrigated systems. This might be clear to us but may not be clear to everyone who reads your article. This can either be included in the introduction or in the methodology section.
4. I do not really understand why you used the actual yield in your calculations instead of the modelled yield. You used the modelled yield for alpha but not for the actual yield which only effects your EWF for irrigated areas. Is there a reason for this? Also, maybe it would be a good idea to also calculate this using the modelled yield and compare with the results you obtain using the statistics or actual yield?
5. What is GeoDa? I have looked it up but I would suggest that you also describe this in your models section that I suggested you incorporate into your methodology.
6. More explanation is required in the results or in the discussion regarding what the results mean and not just the statement of the numbers. Why is the SI lower in one province, what significance does having H-H clustering in several provinces mean to the area? What does it mean if there is a decrease in agglomeration over time? What impact does this have? You need to go into the impacts of your numbers and trends so that the reader can get some information from the paper. These are just some questions but you should do this for all your results.
7. In table 8, you are comparing EWF in ‘Wheat in Morocco’, ‘Wheat in Tunisia’, ‘Winter wheat in China’ and ‘Spring wheat in China’. Considering the large differences in the regions/countries, is this possible to compare? Please also make note these comparisons are not in the same regions and make sure you include the assumptions you make in these comparisons.
8. The main goal of this paper is the SI, but I am still unclear on this index. I think this index needs to be explained in greater detail in the methodology as well as the interpretation and

impact of this index in the subsequent results and discussion sections needs further improvement. This is the innovation of your paper so this needs to be more clear.

9. You need to be careful with some English terminology such as 'contradiction'. I do not believe that is what you meant in several places where you use it.

Specific comments

P3L79 – Change 'which are respectively calculated from the daily green ($ET_{g[t]}$, mm) and blue evapotranspiration ($ET_{b[t]}$, mm)' to which are respectively calculated from the blue evapotranspiration ($ET_{b[t]}$, mm) and daily green evapotranspiration ($ET_{g[t]}$, mm)' as you use respectively and then change the order or green and blue.

P5L131 – you should define what economic benefit unit is.

P7L184 – move the data section before your methods.

P7L175 – You state 'Obviously, -2 <= SI <= 2'. Why is this obvious? Please explain and clarify in text.

P8L191 – I would refer to your figure 1.