

Interactive comment on “Globalization of agricultural pollution due to international trade” by C. O’Bannon et al.

Anonymous Referee #5

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This paper gives a valuable attempt in accounting for the historical trend of the global grey water transfer due to international trade. The results show that the grey water trade has been greatly intensified from 1986 to 2010. I agree with other reviewers that it enriches the literature in grey water footprint analysis. However, I also suggest a major revision in order to provide a neater version. Apart from the incorrect units as Prof. Savenije mentioned, I have other comments as followed.

First, the ‘Data Section’ should be as clear as possible. It is necessary to provide more detailed information of commodities and the trade data, not just mention the references. Mekonnen and Hoekstra (2010) calculate the grey water footprint with many years’ average. How do you use such data to calculate the grey water footprint in different years? Or do you account for the change of the nitrogen fertilizer in different years?

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You should specify. Furthermore, in equation (1), it is not necessary to have GWNT, on the contrary, you should incorporate internal and external grey water footprint in it.

Second, The summary results should be expanded to provide more information. Specifically, how much grey water is externalized due to international trade? Which countries are the largest NET importers or exporters? Can you specify the large grey water flows between countries? I think readers should be more interested in such information more than just the largest importers or exporters of grey water footprint.

Page 11223, Line 6. Allan has defined ‘virtual water’ not ‘water footprint’.

Page 3, Line 6-9: “. . .are transferred “virtually” from the exporter to the importer (Chapagain and Hoekstra, 2008; Hoekstra and Chapagain, 2008). Add the following references: (1) Liu J., Savenije H.H.G., 2008. Time to break the silence around virtual-water imports. *Nature* 453 (7195) : 587.

(2) Liu J., Zehnder A.J.B., Yang H., 2007. Historical trends in China’s virtual water trade. *Water International* 32(1): 78-90.

Page 11226, Line 20. What are ‘within-class’ and ‘between-class’? please specify.

Page 11227, Line 8. “While the United States was. . .” This sentence is a repetition of previous description, and should be deleted.

Page 11227, Line 12. “As such China generated. . .” This sentence is a repetition of previous description, and should be deleted.

Page 11227, Line 15. I assume you want to talk about the net grey water importers/exporters, because Fig. 3 shows the map of the net importers/exporters. If so, another question is raised, is it true that large net grey water importers/exporters remained their identities statically? I can’t tell such conclusion from Fig. 3.

Page 11230, Line 4. I don’t think the concept of grey water footprint can be extended with incorporating other types of pollutants.

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Page 11230, Line 9. Why you are sure that the results will not change much with other pollutants included?

Page 11231, Line 9. Again you should check the reference, I don't think Allan has mentioned the grey water in 1998.

Page 11236, Fig. 1. Fig. 1 is neither clear nor necessary. It looks like importers transfer the pollution to exporter directly. However, the exporter actually generates the pollution by itself, but doing so due to the commodities demand from the importer. I recommend delete Fig. 1

Page 11238 Fig. 3 You mentioned that large net grey water importers/exporters remained their identities statically. However, I noticed from Fig. 3 that several countries have changed between net importer and net exporter. For example, China is a net grey water exporter in 1986, but a net grey water importer in 2010.

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