

Interactive comment on “Virtual water trade flows and savings under climate change” by M. Konar et al.

Anonymous Referee #2

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The topic of the paper is interesting and important but there are a number of issues that make the analysis vulnerable to criticism. In general, it is not clear what the paper adds to the existing literature.

- 1) The authors provide no references to the previous literature. This is somewhat surprising since first papers were published several years ago. A number of those studies are based on a CGE modelling framework (for a review see Dudu and Chumi, 2008) others use optimization models (e.g. Fader et al., 2011) or input-output methodologies (e.g. Antonelli et al., 2012). Some of those have looked at the impact of climate change (Calzadilla et al., 2011).
- 2) The concept of virtual water used in the analysis considers only direct (final) water usage, ignoring many indirect (intermediate) uses as input to production. Also, recent

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studies have shown that it is important to distinguish between different types of water (green or blue water).

- 3) The GTAP model is used but water is not included as a factor of production.
- 4) The authors consider only three agricultural sectors but the GTAP database would allow for a much more disaggregated analysis.
- 5) It is not clear why the authors base their analysis on a CGE model. The projections for 2030 consider changes in the productivity in the three agricultural sectors but ignore changes in all other sectors of the economy. A partial equilibrium model, like the IFPRI model, would have been sufficient for such an analysis.

Antonelli et al. (2012) Systemic Input-Output Computation of Green and Blue Virtual Water ‘Flows’ with an Illustration for the Mediterranean Region, Water Resource Management 26: 4133-4146

Calzadilla, A., K. Rehdanz and R.S.J. Tol (2011) Trade Liberalisation and Climate Change: A CGE Analysis of the Impacts on Global Agriculture, Water 3: 526-550.

Dudu, H. and S. Chumi (2008) Economics of Irrigation Water Management: A Literature Survey with Focus on Partial and General Equilibrium Models, Policy research working paper 4556, World Bank: Washington, DC.

Fader, M., Gerten, D., Thammer, M., Heinke, J., Lotze-Campen, H., Lucht, W. and W. Cramer (2011) Internal and external green-blue agricultural water footprints of nations, and related water and land savings through trade, Hydrol. Earth Syst. Sci. 15: 1641-1660.

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