

Interactive comment on “

Analysis of intra-country virtual water trade strategy to alleviate water scarcity in Iran” by M. Faramarzi et al.

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Responses to Anonymous Referee 1

1) Section 2.3(.1): A more detailed explanation is needed of how blue water resources, evapotranspiration, and yields were calculated, and how from these crop water produc-

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tivity and eventually the water requirements for self-sufficiency were determined. Also helpful would be a map showing the present pattern of crop water productivity.

A: The whole analysis of this paper is based on the two previous works of the authors: quantification of regional water resources availability with specification of blue and green water at sub-basin level in Iran (Faramarzi et al., 2009); estimation of crop water use, yield and water productivity at the sub-basin and provincial level in Iran (Faramarzi, et al., 2010, Agricultural Water Management). We have made references to these previous works in this paper. Nevertheless, we will provide some necessary explanations on the estimates used in this paper. A map showing the crop water productivity is available in (Faramarzi, et al., 2010, Agricultural Water Management). We will make a reference to this paper.

2) Can you speculate about what potential there is to reallocate the production areas of crops other than the four investigated here (i.e. including reallocation of non-irrigated areas, or even non-cropland areas)? And inasmuch the “historic maximum” of crop area change in a province, which is set as an upper limit here, could be exceeded in the future?

A: We plan to carry out a more detailed study using more crops, but rather not speculate in the manuscript. The four scenarios investigated focus on exploring the possible options to halt the blue water depletion by reducing irrigated areas in water scarce regions/provinces and expanding irrigated areas in water abundant regions/provinces. Reallocation of non-irrigated areas is not directly addressed because reducing green water use in water scarce regions generally does not help alleviate their blue water scarcity. As for the non-cropland areas, it is very difficult to predict how much and where the expansion could be possible in the future. The environmental consequences of expanding crop areas to marginal land further complicated such prediction. In this study, the scenarios are set under the assumption that crop areas will not exceed the historic maximum in each province. We will, however, try to give more justification about our assumption when revising the paper.

3) It is quite often stated that the focus is on the national crop and self-sufficiency strategy, this statement can be deleted at some places. 4) Section 3.1: The first paragraph belongs to the methods. The parameters should be named here, in relation to Fig. 2. 5) Editorial comments: Page 2622 line 26: What is the “national I value”? Page 2624 line 10: Delete “S3” (mentioned twice). Page 2626 line 18: Delete “of them”. 6) Section 4.1: First part belongs to Methods.

A: 3), 4), 5) and 6) Suggestions are taken.

7) Section 4.2 lines 20 ff: I do not understand: If the water required in a recipient basin is larger than in the resource basin, this does not suggest that water transfer projects are inefficient but exactly the opposite is true? The following sentence on water quality should be merged with / moved to section 5. In the latter section a bit more of discussion of the limitations of the present modeling approach and the chosen parameters is needed.

A: The statement in the paper is correct. If the water required in a recipient basin is larger than in the source basin, it means that the recipient basin has lower crop water productivity than the source basin. In other words, the same amount of water can produce more crop in the source basin than in the recipient basin.

8) Table 4: Is this table referred to anywhere in the text?

A: yes, page 13 line 13

9) Fig. 1: The “No” arrow on the bottom right side should be placed next to the “Desirable solution” box and not the “Stop” box. Fig. 3: “resulting” not “resulted”. Especially in Fig. 6 the letters are too small; the titles in the legends of all maps are not needed C1078 and should be written only once, in the figure caption. Fig. 8: What do the two gray color schemes represent? Where does the figure show virtual water fluxes?

9) The suggestion is taken.

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