

## ***Interactive comment on “Determination of virtual water content of rice and spatial characteristics analysis in China” by L. J. Zhang et al.***

### **Anonymous Referee #2**

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#### Revision Comments

This manuscript proposed a modified calculation framework of virtual water content (VWC) of crops to assess the rice VWC and its spatial characteristics in China. It is an interesting and valuable topic, and the paper was well organized. The following specific comments may be helpful for the authors to further improve the manuscript.

1. The abstract did not well highlight the innovation of this paper. The innovation of this paper should be put forward in the abstract by briefly mentioning the deficiencies of the previous research.
2. This paper has two main purposes: 1) propose a modified calculation framework of VWC of crops; 2) analyze the spatial characteristics of VWC of rice in China. The

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Introduction section should focus on the advantages of the modified calculation framework of crop VWC and the significance of the spatial distribution analysis of rice VWC in China.

3. In the introduction, authors should briefly introduce the results of distribution characteristics of virtual water content of rice by sun (2013a).
4. Authors divided the VWC into direct water and indirect water, and the direct water was divided into direct green water, direct blue water and direct grey water. Why the indirect water was not divided into indirect green water, indirect blue water and indirect grey water?
5. For the sector 2.1.3, the meaning of “actual total irrigation water consumption” should be explained more clearly. Authors should explain the relationship between the irrigation water consumption, irrigation water supply and irrigation coefficient. It will help readers better understand the meaning of “actual total irrigation water consumption”.
6. The data source of rice fertilizer is not clear, and reference should be added.
7. It needs to explain the difference among ‘irrigation water consumption’, ‘irrigation water supply’ and ‘actual total irrigation water consumption’. These similar terms were motioned in the method without the difference which could be confusing for readers. Which data are used in the calculation?
8. It is necessary to intensively analyze results of the spatial characteristics of rice VWC in China, and clarify the reasons for the spatial characteristics. The paper should discuss how the various virtual water is transferring or transporting regionally and why?
9. The spatial characteristics of various components of VWC show obvious regionally distribution characteristics, and there are also differences among individual regions. Please clarify their causes.
10. The results in this paper need be compared with those by Sun (2013a)?

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11. The discussion section mentioned the indirect water ratio of some crops will be higher. Can some evidences be given rather than just speculation?

12. In Table 2, the unit “%” should be marked.

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