Dear Editor and Reviewers,

Thank you very much for your constructive comments on our manuscript entitled “Assessing blue-green water utilization in wheat production of China from the perspectives of water footprint and total water use” (Ms. No. hess-2013-548). We have made a major revision of the manuscript taking into account all the comments and responded to the issues raised. We hope that the revisions in the manuscript and our accompanying responses will be sufficient to make our manuscript suitable for further review.

Best wishes and yours sincerely,

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Responses to the comments from reviewer #2 (Report #1):

The comments of reviewer are in Helvetica font, while our responses are in Times New Roman font.

1. It is still questionable to define the GWF based on ETc since ETc is not the actual evapotranspiration.

Response: Actually, we defined the GWF based on effective precipitation (Pe) but not ETc with reference to the early related researches. We revised the statement and clarified this point further in section 3.1.1 (L137 ~ 143)

2. In addition, it is another challenge to determine Kc for different locations and wheat varieties.

Response: The Kc values listed in Chen, et al. (1995) and Duan, et al. (2004) are the test results collected from irrigation experimental station located in different regions of China. Further explanation was posted in the revised manuscript with “Kc values listed in these references are the test results collected from irrigation experimental station located in

List of Responses and Main Paper Changes
different regions of China” (L123 ~ L124)

3. Some data and parameters are difficult to obtain, such as IWC, $\eta$ and $\alpha$. The value of $\alpha$ is selected as 3%, $\alpha=5\%$, $\alpha=8\%$. These assumptions are lack of enough evidence, which make the results big uncertain.

**Response:**
1) The IWC (irrigation water capacity) is statistical data collected from each administration bureau of irrigation district. We explained it in section 2.2 by “The statistical data including actual irrigation water capacity (IWC, the gross irrigation water diversion ), crop yield, irrigation water utilization coefficient ($\eta$) and irrigated area from the administration bureaus of 442 irrigation districts in 30 provinces (Fig.1) are collected for this study” (L110 ~ L112).

2) The $\eta$, which is conducted by engineers work for administration bureau of irrigation district, is also collected from each administration bureau of irrigation district conducted by engineers work for administration bureau of irrigation district. It is explained in the revised manuscript by “The actual measurement of $\eta$ was conducted by engineers work for administration bureau of irrigation district” (L112 ~ L113).

3) For the value of $\alpha$. It is hard to be calculated and the empirical (not assumed) values referenced (WMR, 1999) are applied in this study. We clarified this point further with “The value of $\alpha$ recommended by the reference is consulted by irrigation engineering designers in China and it is widely considered accords with the actual conditions basically (Li, 2006)” in section 3.2.1 (L163 ~ L169).

4. The percolation ($BW_p$) is another problem and has not been satisfied responded.

**Response:** The $BW_p$ falls into total water use (TWU) in the new version of manuscript. $BW_p$ was elaborated deeply in line 211 ~ 217 in the revised manuscript as follows:

$$BW_p=IWC-BWF$$

Blue water footprint (BWF) of crop could not be satisfied if some more water withdrawal for percolation has not been supplied by the reservoir or the headwork of irrigation district. It is important for regional could be reduced by improving the quality of irrigation works.
5. (Special comment 1) Equation 2, A (area) is used but it is not used in other equations.

Response: The A (area) Equation 2 is regional crop planting area, and is not used in other equations. In order to differentiate, it was replaced with $A_p$ in the revised manuscript (L143 and 146).

6. (Special comment 2) Equation 5, how about if $ET_c < P_e$?

Response: The crop is no need to be irrigated if $ET_c < P_e$, and Equation 5 was changed to (L156):

$$IWR = \begin{cases} 0, & ET_c \leq P_e \\ ET_c - P_e, & ET_c > P_e \end{cases}$$

7. (Special comment 3) Equation 16, $WF_I$ should be $WFP_I$.

Response: The $WF_I$ on the right side of the equal sign was changed to $WFP_I$ (Equation 16, L200).