

A novel regional irrigation water productivity model for complex cropping patterns in arid regions coupling soil water and salinity dynamics, irrigation and drainage, and shallow groundwater movement

The manuscript has been reviewed by two reviewers, and the authors have, in my view, responded adequately to the issues raised.

I have, however, two additional issues that were not raised by the reviewers, and which I like to share with the authors. I invite the authors to take my comments into account when submitting an improved version of the paper.

1. There are some references in the text that do not appear in the reference list; take for example the references cited in lines 55 to 62: of the 9 references, 5 do not appear in the reference list. Also check the reference in line 174.
2. The manuscript is inconsistent with its units. All water fluxes should have a time dimension. So W_{ls} (line 193-194) is the groundwater recharge per unit; and in your model you use a daily time step, so the correct unit is m/day. Same for W_{as} (line 202-203), I_n (line 203), D_g (line 213), W_{gr} (line 224), P_{wg} (lines 251-252), G_{wg} (lines 252-253). Check the correct unit of K (permeability coefficient, lines 224-225), I think it should have a time dimension. Check eq. 10 on consistency of the units/dimensions.
3. The amount of irrigation water applied seems small (lines 320-323); I calculated an average gross irrigation application of 162 mm/year $[(12 \times 10^8)/(0.66 \times 1.12 \times 10^6 \times 10^4)] = 0.162$ m/year. Kindly explain.
4. Lines 388-391: What are thresholds for acceptable and good model performance for the 3 evaluation criteria used (NSE, R2 and RMSE)?
5. Line 451: “readily available groundwater”; here I think you deal with the unsaturated zone, so do you rather mean: “readily available soil moisture”?
6. Figure 9: in an earlier iteration I asked the authors to improve the colour-scheme of this figure. You have done so, but in the process, you have, unfortunately, not standardized the scales (as you had done in the original version of this figure, and as you have also correctly done in your figure S3). For the reader it is therefore very difficult to compare the different years. So for each crop redraw the maps by keeping the colour scale fixed over the years.
7. Figure 9 once more: none of the maps contain blank pixels – this suggest that each pixel in all years have values for the productivity of all three crops. This I find highly surprising, and in fact unlikely, (but I admit that I do not know the irrigation district). Please explain.
8. Section 3.2.1 concludes about which crops have the highest productivity (lines 481-486). Here productivity in money value (expressed e.g. in US\$/m³ or RMB/m³) would be the most

convincing criterion. Do you have average farm gate prices of the three crops, so that you can convert the IWP (kg/m^3) into RMB/m^3 ? You suggest that sunflower has a much higher “benefit” (line 485) than wheat. Do you mean “price”?

9. The manuscript still is weak in grammar, and reviewer #2 did a great job to highlight the major weaknesses. Please also check the following lines: 15, 72, 98, 146, 196, 206, 269, 293, 295, 296, 315, 364, 427.

I encourage the authors to submit a revised version of the paper, taking also the above details into account.