

Interactive comment on “Projected changes in crop yield mean and variability over West Africa in a world 1.5 K warmer than the pre-industrial” by Ben Parkes et al.

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This is a modeling study of changes between near-past and near-future climate in grain yield in West Africa. Changes in both the mean and variance of modeled yield are considered. This is a significant topic, but many important details of the results are currently missing, making it difficult to evaluate them.

“Descriptions of each crop model can be found in the Supplemental material.” (4:7)
Please describe the linear model also.

It is mentioned that “The four crop models were driven using the outputs of the four

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bias corrected CORDEX-Africa RCM simulations as listed in table 1. The CORDEX-Africa simulations were driven by ten GCMs as part of CMIP5” (4:19). However, there is no discussion of the uncertainty due to climate forcing from the GCMs and RCMs. It seems important to provide some quantitative measure of it and compare it to the range of results from crop models under the same forcing, which by contrast is discussed extensively.

The relative global warming between the two climates considered is 0.8 K (5:8). What about the local warming in W Africa, which is much more directly relevant here? What is the corresponding local precipitation change? It might be helpful to include a figure that shows the temperature and precipitation seasonal cycle and the modeled changes for the area considered.

“To simulate high temperature stress resistance the GLAM is rerun with the high temperature stress routine disabled” (6:22) but this situation is biologically impossible. How would the conclusions change if only more realistic stress adaptation were considered?

What is the meaning of “does not suffer from spread from the input data” (7:6)? Also, within the context of this work the “successful” performance of ORCHIDEE-Crop is not very encouraging, as it was run for only one of the three crops considered.

“The yield gains predicted herein need to be considered as part of longer term trends that show severe yield reductions as the 21stst [sic] century progresses.” (8:7) It would be good to provide citations.

Figures 4-6: It’s impossible for the variability or failure rate to be less than zero. So the color scale should start no lower than zero.

Figure 7 is hard to understand. The caption should explain “Impact in current climate” and “Impact of adaptation”, and the mean yield and number of years between crop failures should probably be shown in different panels since they are fundamentally different quantities.

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Tables 3-5: Please also include and discuss the region-wide mean change (production-weighted sum of the by-country changes).

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