Reviewer #2:

This study improves the crop suitability assessment method by considering the climate variability. It compares results with SPAM2020, GAEZv4, and the crop calendar from GGCMI. The manuscript is clearly written. I have a few comments.

Reply: Dear Reviewer #2, thanks a lot for your comments and for reviewing our paper! In the following, we refer to your comments and answer them directly below your comment. Please note that line numbers in our reply refer to the revised version of the manuscript with track changes. Thank you!

Major:
1. Make the dataset and results more accessible. Now, all the results in Zenodo are *.png, which contain no geographical information. I highly recommend authors to provide geographic file format, e.g., Geotif and netcdf.
Reply: It is planned to include the geographic data (GeoTIFF and/or NetCDF) to the Africa Agriculture Adaptation Atlas, where it will be provided for download. However, this will take some time and we don't know when this will happen. Therefore, we uploaded all raw data to Zenodo (https://doi.org/10.5281/zenodo.14196331), where we additionally also provide the compiled maps, that we only show exemplarily for maize in the paper, for all 48 crops as png files via Zenodo. This is not a substitute, but an addition.

Minor:
1. line 77, Is the soil texture for >200cm also needed? if yes, where does it come from?
Reply: Soil texture is calculated based on the clay and sand content taken from SoilGrids data. This data is only available up to 200 cm. Deeper texture is not required.
2. Why the soil layer in lines 79-80 is different with Table 2
Reply: This is indeed not well explained and we revised the paragraph and added a description in L96-L101. The paragraph now reads as follows:

Available soil layers can be weighted in CropSuite as required. The SoilGrids datasets provide information for six depths: 0-5 cm, 5-15 cm, 15-30 cm, 30-60 cm, 60-100 cm, and 100-200 cm (Hengl et al., 2017; Hengl et al., 2014). According to Sys et al. (1991), soil properties have different effects on crop suitability depending on the soil layer. Accordingly, we use weighting factors as proposed by Sys et al. (1991) (see Table 2). The different distribution of the soil depths between the SoilGrids data and the weighting factors by Sys et al. (1991) is taken into account by using a proportional weighting of the SoilGrids layers.

3. Line 81, reference formate. And, why are the weights needed? How are these weights applied? It's a bit confusing here. Did the authors mean that weights were used to multiply with original value to generate the new value?
Reply: Thank you, we corrected the reference format.
The question is how e.g coarse fragments impact on crop suitability. According to Sys et al. (1993), the upper soil layer (0-25 cm) has a much higher impact on crop suitability than the lowest soil layer (125-150 cm). Therefore, the different available soil layers can be weighted.

4. line 233. OK, MapSPAM2020 may introduce some uncertainties, then why not using MapSPAM2010?

Reply: We did this analysis for different versions of MapSPAM, however, for the paper we decided to show only the comparison with MapSPAM 2020, because that was the latest release with a special focus also on Africa. It also provided the largest overlap of crops with our study. MapSPAM 2020 has 32 crops, while SPAM2017 has 29 crops and SPAM2000 only 15 crops. As you can see below in the screenshot, exemplarily for maize, the SPAM data differ a lot. While SPAM2000 shows large harvested areas that are not suitable in CropSuite (red areas), these areas are less in SPAM2017 but considerably lower in SPAM2020. We included this comparison to the Supplement.

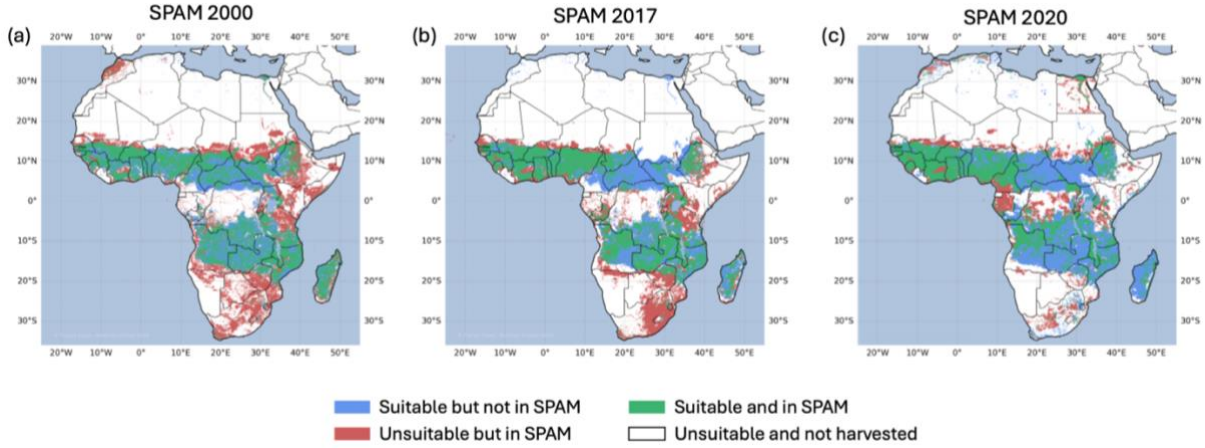
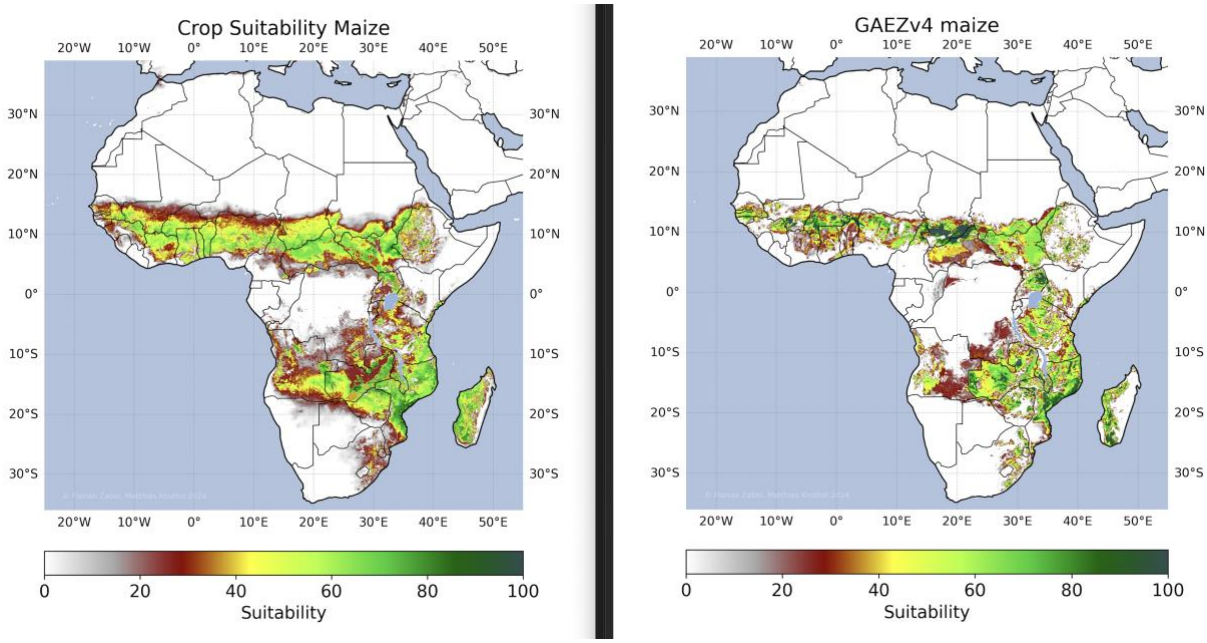


Figure S2: As Figure 7b but comparison of CropSuite with (a) SPAM2000, (b) SPAM2017 , and (c) MapSPAM 2020, exemplarily for maize.

5. Line 277, is it because that nutrient and soil fertility are not considered in this study?

Reply: We compared against GAEZ data with 'high input level', assuming that nutrients are not limiting for this option, as assumed also in CropSuite. For a better explanation, we added a more detailed description of these assumptions in L310-312.

We think that the differences mainly result due to differences between the different soil data used (HWSD in GAEZ, SoilGrids in CropSuite). This is illustrated by the following figure, indicating more gradual changes in CropSuite, whereas GAEZ shows strong and abrupt changes, especially between borders (e.g. between Angola and Zambia). This follows patterns of the underlying soil data, which is a known issue in the HWSD data.



Suitability for maize for CropSuite (left) and GAEZv4 (right).

6. In theory, I would expect a smaller area in this study because this study considers additional climate variability. However, Figure 8 shows a larger area by this study. Can the authors explain more about this?

Reply: Thank you, this aspect was not addressed adequately so far. To better illustrate the impact of climate variability in the comparison with GAEZ, we do not consider climate variability any more in Figure 8 (as we did previously). In addition to Fig. 8, we included Fig. S4 to the supplement, showing the comparison with the consideration of climate variability and discuss the difference in the results section 336-337. When considering climate variability in CropSuite, orange and grey bars increase as larger areas are considered unsuitable due to climate variability (see Fig. S4 compared to revised Fig. 8).

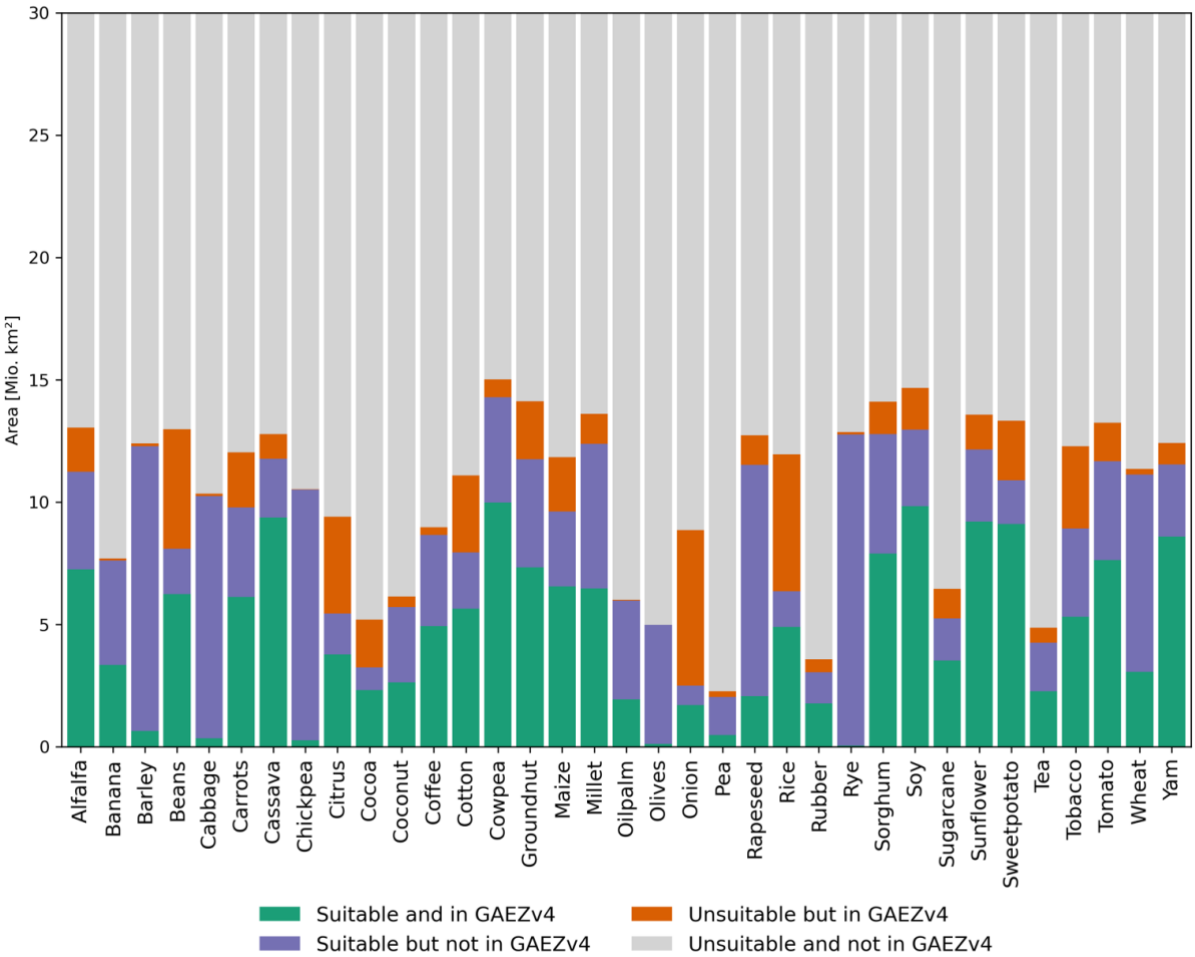


Figure S4: Same as Fig. 8 but with consideration of climate variability for CropSuite.