

Comments to the manuscript entitled “Gridded 5-arcmin, simultaneously farm-size- and crop-specific harvested area for 56 countries” by Han Su et al. (essd-2022-72)

General comment:

I respect the authors’ challenge in compiling farm-size- and crop-specific harvested area datasets like one presented in this study. Although there might be much room for further validation of the developed dataset, I would not request it since it is in really difficult to objectively assess the uncertainties of the dataset when no similar dataset is available. My comments are mostly from editorial point of view, and to improve the manuscript further.

Relatively major comments:

1. I did not find any list of the 56 countries covered in this dataset. Probably, Table S6 is close to the list, but it might be incomplete in the case that Meharabi’s dataset and your dataset are not overlapped. Related to this, why don’t you present your dataset as the map in main text for demonstration purpose? Showing a map of main variable of your dataset is help readers understand your dataset.
2. Since some farming types (e.g., the rainfed subsistence in SPAM2010) are assumed to be an indicator of small-scale farmers in literature (e.g., Iizumi et al., 2021), it would be great if you could show how the individual farming type considered here correlate with field size or not, using your dataset.
3. I would encourage the authors to add a brief discussion towards next step – specifically, compiling a farm-size and crop-specific production or yield dataset. Increasing productivity of small-scale farmers is a main goal in SDG 2 (zero hunger). Once farm-size harvested area datasets like one presented here become available, then people expect farm-size- and crop-specific yield dataset to calculate the production share of small-scale farmers. But it is elusive how yield differ by farm size (e.g., Muyanga and Jayne (2019) and Supplementary Text of Iizumi et al. (2021)). What is your though on the current feasibility and limitations to develop such dataset?

Specific comments:

4. Table1. The units of spatial resolution are mixed (arcmin and km). Using a consistent unit or showing an indication for conversion (for instance, approximately 10 km for 5 arcmin) increase readability.
5. L129. Can you add a brief definition of crop area, planted area, harvested area and cultivated area? Especially, are crop area and cultivated area used here crop-specific?
6. L164. “the total harvested” -> “the total area harvested”
7. L216. “access” -> “assess”
8. Fig. 3. How did you associate farm size with the water scarcity levels of Hoekstra et al. (2012)? Since the water scarcity level data are on monthly resolution, did you calculate an average for cropping season?
9. L308-309. This is rather speculative. At least, relevant citations are needed to support this statement on change in farm size for ten-year period. And for your reference, in their Fig. 2, Yu et al. (2013) reports based on farmer interview that change in farmland area per household increase from 1.3 ha in the early 1980s to 2.6 he in the early 2010s for some villages in North China. Although you have talked here about Bulgaria, which could be largely different with China, it seems that the difference (78.5% and

- 5% of harvested area is under the farm size 50-100 ha in Lowder's dataset and your dataset, respectively) is too large to be explain by the difference in the reported time.
10. L364. I think the social-ecological factors mentioned here indicate the use of GAEZ. Although this reasoning may be true, there is no result to show what social-ecological factors lead to the difference in the two crop maps.

References

- Iizumi, T. et al. (2021) Soil carbon-food synergy: sizable contributions of small-scale farmers. *CABI Agric Biosci* 2, 43. <https://doi.org/10.1186/s43170-021-00063-6>
- Muyanga, M. and Jayne, T.S. (2019) Revisiting the farm size-productivity relationship based on a relatively wide range of farm sizes: Evidence from Kenya. *Amer J Agric Econ.* 101, 1140–1163. <https://doi.org/10.1093/ajae/aaz003>
- Yu, Q. et al. (2013) A survey-based exploration of land-system dynamics in an agricultural region of Northeast China. *Agricultural Systems*, 121, 106-116. <https://doi.org/10.1016/j.agsy.2013.06.006>