

## Response to referee comments

General reply. Thank you for your insight comments which have improved our work greatly. To show the improvement made by our regional dataset, three widely used global datasets HYDE 3.2, PJ, and KK10 were selected to compare with our results. SAGE cropland dataset was not selected because PJ dataset was developed based on SAGE. The cropland data source in PJ dataset for Scandinavia was from SAGE dataset over the period of 1700–1992. In this revision, we added comparison of the total cropland area between SAGE and this study. Because the cropland gridding method of PJ is improved compared to SAGE, we compared the spatial distribution of cropland area with PJ dataset but not SAGE dataset. We understand our timeline is similar with SAGE dataset, but the methods of SAGE are completely different from this study.

1. In introduction, I would suggest to reduce introduction on global cropland mapping importance and focus on why it is important to provide cropland maps in your study area. There is background on agriculture in the study area but it is not clearly suggesting why grid based cropland mapping is necessary. I would suggest author to add a paragraph on it and reduce the other part focusing on global cropland mapping little bit.

Second, I am not getting the story in continuous manner while reading the introduction. My suggestion would be rearrange some information to get the flow of context.

**Reply:** Thank you for your comments. We have rearranged the **Introduction** and made it more kind for readers. We also explained more about the necessities of historical grid-based cropland data in Scandinavia. Please check the pages 2–4.

2. You can remove the sub-divisions in data sources section. It just creating confusing and misreading the reader about usage of satellite data and other datasets. You have used some reference datasets and some statistical dataset, which can come under one hood of “available cropland data from the study area”.

**Reply:** Thank you for your comments. We have removed the sub-divisions in data sources section.

3. In methods, I would suggest just to have one flowchart covering all the steps rather than having many flowcharts in each section. In that way, it will be easier for reader to understand entire methods in one go. I am happy to review the new one flowchart if required.

**Reply:** Thank you for your comments. In the last version, because Figure 3 includes a flow chart and a table, the combination of Figure 1–3 will increase the complexity of the methodology flowchart. Thus, we combined Figure 1 and Figure 2, but kept the flowchart of cropland area allocation model (Figure 3 in the last version, but Figure 2 in this version).

4. Validation should go under results section. Also, time-series changes should be under one section and not two subsections if possible.

Reply: Thank you for your comments. We have moved “Validation of the dataset developed in this study” to **Results** section. Time-series changes are under one section in this revision.

5. Discussion should discuss the limitations of the dataset clearly.

Reply: Thank you for your comments. We have discussed more about the uncertainties of our dataset. Please check “**5.2 Uncertainties**”.