

Nat. Hazards Earth Syst. Sci. Discuss., author comment AC2  
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## Reply on CC1

Marthe L. K. Wens et al.

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Author comment on "Education, financial aid, and awareness can reduce smallholder farmers' vulnerability to drought under climate change" by Marthe L. K. Wens et al., Nat. Hazards Earth Syst. Sci. Discuss., <https://doi.org/10.5194/nhess-2021-216-AC2>, 2022

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Dear Dr Lang

Thank you for your interest in and feedback on our manuscript. Based on your review, we would like to the ODD+D protocol in supplementary to increase the level of detail and clarify many of the model assumptions and design characteristics as per your suggestions.

With respect to water management, we agree this creates confusion and propose to change the term to "drought adaptation measures" as they were used interchangeably in the manuscript. Currently, all considered measures are individual and on-farm applications – no sharing is assumed to happen. we agree looking into community water harvesting structures such as larger boreholes or sand dams would be super interesting, but this requires – as you remark – other interactions on which we did not collect any empirical information. Some lines related to this is will also be added to the discussion chapter.

With respect to farmers' adaptation intention, we would like to highlight that the detailed model design including all formulas iis already published in Wens et al 2020 - and the ODD+D attached to this manuscript supplies the most important information regarding the model application of the PMT. We however agree that the formulas should be repeated in the ODD+D of this manuscript; and thus will significantly revise its description (especially II.ii).

With respect to the ODD+D protocol, we would like to note that, given that we designed a agent-based model, we followed the ODD+D protocol of Muller et al 2013 – which is an extension of the ODD protocol of Grimm et al. However, based on your suggestions, we will fully revised the ODD+D to reply to increase the level of detail. We will adress your comment 1 (entities, state variables, and scales) in the process overview (I.iii) by adding a UML diagram; we will adress comment 2 (process overview) by adding a flowchart; we will adress comment 3 (submodels) by adding more details about the decision module (in II.ii) but feel that, since the crop-water model Aquacrop is an existing model, published by Foster et al. 2017, only its basic principles are explained while the details should be sought in the article of Foster et al.; and we will adress comment 4 (initialisation parameters) by adding a table on the agent characteristics in III.II.

We would like to thank you for your thorough spelling and punctuation check, and will revise the manuscript accordingly.

Respectfully,  
Marthe Wens