

Hydrol. Earth Syst. Sci. Discuss., referee comment RC1  
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## Comment on hess-2022-96

Anonymous Referee #1

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Referee comment on "FarmCan: A Physical, Statistical, and Machine Learning Model to Forecast Crop Water Deficit at Farm Scales" by Sara Sadri et al., Hydrol. Earth Syst. Sci. Discuss., <https://doi.org/10.5194/hess-2022-96-RC1>, 2022

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This paper presents a study of using a machine learning framework, FarmCan, to forecast irrigation demand in 4 farms in Canada. Based on the machine learning modeling results, the authors find that soil moisture shows a strong correlation with precipitation. Also, evaporation and potential evaporation are effective predictors of NI. The study shows the potential of using machine learning models to improve the timing of irrigation and therefore to save water and achieve sustainable agricultural production. The manuscript is on a topic of interest to the audience of HESS. I only have a few minor comments that I hope the authors could address in their revision.

Specific comments:

- Lines 51-58: In this part, the authors could add a few more references and add more in-depth discussion about the current stage of ML models for irrigation water demand.
- Line 101: I checked the citation (FAO, 2021), which has the equation as:  $ICU = ET - P - dS$ . Please revise equation (1).
- Line 167: There is a question mark here, which I assume is a place holder for references.
- Lines 171-175: This description suggests that the FarmCan model is site-specific. The authors could add some discussion here to explain the flexibility of the model. Also, the authors can add explanation how the model can be transferred to other farm fields.
- In Figure 6, I would suggest change the color scheme. It is a bit confusing with ET and SM both presented in reddish colors.
- At the end of the result section, maybe the authors can add a subsection to discuss about the practical application of the FarmCan model. For example, how can we use the model to improve agricultural water use management?