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.

Thank you for your comprehensive review of our manuscript.

Specific comments:

1. 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.

This section is reorganized and rewritten to address various issues, including adding more references for ML models.

"Over the past few decades, Machine Learning (ML) techniques have been progressively used to process large amounts of information created by remotely sensed data. Various machine learning algorithms, such as Random Forests (RFs), Support Vector Machines (SVMs), Artificial Neural Networks (ANNs), Genetic Algorithms (GAs), and ensemble learning, have been used on remote sensing information in farming {Virnodkar_S.S.-2020-01}. RF applications have become popular for addressing data overfitting, especially in geospatial classification and prediction of remote sensing data p{Vergopolan_N.-2021-01, Saini_R.-2018-01}. However, their application for evaluating crop water stress and NI using remote sensing data continues to be under-explored, and the existing methods can still be greatly improved {Virnodkar_S.S.-2020-01, Yang_Y.-01-2020, UIUC_2021-01}. {Poccas_I.-2017-01} used RF and SVM to model leaf water potential for assessing grapevine water stress. {Loggenberg_K.-2018-01} combined RF with remote sensing data to distinguish stressed and non-stressed Shiraz vines."

2. Line 101: I checked the citation (FAO, 2021), which has the equation as: ICU = ET – P – dS. Please revise equation (1).

Although it does not make a difference in the results and the calculations, I have changed the equation to match the citation (FAO, 2021).

3. Line 167: There is a question mark here, which I assume is a place holder for references.

Yes, that was an issue in the BibTeX file, which is now addressed!

4. 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.

FarmCan is versatile in being applied to any farm in the region. I clarified that in both the discussion and introduction.

5. In Figure 6, I would suggest change the color scheme. It is a bit confusing with ET and SM both presented in reddish colors.

There was a mistake in the size and thickness of the legend for this figure. It is now fixed, and the colors are identifiable.

6. 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?

I edited the text in various spots to address this issue, especially in the Introduction. For example:

"In irrigated farms, information on NI can help regulate water deficit, achieve higher levels of crop produced per unit of water consumed, and optimize profit while minimizing potential negative environmental effects {Han-M.-2018-01, Chalmers_D.J.-1981-01, Taghavaeian_S.-2020-01}. However, information on the proper quantity of water to feed crops is also essential in rainfed areas with insufficient rainfall to maintain crop yields and soil conditions {Virnodkar_S.S.-2020-01}. As climate change and drought continue to impact crop water stress and food insecurity, rainfed farms in the U.S. and Canada are increasingly adopting irrigation technologies {USDA_2021-01}. For example, the Canadian Ministry of Agriculture is encouraging farmers in Saskatchewan to evaluate their potential NI and apply for irrigation development {Saskatchewan_2022-01}. Knowing the quantity and timings of the water supply gives farmers incentives for more efficient practices, allows them to identify the timing and amount of nutrients, and facilitates more extensive management planning and adaptation strategy goals {White_J.-2020-01, Levidowa_L.-2014-01, IPCC_2013-01, Geerts_S.-2009-01, Taghavaeian_S.-2020-01}."