Dear editor,

We would like to thank you for the valuable feedback provided for our manuscript entitled, “Investigating unproductive water losses from irrigated agricultural crops in the humid tropics through analyses of stable isotopes of water”.
Please find our point-by-point responses (in blue) to the comments (in black) below.

We believe that the modifications result in an improved manuscript. We hope that the manuscript is now suitable for consideration for publication as a research paper in Hydrology and Earth System Sciences.

We look forward to hearing from you.

Best regards,

On behalf of the authors,

Amani Mahindawansha

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Dear first author, Amani Mahindawansha, and corresponding author Lutz Breuer,

Thanks for sending the revised manuscript and I appreciate the responses provided to each of the comments.I think that the manuscript can be published after clarification of the two following issues that came up.

1.) Now that I see can in Figure 3 that RW isotope ratios are more enriched than the soil water isotopes for Wet rice (WS) and GS2 and GS3 (Fig. 3 a&b) I do not understand how one gets the high FE values reported in Figure 5. In this case, dP will be bigger than dS in Equation (1) and that would result in a negative FE value. In general, it would not be expected that the fraction of evaporation loss is highest for the soil water samples that are least fractionated (Wet rice (WS)). Please look into your calculations and explain what is going on here – I seem to misunderstand something.

Thank you for the comment. As shown in Figure 4, only for Wet rice (WS) at GS2 and GS3 the isotopic composition of soil water is more depleted than the weighted isotopic composition of rainwater and of irrigation water. For Wet rice (WS) at GS2 and GS3 the weighted isotopic composition of precipitation (δ^{18}O -4.42 ‰ and δ^{2}H -26.82) does not reflect the true input end member. The isotopic composition of infiltrated water has a negative bias compared to the weighted isotopic composition of rainwater. Therefore, as mentioned in the text, “During the WS, δp was estimated as the weighted average of the isotopic signals from the frequently occurring large precipitation events (larger than 10 mm).” The values used in equation 1 are -36.6 ‰ for δ^{2}H and -5.8 ‰ for δ^{18}O. As a result, δp is lower than δs and the FE value is positive.

There is also an effect of the isotopic composition of atmospheric vapour (δ_A) and of relative humidity on the fractionation. The isotopic composition of atmospheric vapour (δ_A) was calculated assuming equilibrium with precipitation (Eq. 4 in the supplementary materials). A more depleted atmospheric moisture during the wet season increases the estimated value of FE.

Thank you for bringing this point up. We agree that it is better to clarify the calculation method and resulting values in the text. Please see P5L24-25, P8L6-9, and P8L28-33 in the revised manuscript.

2.) Figure 2: I understand that in hydrological manuscripts, precipitation on bar plots often has an inverse axis. However, this is usually only necessary if there is also stream discharge or similar data additionally plotted in the graph. More importantly, the y-Axis for d2H is inverse, which is very confusing and should be changed. I am sorry that I did not realize in the previous round of reviews.

We agree. We changed the figure as recommended.