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Hydrology and Earth System Sciences
Discussions

Interactive comment on "Grey water footprint reduction in irrigated crop production: effect of nitrogen application rate, nitrogen form, tillage practice and irrigation strategy" *by* Abebe D. Chukalla et al.

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This paper conforms to the literature regarding virtual water transfers, though it allows me to raise a continuing concern regarding the classification of gre y water footprint (WF) as an absolute, given its abstract dependency on time and location. The modification of environmental regulations by a governmental unit can result in significant differences for embodiment of virtual grey water in an agricultural product, making global water movement tabulation chimerical. Noting this objection, we proceed with review of the paper and its findings. I'm uncomfortable with evaluating the WF in terms only of

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Discussion paper

Nitrogen, since nitrogen-only inorganic fertilizers significantly affect soil pH. Phosphorus is prevalent in many inorganic fertilizers and in many locations is viewed to have a greater impact on receiving waters than N, thus governing grey WF. Incorporation of P into grey water analysis, or alternatively addressing pH imbalances in N-only fertilizers, could significantly alter the outcome of comparison between manufactured and organic fertilizer impact on WF, and this at least should be acknowledged in the paper. Line 276 – knowing the complexity of Penman-Monteith calculations and the parameters associated with the equation, I'd want to look more closely at data before accepting reference ET calculation for this evaluation. Line 283 – use of zero pest stress impact seems odd for this evaluation. If zero-stress conditions are used, it would make sense to conduct at least a handful of scenarios with high-stress conditions to evaluate the variability of impact based on more extreme ambient states. Discussion/Conclusion – It would be helpful to identify and analyze optimal conditions in terms of balancing grey WF and yield. Can you determine the conditions that generate the best outcome, evaluate them in APEX, and provide data to confirm?

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