

## ***Interactive comment on “Towards systematic planning of small-scale hydrological intervention-based research” by K. E. R. Pramana et al.***

### **Anonymous Referee #1**

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#### General Comments

The paper proposes a systematic process for undertaking small-scale hydrological research projects that 1) involve local populations and 2) evaluate the effects of an intervention in the land-water system. It includes three field-based cases studies that appear not to have been published before. The case study content is, in my view, the major contribution of the paper.

The goal of the paper is a valuable one, but I do not see that it has been reached here. I do not come away with a comprehensive process for undertaking, or considering

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to undertake, this type of investigation. Two analysis steps are proposed: 1) being prepared for surprises and 2) cost-benefit analysis.

While are some systematic tools invoked for doing such analyses, I doubt they are foreign to anyone attempting this type of work. Planning for surprises, whether executed by humans, animals, meteorological events, etc., is almost certainly always done to the greatest extent foreseeable, as these efforts are expensive both in time, energy and capital. Cost-benefit analysis is implicitly, if not necessarily explicitly, built into the process of applying for and spending research funds.

I further find the flow and focus of the paper difficult to navigate, particularly in sections 1, 3, and 5. Consecutive paragraphs are disjointed, and there are frequent awkward sentence constructions. I have identified specific locations (below) where this awkwardness precludes clear understanding of the intended meaning. There is a lot of content within and among paragraphs that could be shed for better streamlining of the main arguments.

There is a lot of good content here, and thoughtful consideration of theories and practices that could support hydrologic research focused on human engagement and needs. A major revision could help deliver that content, and it is possible that a more coherent, comprehensive proposal would emerge in the process.

#### Specific comments

- p. 9491, Line 22, Clarification needed: please specify what “scientific research areas” refers to

- p. 9498 line 6: “specific paths” for flow that are “concentrated in space” are usually referred to as “preferential flowpaths” in the literature. May want to use this language here too.

- p. 9499, Modeling section – need to describe boundary conditions. Is infiltration measured with the tracer or other method? Shouldn't the modeling section come after

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the discussion of the collected data?

- p. 9501, Conclusion here – that trenches increase groundwater levels – is not convincing as written. The description of the methods jumps around such that this conclusion is abrupt.

- p 9503 How does TRMM data help with vegetation growth detection?

- p. 9503 Seems like if freely available data was needed, LANDSAT would be a much better choice than MODIS at the small spatial scale of consideration (hectares). Perhaps the weak results from this analysis discussed later have to do with the satellite data resolution?

- p. 9505 It is not clear how the NDVI analysis shows a short-term effect of contour trenching.

- p. 9510 Suggest rewording section heading 3 as “Human participation in hydrological research and intervention”

- p. 9510, Section 3: the first paragraph for this section seems out of place. It leads with all the negative human (and animal) interventions in hydrological research, when the following conversation is much broader. Also, these negative aspects are mentioned again a few paragraphs later. I suggest starting this section on the second paragraph.

- p. 9513. Again, there is a confusion between human and non-human disturbance in the research process. The paragraph starting on line 8 says “The implementation of the hydrological research was strongly correlated to social relations and aspects.” Ignoring for the moment that this sentence is unclear as worded, I interpret “social” to mean we are talking about human actions. The paragraph goes on to refer to elephants, fine sands, strong winds, etc. Need to focus on humans here or broaden scope of section to include all mishaps in the field (I suggest the former).

- p. 9523: First paragraph on this page is out of place in this section, belongs much earlier in paper.

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Fig. 2: What do the thick black lines indicate?

Fig. 3: Fonts are very small. Color-coding for wells 2 and 3 in lower right figure does not match the map.

Fig. 8: This figure difficult to understand quickly. Need to color-code rainfall axis with rainfall bars to separate visually from NDVI presentation.

Figs 11-12: Can't these figures be combined into one?

Fig. 13: It would be helpful to show the differences in ratings between scenarios, perhaps as a third panel to the right. Reader can't easily evaluate the significance of switching between scenarios. What about ratings for scenario 1?

Table 4-6: I don't see the value of these tables.

Table 7: Need to define the meaning of the “+”, “+”, etc. symbols here as is done in text, and/or skip definition in the text altogether. I also don't understand how these same symbols are used in the “Process” and “Model” columns, are these also monetary evaluations?

Table A1: Need to define “+” symbol again is appendix tables appear separately from prior tables.

Tables A1-9: Need to include case study name in the titles.

Technical corrections

p. 9491 line 21, suggest changing “during a research” to “during a research project” or “during a research effort”

p. 9492 rewrite “Human changes” as “Humans change”

p. 9493 should read either “being prepared for and responsive to surprises” or “being prepared to respond to surprises” or “being prepared for surprises”

- p. 9495 line 3 – should this say that “a few efforts quantified a positive effect..”?

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Otherwise, it doesn't make sense to start the next sentence with "on the other hand"

p. 9497 line 6, suggest edit to "an inexpensive dye tracer in powdered form was available in the local market. We dug an area 40cm x 40cm to a depth of 3cm in the middle of the trench and evenly applied the powder, replacing the dug sediment after"

p. 9512 Instead of "shape" (lines 23, 25), use "design"

p.9530 Should this say "a longer" sampling period for isotope tracers is added?

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