I. Summary of the review
This work attempts to increase our understanding of rainwater harvesting tank systems used in regions where biophysical and sociological factors are relevant. In particular authors focus on the water-exchange dynamics of these systems both at tank and catchment scales. The work is of interest and suitable for this journal as it deals with a relevant topic, and clearly has the potential to contribute to the science of socio-hydrology.

Thank you

Nonetheless some issues need to be addressed prior to acceptance for publication. In particular I have certain concerns with some methodological aspects, which are described below.

We have addressed these comments below.

II. Major comments:
1. The application of the White method: I think there are two issues here that need to be better clarify, as the method is central to the research and the results. In particular, Eqs. 1 and 2 seem to imply that sluice flow takes place only during the day. Is that the case? Is it a valid hypothesis? Could the term -S_o be in equation 1 instead of equation 2? The manuscript mentions that at certain points ET seems to reach very high values. I am wondering if this is partially due to how S_o was considered in Eq2.

Sluice flow does indeed take place both day and night. We therefore make an assumption of 24-hour sluice outflow in our calculations (see line 265). The h is the hourly nighttime drop that includes both sluice outflow and groundwater exchange (GE). Therefore, when *h* is multiplied by 24, we get the total daily drop due to sluice and GE. The remaining flux is then assumed to be ET, as captured in equation 1. To clarify, we will add text to define *h* (the nighttime slope) as including both GE and S_o.

Moreover a value of S_y = 1 was adopted, whereas section 4.3 is mentioned to be a section where "important caveats regarding this assumption" are presented. There is no section 4.3, and I do not see a strong analysis elsewhere in the document addressing the assumed value. Indeed the specific yield concept applied to these equations is not totally clear to me, and I think it could be better presented in the text.

We apologize for the confusion. The section number referenced here should be 4.1.3, not 4.3. This will be corrected. We will also add text to sections 4.1.3 and 4.1.4 to better address our use of Sy = 1 and related caveats to determine ET (4.1.3) and groundwater exchange (4.1.4) as depth and volume losses of surface water storage. For more details regarding this new text, see specific responses to comments by Anonymous Reviewer 1a.

2. The approach to analyse the no-tank scenario: Authors mentioned the "Strange method" to simulate this scenario, which I think it is not well known for the community. Furthermore, the reference provided (Shanmugham and Kanagavalli, 2013) seems to be a local publication in India. Nothing is said about the method despite its application is critical, as important results and conclusions are based on the simulations of the system with no tanks using the model. How does it work? Is there any bold assumption? How should the reader approach the results based on potential limitations of the model. I think a better explanation of the model is critical.

We have added the following details.

The Strange method is an empirical method that is widely used by government departments in India, including the public works department of Tamil Nadu, for computing the runoff yield from the catchments of irrigation tanks and small reservoirs (Latha et al. 2012). In this method, daily runoff is calculated as a percentage of daily rainfall, based on tabulated values in which % runoff is expressed as a function of (a) rainfall on that day, (b) antecedent rainfall conditions, and (c) catchment characteristics (Shanmugham & Kanagavalli, 2005). For example, with a 50-mm rainfall, runoff could range from 10% for a dry catchment to 34% for a wet catchment, with the catchment condition (wet, damp or dry) being determined based on the days since last rainfall and the intensity of the preceding rainfall events. The Strange Method has been shown to provide results comparable to those obtained with the more commonly used SCS Curve Number method (Latha et al. 2012), but is more representative of the south Indian conditions that are the focus of our study.

Moreover, the classification of the landscape with three domains seems to be a very specific decision that could be better supported, both through a clearer rationale and a sensitivity analysis (for example, recharge for domains 2 and 3 are very specific. Particularly for the domain 3, a very specific value of 17% of rainfall is used).

Thank you for the comment. We will rewrite the section to clarify better the objectives and assumptions. We will also add a figure that illustrates the three domains. Our goal in this section is not to develop an exact model for the watershed, but to demonstrate, quantitatively, that tanks provide a significant recharge benefit. The three domains characterize the three areas of the watershed in which we expect the recharge function to be significantly different – the tank bed area, the command area and the rainfed catchment area. This is because the significant irrigation in command area leads to increased recharge, recharge is higher in tank bed due to standing water, while in the rain-fed catchment area, recharge would be the typical values based on the prevailing land use. The 17% number is based on studies in the area with similar land use, and we do not have enough information, or a

detailed model to do a proper sensitivity analyses in this study. Future work will include this. We will add some of these details to the text for clarification.

3. In section 4.2.3 it is not clear whether the "wasted" water from the different tanks is indeed wasted. Sluice flow from one tank could enter the next ones and be used for irrigation. The analysis seems to be only local in this regard, although the authors have point out the relevance of a systemic approach. Please clarify.

Thanks for the comment. Indeed, sluice outflow from one tank can enter the downstream tank via return flows, and/or recharge the groundwater. We will modify this section accordingly.

4. In my opinion, the manuscript is a little bit wordy. When describing my minor comments, I try to identify some paragraphs whose size can be reduced, although throughout the document there are opportunities for reducing the number of words. In particular I think the conclusion section is to long as it dedicates many lines to present a kind of abstract of the work.

We will streamline the manuscript further.

5. The literature used in the manuscript: This is a paper that focuses on a local case study in India, and thus, a significant portion of the references seem to be local reports and publications. Scientific literature is not used to the extent of typical manuscripts in a scientific journal. I fully understand that this situation is explained by the topic of research, but I think the editor may want to make sure that the journal is OK with this

We have added the additional references to appropriate literature.

I. Other comments:
1. In the title, I would suggest changing "at tank and catchment" and simply use "across"

We will make that change.

2. I was not familiar with the term "command area". Maybe it is a good idea to clarify the concept the first time is presented (i.e., ...)

Will do

3. Some descriptions in the first paragraph of section 3 are very detailed. I am not sure whether this is needed.

We will go through paragraph 3 carefully, and get rid of extra information.

4. I suggest removing "found to be" in line 11, page 12130.

Will do

5. I would suggest using a letter different than “h” in eq.1 and eq. 2 because it is easy to get confused and read 24 hours.

Will do

6. I do not understand what the authors are proposing in lines 7-9, page 12132. Moreover, the end of this paragraph could be reduced with the support of figure 1.

The White method cannot be used to estimate ET on days with rain. To estimate ET on those days we used interpolation. We will clarify those sentences to describe that better. We are not sure how the end of this paragraph can be reduced as the reviewer proposes.

7. Because of the results described in line 24-25, page 12134, in Fig. 5 I would suggest to color differently the ET fluxes when inundated areas are larger than 25% of the maximum area. Moreover, how are the +/- values estimated or computed? What is the precise meaning of them?

We feel that coloring it different makes the figure look busy, and would prefer to use only the dashed line to show the difference.
The +/- values are the standard errors of the estimate when we provide only one average value over the entire season. We will add the information to those lines.

8. Line 9 and 10 in page 12135 define again S_y. Is it needed?

We will delete that definition

9. In general, captions of figures are unnecessarily long. One thing that authors should do is to better use legends to explain the meaning of the different series in the plot. Currently they use the caption to do so.

We will condense the figure captions

10. Rewrite sentence in lines 9-10, page 12137 in a simpler manner.

Will do

11. Line 20-22, page 12137. Why using “most” if only one reference is provided?

We cannot understand the question. There is no reference provided here, and this is based on our data.

12. Some tables could be simplified. Maybe the magnitudes and corresponding percentages could be presented in a single row using the value and then the percentage in parentheses.

We will follow the suggestion to modify Table 3

13. At the end of page 12138 authors mentioned that "These relatively small percentages contradict the established view of tanks losing a significant fraction of their water through ET". I think the sentence is more accurate if the ET vs recharge comparison is explicitly mentioned. In other words, I think the current sentence can be read as if ET in the study area is small. Indeed what happens is that the ratio of ET vs recharge is small, and thus recharge itself can be really high in the study area.

We agree and will modify the sentence accordingly following the suggestion.

14. Figure 11 is cited several times, although is not included in the manuscript.

We apologize for the mistake. It is actually Fig 10 we are referring to. We will make that change.

15. Line 3, page 12142. It should be Brouwer et al. (1989)

Will change

16. Table 1: What is the meaning of column %total? Is it needed?

We apologize for the confusion. That heading should read % of workforce that is agricultural and should be under population and not land use. We will correct this in the table.

Table 2: Meaning of current tank capacity? What area the implications and meaning of soil types?

Current tank capacity is based on our measurements, while historical tank capacity is the information we received from tank memoirs. Different soil types in different tank areas indicate the possibility of different groundwater exchange dynamics. We do see very different dynamics in Tanks 1 versus the other three tanks. We will discuss in the discussion section, and also add some text to the table caption differentiating between historical and current capacity.

17: Could you locate the weather station in figure 1a?

Will do

18: remove "a" in "view of a tank 4" (caption of figure 4)

The caption of Figure 4 reads "Tank water level and daily rainfall for the four tanks over the North East monsoon season. Tank water level is measured from the deepest point of the tank". So, we are not certain what this means.

19. I think equations are not needed in figure 3

We have removed the equation in Figure 3, and referred to the corresponding equation in the figure caption.

20: Figure 4: Because of the temporal scale, the initial conditions for the tanks are not clear. Maybe you can talk about it. Additionally, Why water levels in tanks 1 and 2 are plotted only until January?

The tanks were dry at the start of the monsoon season – so stage was zero at start. We tried to select the wells at the deepest points in the tank so that when the sensor in the well doesn't show a reading, the tank has no water. Unfortunately, the placement was incorrect in tanks 1 and 2, leading to the sensor in the well being dry earlier, while the tank still had some water at the deepest point. We will add this information to the figure caption for clarity.