

## Comment on hess-2021-506

Anonymous Referee #2

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Referee comment on "The role of multi-criteria decision analysis in a transdisciplinary process: co-developing a flood forecasting system in western Africa" by Judit Lienert et al., Hydrol. Earth Syst. Sci. Discuss., <https://doi.org/10.5194/hess-2021-506-RC2>, 2021

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In this interesting manuscript, the authors have conducted a brilliant participatory MCDA study. The topic is exciting and meaningful. Furthermore, the methodology applied is robust and innovative, and the final outputs are of good quality. The authors are thorough in their investigation (e.g. by conducting uncertainty analysis), which I really appreciate. The graphs and Figures produced summarize well the outcomes. In summary, the research conducted is outstanding.

However, the use of abbreviations for the different configurations of the FEWS system makes it very hard to follow. Furthermore, I have some major concerns regarding the text length. It currently has 40 pages, which is too much. Because of that, the article currently lacks focus. Especially the abstract and introduction should be revised to reflect the work that was done. The ability to simplify means eliminating the unnecessary parts of the text so that the necessary ones can "speak".

### Main comments

- The abstract should be revised entirely. Currently, it is not possible to follow it due to vagueness. I understand that the authors have done some exciting research and want to show all of it. However, when reading it for the first time, I could not grasp what the paper was about. Please see the specific comments for details on how to improve it. In general, I would say your research has two main complementary goals: (1) the development of the FANFAR flood forecasting system using MCDA and problem structuring, and (2) analyzing the suitability of MCDA in transdisciplinary projects. These could even be two separate papers....
- The introduction follows a very fuzzy order that makes it harder for the readers to read. The authors come back and forth, which makes the text longer. I would suggest using the traditional "formula" for the introduction: (1) What is the problem? (2) Are there any existing solutions (i.e. in the literature)? (2) Which solution is the best? (4) What is

its main limitation? (i.e. What gap am I hoping to fill?) (5) What is the goal of the paper. What do I hope to achieve?

- Section 2.2 is, in general, very well written and is a good reference for PhD students. However, the authors mix review and their own methods. I suggest having it very clear when the review ends, and when your method starts. I recommend having a section called "2. Review" or something similar with the items 2.1 and 2.2. and a New section "3. Methods" starting on Line 230. It could be something titled "3.1 Proposed transdisciplinary MCDA" and then you should clarify that it is applied in FANFAIR.
- The coding system used for the objectives and configurations makes it very hard to read the paper. I suggest having real names instead of "a\_fast.-dev" use "fast development".
- In general, the text is too long to follow and read at once. It is, in most cases, easy to understand what the authors mean, so it is not a problem of the English, but of the length. The authors seem to have many ideas, but the text needs to be restructured to highlight what is more important. I disagree with referee 2 that asks for a review of standard MCDA methods (there are several of these out there). On the other hand, I agree with referee 1 that the choice for the compensatory method should be clarified.
- In the conclusions section, the authors re-state many of the findings/discussion, which was a bit repetitive. I suggest having some more "punching" conclusions.

## Specific comments

Line 11: it is not clear what is the „FANFAR system“ here in the abstract. I suggest rephrasing to add "of the " FANFAR forecasting system. Perhaps you can use established acronyms such as FEWS to be more specific and avoid repetition/long sentences.

Line 12: Again, it is not clear. Objectives of what? What are these configurations?

Line 15: "we investigated if problem structuring helps focus early technical system development." What is meant here? Early technical system?

Line 16: What is understood by "full" MCDA". What would a partial MCDA be? Please be more specific

Line 16: This last objective is a bit disconnected from the others. Hence, I would suggest rephrasing: "Thirdly, to support further research on xxxxx, we critically analyzed..."

Line 19: "MCDA met many requirements to achieve this framework" or something similar

Line 27: projections of what? Of impacts? Of runoff quantities?

Line 30: I am not sure how meaningful is to add the information “double the number of 2019”. Why is 2019 used as a reference? It would be more robust to have a comparison of the average the last 10 or 20 years.

Line 35: I suggest adding references to back up this sentence that there are problems in existing systems. These articles could be potentially relevant (please check in detail if relevant before citing):

<https://www.sciencedirect.com/science/article/abs/pii/S2212420920312966>

<https://link.springer.com/article/10.1007/s11069-016-2537-0>

<https://onlinelibrary.wiley.com/doi/full/10.1111/jfr3.12664>

Line 43-53: If possible, I suggest cutting a bit of the text here, as the paper is already very long.

Line 54: Please start another line here

Line 54 to 63: Here, you describe the methodology adopted, which, in my opinion, should be in the methods section. In the introduction you should rather focus on the problem at hand. Why it is important to address and how your proposed approach improves the status quo. The justification needed appears only later, in line 63. Perhaps you could invert the order? First the problem that exists and then how you want to address it. Also move parts of the text in lines 54 to the methods session.

Line 75. The aim of the project should be stated when you speak about the project in 1.1. Here, please focus on the aims of the paper.

Line 79-80. I would remove this sentence as it reads more as a project report than a scientific paper. Not sure how relevant this is

Line 87: which special issue? Please specify the name of it in addition to the reference. Here you are again stating the problem

Line 99: why aren't the research questions together?

Line 100-109: I suggest removing this to reduce the text, but it's a suggestion only.

Item 2.1. These topics have appeared in the abstract but not in the introduction (sustainability and transdisciplinarity). It should appear as one of the research questions too. In general, section 2.1 is well written. Still, I suggest reducing where possible.

Line 138: why the need to emphasize ""Nature Sustainability" here. I Would say that recent articles propose without referring to the journal as a measure of perceived quality.

Table 2: It is quite challenging to read this table. Perhaps it could be in landscape format? Using the "ID" does not help as I had to return to the table multiple times Would it be possible to have the full description in the tables and figures "e.g. Fast development" instead of "a\_Fast-dev"

Figure 4: Please remove the \_ and add the full legend to the figure.

Line 430: This should be in the results section, not in the methods.

Line 567. 12 is a relatively low number of responses. It would be good if in Figure 1 you could add the number of participants in each workshop. This would be good to understand these 12 responses you got.

Table 4: I enjoy the table, it provides an excellent summary.

Line 839: Value Focused Thinking appeared for the first time here. It should be In the methods.