Comment on hess-2021-506

Anonymous Referee #1

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-RC1, 2021

Dear Authors,

The draft manuscript provided an interesting approach to designing a transnational/regional flood forecasting system using MCDA. This is a rather new approach to integrating user requirements on systems design considering the large scale and engagement of many transnational stakeholders. Whilst, MCDA has been used in environmental topics such as to assess vulnerability, risk and decision making in finding the best solutions.

The approach built upon the concept of inter and transdisciplinary research, integrating stakeholders' expert opinions with scientifically sound facts. The development of the system started with stakeholder analysis to identify the right stakeholders to include in the process. The requirement for the MCDA was then defined in a participatory manner, the objectives/criteria, attributes/indicator and weights.

In general, the important concepts has been sufficiently described in the manuscript. There is however a concept that I think was misleading. On page 9 line 233 –" As first step of the MCDA process, we undertook a stakeholder analysis (e.g., Grimble and Wellard, 1997;Lienert et al., 2013;Reed et al., 2009), which is often neglected in MCDA projects." , Page 25, line 577, "..MCDA…it can be very suitable for identifying stakeholders …." and similarly in page 28, line 682-683. In my perspective stakeholder analysis is important when you do any participatory research works and MCDA is a technique to integrate different criteria to select the best possible options. Hence it is not always that MCDA equates to stakeholder identification.

To improve the manuscript, I would suggest providing a brief review of different MCDA techniques such as SAW, TOPSIS, etc. and to elaborate on why the choice of the compensatory method used in FANFAR. Similarly, also for the weighting method. Please

also elaborate more clearly on how the value function curve for the attributes was derived. In a participatory manner and what is the process?

On page 13 line 347, here it presented that seven evenly spaced levels were created for the sub-attribute (worst, very bad, bad, neutral, good, very good, and best). This attribute level was transformed from 0-1 values using linear interpolation. Having a linguistic term, why was the Fuzzy set theory (Chen and Wang 1992) not considered in converting it to crisp number values?

Page 13, line 355, elaborate why two methods for weighting was used for different language groups. Why Swing and Simos?

Page 15, line 403, how did you come up with 1,000 Monte Carlo Simulation? Please elaborate on the combinations

Page 21, line 514, were you able to capture in context why the differences in weight preference? This may give you additional insight into the stakeholders' perspectives.

Page 33, line 791, many were satisfied with its performance during the rainy days of the year 2020. Were you able to gain some information on some numbers of true and false predictions? This may be helpful to correlate with the satisfaction of experts.

Page 33, line 805, any discussions on how the FANFAR Flood forecasting system be maintained in the far future?

I also find that the drafted manuscript needs revisions on the flow of thought in writing. Please see across the manuscript. Numerous contexts are somehow incoherent. Such examples were:

- page 2, line 31, "Worldwide, good operational flood forecast systems, giving accurate, timely, precise, and understandable forecast information and alerts, provide effective and affordable help to anticipate and minimize flood impacts (Perera et al., 2019)".
- page 29 line 707 " When creating FANFAR system configurations, it became evident that e.g., frequent power cuts and slow internet in West Africa need consideration. Multi-Attribute Value Theory (Eisenführ et al., 2010) allows later including system configurations (Reichert et al., 2015). ".
- Page 27, line 660, I do not see the relevance on mentioning the MCDA in building collaborative research "…In the FANFAR project, building the collaborative research (or project) team with consortium partners from Europe and West Africa was achieved

(step 1a, Table 1), but not by MCDA…" The statement somehow does not fit.

Other comments:

- For some parts, the literature, section and abbreviation/text referencing are cited almost every after sentence. This becomes inconvenient to read. Such example is page 42, line 688 "To foster joint understanding, commitment, and trust, many of 31 analyzed transdisciplinary projects provided e.g., trainings, or attractive visualizations of recent research (Schneider et al., 2019). Capacity building can be promoted by working in integrated ways of knowledge coproduction discussed above (Caniglia et al., 2021), or with capacity building courses (Wuelser et al., 2021). The FANFAR project offered many training and capacity building opportunities, which cannot be attributed to MCDA."
- Page 18, line 468, table 2 text description can be presented as a footnote below the table rather than as part of the caption. Same for table 3 and others
- Page 19 "..g_Attractve Most attractive in West Africa:…" This I do not understand.
- Page 24 Figure 7. I see no value of information of having colors of dots.