

Interactive comment on “Towards impact-based flood forecasting and warning in Bangladesh: a case study at the local level in Sirajganj district” by Fabio Sai et al.

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The authors would like to thank the reviewer for providing very relevant feedback to our work. We think that the comments will help us to improve the manuscript and increase the chance of its publication. In the following we are providing our replies to the comments.

Comment # 1: Page 1, line 1: On the scientific relevance of the work beyond the specific community addressed in the research. Response # 1: As a response to your general comment regarding the scientific relevance of our work, we would like to remark that Bangladesh is a country prone to large scale fluvial floods and those who are af-

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ected, may be from different locations, are often belonging to the same social context. In fact, although communities differ, similar local structures can be found elsewhere (i.e. farmers cultivating agricultural field in low lying areas and/or domestic farming, households, small-scale industries, etc.). Thus, the main point of our case study is indeed to stand key elements that can be tested and deepened through further research: impact-based warning thresholds and an approach for delivering tailored flood warnings. We sincerely believe that this work can address the scientific community towards innovative and feasible impact based forecasting techniques for developing countries, which is spearheaded by the World Meteorological Organization's input.

Comment # 2: Page 1, line 1: Manuscripts reads more like an NGO report and less like a scientific paper. Response # 2: We agree that the manuscript is verbose. This is mainly due to the topic that it addresses. Impact based flood warning is a new topic and its usage in countries like Bangladesh is limited. Therefore, there is a need to portray the state-of-the-art of the flood warnings and its limitation. This part will have to be descriptive. In the revised manuscript we will explore to present the manuscript in less descriptive way, including adding more figures and tables.

Comment # 3: Page 1, line 1: Large use of abbreviations do not ease the reading. Response # 3: We agree that too many abbreviations have been used and they hinder easy reading. We are avoiding to provide a list of them as that may not help in easy browsing through the text. We will work on the revised manuscript to remove some of the details and in further abstracting information so that the need of abbreviated names of organisations and procedures will be less required. This response will also (partly) address the main comment of the reviewer about the scientific relevance of the manuscript beyond the specific community addressed in the study.

Comment #4: Page 1, line 26: "First insight" on a "case study "is not really a great selling argument for the manuscript Response #4: The phrase "first insight" does not refer to the case study but towards the critical analysis of possible impact based forecasting in Bangladesh illustrated with a case study.

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Comment # 5: Page 2, line 10: Is all this part of the (UNISDR, 2006) citation? Response # 5: Yes it is, we will revise the manuscript for clarifying this citation according to the newer issue of 2018 https://ane4bf-datap1.s3-eu-west-1.amazonaws.com/wmocms/s3fs-public/ckeditor/files/Multi-hazard_Early_Warning_Systems_A_Checklist.pdf?fVgoQYM7LhPb3oR0V97j2.Qkjs3Wc5Rq

Comment # 6: Page 2, line 19. “I miss here examples of IBFW implemented in other areas”. Response # 6: The examples are briefly provided in the existing manuscript. We request the attention to the existing text on page 2, line21: “Although recently introduced, best practices can be found in national meteorological services, like the UK Meteorological Office (UK MetOffice, 2017) and the United States National Weather Service (US NWS, 2017), as well as in international programs led by WMO through dedicated workshops (WMO, 2017).”

Comment #7: Page 2, line 26: Suggested references: You might find also information in Ronco, P., Gallina, V., Torresan, S., Zabeo, A., Semenzin, E., Critto, A., and Marcomini, A.: The KULTURisk Regional Risk Assessment methodology for water-related natural hazards – Part 1: Physical–environmental assessment, *Hydrol. Earth Syst. Sci.*, 18, 5399-5414, <https://doi.org/10.5194/hess-18-5399-2014>, 2014.

Ronco, P., Bullo, M., Torresan, S., Critto, A., Olschewski, R., Zappa, M., and Marcomini, A.: KULTURisk regional risk assessment methodology for water-related natural hazards – Part 2: Application to the Zurich case study, *Hydrol. Earth Syst. Sci.*, 19, 1561-1576, <https://doi.org/10.5194/hess-19-1561-2015>, 2015. Response # 7: We will go through the suggested references and will add citations. We are thankful to the reviewer for the valuable suggestion.

Comment #8. Page 4, line 3: This does not belong in the introduction. Response #8: We thought of providing the text on state-of-the-art of flood forecasting and warning in the introduction section. Based on the reviewer’s suggestion we will consider placing it as an introductory text in Section 2.2 (Case study locations and participant selection).

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Comment # 9: Page 5, line 19: “Are you the first using this first step approach? How did other researcher plan the setup of a IBFW”. Response # 9: As mentioned, IBFW is a new initiative without many applications. Some applications are mentioned in the manuscript. However, we have indeed missed mentioning them in the beginning of Section 2. We will refer to the existing success stories in the revised manuscript.

Comment #10: Page 7, Fig 2: Is there any "char" that could be highlighted in Figure 2? Response #10: Figure 2 will be updated to include a “char”.

Comment #11: Page 9, line from 1 to 6: “Very vague and qualitative description on how warning levels have been set. This can be surely improved”. Response #11: We will work on to bring more clarity to this section.

Comment #12: Page 9, line 17: Minor: this Orange is to me much closer to red than to yellow. Response #12: Agreed, we will work on Figure 3 to change the colour.

Comment #13: Page 10, line 10: The reader has to believe you here. Anyway, it seems to reign concordance with respect to the perceived severity of flood impacts. Response #13: Participants at the focus group discussions answered spontaneously and in most of the cases all agreed on a single response. In case there was less concordance on a single event they perceived as representative for a particular scenario, multiple events were then considered and inserted in table 3. We decided to choose the one with the lower recorded water level.

Comment #14: Page 11, line 5: “Is there any way to put uncertainty bands in these quite precise numbers?” Response #14: We agree on putting a confidence interval. It can be done by adding the upper and minor values to the calculated one according the standard deviation of the correlation formula.

Comment #15: Page 13, line 4: “How can one justify that vaccinations are needed only starting from ORANGE level, while all other mitigation measures are useful also for minor events?” Response #15: The main point in this case is not only related to flood

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levels but also to flood duration. Indeed flood impacts for the significant events (orange code) are related to flood duration of 3-4 weeks. With such a long duration waterborne diseases spread among domestic animals. We will add this explanation in the revised manuscript.

Comment # 16: Page 14 – line from 1 to 14. “I have here the impression, that the authors recognize and acknowledge that this study is possibly out too early, and that higher number and more independent samples might finally lead to different outcomes with respect to the IBFW”. Response # 16: Our main goal is not to demonstrate that the approach studied in this research is a solution that can be applied anywhere. Indeed the data was limited, however, the study demonstrated the usefulness of the approach. The authors have presented a critical analysis and have pointed out the limitations, which point out that for drawing more general conclusions about the approach a larger data sample representing larger area over several flood events will be required. This does not however, contradict presenting a proof of concept with a limited dataset.

Comment #17: Page 14, line 20: It would be more fair to stray with the "individuals" here and do not calculate the percentages. Response #17: We agree with this observation and we will revise the manuscript.

Comment #18: Page 15, line 3: It would be more fair to stray with the "individuals" here and do not calculate the percentages. Response #18: We agree with this observation and we will revise the manuscript.

Comment #19: Page 15, line 26: And suddenly you speak about "probabilistic forecasting", without having introduced it before. See fore example: Bruen, M.; Krahe, P.; Zappa, M.; Olsson, J.; Vehvilainen, B.; Kok, K.; Daamen, K., 2010: Visualizing flood forecasting uncertainty: some current European EPS platforms - COST731 working group 3. Atmospheric Science Letters, 11, 2: 92-99. doi: 10.1002/asl.258 Response #19: We agree with this observation and we will revise the manuscript by being more precise according to “probabilistic forecasting” already in the introduction.

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Comment #20: Page 17, line 4: Summarizing: acceptance of generally accepted colour codes could be observed among the local stakeholders. Response #20: Indeed this is the main conclusion this study wants to lead to. In parallel with this outcome, we wanted to highlight the benefits, the limitations and the challenges for up-scaling the proposed methodology.

We thank the reviewer for providing valuable comments. These comments will certainly help in improving the manuscript.

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