Review of manuscript: *"Flood risk assessment due to cyclone induced dike breaching on coastal areas of Bangladesh"*.

Overview

The paper describes the methods and suggests tools for the probabilistic flood mapping in a polder area of Bangladesh. The study area selected by the author is interesting in terms of its geographical complexity and challenges related to the data collection. The methods used are rather simplified and aimed at giving a general overlook on the problem.

The main concerns

There are however, some major concerns about the idea behind methods and scenarios selection. The research questions should be addressed in Discussion section. One of the main problems is the description and structure of Study area and Methods sections. Some additional references are required in places where it is not clear where exactly the data or information come from. In addition, there is a large amount mistakes in language usage, both grammar, punctuation and word selection. The figures are not consistent throughout the manuscript. Therefore, my recommendation is to return this manuscript to authors for major revisions

General comments

Study area. Due to the specific conditions of the region, it is important to give more clarity and structure to this section. Probably it is a good idea to consider removing some unnecessary information and add more visualisation to more important aspects that are crucial for this specific research.

Research question. Should be stated clearly what exactly is developed within the study and to which degree it is considered innovative.

Methodology. Here are major rewritings are required to increase the quality of the paper. Modelling sub-section needs more clarifying in tools selection and usage. In addition, I suggest more description of the data used for model set-ups and calibration.

The subsection 3.2 Cyclonic scenarios considered; the selection of the values for different scenarios based on the IPCC report is rather subjective. It is suggested to consider regional sea level changes rather than global mean, as there is a significant difference specifically for Bangladesh. This may bring more impact on the outcomes of the study.

Discussion and Conclusion. It would be worth writing how/if the future studies would improve the current outcomes.

The take-home message is rather vague. The discussion section needs major re-writing in accordance to the research questions stated in Introduction. In my opinion such general methods used in this study should be accompanied with rather more detailed (sub)-section on the sources of errors and limitations.

Heroic assumptions such as "lead to economic growth" and "end the problem of poverty" should be avoided.

English. A serious revision of the language is necessary to improve the quality and readability of the manuscript. Among main issues I would outline: plural vs. singular, passive voice use, punctuation, repetitions of the same structures in consecutive sentences/paragraphs, repetitions of abbreviation explanations, articles selection, language use, etc.. The specific remarks do not cover language issues.

Specific remarks

p.2 line 2. According to Neumann et al (2015) 49% of population located in low elevated coastal zone for the year 2000, at that time the overall population of Bangladesh was 139 mil. Values should be corrected.

p.2 line 11. The number US$1.67 million seems rather small, needs additional check.

p.2 line 14. "Raising the crest level …" the sentence is unclear.

p.2 line 15. References needed to indicate which exactly previous studies were done in this matter.

p.2 line 17. It needs more clarification how land use zoning address the flood mitigation.

p.2 line 19. "…of these tropical cyclones will increase…" the statement *will* is rather confident, however it is *likely* increase. We are not 100% sure it will increase the intensity of storms. Look further through the manuscript for same errors.

p.2 line 26. Which exactly severe consequences specifically in Bangladesh? Look at Neumann et al (2015) for ideas.

p.3 line 3. It is recommended to visualise coordinates in Figure 1.

p.3 line 6. The source of census data is missing.

p.3 line 12. Consider the importance of putting the local names of seasons to the manuscript.

p.3 line 15. Some figures on the land subsidence rates may bring more light on the severity of the problem in the region.

p.4 line 12. "Model set up" rather than "model development"

p.4 line 20. The reference on FINMAP is missing.

p.4 line 26. More details on the computation mesh are recommended.

p. 5 line 9. The version of the model is missing.

p.6 line 17. I would include the figures on the land subsidence.

p.6 line 23. The figures of SLR indicated could be updated to the ones for 2100.

p. 7 line 15. It is better not to describe indirect damages if they are not consider further.

p.8 line 16. More reasoning for choosing of the figure of 50% would bring more light on the selection.

p.9 line 7. "More research…" is rather suitable for conclusion.

p.9 line 16. This definition of risk was presented earlier by Helm 1996. See Helm, P. (1996). Integrated Risk Management for Natural and Technological Disasters. Tephra, 15(1), 4-13.

p.10 line 9. It is not clear where M and N are in your formula.

p.11 Figure 4. The boundaries are not clear, some simplification of shapes could bring more readability to the map.

p.12 Figure 5. There is some confusion what exactly this figure is supposed to show.

p.15 Figure 8. The map layout is not consistent with other maps.

p.15 line 6. Some elaborate clarification why 0.5 m is used. My guess, some damages might be underestimated by selecting such high value.