Authors would like to thank the reviewer for the time taken to review the paper and for the suggestions and comments made. These were found very helpful to improve the manuscript.
Please find bellow the answers to the comments.
Remark: Reviewer comments are normal text, authors' response is italic text.

General Comments from the reviewer:
The main issues I have with the paper are as follows;

- **Methodology:** The methods used for calibration, breaching analysis and scenario development are all unclear and open to debate, but the biggest problem is the 1D2D model used. It is not described clearly, and as I understand it, models the sea in the 1D component. If this is the case, it requires a much better explanation and/or figures.

Author's Response:

Thank you for the comment. More detailed information will be provided in the methodology with a flow chart to bring more clarity in the revised version, following your suggestion.

- **Message:** I find the message of the paper ambiguous. The discussion and start of the conclusion mention the dynamics of the case-study, which make sense as discussion topics. However, conclusions about flood forecasting and early warning systems seem out of place. Perhaps the potential development of PFMs for other polders is better suited to be discussed in the conclusions. Lines such as 'end the problem of poverty' should certainly be reconsidered.

Author's Response:

More effort will be put in to create more coherent and connected conclusion in the revised version.

- English: Multiple mistakes are found which distract the reader and give the impression of a careless approach to the work. In the specific comments below, only the ones found in the introduction are listed, but many more exist throughout the manuscript.

Author's Response:

To improve the level of English, native English speakers will be consulted and the revised version of the manuscript will be adjusted following their suggestion.

Reviewer 1:
"P1, Line 22: Presumably this second smaller abstract is not meant to be part of the main abstract. This is perhaps a formatting error during the upload process**."**

Authors' Response:

The error will be adjusted accordingly.

Reviewer 1:
"P2, Line 7: "…to protect the land from flooding due to diurnal high tide". The English here is incorrect. Either 'high tides' or 'the diurnal high tide'.**"**

Authors' Response:

Thank you for the suggested correction. To improve the level of English, native English speakers will be consulted and the new version of the manuscript will be adjusted following their suggestion.

Reviewer 1:
"Also, do the polders not also protect from the heavy rainfall mentioned just before this sentence?**"**

Authors' Response:

Most of the polders of Bangladesh were built under the project titled as Coastal Embankment Project (CEP) in the 1960s. However, several articles and reports such as Mondal et al., 2006, Islam 2006, Islam et al., 2013, Bangladesh Delta Plan 2100, Coastal Embankment Improvement Project (Phase I) (Main Report) etc. indicated that the polders were constructed to protect the land from tidal flooding and salinity intrusion.

Reviewer 1:
"P2, Line 14: "Rising the crest level...". English.**"**

Authors' Response:

As mentioned previously English will be specially checked for improvement.

Reviewer 1:
"P2, Line 16: "Effect of…". English**"**

Authors' Response:

English will be checked and corrected as needed.

Reviewer 1:
"P2, Line 16: "Moreover, non-structural flood mitigation measures such as (…) and (…) is currently unavailable for the coastal areas of Bangladesh". English.**"**

Authors' Response:

English will be checked and corrected as needed.

Reviewer 1:
"P2, Line 23: "Furthermore..". This sentence suggests that SLR is not an effect of climate change. Did Mendelsohn et al. include this in their study?**"**

Authors' Response:

Authors acknowledge that the Sea Level Rise is indeed result of climate change and the paragraph will be rearranged to clarify the message. Moreover, English will be checked and corrected as needed.

Reviewer 1:
"P2, Line 31: I cannot find where the variables of breach width, height and propagation are analysed in the study**"**

Authors' Response:

As the reviewer indicated in the later comments that the breach properties were not independent variables, it should not be included as a parameter of scenario development. Authors acknowledge the suggested correction and the revised version will be adjusted accordingly.

Reviewer 1:
"P2, Line 31: Scenarios mentioned only previously in abstract. Authors could consider a minor revision here**"**

Authors' Response:

Authors acknowledge the suggestion and will be adjusted accordingly.

Reviewer 1:
"P3, Fig. 1: Upazilla term used in figure, but not explained in text. Presumably it is a form of district**"**

Authors' Response:

Thank you for raising this issue the manuscript will be adjusted accordingly.

Reviewer 1:
"P3, Fig. 1: Would it be possible to indicate the extent of the mangrove forests?**"**

Authors' Response:

The extent of the mangrove forest will be indicated in the map following your suggestion in the revised version.

Reviewer 1:
"P3, Line 7: Who has classified this? The authors or a governmental body?**"**

Authors' Response:

The classification was done by the Ministry of Land of Bangladesh. The information will be added in the revised version.

Reviewer 1:
"P4, Line 18: "…simulated using discharge as the upstream boundary…". What discharge? Is it important? Is it correlated to the cyclonic rainfall? Is it negligible in relation to the water level.**"**

Authors' Response:

The authors were trying to describe the developed 1D model which was calibrated against the measured water level and discharge on the river stations and then couples with 2D model. The 1D model was calibrated for normal condition (without cyclones) as hydrometric data during cyclonic events were not available. Moreover, the simulated cyclonic event "Sidr" made landfall in the coast of Bangladesh during the month of November which is post monsoon season. In the past, most of the cyclones his the coast of Bangladesh during the months of October-November or April-May which are pre and post monsoon where discharge from rivers don't play a significant role. The authors acknowledge the "Methodology" section requires more detailed and clearer description and will try to do so in the revised version.

Reviewer 1:
"P4, Line 29-30: "…and the location furthest from the dike breach is most sensitive." Given we don't (yet) know the locations of the breach or in which direction from the breach you mean, this is very ambiguous. You presumably mean in areas of low flow.**"**

Authors' Response:

As suggested by the reviewer, authors intention was to indicate about the sensitivity of the low flow areas to the coefficient of roughness "n", indeed.

Reviewer 1:
"P5, Line 3: This paragraph about data gathering seems out of place, considering that data gathering was described before the previous paragraph about sensitivity analysis.**"**

Authors' Response:

Authors will adjust accordingly in the reviewed version.

Reviewer 1:

"P5, Line 6: Perhaps you should mention that the flood extent data from MODIS data was (presumably) used for calibration.**"**

Authors' Response:

It will be adjusted accordingly.

Reviewer 1:
"P5, Fig. 2. Please indicate the Khaprabhanga river on the map**"**

Authors' Response:

It will be adjusted accordingly.

Reviewer 1:
"P5, Fig. 2. As I understand it, the 1D component of the model stretches right around the polder, from the start of the Khaprabhangra river into the foreshore. Can you indicate the extents on the map?**"**

Authors' Response:

It will be adjusted accordingly.

Reviewer 1:
"P5, Line 12: "For the rivers, the surveyed cross…". You are presumably referring to the Andharmanik and Galachipa rivers on the east and west sides of the polders, but the previous sentence mentions only river. Please clarify this.**"**

Authors' Response:

In the new version of the manuscript it will be clarified and adjusted accordingly.

Reviewer 1:
"P5, Line 13: I find the use of 1D channels to simulate the foreshore very irregular, and feel it deserves more explanation or references of previous methods. Are these channels connected to the river channels? Is discharge a factor? It is not mentioned."

Authors' Response:

Thank you for the comment. The authors tried to represent the condition of the water bodies adjacent to the dikes with 1D model with synthetic boundary condition. As the coast of Bangladesh is flat and shallow, a 2D model for coastal hydrodynamics will require inclusion of larger area of the sea which was not the area of interest and which would have increased the simulation time too. The utilised 1D network was not connected with the rivers as explained earlier the river water didn't play a major role during the previous cyclones as it's pre or post monsoon. The authors acknowledge this requires clearer description. The revised version will be adjusted to provide more detailed and clearer explanation.

Reviewer 1:
"P5, Line 14: 13 control structures are mentioned here, which are presumably the 'Sluice gates' indicated on the map. If they are, please use the same term, and also, why are 13 not indicated?**"**

Authors' Response:

It will be corrected accordingly.

Reviewer 1:
"P5, Line 16: "Therefore, the canal network inside the polder was not included in the 1D model". The canals will have no effect on the dynamics outside the polder, but once flooding occurs they almost certainly will. I understand the DEM resolution will be too coarse to capture them, but this fact should be mentioned**."**

Authors' Response:

The canal network inside the polder was not connected to the river network as during a cyclone the gates of the control structure will remain closed. But the larger canals were included in the DEM. The width of the larger canals were wide enough to be included in the DEM.

Reviewer 1:
"P5, Line 19: Surely the foreshore data has no average slope?**"**

Authors' Response:

The authors agree that the rivers had higher slope than the foreshore area. As the distance between computational points is inversely proportional to slope, the rivers will require smaller Δx and same Δx will reduce instability for the foreshore area too. A clearer explanation will be provided in the revised version.

Reviewer 1:
"P6, Line 13: Are these storm surge heights directly applied as boundary conditions to the 1D model at every 1D cross-section location on the foreshore. I find this very difficult to understand**."**

Authors' Response:

To ensure same water level at all the points of the foreshore reach, same water level was applied at both ends of the reach as hydro dynamic boundaries. The authors acknowledge this requires clearer description. The revised version will be adjusted to provide more detailed and clearer explanation.

Reviewer 1:
"P6, Line 16: This seems out of place, perhaps more suited to the literature review earlier."

Authors' Response:

Thank you for the suggestion. Agreed that part of the paragraph can also be suited in the literature review section and will be adjusted accordingly.

Reviewer 1:
"P6, Line 26: Where is this section? As mentioned it should be in the map"

Authors' Response:

Following your suggestion, it will be depicted in the map with mangrove forest,.

Reviewer 1:
"P6, Line 30: It was previously indicated that the breach geometry and propagation were variable in the scenario make-up (Abstract and Introduction). However in the end they are dependent on the other variables. This should be made clear"

Authors' Response:

Indeed these are not independent variables and should not be stated as parameters for scenario development. The revised version will be adjusted accordingly.

Reviewer 1:
"P7, Line 6: Why not call the scenarios east west and central for simplicity?"

Authors' Response:

The change of the tittle of the scenarios will require the adjustment of most of the figures and tables. Because this is just a matter of choice, authors will see what can be done in the new version of the manuscript.

Reviewer 1:
"P7, Table 1: The SLR variation is based on current conditions and a possible future rise in 2100. This raises the question as to which period the PFMs that have been developed correspond. Perhaps it makes more sense to vary SLR for a given future moment according to the RCP scenarios. Also, the 1/25yr surge height used for the cyclone is presumably for current conditions, but as you explain earlier, this is subject to change."

Authors' Response:

Thank you for your suggestion. As stated earlier SLR has been considered according to the RCP scenarios. The storm surge height for 1/25 yr event was based on current condition. As not enough measured data was available, previous literatures were used for determining the storm surge height

for simulation. Time series data for sea level rise for the study area was not available either. Therefore, the scenarios were developed for the years for which data was available. The authors acknowledge that the section needs to be described more clearly and will be done in the revised version.

Reviewer 1:

"P7, Line 9: I don't understand this. If flooding results from the 3 worst case scenarios are available, it surely means breach locations are already selected. So how does this allow for a critical breach location to be selected? Is this flooding from overtopping of the dikes?"

Authors' Response:

The flooding occurred for breaching only as the crest level of the dike was considered to be elevated to a height suggested by CEIP in the future. Breaching of the dike was considered for all the scenarios, therefore, authors agree that dike was breached already in the three worst case scenarios as well. The intention was to present a methodology to compare and identify a critical location based on damaged caused by flood in case of breaching of dike which could be applied in other locations. Providing better protection at the critical locations might reduce the damage significantly during and after a cyclone. The authors will provide clearer explanation in the revised version.

Reviewer 1:

"P8, Line 3: "…depth-damage curves from elsewhere." This is explained later, but at this point the sentence is very ambiguous."

Authors' Response:

It will be adjusted accordingly.

Reviewer 1:

"P9, Line 5: "The critical location of breaching…" Why is this included here? It adds to my existing confusion about how these locations are selected."

Authors' Response:

It will be adjusted accordingly. The locations were selected on the basis of exposure to the storm surge and placement along the sea facing dike (east, west and central). Will be explained in better detailed in the revised version.

Reviewer 1:

"P10, Line 2: "we have assumed that the probability of occurrence of the hazard and the probability of failure of dike as the same". Can the authors estimate the accuracy of this assumption? Presumably no flooding occurs (from overflow) of the dike in the simulations without breaching, but perhaps wave overflow would occur?"

Authors' Response:

The crest level of the dikes was considered to be at the design height suggested by Islam et al., 2013 and CEIP. Wave action was considered during the calculation of design crest level and a free board was also considered. It can be safely concluded that the crest level suggested by Islam et al., 2013 will be sufficient enough to protect area inside the dike from overtopping during a 1/25 year event. Moreover, the breaching of a dike depends on the physical condition of the dikes and it's soil properties. Neither of these data were available. Therefore, the calculation of probability of the dike breach was not possible. To simplify and to investigate the effect of dike breach, the breaching probability was considered same as the cyclonic event. This part will be described in more detailed in the revised version.

Reviewer 1:

"P10, Line 4: I don't understand the relevance of this reference, as all scenarios used in the study have the (assumed) same probability"

Authors' Response:

The authors intention was to provide reference for the equation used for calculation of probabilistic flood maps. It will be rephrased in the new version of the manuscript, for better clarity.

Reviewer 1:

"P10, Line15: "…comparing the observed and simulated water level and discharge". As mentioned previously, you have not mentioned what discharges are being simulated, or what you are calibrating them to. Also if the cyclone water levels are applied as boundary conditions, surely the calibration is trivial?"

Authors' Response

As mentioned earlier the calibration of 1D model was done for normal condition, not for a cyclone event as no data was available during that event and very few data was available for calibrating the 2D model. The intention of the authors was to present a methodology with which flood risk maps and PFMs can be generated for different locations. This section will be described in more detailed in the revised version.

Reviewer 1:

"P14, Figure 7: Can the authors explain why the damage decreases for larger flood depths?"

Authors' Response

The damage is a function of flood depth but the unit is per unit area(per m^2). Therefore, if the flood extent for higher depth is lower, the damage due to flood might be lower too.

Reviewer 1:
"P15, Line 6: Ignoring depths less than 0.5m seems quite extreme, can the authors explain why this was done?"

Authors' Response

The developed damage curves suggest that the damage for flood depth below 0.5 m is minimal. Moreover, the authors tried to explore the effect of living with flood concept. Also tried to consider the uncertainty of the DEM and the 2D inundation model. The depth as 0.5m is an arbitrary depth. For a country where flood is a recurrent phenomenon with larger depth, living with flood might be already adopted by the local people.

Reviewer 1:
"P16, Line 22: "Figure 4 demonstrates that the depth of flooding gradually decreases as the water moves inland". This is not true, the figure only shows inundation extent. Perhaps the authors mean imply."

Authors' Response

It will be adjusted accordingly.

Reviewer 1:
"P17, Line 18: "…(Fig. 8). Therefore, although canals play a crucial role in the economy and social life of the area, they also increase the risk of flooding". This is a strange, and in my view, inaccurate conclusion. Figure 8 shows the residential areas as high risk because they are more valuable. They happen to be situated beside canals."

Authors' Response

Indeed the residential areas had higher depth damage ratio than other land classes. But the residential areas were flooded primarily for being by the side of the canal. The authors' intention was to state that as these areas are adjacent to the canals for various reasons such as being advantageous for transportation, also makes them susceptible to flooding and higher damage. The authors will try to explain more clearly in the revised version.

Reference

Mondal, M.K., Tuong, T.P., Ritu, S.P., Choudhury, M.H.K., Chasi, A.M., Majumder, P.K., Islam, M.M. and Adhikary, S.K., 2006. Coastal water resource use for higher productivity: participatory research for increasing cropping intensity in Bangladesh. *Environment and Livelihoods in Tropical Coastal Zones: Managing Agriculture-Fishery-Aquaculture Conflicts.*, pp.72-84.

Islam, M.R., 2006. 18 Managing Diverse Land Uses in Coastal Bangladesh: Institutional Approaches. *Environment and livelihoods in tropical coastal zones*, p.237.

Islam, M.S., Alam, R., Khan, M.Z.H., Khan, M.N.A.A. and Jahan, S.N., 2013. Methodology of crest level design of coastal polders in Bangladesh. In *4th International Conference on Water & Flood Management*.