

Comparison of Present-day and End-Century Multi-hazard Maps for Bangladesh Coast

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Abstract

The geographical location, land characteristics, low elevation from the sea, extremely complicated estuarine network, high population density, high levels of poverty, and overwhelming dependence on nature, its resources and services render Bangladesh coastal region as one of the most vulnerable zone to the impacts of climate change and sea level rise. The dominant hazards for Bangladesh coast are cyclonic storm surge, fluvio-tidal flood, salinity intrusion and river bank erosion. The present-day (PD) hazards of coastal inundation from storm surge & fluvio-tidal flooding, river erosion and salinity intrusion has already initiated large scale migration from this region. Due to climate change and sea level rise by the end of century, we still do not know how coastal hazards from storm surge & fluvio-tidal flooding, river erosion and salinity intrusion will affect this region. To understand the future threads due to climate change sea level rise, future hazard conditions by the end of twenty-first century are assessed by constructing Multi-hazard map of future scenario. A comparison of present-day Multi-Hazard map is made with the end-century (EC) Multi-Hazard map. This also gives an indication of future climate-driven hotspots for the region.

Introduction

- The dominant hazards for Bangladesh coast
 - ✓ Cyclonic storm surge
 - ✓ Fluvio-tidal flood
 - ✓ Salinisation
 - ✓ River bank erosion
- In case of climate change scenario, it is already predicted that the situation will be worsen.
- Future hazard conditions (end of twenty-first century) are assessed to understand the future threads due to sea level rise .
- This gives an indication of future climate-driven hotspots for the region.

Study Area

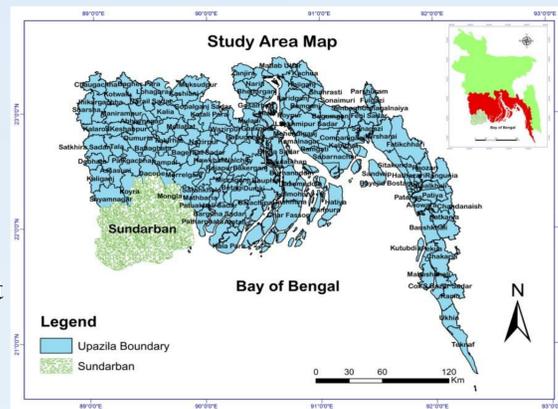


Figure 1: Study area

Methodology

Individual Hazard Maps (PD and EC)

$$\text{Multi-Hazard Maps} = \text{Storm Surge} * \text{Weightage} + \text{Flood} * \text{Weightage} + \text{Erosion} * \text{Weightage} + \text{salinity} * \text{Weightage}$$

Comparison between PD and EC Multi-Hazard maps

Table 1: Individual hazard weightage

Hazard	Weightage
Storm Surge	0.323
Flood	0.098
Erosion	0.308
Salinity	0.278

Results

Table 2: Multi-hazard ranking (PD)

District	Upazila	Rank
Cox'S Bazar	Teknaf	1
Cox'S Bazar	Cox'S Bazar Sadar	2
Cox'S Bazar	Maheshkhali	3
Chittagong	Sandwip	4
Bhola	Manpura	5
Lakshmipur	Ramgati	6
Cox'S Bazar	Kutubdia	7
Cox'S Bazar	Pekua	8
Bhola	Char Fasson	9
Noakhali	Hatiya	10

Table 3: Multi-hazard ranking (EC)

District	Upazila	Rank
Bhola	Manpura	1
Lakshmipur	Ramgati	2
Khulna	Khulna Sadar	3
Bhola	Tazumuddin	4
Pirojpur	Zianagar	5
Barguna	Patharghata	6
Satkhira	Shyamnagar	7
Cox'S Bazar	Pekua	8
Khulna	Koyra	9
Chittagong	Patenga	10

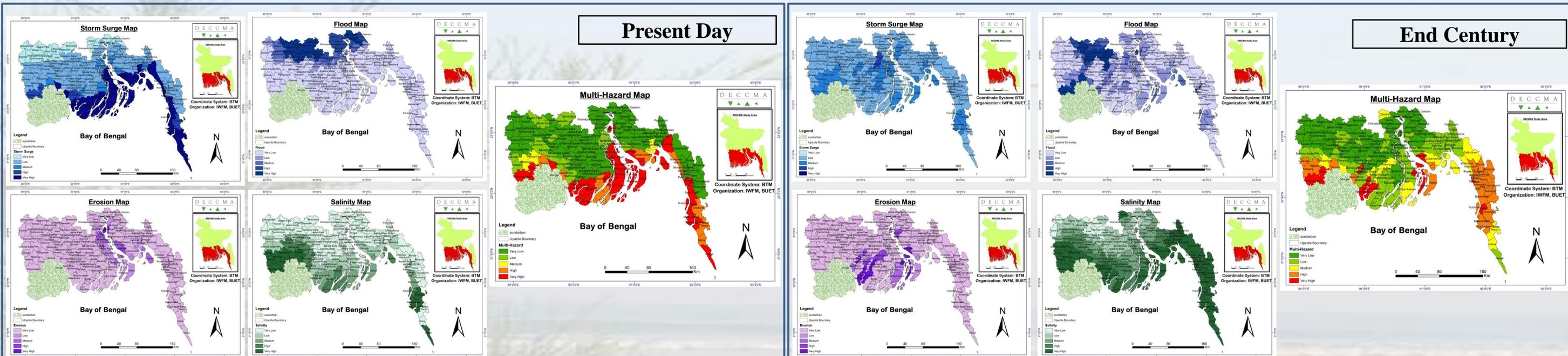


Figure 2: Individual hazard and multi-hazard maps (Present day)

Figure 3: Individual hazard and multi-hazard maps (End century)

Discussion

- In this study, soil salinity is used for present day condition and river salinity is used for end century because of non availability of data. Water salinity is used as a proxy to soil salinity.
- In present condition, polder is not considered for storm surge but it is considered for further sea level rise scenario in end-century.

Conclusion

- There will be major re-shuffle in the rankings of Upazila as a climatic hotspot in end-century. Only two of the top-ranked upazilas for present-day condition will remain as a climatic hotspot in end-century also.
- The ESPA-Delta climatic and sea level rise scenarios are considered valid for the present study. Change of climatic drivers will change the climate-driven hotspots.
- This study is a very preliminary assessment about end century hotspot.

Acknowledgement

