

Multi-hazard mitigation challenges during the Covid-19 crisis? Evidence from the tropical regions

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1. Background

- Across the world, health and disaster managers are experiencing the challenges of responding to natural hazards while minimizing the risk of spreading COVID-19 (Pramanik et al. 2021, Lal et al. 2021)
- Tropical cyclones and floods affect vulnerable communities and result in losses of life and damages to the assets. The drought situations can weaken the agriculture based economy and local livelihoods
- These impacts could be amplified by the COVID-19, mainly during the monsoon season, which is of great importance for informed-planning in the GBM, Mekong and red delta (figure 1)

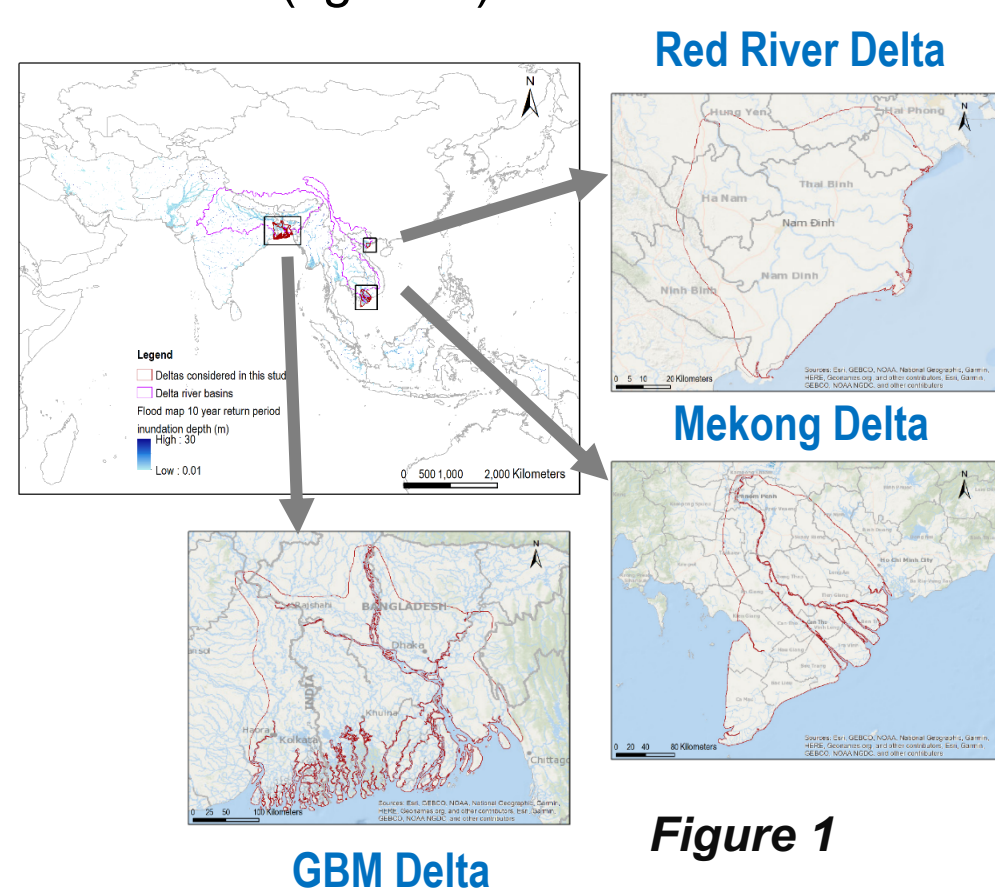
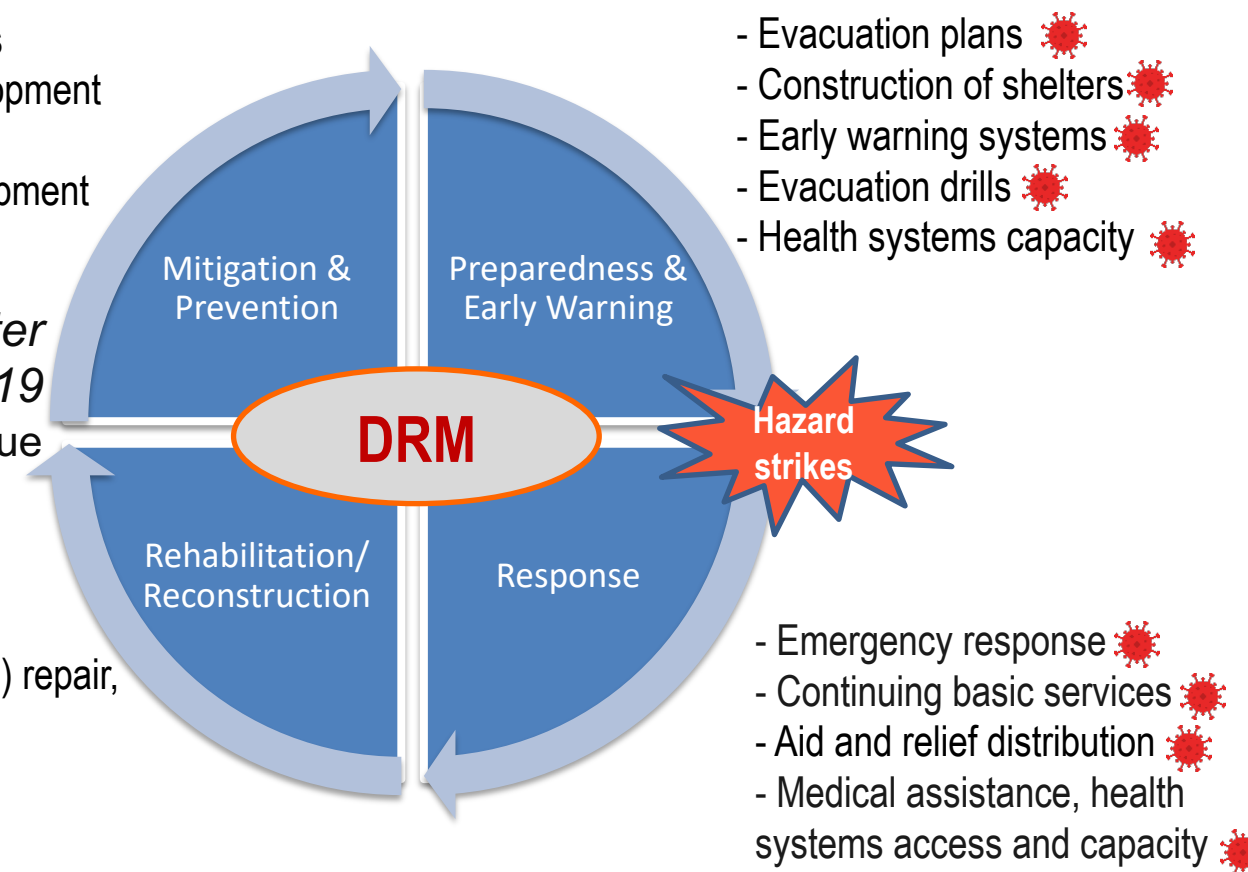


Figure 1

- Construction of embankments
- Regulation on property development in hazards prone areas
- Regulation on farming development

Figure 3 Disaster management during COVID-19 Indicates the mostly hampered due to pandemic

- Short-term (up to 3 years) repair, reconstruction of homes, infrastructure, services
- Temporary housing



4. Results

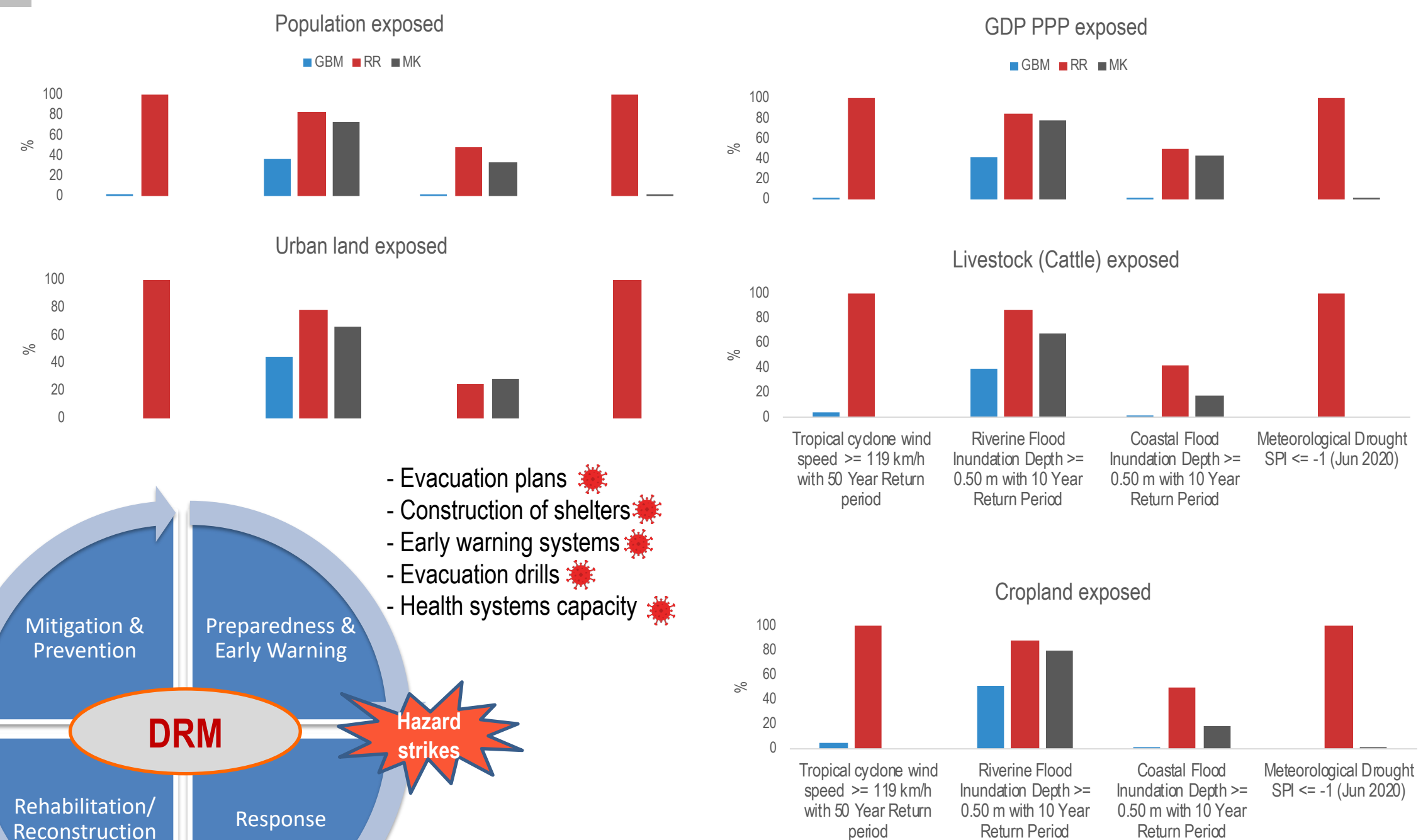


Figure 2 Hazard exposure in the deltas

2. Study Aims

- Quantify population and economic exposure to probabilistic hydro-meteorological hazards (tropical cyclones, floods, and droughts)
- How could the COVID-19 affect the different phases of disaster risk management?

3. Data and methods

- The return periods of natural hazards (e.g., 10, 20, 50, or 100 years), mainly floods, are essential for infrastructure design, planning land use, and mitigation for the deltas
- The socio-economic indicators exposed to monsoon-related hazards used in this study are population, urban area, cropland area, livestock, and GDP (table 1)
- Bilinear interpolation is used for resampling the data to match the grid sizes of the raster data.

Table 1 Details of the data

Data	Spatial Resolution	Period
Cyclone	0.2713°	50, 100, 250, 500, 1000 - year RP
Riverine flood	0.0083°	10, 20, 50, 100, 200, 500 - years RP
Coastal flood	0.0083°	10, 25, 50, 100, 250, 500 - years RP
Precipitation data for drought	0.05°	1982-2020
Population	0.0083°	2000-2020
Land use*	0.0500°	2018
Livestock (Cattle)	0.0833°	2010
Gross Domestic Product (GDP)	0.0833°	2015

5. Key findings

Economic activities exposed to different hazards in GBM delta, about 1.64, 40.86, 0.25, and 2.27% GDP expressed in PPP is exposed to tropical cyclone (50 year RP), riverine and coastal floods (10 year RP), and meteorological droughts (June 2020), respectively.

A higher proportion of socio-economic exposed to riverine and coastal floods was found in RR delta than GBM and MK deltas (figure 2).

The RR delta had the highest population exposure to meteorological drought in June and Jul monsoon months of 2020. In contrast, the MK delta experienced severe meteorological drought in May and July 2020, affecting a larger population.

The relief operations were severely hampered by the COVID-19 restrictions such as social distancing and lockdowns (figure 3).

6. Conclusion

It recommends need for geospatial location maps of the designated tropical cyclone and flood shelters, their designs, and capacities to undertake detailed research on the time needed for evacuation.

References

Pramanik, M.K. (2021). Population health risks in multi-hazard environments: Action needed in the Cyclone Amphan and COVID-19 – hit Sundarbans, India. *Climate & Development*.

Lal, L. (2021) Fragmented health systems in COVID-19: rectifying the misalignment between global health security and universal health coverage, *The Lancet*, 397, 10268, 61-67.