

Tidal wetlands as Ecosystem-based adaptation to coastal flood risks

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Coastal hazards are realities to coastal communities around the world; coastlines and their human settlements face increasing threats due to climate change, such as increasing cyclone intensity or rising sea-level. Traditional coastlines protection structures are mainly engineering structures in need of costly maintenance and adaptations and whose ability to endure will be challenged by climate change induced events. Over the past years and in some regions, the use of preserved or restored coastal habitats as tidal wetlands have been developed, often in complement to more hard engineering structures, to protect populations and economic assets from coastal hazards. This approach, defined as Ecosystem-based management, relies on the ability of vegetation to alleviate coastal hazards and to adapt by sedimentation to the sea-level rise in addition to other valuable ecosystem services.

Our study investigates a specific aspect of the Ecosystem-based management approach, namely the ability of salt marshes and mangroves to reduce storm surges, by comparing the consequences of its presence in the world's most populated deltas. We investigate these consequences using a GIS model that assesses the potential reduction in surge height due to presence or absence of coastal vegetation. The Ganges-Brahmaputra delta in India and Bangladesh is used as a case study to present initial insights on the implications of Ecosystem-based management on a large spatial scale.

Keywords: ecosystem-based management; tidal wetlands; storm surge reduction; GIS