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Successive Cyclones Attacked the World's Largest Mangrove Forest Located in the Bay of Bengal under Pandemic

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Abstract: Despite the global focus on the COVID-19 pandemic, the promise of impact to tropical coastlines and stochasticity of destruction caused by tropical cyclones remains unaltered, forcing human societies to adapt to new unadaptable scenarios. Super Cyclone Amphan's landfall—the third cyclone of the season within the world's largest mangrove forest—brought a new uncertainty to this undeveloped region of South Asia. How do vulnerable people deal with multiple disasters that limit necessary humanitarian response while still maintaining the natural environmental integrity of a system harboring critical wildlife populations and protecting people from further disaster? We explored this reality for the Sundarbans region using a remote sensing technique and found that the western part of Sundarbans mangroves was severely damaged by Amphan, suggesting that rapid remote sensing techniques can help direct resources, and recognize the eventuality that response will be a best effort for now. If 2020 is a window, multiple disaster management scenarios may become more common in the future. Yet, society's obligation for maintaining environmental integrity remains unchanged.

Keywords: Amphan; cyclone; mangrove; pandemic; Sundarbans



Citation: Sharma, S.; Suwa, R.; Ray, R.; Mandal, M.S.H.; Krauss, K.W. Successive Cyclones Attacked the World's Largest Mangrove Forest Located in the Bay of Bengal under Pandemic. *Sustainability* **2022**, *14*, 5130. <https://doi.org/10.3390/su14095130>

Academic Editor: Carmelo Maria Musarella

Received: 19 January 2022

Accepted: 21 April 2022

Published: 24 April 2022

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1. Introduction

Although a positive feedback between global warming and the degree of variability of tropical cyclone frequency and intensity has been a subject of debate, consistencies among simulation models and physical reasoning are capable of projecting at least 3 future scenarios: (1) decreases or no change in tropical cyclone frequency [1–3], (2) increases in intensity with clustering patterns and fractional increases in the number of more intense storms, and (3) increases in tropical cyclone-related rainfall rates [1–3]. Scenarios 2 and 3 explicitly apply to the northern Indian Ocean (NIO) where, despite reduced frequencies of cyclones compared to other basins, the destructive power of cyclones is often much stronger because of the lower social and economic development of the human landscape [4].

The Bay of Bengal (BoB), located at the eastern side of the NIO, is the largest bay in the world, and one of the most populated coastal settings (~500 million people) where the Frequency of intense cyclones has risen recently [5], and with some of the deadliest reported cyclones in recent history. An analysis of all tropical cyclones that formed from 1982 to 2020 over the NIO indicated that the BoB was also a prominent source of cyclone intensification in comparison to the western Arabian coast. The BoB has a warm oceanic-sized water body throughout the year with present sea surface temperatures (SST) of 28–29 °C [6]. These SSTs are greater than the threshold SST for cyclogenesis (25.5–26.5 °C) [7], ensuring