**Ocean Acidification and Hazard Vulnerability in the Sunderbans of Bay of Bengal**

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**Abstract**

Ocean acidification is a consequence of elevated atmospheric carbon dioxide (CO2) levels, a rapidly intensifying global concern with far-reaching implications for every ecosystem. This poster presentation describes the intricate interplay between ocean acidification in the Bay of Bengal, its effect on mangroves of the Sunderbans, and the socio-environmental repercussions on coastal communities. Through an interdisciplinary approach, investigation in done on the pathways of ocean acidification, the dwindling mangrove cover in the Sunderbans, and its profound effects on both natural systems and human societies. The Bay of Bengal, a vital hub of marine biodiversity, is not immune to the effects of ocean acidification as carbon dioxide dissolves in seawater, causing pH levels to drop and obstructing crucial calcification processes essential for marine life. This study explores the diverse pathways through which this acidification occurs in this basin. The Sunderbans, a UNESCO World Heritage Site, stands as a sprawling mangrove expanse straddling the Bay of Bengal. Analysis of satellite data like Normalized Difference Vegetation Index (NDVI) and Land Use Land Cover (LULC) reveals an alarming reduction in mangrove cover, partly attributed to ocean acidification. The complex links between pH reduction and the diminishing resilience of these critical ecosystems are investigated, encompassing shifts in soil chemistry, root zone acidification, and disruptions in nutrient cycles. The rapid urbanization of coastal regions, driven by economic growth and population migration, further augments mangrove loss, disrupting coastal livelihoods. This socio-environmental challenge necessitates thoughtful consideration, particularly regarding the shifting economic dynamics impacting the traditional and contemporary preservation of mangroves. Ocean acidification synergistically interacts with rising sea levels and heightened human activities, hastening the erosion of the estuarine delta. This erosion, evident throughout the Sunderbans, further accelerates the decline of mangrove habitats. Temporal analysis describes the interconnectedness of environmental stressors and their cumulative effects on coastal ecosystems. Mangroves, acting as a natural shield against cyclonic events, provide vital protection to coastal communities. The focus here is on the alarming consequences of reduced mangrove cover, leaving vulnerable communities exposed to elevated cyclone risks. Historical insights highlight the correlation between mangrove loss and increased vulnerability to cyclones. Case studies of Cyclone Aila (2009) and Cyclone Amphan (2020) serve to highlight the tangible implications of diminished mangrove cover, magnifying the destructive aftermath of these cyclones on these regions. Through the examination of intricate connections between ocean acidification, mangrove decline, and socio-environmental dynamics, this presentation accentuates the pressing need for comprehensive conservation strategies that safeguard both natural ecosystems and the well-being of coastal communities in the face of escalating climate challenges.