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Changing Pattern of Coastline and its Impact on Land Use and Land Cover (LULC) in the Lower Meghna River Region of Bangladesh

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Coastal erosion is one of the major natural hazards issue throughout the world. Due to erosion, people living in the coast lose their houses, land, and livelihood. Due to anthropogenic and climatic influences, it is predicted that the erosion will be increased in the future. With an aim to assess the impacts of changing coastline, this study investigates the spatio-temporal changes in coastline movement and its impact on coastal land use and land cover in the lower Meghna river region of Bangladesh. Multi-temporal Landsat imagery from 1988 to 2021 (34 years) were used to quantify the rate of annual shoreline movement. The End Point Rate (EPR), Linear Regression Rate (LRR), and Weighted Linear Regression (WLR) were used to quantify the erosion rates. To assess the impacts of coastline movement on different LULC, twelve different images were classified using Random Forest and Support Vector Machine supervised algorithm. Our results revealed that this region is experiencing dominant erosion over the last three decades. The south region experienced extreme erosion while central region had dominant accretion over the studied period. Our results also found that the agricultural lands are the dominant form of land cover that has been eroded most over time. While empirical results are specific to the project's study area, results can inform this region's mitigation and adaptation strategies. We believe that the findings of this study will be helpful for policy makers in managing and developing associated mitigation and adaptation measures for this part of the coast in Bangladesh.