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Mixed Model Approach: A Climate-adaptive Protection Paradigm for Vulnerable Coasts of Sri Lanka

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Coastal protection measures in Sri Lanka have largely disregarded the important aspect of aggravating impacts of climate change. The current study utilized unpublished data on shoreline geomorphology, community perceptions, published reports, personal experience and expert knowledge to "conceptually design" the climate-adaptive, long-standing protection paradigm; "Mixed Model Approach (MMA)". The MMA comprises of Hard, Soft and Green barrier structures, positioned as respective 1st, 2nd and 3rd line defenses from the seaward limit, at coasts which are vulnerable for sealevel rise. The extent to which these structures are applicable for a particular vulnerable coast is decided based on a calculated Vulnerability Index (VIn) achieved through comprehensive analysis of shoreline physical factors (geomorphological slope, type of coastal ecosystem, degree of coastal erosion and artificial constructions) using high resolution satellite imagery and GIS techniques followed by field verification. The resulting, VIn score can be used to prioritize the urgency for protection, thus suggests the most appropriate structure/s that should be established as the defence/s at a specific stage of protection. Accordingly, the study applauds establishment of all three defences for highly vulnerable stretches, i.e. coastal areas with high VIn score (coastal areas with less slope and less barrier effects), soft and green defences for moderately vulnerable stretches (coastal areas with less slope, high barrier effects or high slope, less barrier effects) and green barriers for the least vulnerable stretches (coastal areas with high slope and/or high barrier effects). Subsequent application of non-structured schemes (restricted coastal extractions and community awareness) is mandatory for successful implimentation of this conceptual design. The authors believe, the conceptual MMA will have the potential to provide long-standing coastline protection ensuring the climate adaptability. However, further research need to be carried out to investigate the validity of the VIn and practicability of such implimentation covering the entire coastal strech of the country.

Keywords: Climate change, Coastal protection, Defence, Mixed model approach, Vulnerability index