APPLICATION OF INTEGRATED REMOTE SENSING AND GEOGRAPHICAL lNFORMATION SYSTEM TECHNIQUES IN ASSESSMENT OF COASTAL EROSION VULNERABILITY

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ABSTRACT: The primary objective of this study was to attempt an assessment of coastal erosion vulnerability of a coast using integrated remote sensing and geographical information system techniques. A quantitative measure, 'coastal erosion vulnerability index (CEVI)', was evaluated by integrating multiple data, viz., erosion-accretion, landuse / landcover and population density on a geographical information system (GIS) platform. The CEVI value was calculated over a 65 km long coastal stretch, located between Rasulpur in Midnapuir district of West Bengal and Subarnarekha in Balasore district of Orissa, on the eastern coast of India. The area includes both erosional and accretionary beaches. Since the study area lies over a tourism site, several man-made structures, such as seawall, groin and pylon, had been constructed at different periods for possible prevention of erosion. Multi-resolution Landsat satellite imagery of 1972, 1980, 1990, 2000 and 2010 were used for identifying shoreline positions at ten year intervals. Shoreline changes show accretion up-drift of artificial structures and erosion along down-drift of structures. These changes were divided into four categories, from 'high erosion' to 'high accretion'. Satellite data were also used to map landuse / landcover, which were categorized into four divisions, 'very high capital' to 'no capital' land use. Population density maps of coastal villages in the study area were prepared using Census data, and divided into four categories, from 'high density area' to 'very low density area'. Finally, coastal erosion vulnerability index (CEVI) was calculated by integrating shoreline retreat with land use type and population density. Zones of vulnerabilities of different

magnitudes, namely, ‘very high’, ‘high’, ‘moderate’ and ‘low’, had been identified. The result indicates that maximum vulnerability values are around artificial structures. The coastal erosion vulnerability index map prepared from this study can be suitably used for proper planning and management of this coastal region.