

ASSESSING THE COASTAL HAZARDS USING UAV IN THE EASTERN COAST OF AMPARA DISTRICT, SRI LANKA

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Abstract: Coastal hazards such as erosion, tsunami, sea level rise, and storm surges are major challenges to the coastal community and to the sensitive coastal environments including the estuarine areas of major rivers, emptying into the sea in which frequent monitoring is pivotal for conservation measures. Therefore, this study attempts to monitor the short and long-term shoreline and estuarine changes and to assess the coastal hazards using the Unmanned Aerial Vehicle (UAV) in the Oluvil coastal area in Ampara district. Severe coastal erosion of the Oluvil beach and its associated hazards were mapped using the UAV which was hovered over the shoreline at 100 m altitude with the 2.73 cm px⁻¹ Ground Sampling Distance (GSD). An orthomosaic imagery was created using the structure from motion (SFM) processing technique using the Agisoft Metashape software. Google Earth (GE) historical images were used to find out the previous state of the shoreline and the Digital Shoreline Analysis System (DSAS) tool was used to find the Linear Regression Rate (LRR) and End Point Rate (EPR) for assessing the beach shift and associated hazards. The LRR and EPR were recorded as -16.8 m year⁻¹ to -17.8 m year⁻¹ and -15.5 m year⁻¹ to -17.7 m year⁻¹, respectively at the Gal-Oya estuary and its southward coastal strip. According to the LRR and EPR findings, 2023 UAV imagery in short-terms showed severe shoreline dynamics compared to 2006 and 2014 GE imagery. When observing during the field visit, several hazardous zones were spotted as a result of severe erosion which were highlighted using the UAV imagery. In conclusion, the shoreline movement and coastal erosion raised alarms of loss and gain in Oluvil beach suggest that the present shoreline changes should be mitigated with integrated coastal zone management (ICZM) plans to conserve the coastal community and the environment.

Keywords: Coastal hazard; Digital shoreline analysis system (DSAS); Google earth imagery; Shoreline change; Unmanned aerial vehicle (UAV)