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GEO-INFORMATION-BASED ASSESSMENTS OF CLIMATE CHANGE IMPACTS AND COMMUNITY RESILIENCE ON COASTAL DEGRADATION IN WEST-AFRICA

Abstract

Climate change environmental degradation had affected the world's natural resources, ecosystem services, socio-economy values and societies to a large extent. However, considerable differences in the range and intensity of these impacts between regions provide insight into cumulative threats to marine biodiversity. Human-induced risks along the coastal zone have lead to coastal degradation from marine pollutants, anthropogenic activities such as untreated discharges of municipal, industrial liquid and solid waste, depletion of marine species, and loss of marine habitat. The research adopted remote sensing techniques with data capabilities from ground-based meteorological station (NIMET), Landsat OLI, and Sentinel-2A satellite imageries, for monitoring the environmental impacts of marine pollutants and wastewater discharge along the Gulf-of-Guinea coast. The high-precision ALOS DSM and TANDEM-X satellite data were used to model the coastal terrain and the slope. The satellite data were processed using a web-based GIS tool known as Coastal Environmental Risk Index (CERI) was used to estimate the level of environmental damage and coastal degradation over the study area. Further geostatistical analysis were performed using the cellular automata and Support Vector Machines (SVM) methods. The results of the research suggested adaptation and protection measures through integrated management of land-ocean interaction in the coastal zone, enhancement of integrated global observation system, and coastal ecosystem-based management. Lastly, adequate information tools should be made available to policy makers and environmentalists to identify the most severe and pressing risks, and to assess and implement the most effective prevention and adaptation measures in reducing pollution of the seas.