

Impact of Change in Land use/Land Cover on Toxic Metal distribution in Mangrove Sediment and Ecological Risk Assessment, Gulf of Kachchh , India

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Economic aspiration leading to land use/land cover change in coastal area is impacting mangroves worldwide. Situated in the fringe of tropics and subtropics, although Mangroves play very important role in biogeochemical cycling of nutrient and metal in coastal and nearby ocean ecosystem. Despite their ecological importance, they are the most threatened ecosystems, are declining at an alarming rate of 1–2% per year worldwide. The present study is done in Mangroves of Gulf of Kachchh, west coast of India, Gujarat which is second largest Mangrove cover of India. Besides, two major and seven minor ports this region is witnessing large urban sprawling, various industries like Asia largest fertiliser Industry, food processing, salt pans and chemical industries are present in this area. Besides anthropogenic activity, this region is also facing sea level rise, temperature and sea salinity. In the present study change in land use land cover was assessed using LISS IV high resolution sensor and NDVI is also calculated to assess the vegetation health status. Heavy metal analysis was done in Mangrove sediments. The average concentrations (mg/kg) of toxic metals were obtained in the following order: Fe> Ti> Mn> Sb> Sr> Cr> As> Ni> Zn> V> Cu> Li> Pb> Mo> Co. The mean values of toxic metals were found higher than the average shale value except for Co, this indicates anthropogenic sources are primarily dominated in the study area. Contamination indices like enrichment and contamination factor, geo-accumulation index, suggest minimal to extremely high level of contamination, and sediments have found extremely contaminated with Sb and As. Pollution load index indicates significant deterioration of sediment quality. Ecological risk and potential ecological risk index also indicate about 72% of sites come under higher ecological risk. The Normalized Difference Vegetation Index (NDVI) suggest that 59.80% comes under very-poor health, 28.89% in poor health, 8.28% in moderate, and only 3.04% in the healthy category. The present study suggests, ongoing land use activity is impacting both the mangrove plant and sediments which will impact the total biogeochemical processes of the mangrove.