

Impact of climate change and human interference on coastal resources in Sri Lanka

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Key words: Lagoon, hypersaline, eutrophication

Abstract.

The coastal zone between land and ocean serves as the end point of impact and effect of all natural and anthropogenic changes in climate and utility. The anthropogenic activities, such as overexploitation of resources, emission of green house gas, deforestation, adhoc irrigational and other development, land use changes, sand mining exerts extensive pressure on the on the coastal zone.

The bar-built coastal water bodies of Sri Lanka are typically shallow and generally open into the ocean by elongated channel with narrow mouths, which effectively restrict tidal exchange through choking. Freshwater supply is seasonal, thus water exchange with the open ocean is poor and varies with season. Poor water exchange results in large daily temperature and strong seasonal salinity variation. Thus, the tropical and sub-tropical coastal water bodies are more sensitive than temperate coastal water bodies. In these sensitive ecosystems, nature exerts profound impacts, while unplanned developments further aggravate the social, economic, and environmental conditions. Thus, management of tropical and sub-tropical coastal water bodies for the protection of water quality, aquatic life and other uses must be approached somewhat differently in the tropics from how it is approached at temperate latitudes.

Human interference in the catchments area and the upper stream converted the seasonally hypersaline Malala Lagoon into almost a freshwater lake, while the typical Puttalam Estuary is converted into a seasonally hypersaline inverse estuary. The Batticaloa Lagoon, particularly the inlets located at close proximity to the agricultural land shrunk up to 200 m, due to the siltation induced by ad hoc construction and adverse land use patterns. Furthermore, enhanced agriculture and urbanization resulted in hyper-eutrophication and seasonal fish kills in the Batticaloa lagoon. The unplanned construction regulation of rivers, and improper practices on the catchments area may result in larger variation in hydrography and water exchange of shallow tropical lagoons than in a normal estuary and could lead to deterioration of their utility, water quality, production of commercially useful species, and recreational value.

The degradation of the coastal water bodies are further aggravated by climatic changes. The air temperature increase in the rate of of 0.01oC - 0.036 oC y⁻¹, while rainfall decrease by 10 to 35 mm across Sri Lanka, except on the northwest coast. Sea level has been increasing at the rate of 1.5-3 mm/yr over the past 100 years. The coastal stability studies indicate that except for the northern most coast almost the entire coast is under different degree (moderate to high) of erosion. The cumulative implications of climate changes possess the potential of inducing adverse effect on the coastal fishery, aquaculture and agriculture.

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