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State of Surface and Vertical Salinity in Puttalam Lagoon during North-East Monsoon

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Abstract

Puttalam Lagoon which covers 226 km^2 located in Sri Lanka's Northwest coast, plays an important role in aquaculture and lagoon capture fisheries. Kala oya and Mee oya are the major freshwater sources which empties into the Lagoon by eastern bank. Salinity variability is an important environmental variable in lagoon system that has an impact on aquaculture and aquatic resources. During the Northeast monsoon (NEM) in 2021, the spatial and vertical fluctuation of salinity in the lagoon was studied using SBE 19plus V2 CTD profiler. Field measurements show that the vertical salinity stratification in the lagoon was substantial during the study period. The lagoon has a significant spatial variability of salinity, ranging from 15 psu to 26 psu and Kala Oya river mouth has a salinity of 22 psu which impacted by freshwater and sea water circulation. The Salinity stratification in eastern section of the lagoon where the Kala Oya and Mee Oya streamflow reach is observed with surface salinity of 15 psu. During the NEM season, the average discharge of Kala Oya and Mee Oya to the lagoon was 10.8 m^3/s and 9.4 m^3/s, respectively, with a mean monthly precipitation of 48.89 mm. Fresh water from the Kala and Mee oya rivers flows into the lagoon during the season, while low evaporation and significant rainfall led the salinity to decline during the wet season, influencing the structure and function of lagoon ecosystems. The study reveals that a significant area of the lagoon is covered by the 20-30 psu salinity range, which is more appropriate for brackish water fisheries, particularly for shrimp and prawns during NEM.

Keywords: Salinity, CTD profiling, Northeast Monsoon, Freshwater