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# Spatial and seasonal variations in mud quality of the Jaffna lagoon in Northern Sri Lanka

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**Background:** The Jaffna lagoon is one of the key marine resources in the Jaffna Peninsula, which provides habitat for a number of fauna and flora, livelihood support for fishing communities in the area and seafood for the local population. However, a comprehensive study on its mud quality has not been reported so far.

**Objectives:** The present study assessed the spatial and seasonal variations in mud quality of the Jaffna lagoon to support the upcoming development efforts in the region while ensuring the sustainability and resilience of the Jaffna lagoon ecosystem.

**Methods:** Mud samples were collected at 30 different geographical locations in the Jaffna lagoon along the coastline from Ponnalai to Kilaly during the period from December 2018 - June 2019, covering both dry and wet seasons, and the selected physicochemical parameters were determined adopting the standard analytical methods. The obtained data were statistically analysed by t-test and correlation coefficient analysis using SPSS software.

**Results:** The lagoon mud samples analysed during the study period covering both seasons revealed the following range of variation for each physicochemical parameter studied: lagoon depth 13-127 cm; pH 6.96-8.82; EC 11.90-108.05 mS/cm; salinity 6.35-65.60 g/kg; sulfate 793-6,250 mg/kg; phosphate 0.00-10.95 mg/kg; alkalinity 825-3,300 mg/kg; and hardness 1,750-14,000 mg/kg. Though some degree of seasonal variation was witnessed for each quality parameter, EC, salinity and sulfate showed significant differences between the wet and dry seasons ($P < 0.05$) while an insignificant difference was observed with respect to pH, phosphate, alkalinity and hardness. In the dry season, all parameters, except phosphate, negatively correlated with lagoon depth while a positive correlation was found with respect to pH and phosphate in the wet season. In terms of spatial variation in the mud quality, a high concentration of phosphate was detected in locations where the stormwater carrying detergents and agrochemicals drains into the lagoon.

**Conclusion:** The study reveals the patterns of spatial and seasonal variations in mud quality of the Jaffna lagoon and helps to understand how the resourceful lagoon could be efficiently utilized for various economic development activities based on these findings without compromising its productivity, biodiversity and sustainability.

**Keywords:** *Jaffna lagoon, Mud quality, Phosphate, Spatial and seasonal variations*

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