

Multimetric socio-ecological assessment of water hyacinth (*Eichhornia crassipes* (Mart) solms) invasion of an urban Ramsar wetland lake

W. M. Dimuthu Nilmini Wijeyaratne (Department of Zoology and Environmental Management, Faculty of Science, University of Kelaniya, Colombo, Sri Lanka)

Uditha Prabhath Liyanage (Department of Statistics and Computer Science, Faculty of Science, University of Kelaniya, Colombo, Sri Lanka)

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Abstract

Water hyacinth (*Eichhornia crassipes* (Mart) solms), a widely distributed invasive aquatic plant in Sri Lanka, has invaded the Diyawannawa wetland lake located in Colombo city, which is the first Ramsar wetland city in South Asia. The present study was conducted to assess the water quality parameters that influence the distribution of water hyacinth and to identify the environmental, economic, and social consequences of its invasion of the Diyawannawa wetland. Five sampling sites were selected from the Diyawannawa lake, and the water pH, temperature, conductivity, total dissolved solids (TDS), salinity, dissolved oxygen concentration (DO), nitrate concentration, and total phosphorus concentration were measured at monthly intervals in the rainy and dry seasons of 2020. The abundance of water hyacinth was recorded at each site at each sampling event. Interviews and focus group discussions (FGDs) were conducted with the representatives of the community associated with the wetland to assess the ecological, economic and social effects of water hyacinth invasion. Principal component analysis of the water quality parameters revealed that phosphorus and nitrate concentrations in water significantly influenced the abundance of water hyacinth. Further, the water quality index (WQI) indicated poor water quality in the sites invaded by water hyacinth. The interviews and FGDs revealed that water hyacinth invasion has adversely affected the lake's fisheries and navigation pathways and increased the frequency of flooding, resulting in an increased mosquito population. The results of the present study highlighted the importance of implementing water quality management programmes in the Diyawannawa wetland to control the invasion of water hyacinth. Further, we recommend increasing community participation in water hyacinth control programmes and providing opportunities for the community to engage in self-employment activities associated with the uses of water hyacinth.

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