MSc Degree in Environmental Science

ASSESSMENT OF MACROPLASTIC POLLUTION IN BELLANWILLA ATTIDIYA WETLAND, SRI LANKA

A dissertation submitted

by

SELLAPPERUMA ARACHCHIGE NISHADI MADUWANTHI

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ABSTRACT

The Bellanwila–Attidiya Wetland, situated in the Colombo District of Sri Lanka, is a vital urban ecosystem that offers significant ecological, hydrological, and socio-economic benefits. However, its environmental integrity is increasingly threatened by macroplastic pollution, primarily driven by human activities. The present study assesses the extent, composition, spatial and temporal distribution, and community perceptions of macroplastic pollution within the wetland. Field sampling was conducted at twelve strategically selected sites in March 2025. Macroplastic debris (>5 mm) was manually collected, classified into seven material types (PET, HDPE, PVC, LDPE, PP, PS, other plastics) and rubber, and quantified by item count and total weight. A structured questionnaire was administered to 100 residents to assess awareness, attitudes, and behaviors concerning plastic pollution. LDPE, HDPE, PET, PP, other plastics, and PS emerged as the most prevalent types, with total weights of 8.16 kg/20m^2, 8.98 kg /20m^2, 6.27 kg /20m^2, 7.04 kg /20m^2, 4.85 kg /20m^2, and 4.47 kg /20m^2respectively, and corresponding item counts of 863 items /20m^2, 467 items /20m^2, 501 items /20m^2, 357 /20m^2, 424 items /20m^2, and 216 /20m^2, particularly concentrated near residential and commercial zones. Spatial patterns indicated higher pollution levels in densely populated areas, while temporal variation suggested seasonal and human activity-related influences. Community survey results revealed that while all respondents recognized the environmental harm caused by plastic waste, waste management practices varied 64% relied on municipal collection, 30% engaged in open burning, and only 30% practiced waste segregation. Moreover, 94% were unaware of local recycling programs. Public perceptions identified primary pollution sources as road users (43%), residents (22%), and stormwater runoff (20%). Respondents showed strong support for mitigation measures, including increased government involvement (94%), stricter enforcement of anti-littering laws (100%), and implementation of localized waste segregation and recycling initiatives. The study highlights the growing threat of macroplastic pollution to wetland ecosystems, emphasizing the need for integrated management strategies, environmental education, and community participation.Continued long-term monitoring and seasonal studies are crucial to support sustainable wetland conservation and inform national plastic waste management strategies.

Keywords: Wetland, Macroplastic, Bellanwila attidiya, Plastic Pollution, Public perception