

Centre for Environmental Studies
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The Open University of Sri Lanka

MSc Degree in Environmental Science

FLORAL DIVERCITY ASSOCIATED WITH DIFFERENT HABITAT
WITHIN KIRALA KELE SANCTUARY IN SOTHERN PROVINCE
AND EXISTING THREATS FOR ITS CONSERVATION

A dissertation submitted

By

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Abstract

The Kirala Kele Sanctuary, situated in the Southern Province of Sri Lanka at Matara, represents a biologically significant wetland ecosystem comprising mangroves, marshes, and transitional forests. This ecologically diverse landscape supports a rich assemblage of flora and fauna, including numerous endemic and threatened plant species. However, the sanctuary is increasingly imperiled by anthropogenic pressures, notably habitat degradation due to garbage pollution and the rapid proliferation of invasive alien species (IAS). This study presents a comprehensive assessment of floral diversity and ecosystem health across four major habitat types within the sanctuary: sparse forest, marshy land, stream, and stream line.

Field investigations employed a stratified systematic sampling approach, integrating quadrat-based vegetation surveys and GIS-assisted spatial analysis. A total of 27 plant species were recorded, including ecologically valuable such as *Sonneratia caseolaris* and *Cinnamomum verum*, as well as aggressive invaders like *Acacia melanoxylon*, *Annona glabra*, *Lantana camara*, *Salvinia molesta*, *Typha angustifolia*, and *Eichhornia crassipes*. Biodiversity metrics, including the Shannon-Wiener and Simpson's indices, were applied to evaluate species richness, diversity, dominance, and evenness across habitats.

Results indicate that IAS dominate several habitat types, accounting for over 70% of vegetation cover in certain areas. This dominance has led to a significant reduction in native species diversity, disruptions in community structure, and impaired ecosystem functioning. Marshy lands exhibited the highest species diversity (Shannon-Wiener Index $H' = 0.81$), while stream habitats showed the lowest ($H' = 0.25$), correlating with intense IAS colonization and degraded environmental conditions. Sparse forests supported the highest total plant abundance (618 individuals), though diversity remained moderate due to dominance by generalist and invasive taxa.

Vegetation cover varied from 70% in degraded marshy zones to 90% in stream line habitats, yet high cover often masked underlying floristic degradation due to IAS prevalence. Soil and water quality assessments revealed habitat-specific physicochemical alterations, including increased salinity, eutrophication, and oxygen depletion, primarily driven by IAS

presence and human disturbances such as livestock grazing, agricultural encroachment, garbage disposal, and fuel wood extraction.

The findings underscore the urgent necessity for targeted IAS management, habitat restoration, and community-engaged conservation strategies. Accordingly, this study proposes an integrated, habitat-specific restoration framework involving invasive species removal, assisted natural regeneration, enrichment planting, hydrological rehabilitation, and long-term ecological monitoring.

By documenting the ecological impacts of invasive species and highlighting key degradation drivers, this thesis contributes to the broader understanding of wetland ecosystem dynamics in tropical regions. Furthermore, it offers a replicable model for biodiversity conservation and ecosystem restoration applicable to similar habitats throughout southern Sri Lanka and beyond.