

(248)

The Impact of Land Use and Climatic Factors in Indirect Biodiversity Conservation of Sri Lanka's Plantation Landscape: Case Study

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Abstract

Two thirds of Sri Lanka's threatened species inhabit the wet zone climatic region where only 14% is protected. Regional plantation companies account for 20-30% of the whole wet zone region highlighting the need for biodiversity conservation outside the protected area network. This study aims to understand the key contributing factors influencing biodiversity conservation within plantation landscapes. Therefore, 25 estates managed by Kelani Valley Plantations PLC were clustered based on seven land distribution variables (total area, elevation, wetland area, built area, forest extent, abandoned area, rock cover), three agricultural variables (tea, rubber and other crop extents), four climatic variables (annual average rainfall, temperature, aridity index, evapotranspiration), and three production variables (tea production, rubber production, greenhouse gas emission from factories). The cluster analysis resulted in three different clusters among the 25 estates. The species richness data of two selected taxa (mammals and birds) was extracted from the company data catalogue to analyze how different land use and climatic factors have influenced biodiversity in these clusters. Cluster one, characterized by the highest means of forest cover, total area, and other production areas supported the highest species richness for mammals and birds. Cluster two with the highest means of tea production area, being more oriented towards production showed the lowest faunal diversity for the selected taxa. Cluster three, with the highest means of rubber production area, temperature, and rainfall demonstrated a moderate species richness for the selected taxa. The findings emphasize the vital role of forest coverage in sustaining biodiversity within the plantation landscape. It is estimated that if the plantation companies increase the land designated for biodiversity conservation by just 4% it can significantly aid the preservation of critical biodiversity elements in the wet zone contributing toward national and global biodiversity targets. While efforts were made to minimize errors by using more reliable taxa for inter-estate comparisons, potential discrepancies may arise due to differences in sampling expertise and methodology. Therefore, biodiversity conservation within plantation landscapes outside the protected area network calls for further intensive research and standardization of biodiversity sampling protocols to enhance data accuracy and conservation strategies.

Keywords: *Biodiversity, Cluster, Conservation, Plantation, Sri Lanka*