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Comparative Carbon Storage of Common Tree Species: A Study at University of Kelaniya Sri Lanka

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Abstract

Vegetation helps to combat climate change through the process of carbon dioxide sequestration. Different species of trees have different rates of growth resulting in significant differences in carbon sequestration potential. The objective of the present study was to assess the carbon storage potential in commonly occurring trees in the University of Kelaniya premises in Sri Lanka. Diameter and height of 269 trees were used as the basis of field data collection. For each tree, trunk Diameter at Breast Height (DBH) was measured at approximately 1.3 m above the ground, and the tree height was determined using a clinometer. Trunk mass was calculated by assuming the dry weight of the stem as 50% of the wet mass and the carbon content as 50% of the dry weight. Allometric equations were used to assess the carbon content. To determine the key carbon storage species, the Pareto Principle was applied. The findings provide evidence that *Terminalia bellirica, Dypsis lutesenes, Ficus benghalensis, Delonix regia, Terminalia catappa, Artocarpus heterophyllus, Swietenia macrophylla, Azadirachta indica, Carallia brachiata, Filicium decipiens, Delonix regia, Mangifera indica, Pterospermum subcritolium, Syzygium cumini, Bridelia retusa* from 44 tree species contribute up to ~80% of the cumulative carbon stock. *Terminalia bellirica* depicted the highest value of 2.4 kg C/m for the carbon per diameter unit followed by *F. benghalensis* (1.7 kg C/m), *T. catappa* (1.5 kg C/m), *S. macrophylla (*1.4 kg C/m), and *A. heterophyllus (*1.3 kg C/m). Therefore, identifying key carbon storage species and estimating carbon per diameter unit for tree species helps to determine which species contribute most efficiently to carbon sequestration across different size classes. It offers important implications for land-use systems where space is constrained. By integrating the species that demonstrate an ability to pack greater carbon with smaller size classes into urban forestry, it is possible to enhance carbon sequestration efficiency, contribute to climate change mitigation, and simultaneously promote biodiversity conservation within multifunctional landscapes.

Keywords: *Carbon sequestration, Climate change mitigation, Forestry, Keystone species*