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IMPACT OF THE ESTABLISHMENT OF A BOTANICAL GARDEN ON SOIL CARBON CONTENT IN DRY ZONE OF SRI LANKA

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ABSTRACT

Botanical gardens are established for the purpose of maintaining documented collections of living plants varieties used for conservation, display, education and scientific research. In addition, botanical gardens have a unique set of resources that are important in climate change mitigation and improving soil organic carbon content in urban soils. The major objective of this research was to study the potential of soil organic carbon content with the establishment of a botanical garden in the dry zone of Sri Lanka. This study investigates organic carbon storage capacity of different thematic areas of a dry zone botanical garden in Sri Lanka, 10 years after its establishment. The selected thematic collections in this garden were Arboretum part A (HARA), Arboratum part B (HARB), Ethanobotanical garden (HEBG), Herbal garden (HHG), Ornamental shrub garden (HOSG), Student garden (HSG), Valley path (HVP), and Natural shrub garden (NSG) which is the previous vegetation remaining inside the botanical garden. Soil moisture content, soil pH and electrical conductivity (EC), bulk density, total organic carbon (TOC), microbial biomass carbon (MBC), $KMnO_4$ oxidizable carbon (POC) and water soluble carbon (WSC) in all thematic collections were determined. The study concluded that the soil conditions in terms of organic carbon have been improved after 10 years of the establishment of the botanical garden in dry zone scrublands. All the Carbon fractions analysed were significantly higher than the NSG. Some management practices used in maintaining this botanical garden such as pruning techniques, organic fertilizer applications, and irrigation practices may have affected the soil organic carbon status in the dry soil. The study further showed that the establishment of botanical gardens is important to improve organic carbon contents in the tropical soils.

Keywords: Soil Organic Carbon, Botanical Gardens, Dry Zone