

## Plant Species Diversity and Quantification of Tree Carbon Stock of Waddakanda Forest Reserve in Anuradhapura District, Sri Lanka

Dissanayaka, D.J.G.M., \*Jeyavanan, K., and Sivachandran, S.

Department of Agronomy, University of Jaffna, Sri Lanka

\*Corresponding E-mail: [kjvanan@gmail.com](mailto:kjvanan@gmail.com)

Quantification of carbon stock is one of an assessment of regulating services of the forest which significantly contributes to global climate change and mitigation. Amount of the tree carbon stock is mostly dependent on species, wood density, height and diameter. Therefore, the study was carried out in the Waddakanda dry reserve forest (2,248.6 ha, 0.12 % of total forest), Anuradhapura district, in Sri Lanka to assess plant species diversity and quantify the tree carbon stock. About 34 sampling plots were randomly laid at a size of 20 m × 20 m. Height and diameter of trees were measured to estimate biomass and carbon stock by using a tropical allometric equation. Herbarium specimens were prepared from collected samples and submitted to the National Herbarium, Royal Botanical Garden, Peradeniya for species identification. A total of 1,251 trees, 6,407 saplings and 7,127 seedlings were enumerated from 44 plant species excluding 10 species of lianas. The based on the Importance Value Index (IVI), the forest was dominated by *Drypetes sepearia* (Wight & Arn.) Pax & Hoffm. (71.62 %), followed by *Dimocarpus longan* Lour. (39.45 %), *Nothopegia beddomei* Gamble. (27.17 %) and *Diospyros ovalifolia* Wight. (21.14 %) with most representative family of Ebenaceae. The evaluated community presents a tree basal area of 75.31 m<sup>2</sup> ha<sup>-1</sup> and density of seedlings, saplings and trees were 5,240.25±946.5, 4,711±988.75 and 919.75±46.5 numbers ha<sup>-1</sup>, respectively and these results revealed that number of seedlings was greater than saplings followed by trees, indicating that the forest is in the stage of good regeneration capacity. Mean value of Shannon–Wiener index for trees, saplings and seedlings was 1.91±0.04, 1.72±0.07 and 1.64±0.06, respectively and this result revealed that diversity of species was medium compared to wet zone rain forest. Mean value of evenness for trees, saplings and seedlings were 0.87, 0.79 and 0.77, respectively and this result revealed trees were more equally distributed over the seedlings and saplings. Mean canopy cover percentage of the forest was 70.88 % and this result revealed that the forest canopy density is high. Mean value of total carbon stock was 494.2 and 232.27 Mg ha<sup>-1</sup>, respectively.

**Keywords:** Diversity, Dry forest, IVI, Tree carbon, Regeneration