

**SPATIAL AND TEMPORAL VARIATION OF TREE BIOMASS IN TROPICAL RAINFOREST OF SOUTHWEST SRI LANKA**

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Although tropical rain forests hold large amounts of carbon, there is uncertainty about the quantity and distribution stored in forests. The Above Ground Biomass (AGB) of forests provides estimates of the carbon pools, as 50% of AGB is carbon. Hence, the availability of reliable AGB estimates is important. This study was carried out in the 25-ha Sinharaja Forest Dynamic plot (FDP). This study aims to estimate the AGB in the FDP and analyze the spatial and temporal variation of the AGB of the FDP over 25 years. The stems of the selected species were analyzed at eight different diameter classes. The 20 most dominant species in the FDP were selected for analysis based on the Important Value Index (IVI). The estimated AGB of the selected species were analyzed at eight different diameter classes. The ANOVA repeated ANOVA and Kruskal-Wallis test were used to understand the significance of temporal variation and the variation of AGB across diameter classes. The total AGB in each quadrat was obtained in  $\text{Mg ha}^{-1}$  and they were analyzed and visualized through spatial maps at a scale of 0.04 ha to understand the spatial variation of AGB. Further, AGB gains and losses over the years were calculated. Even though a change in AGB was observed over the years, the temporal variation of the overall AGB was not significant. However, the AGB change at diameter classes was highly significant. The spatial variability within the plot was high, and the spatial variation at 0.04 ha level over the years was statistically significant ( $p < 0.05$ ). Most of the quadrats (80%) had  $\text{AGB} < 60 \text{ Mg ha}^{-1}$ , and around 42% of quadrats contained  $\text{AGB} < 20 \text{ Mg ha}^{-1}$ . The overall distribution of AGB in the FDP was positively skewed. Further, the total AGB in the FDP has decreased with time, indicating its role as a carbon source rather than a carbon sink.

**Keywords:** ANOVA, Kruskal-Wallis test, Repeated ANOVA, Spatial variation, Temporal variation