
Floristic Diversity and Carbon Stock Estimates of a Novel Community Forest Ecosystem in Sri Lanka

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Areas where for natural forest has been cleared often regenerate as novel ecosystems. This is often because local communities enrich forests by planting preferred species and managing these forests collectively ("community forestry"). There are few studies of these community managed novel forest ecosystems in Sri Lanka. We studied a community forest at 'Solai Amman Temple' in Chavakachcheri area of Thenmaradchy Division in Jaffna district (dry zone), Sri Lanka. The study was aimed to assess the floristic diversity and carbon stock in the forest reserves. Since the total forest area is small, full enumeration was done in the forest reserve with a division of square plot at the dimension of 20 m × 20 m. A total of 1.16 ha with 29 plots was demarcated by using GPS coordinates in the study area. For the assessment of floristic diversity, Shannon-Weiner Index (SWI), species richness, and evenness were used, similarly, for the species dominance, the importance value index (IVI) was calculated. Pantropical allometric equations were used for tree carbon stock estimation. Results of the study showed that a total of 40 species including trees, saplings, seedlings, and 4 lianas were recorded from 29 families. The population density of trees, saplings, and seedlings were 495, 2,307, and 5,160 stems/ha. SWI of trees, saplings, and seedlings was 2.19, 1.91, and 1.36, respectively and this result showed that tree diversity was higher than saplings and seedlings. Similarly, the evenness of the above categories was greater than 0.5 and this indicated that trees, saplings, and seedlings had less uniform distribution. Based on the IVI, the dominant species in the community forest was *Mimusops elengi* L. (70) followed by "Sadavakkai" (51) and *Garcinia spicata* Wight & Arn. (47). The mean value of the tree carbon was 218.8 MgC/ha and it was contributed substantially by the dominant species in the forest reserve. Correlation analysis showed that basal area was significantly ($p < 0.001$) a strong positive correlation with tree diameter (0.82) and total carbon (0.95). The species-area curve was represented that species richness had a significant ($p < 0.001$) strong correlation (0.98) over the area. The mean value of soil organic carbon was 4.67 % and this showed that forests had the highest soil organic carbon than other land-use systems. There was a significant ($p < 0.001$) strong positive correlation between carbon stock and tree diameter (0.84) or basal area (0.95).

Keywords Carbon stock, Community forestry, Floristic diversity, Jaffna, Tropics
