

Variation of Tree Diversity and Above-Ground Biomass of Homegardens in Matale District, Sri Lanka

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Homegardens are known as integrated man-made ecosystems with annuals and perennials where trees play a significant role in storing atmospheric carbon. Homegardens are agroforestry systems that have been identified as a favorable approach in mitigating climate change, by easing the pressure on natural forests in reducing greenhouse gas accumulation (CO₂) in the atmosphere via fixing carbon in the vegetation as above-ground biomass (AGB). A study was conducted to assess the tree diversity and AGB carbon stock of homegardens in Matale, Sri Lanka. A total of 122 homegardens were surveyed, capturing a vast diversity. Homegardens surveyed were ranging from urban dwellings to sub-urban and close to natural eco-systems under five agro-ecological regions (AER). A total of 5,140 woody trees were recorded under 100 genera and 45 families, covering 16.67 ha of homegardens. Six and three species were identified as vulnerable and near threatened, respectively, in terms of national level conservation status. Shannon-Wiener index (SWI) was computed with a mean of 1.90±0.49 and a range of 0.49-2.83, owing to the multiplicity and composition of tree species. Using allometric equations, mean AGB was calculated to be as 36.5±27.4 Mg C/ha (0.8-139.4 Mg C/ha). AGB and SWI were higher in small scale (38.8±29.7 Mg C/ha and 1.91±0.50) than medium scale (28.0±14.9 Mg C/ha and 1.86±0.50) homegardens. A high species richness and species/ha was observed in small yet well managed homegardens. No large scale homegardens were found during the survey (Small=<0.2ha, Medium=0.2-0.8ha, Large=1.0-1.2ha). A notable variation was observed in tree diversity and AGB among the homegardens in different AERs. The variation of AGB was primarily governed by trees/ha and species diversity. Optimization of potential homegardens in the study area in favor of enhanced carbon sequestration and food security could be used as a timely remedy to mitigate climate change, via storing atmospheric carbon as above-ground biomass.

Keywords: Homegarden, Trees, Diversity, Aboveground biomass, Carbon

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