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Evaluating the Carbon Sequestration Performance of Three Selected Street Tree Species in Urban Setting: Colombo, Sri Lanka

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Abstract

Street trees are one of the most important components of urban green space in reducing the impacts of air pollution, providing shade, controlling noise pollution, arresting soil erosion and increasing aesthetics. With current interest of anthropogenic CO_2 emissions through various activities in urban areas can be offset through increasing carbon sequestration by using appropriate street tree species. The role of urban street trees in CO_2 sequestration potential is still remain uncertain in Sri Lanka due to absence of proper selection mechanism. The objective of this study is to derive and validate allometric equation to predict stem carbon accumulation by three selected street tree species; *Madhuca longifolia* (Mee), *Cassia fistula* (Ehala) and *Pongamia pinnata* (Karanda). Three species belong to different age groups with various characteristics of the *tree* crown, foliage, trunk, and roots within and between the species but the climatic condition is considered as similar in the sampling area due to the same meteorological station the area assigned. Tree parameters; dbh, total height, crown height and crown diameter were measured and C sequestration performance was tested in the laboratory using loss on ignition method for 60 individual trees from each three species. Streets were purposely sampled based on high abundance of species and trees were randomly sampled as 10 trees within 2 km road stretch. Stepwise regression model construction was carried out and validated with Model Bias (MB) and Modelling Efficiency (ME). Stem carbon content of *M. longifolia is* ln Cc=-4.59+3.471 ln dbh, *C. fistula* is ln Cc=-5.100+3.187 ln dbh and *P. pinnata* is ln Cc=-5.708+3.055 ln dbh with the reliability of 66%, 90% and 80% respectively. The model was fitted to the reserved data to be proved to use in the real world to predict carbon performance.

Keywords: Carbon, Sequestration, Tree, Allometric equation

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