

ABSTRACT

ABOVEGROUND BIOMASS ESTIMATION AND CARBON STOCK ASSESSMENT OF MAHOGANY (*SWIETENIA MACROPHYLLA* KING) AND YEMANE (*GMELINA ARBOREA* ROXB.) IN ANGAT WATERSHED RESERVATION

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In this study, the Angat Watershed Reservation reforestation projects have roughly sequestered between 1,018.62 and 1,682.68 ton CO₂/hectare as estimated correspondingly by the Tandug (2006) and Brown (1997) allometric equations. Most of the total carbon (about 80%), has been sequestered by 25-year old Mahogany and Yemane trees; the rest by the 5-year old trees. Regardless of the allometric equations used, Mahogany produced higher total aboveground biomass and therefore stored higher carbon than Yemane at both age groups. Irrespective of species and allometric equations used, ≥95% of the total carbon sequestered by 25-year old trees are accounted for by standing tree and the rest of the aboveground pools is attributed to coarse woody debris, understory/herbaceous, and litter/necromass. In the same fashion, for 5-year old trees, standing trees comprise about 80% of the total carbon stored, understory/herbaceous biomass make up 12%, and coarse woody debris and litter necromass explain the remaining percentage. Perhaps due to minor importance of coarse woody debris as component pool of the aboveground biomass in plantation forests, it is not well-studied here in the Philippines. However, more efforts should be directed in the accurate quantification of this Carbon pool, especially in areas subjected to frequent disturbances, e.g., those frequently visited by typhoons, kaingin areas and logged forests. A comparative assessment and analysis of existing allometric equations that are used to estimate tree biomass was undertaken to make out appropriate non-destructive sampling approach to monitoring and determination of aboveground biomass, particularly in many forestation projects. Based on the data collected from the Angat Watershed Reservation, the tree biomass, predicted by the generic Brown (1997) equation and the site- and species-specific Tandug (2006) equations, was put side by side for further examination. Generally, a 30-percent discrepancy was significantly observed in the predicted tree biomass between the Brown (1997) and Tandug (2006) allometric equations. The difference in mean predicted tree biomass is significant only in trees with greater than 40 cm diameter; below 40 cm diameter, there is no significant difference in the biomass predicted by the Brown (1997) and the Tandug (2006) equations. Like the generic Brown (1997) equation the Tandug (2006) equations are not species-specific; predicted biomass do not significantly differ between Mahogany and Yemane. Expectedly, both the Brown (1997) and the Tandug (2006) equations predict significantly higher biomass for older than younger trees. Further research is needed to single out which allometric equation, the generic Brown (1997) or the site- and species-specific Tandug (2006), will be appropriate for estimating standing tree biomass under local conditions. Results from the study suggests that reforestation areas that are properly managed and maintained can contribute in increasing carbon sequestration in the ecosystems and thereby help reduce the rise of CO₂ in the atmosphere. However, its potential to serve as carbon sink can be enhanced only if they are managed just like any protected critical watershed area.