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Above-Ground Biomass Estimation for Evergreen Broadleaf Forests in Xuan Lien Nature Reserve, Thanh Hoa, Vietnam

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Abstract

The estimation of above-ground biomass (AGB) and carbon sequestration in forests plays a key role in modelling carbon cycle and has a significant concern in addressing the potential areas for carbon credits under Reducing Emissions from Deforestation and Forest Degradation-Plus (REDD+). This study was conducted to estimate the living AGB for evergreen broadleaf forests in Xuan Lien Nature Reserve, Viet Nam with the purpose of providing data for sustainable forest management and baseline data for carbon monioring. These forest stands were classified to four categories by governmental standard basing on standing volume (V), including poor forest ($V \leq 100$ m^3 ha^{-1}), medium forest ($100 < V \leq 200$ m^3 ha^{-1}), rich forest ($200 < V \leq 300$ $m^3 ha^{-1}$), and very rich forest ($V > 300$ $m^3 ha^{-1}$). A total of 380 sampling plots were randomly stratified sampled and all trees with DBH ≥ 5.0 cm were included for biomass estimation. Values for aboveground biomass were obtained using published allometric equations. The results indicated that the AGB increased from 82.0±5.3 Mg ha^{-1} in poor forest to 127.3±10.8 Mg ha^{-1} in medium forest, 184.3±15.6 Mg ha^{-1} in rich forest, and to 303.2±21.8 Mg ha^{-1} in very rich forest (95 % confidence interval). The uncertainty for the estimated AGB were low (< 8.5 %) at 95 % confidence level. Trying to test the corelation of AGB with the varying of altitude (from 108 to 1452 m a.s.l) shows that, AGB has a positive relationship with elevation ($R^2 = 0.53$). It is concluded that tropical evergreen broadleaf forest has significant amount of above-ground carbon stock, and there is strong reductions of above-ground biomass by the degree of human disturbance.

Keywords: Above-ground biomass, carbon stock, evergreen broadleaf forest, uncertainty

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