

Assessing Tree Volume in the Sijangkang Recreation Mangrove Forest, Kuala Langat, Selangor: A Study Of Mangrove Biomass

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Structured Abstract

Background: Mangrove forests are to serve an important ecological role in carbon sequestration, coastal defense, and biodiversity protection. However, extensive site-specific data on mangrove carbon and biomass storage remain poorly reported for the majority of local mangrove forests, including the Sijangkang Recreation Mangrove Forest of Selangor, Malaysia. Proper tree volume and biomass estimation is of paramount importance in order to quantify their ecological value accurately and to support long-term climate change mitigation policy.

Methods: The research utilized non-destructive techniques to calculate standing tree volume, aboveground biomass, and carbon stock in four quadrats in Sijangkang mangrove forest. Measurements of trees, DBH and height were made and used for species-specific and general allometric equations (Ong et al., 2004; Komiyama et al., 2005). Carbon stock was calculated based on a standard proportion of carbon as 0.47. The 10×10 m quadrats were further divided into 5×5 m and 1×1 m subplots for obtaining accurate data according to tree size class.

Results: 131 trees belonging to 19 mangrove species and 12 plant families were counted. Quadrat 3 had the maximum total volume (6.7 m³), biomass (220.08 kg), and carbon stock (103.36 kg) with a mere 19 individuals. This was, however, mainly because it had large mature species like *Xylocarpus granatum*. Quadrat 2 consisted of a greater number of individuals (63) but smaller biomass (178 kg) and carbon (83.66 kg) due to small species like *Nypa fruticans*. The volume of standing trees was 20.9 m³, total biomass 700.19 kg, and carbon stock around 329.59 kg.

Conclusion: The study clarifies the mature mangrove stands' contribution to carbon sequestration regardless of density. It shows that the size of the species and not population size is the factor determining the accumulation of biomass. The study offers comparative ecological data on the Sijangkang Recreation Mangrove Forest and advocates for the promotion of small-scale community-owned mangrove forests for regional planning, conservation, education, and awareness-raising and incorporation into sustainable development agendas and global carbon offsetting initiatives.

Keywords: Mangrove biomass, carbon stock, allometric equation, tree volume, Sijangkang, non-destructive sampling.

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