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## Fine Root Biomass and Soil Carbon Storage of Teak Plantations in Myanmar

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### Abstract

Fine roots of trees and under-story vegetation play an important role in the carbon and nutrient dynamics of forest soils. Therefore, quantifying changes of soil carbon and fine root biomass could be an important consideration under large-scale afforestation or reforestation. However, there is little research on the fine root biomass of reforestation area and its contribution to the carbon storage of the stand. The study was conducted with the main objective of assessing the carbon storage in fine root (<2 mm in diameter) biomass of 20-yr and 30-yr old Teak (*Tectona grandis*) plantations. The amount of live fine roots in terms of dry weight in every stand was estimated from soil cores taken to a depth of 50 cm where most of the root fragments were distributed. Tree species, diameter (1.3 m above ground level) and tree height were measured for all trees within the plot with a breast height diameter greater than 4.5 cm. This allowed accurate determination of individual tree volumes and basal areas, as well as respective stand level characteristics. The average carbon accumulation in the soils of 20-yr and 30-yr old Teak plantations were estimated 95 ton ha<sup>-1</sup> and 161 ton ha<sup>-1</sup>, respectively. Fine root biomass for each stand was 2050 and 3800 kg ha<sup>-1</sup>, and the respective C amounts to 1215 and 2110 kg C ha<sup>-1</sup> in 15-yr and 30-yr old Teak plantations, respectively. The carbon accumulation in soils is increasing with increasing stand age. However, there is no relationship between fine root biomass and the amount of carbon stored in the soils. Commonly used variables describing the stand structure also did not show any notable correlation with the fine root biomass at the stand level. Continuous studies at ecosystem level are recommended for understanding and predicting the below-ground responses to global change.

**Keywords:** Biomass, carbon storage, fine root, *Tectona grandis*