Above and belowground carbon stock of acacia mangium stand in Sabah, Malaysia

ABSTRACT

This study aimed to estimate above and belowground carbon stock in Acacia mangium stands of different silvicultural systems (planted and regeneration) at the Bengkoka Forest Plantation, Pitas, Sabah, Malaysia. Aboveground biomass (AGB) and belowground biomass (BGB), and soil organic carbon content (SOC) at depth of 30 cm were quantified. A comparison was done between the two different silvicultural systems of Acacia mangium. A random systematic sampling method was used for conducting the forest inventory. Three circular plots of 0.25 ha were established in each of the Acacia mangium systems. Diameter at breast high (DBH) of every tree was measured using a diameter tape. Shrub layer and organic layer were measured at five randomly selected positions in each plot. Five litter fall traps (1m x 1m) were set up in the same position as the shrub and organic layer. Three holes (25 cm x 25 cm x 30 cm) were dug to get the roots for quantifying the roots biomass and soil for carbon content. The soil bulk density was determined by using undisturbed soil samples collected by using 51 mm diameter ring (100 cc.). The results showed that the total amount of carbon stock was 73.56 t ha-1 and 82.40 t ha-1 for planted and regeneration stands, respectively. The study revealed that the major contributor to total carbon stock for both planted and regeneration Acacia mangium stands was the aboveground biomass with mean values of 46.99 t ha-1 and 53.83 t ha-1 followed by belowground biomass with mean values of 26.57 t ha-1 and 28.57 t ha-1 , respectively.