

Carbon stock estimation in mangrove forest at Pitas, Sabah, Malaysia

ABSTRACT

Mangrove forests play a significant role in reducing tropical carbon emissions and preventing climate change. The objectives of this study are to estimate the aboveground, belowground, and soil carbon storage in mangrove forests. This study was conducted in a mangrove forest in Pitas, Sabah. A transect method for sampling design was used with a total of 3 transects and 15 sub-transects. Forest inventory was done to get the diameter breast height of standing trees and soil sampling with four different depths (0 - 15 cm, 15 - 30 cm, 30 - 50 cm and 50 - 100 cm) were taken for soil analysis and bulk density. Allometric equation was used to calculate aboveground and belowground biomass then its carbon stock was estimated as 50% from its total biomass. CHNS elemental analyzer was used to determine the soil carbon content. A total of 223 individual trees were measured with DBH classification. The AGB and BGB on the study site were 204.53 Mg/ha and 68.18 Mg/ha and estimated the carbon is 50% of the biomass which is AGC 102.26 Mg/ha and BGC 34.09 Mg/ha. The bulk density of the soil ranges from 1.03 - 1.11 g/cm³ and the soil carbon concentration from 15 - 30 cm depth shows the highest with 3.25%. The soil carbon shows the highest carbon storage in the total ecosystem carbon storage with 313.87 Mg/ha. this study reveals that the total carbon stock in mangrove forests at Pitas, Sabah, Malaysia, amounted to 450.22 Mg/ha which soil carbon contributes 69% of total carbon storage.