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Carbon Flow and Budget in a Young Mature Oil Palm Agroecosystem on Deep Tropical Peat*

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An increasing area of deep tropical peat in Sarawak, which has been logged-over, is being cultivated with oil palm, generating revenue of about US 1 billion in 2006 for much needed socio-economic development. However, there is growing concern with this development in regard to greenhouse gas emissions and loss of carbon from the peat swamp. A study was therefore undertaken to investigate the C flow and budget in a 5-year-old oil palm plantation on deep tropical peat, and to determine if this oil palm agroecosystem is a C sink or source. Results showed that the peat soil contained 3771 t C/ha while the other C pools together accounted for only 0.7 per cent of the total C in the agroecosystem. The net primary production (NPP) by the palms was 12.01 t C/ha/yr while by-products increased soil organic C by 0.3 t C/ha/yr. The measured soil respiration was 15.4 t C/ha/yr with 60 per cent loss through heterotrophic respiration resulting in a subsidence of about 1.6 cm/yr. The oil palm was neither a net C sink nor source but the export of FFB without by-product utilisation will cause a negative C balance of 2.01 t C/ha/yr.

Keywords: Carbon sequestration, dynamics, pools.

