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EFFECTS OF WATER TABLE FLUCTUATIONS ON DISSOLVED ORGANIC CARBON CONCENTRATIONS IN AN OIL PALM PLANTATION IN TROPICAL PEATLANDS

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Peatlands are the largest source of soil carbon and some other major soil nutrients. The continuous functioning of these ecosystems as the source of these nutrients depends largely on peatland drainage which helps to lower the peatland water table levels for sustainable peatland agricultural production. Excessive peatland drainage has caused dissolved organic carbon (DOC) loss as a result of lowered water table levels. This study, therefore, investigated the impacts of fluctuations in water table levels on DOC concentrations. The study was undertaken in four blocks of oil palm of different ages which were further sub-divided into eight sampling plots. Samples were taken from each of the study plots for 16 months on a bi-monthly basis from the installed tube wells (piezometers) and were analyzed for temperature, pH and DOC. The study showed that DOC has positive and strong correlations with water table levels in four of the eight sampling points with weak correlation in the remaining plots. Average water table levels ranged from -27.16 cm during the wet period to -90.8 cm during the dry period. DOC concentrations ranged from 18.60 mg l⁻¹ during the dry period to 250.50 mg l⁻¹ during the wet period when water table levels were expected to rise. These concentrations are much higher than those from studies in temperate countries and elsewhere in the tropics. While water table levels serve as proxy, to some extent, for DOC concentrations, other hydrological elements like rainfall, ambient air temperature except evaporation were observed to correlate strongly and positively with DOC concentrations.

Keywords: *tropical peatlands, oil palm plantations, water table levels, dissolved organic carbon, peatland drainage*