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To evaluate environmental performance of oil palm planted on tropical peatland via life cycle assesment

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Oil palm is a very important industry in Malaysia, accounting for 38% of the global palm oil production. The basic challenge of the Malaysian oil palm industry is to sustain development and global competitiveness in the face of stagnating productivity, increasing production costs and scarcity of environmentally suitable land for expanding oil palm cultivation. In many ways, Malaysia's palm oil industry has responsibly managed plantations in a sustainable manner using the best management practices and committed towards the three dimensions of sustainability namely social aspects, environment and economy. Oil palm plantations on peat soil in Malaysia are currently being debated mainly because of CO₂ emissions related to land conversion and drainage. At present, the C budgets for peat soil are still poorly understood because most research focuses on CO₂ emission from the peat soil only, without incorporating the C uptake by vegetation and additional C flows such as anaerobic decomposition (methane emissions), and leaching. The rate at which CO₂ is released from these ecosystems depends on variety of interrelated processes such as drainage, logging, consolidation, compaction, leaching and fertilization. These processes affect a wide variety of factors such as bulk density, peat profile morphology, soil moisture content, and water table depth and soil temperature. Therefore, a life-cycle assessment (LCA) is an important tool to assess the potential environmental impacts associated with the production of the fresh fruit bunch (FFB) and to assess greenhouse gas (GHG) emissions from specific operations in oil palm plantation for production of FFB from oil palm planted on peat soil. This paper provides detailed calculations, assumptions, inputs and outputs and other necessary information to estimate the life cycle impact assesment and GHG emission for oil palm planted on peat.