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Life Cycle Inventory of the Production of Crude Palm Oil - A Gate to Gate Case Study of 12 Palm Oil Mills⁺

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ABSTRACT

Life cycle inventory (LCI) is the heart of a life cycle assessment (LCA) study. LCA is a tool to determine the environmental impacts of a product at all stages of its life right from cradle to grave. In order to carry out a LCA, inventory data have to be collected and the raw data have to be extrapolated to produce a LCI. This study has a gate to gate system boundary. The inventory data collection starts at the oil palm fresh fruit bunch hoppers when the fresh fruit bunches are received at the mill up till the production of the crude palm oil in the storage tanks at the mill. For this study, 12 palm oil mills were selected. These palm oil mills were selected based on the type of mill which were either plantation-based mills or private mills and have different processing capacities of oil palm fresh fruit bunches ranging from 20 t hr⁻¹ up till 90 t hr⁻¹. The mills selected are all located at different zones in east and west Malaysia basically from north, mid south, south Peninsular Malaysia and east Malaysia. Inventory data collection consists of input and output of materials and energy. The input data basically are inputs of raw materials such as oil palm fresh fruit bunches, electricity, diesel, water, fuel for boiler etc. and the output consists of the biomass wastes, palm oil mill effluents, flue gases from stack, kernel etc. All data were collected for duration of three months from each mill. These inventory data were then calculated for the functional unit of every 1 t of crude palm oil produced at the palm oil mill.

Keywords: biomass, crude palm oil, fresh fruit bunch, life cycle assessment, life cycle inventory.

