

## **LCA Studies for Malaysian Palm Oil**

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Malaysia is currently the world leader in the export of crude palm oil (CPO). Export earnings of oil palm products in 2008 alone reached a record RM 65.2 billion. The Malaysian oil palm industry is an export orientated industry which heavily relies on the world market. Therefore it is vital for the oil palm industry to be sustainable and competitive to increase its long-term profitability and sustainability. It is essential that the oil palm industry is ready to meet the higher expectation of these overseas customers on the environmental performance of the industry as these environmental performance expectations has slowly begin to transform into demands in the market place and has even become a market barrier as imposed by the EU directive on the imports of palm biodiesel into EU. In view of this Malaysian Palm Oil Board has embarked on LCA studies that cover the whole supply chain of the oil palm industry. One such study is the LCA of the production of CPO which will be highlighted in this paper.

The objective of this study is to identify the potential impacts associated with the production of CPO and to evaluate opportunities to overcome the potential impacts. This study has a cradle to gate system boundary. It starts at the nursery where the oil palm seedlings are produced; to the plantations where the oil palm fresh fruit bunches (FFB) are grown and harvested up till the production of CPO at the palm oil mills. At the plantation phase, the land use change scenario of 20 years from logged over forest was used for the production of FFB. However peat land cultivation is not included in this study. The Life Cycle Impact Assessment (LCIA) was carried out for one tonne CPO produced using the SimaPro software version 7.1 and the Eco indicator 99 methodology. Within the system boundary there are four parameters that are causing the potential impacts to the environment; they are the land use change (LUC), fossil fuels, nitrogen fertilizer application and the Palm Oil Mill Effluent (POME). The impact categories that the LUC, nitrogen fertilizers and POME contributes to are under the Respiratory Organics and Climate Change. Both these impact categories are related to air emissions. The main air emission from LUC and nitrogen fertilizers is carbon dioxide and nitrous oxides. The gaseous emissions from the POME are from the ponds during the anaerobic digestion which emits biogas which consists of methane, carbon dioxide and traces of hydrogen sulfide. An alternate scenario was conducted to examine the impact if the biogas was captured. The results show that when the biogas is captured, the impact from the POME is removed. The other significant impact is from the fossil fuels used for processing the fertilizers and also the transportation from overseas. The Malaysia palm oil industry has been very responsible and have been recycling all their by products however it is time to seriously look into the effluent treatment system which is emitting biogas. Currently palm oil mills are beginning to harvest their biogas to be utilized as a source of energy but it will take sometime to have 100% compliance as the investment costs are rather high.