Topic: Environmental Performance of Cocoa Production from Monoculture System and Agroforestry System in Indonesia

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ABSTRACT

Indonesia still tries to expand its cocoa production to meet increased international demand. However, this effort faces economies of scale and ecological challenges. This research aimed at evaluating environmental performance of cocoa production from cocoa monoculture and cocoa-agroforestry by life cycle assessment based on ISO 14040 and 14044, with adaptation for local impact indicators. This study defined cocoa-agroforestry as raw and sequential of cocoa-coconut and cocoa-rubber agroforestry, combined with shading trees *Leucaena sp* and *Gliricidia sepium.* The analysis considered cocoa production at farm level, from cradle to on-farm gate boundary for 1 metric tonne of cocoa pod. The results showed that cocoa-coconut agroforestry had the least contribution to global impact categories of global warming, acidification and eutrophication, accounted for 3.67E+01kg CO_2-eq, 4.31-02 kg SO_2-eq, and 2.25E-05kg PO_4-eq respectively. Cocoa-coconut agroforestry also had the highest organic carbon and soil organic matter, of which these conditions supported the growth and activity of beneficial soil microbeds (*Pseudomonas sp* and *Trichoderma sp*). In addition, total land equivalent ratio of cocoa-coconut agroforestry had the highest value at 1.36, indicating a highest yield advantage was gained. Therefore, cocoa agroforestry could be a wise option to promote environmental sustainability of cocoa farming practices.

Keywords: Environmental Performance, Life Cycle Assessment, Cocoa Agroforestry, Indonesia