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"Global food security and food safety:
The role of universities"

How Can the Environmental Efficiency of Indonesian Cocoa Farms Be Increased?

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Abstract

Increasing global demand for chocolate has led to increased cocoa prices and incentivized farmers in developing countries to expand cocoa cultivation. The expansion into tropical rainforests threatens the functionality of ecological systems, climate change and biodiversity. A challenge is how to sustainably increase cocoa yields without increasing the area upon which cocoa is grown and causing forest degradation or deforestation. We examine these trade-offs between smallholder cocoa intensification and ecological impacts in Sulawesi. We investigate the determinants of environmental efficiency - the ratio of reduced environmental impact to increased production value - applying a distance output function that includes cocoa production and the abundance of native plants. Our household and environment survey in 2015 allows us to analyse 208 cocoa producers socio-economic, environmental and farming system variables using both measured and self-reported data. We find that the intensification of cocoa farms results in higher ecosystem degradation, and that the producers in our sample display substantial mean inefficiency of 50 percent. Increasing efficiency could lead to a win-win-win situation: with higher production from fewer hectares, and with more native plants co-existing with cocoa on those remaining hectares. On average, the efficiency scores suggest that there is scope to expand production by 367 kg of cocoa per farm and year on the existing planted area, to increase rainforest plants per farm by 43680 while maintaining existing areas and production levels, or to reduce acreage by 0.52 hectares per farm without reducing production. Agricultural extension services play an important role in increasing efficiency.

Keywords: Cocoa agroforestry production, environmental efficiency, Indonesia

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