



Tropentag, September 16-18, 2015, Berlin, Germany

“Management of land use systems for enhanced food security:
conflicts, controversies and resolutions”

Exploring Yield Gaps in Smallholder Oil Palm Production Systems in Eastern Sumatra, Indonesia

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Abstract

Oil palm (*Elaeis guineensis*) has become the most produced and traded oil crop throughout the world. During the last two decades the area under oil palm has increased more than two-fold and the production of crude palm oil (CPO) has increased more than four-fold. Its expansion has, however, raised serious environmental and social concerns. Increasing yields on existing plantations is a potential pathway to reduce the undesired ecological impacts of oil palm expansion and to enhance the social benefits of oil palm production. Although oil palm production is still dominated by private sector companies, smallholders are increasingly engaging in its cultivation. In Indonesia, smallholders are expected to outnumber the private sector in both production and area under cultivation in the near future. Despite their growing importance in the oil palm sector, studies on smallholders' agronomic performance are scarce. Based on crop modelling analysis and quantitative household survey data from Sumatra, Indonesia, this paper quantifies smallholder yield gaps relative to exploitable yield levels and analyses smallholders' production constraints. We find that oil palm smallholdings offer a tremendous potential for future yield increases, because they obtain only 56% of the cumulative exploitable yields over a 20 year plantation life cycle. Important determinants of yield gaps are management practices such as fertiliser dosage and length of harvesting intervals. Furthermore, supported smallholders operating under contract arrangements are found to achieve higher yields compared to independent smallholders. Results suggest that smallholders are constrained by limited knowledge about best management practices and by imperfect access to input markets. Some policy implications are discussed.

Keywords: Crop modelling, Indonesia, oil palm smallholders, yield gaps