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Sustainability Performance of Monoculture and Agroforestry Palm Oil Production Systems of Smallholders in Sarawak (Malaysia)

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Abstract

Palm oil is the world's most important vegetable oil, and Malaysia and Indonesia dominate global export trade in crude palm oil with 85 % of the world´s total. The oil palm's incomparably high yield (3.5–4.0 $tha^{-1}y^{-1}$) and the multiple use in food products, soap and industrial purposes, including biofuels, make it a highly valuable commodity. Sustainability in the palm oil industry is debated with growing concern due to ecological and social trade-offs, e.g. destruction of tropical forests, greenhouse gas emissions, land disputes and forced labour.

Using the SMART Farm Tool, we have comprehensively assessed the sustainability performance of 16 non-certified palm oil smallholdings in Sarawak (Malaysia). SMART is an indicator-based multi-criteria tool measuring the 58 sustainability (subtheme-)goals defined in the FAO-SAFA framework. The farmers were selected according to a snowball approach in two regions (1st and 4th division). The dominant cultivation system of the oil palm farms studied is monoculture. However, two of the 16 farms – one in each region – practice agroforestry (AF), which is seen as a strategy to improve environmental sustainability in palm oil production.

As for monoculture systems, the goal achievements per SAFA-goal show that sustainability performance is largely lacking, and usually ranges between 20 % and 60 % goal achievement. Good Governance and Social Well-Being are dimensions which in particular show low scores at all observed farms. One AF-farm performs equally in all dimensions compared to monocrop farms. This is due a relatively small proportion and a low diversity of the AF-system, as well as the use of mineral fertiliser and pesticides. In contrast, the second AF-farm, which does not use chemical inputs, performs better in all ecological and interestingly in most economic subthemes ranging from 60 % to 89 % and 23 % to 97 %.

These findings underscore the need to improve the sustainability of mono-cropping palm oil production not only to reduce ecological and social trade-offs, but also to enhance the economic resilience of smallholders. Although controversially discussed in scientific literature, agroforestry appears to be a potentially more sustainable strategy, especially for smallholders, but that depends on the setting.

Keywords: Agro-forestry, palm oil, Sarawak/Malaysia, smallholder, SMART-Farm Tool, sustainability, sustainability assessment

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