Oil palm and soil fertility: challenges and approaches for sustainability

Paul N. Nelson[1], Cécile Bessou[2], Jean-Pierre Caliman[3], Michael J. Webb[4], Murom Banabas[5]

[1] James Cook University, Cairns Qld 4870, Australia, paul.nelson@jcu.edu.au

[2] CIRAD, Montpellier, France, cecile.bessou@cirad.fr

[3] SMART, Libo, Sumatra, Indonesia, j.p.caliman@sinarmas-agri.com

[4] CSIRO Land and Water/Sustainable Agriculture Flagship, Townsville Qld 4811, Australia, michael.webb@csiro.au

[5] PNG Oil Palm Research Association, Kimbe, West New Britain, Papua New Guinea, murom.banabas@pngopra.org.pg

Since the first large-scale plantations were established in Sumatra in the early 1900s, oil palm has become one of the largest and most rapidly expanding crops in the tropics. Given sufficiently high temperature it can be profitably cultivated across a variety of soils and climates but, as for any crop, soil management can be good or bad. One year after the first international workshop on Sustainable Management of Soil in Oil Palm Plantings, we discuss three challenges. *1. Assessing and communicating the state of the soil*. Soil in oil palm plantations has high spatial variability at the tree scale and large temporal variability in nutrient and carbon fluxes on a ~25-year planting cycle. Indicators of soil fertility that are useful for growers must take this into account. *2. Devising and implementing management practices that maintain or improve soil fertility.* Peat, acid sulfate soils and steep slopes pose particular difficulties and are ideally avoided. In any environment, the crop establishment phase is the most vulnerable, when irreversible damage can be done. Throughout the crop cycle, productivity and the environment both benefit from practices that reduce soil erosion, acidification, compaction, loss of organic matter, loss of nutrients, emission of greenhouse gases and build-up of contaminants or pathogenic organisms. *3. Comparing alternative land uses*. Expansion of the industry is inevitable but optimal futures depend on thorough comparison of land use options. Life cycle assessment of palm oil production and alternatives, including effects on soil, is desirable but complex.