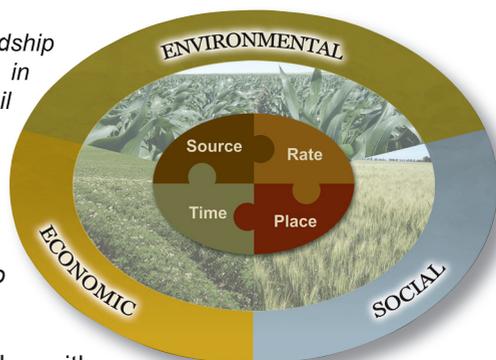


Fertilizer Recovery Efficiency in Oil Palm

The high demand for both food and non-food products of vegetable oil origin have encouraged the expansion of oil palm cultivation area in marginal agricultural land such as sandy soils. Sandy soils are commonly subjected to nutrient leaching especially during high rainfall period. Thus, higher frequency of fertilizer application on such soils is recommended to increase the efficiency of applied fertilizers, i.e. fertilizer recovery efficiency.

With reference to 4R Nutrient Stewardship components, i.e. the right source applied at the right rate, right time and right place (International Plant Nutrition Institute, 2012), nutrition best management practices (BMP) may help to improve fertilizer recovery efficiency in plantations with light textured soils. Blending of fertilizers prior to each application may become one such improved nutrition practice (International Plant Nutrition Institute, 2013).

Figure: The 4R Nutrient Stewardship concept shows great potential in improving fertilization practices in oil palm plantations. The concept defines the right source applied at the right rate, time, and place for plant nutrient application as those producing the economic, social, and environmental outcomes desired by all stakeholders to the soil-plant ecosystem.



IPNI Southeast Asia Program, together with partners, is currently testing this hypothesis in a research project in a plantation in Kalimantan that has been established on soils with high sand content. Application of four rounds per year of individual fertilizers that were blended on-site at the plantation (N, P, K, Mg, S and B), i.e. the BMP treatment, was compared to five rounds of fertilizer applications in standard estate practice (SEP). In SEP, nitrogen and sulfur were contained in 3 of these 5 application rounds, potassium, magnesium and boron were applied in two of the application rounds, and there was only one application round that contained phosphorus.

Preliminary results from year one of the four-year project indicate that nutrition BMP treatment increased fertilizer recovery efficiency of N and K sources by 10% and 18% respectively as compared to SEP treatment (see Table). Fertilizer recovery efficiency for P and Mg had not yet improved, but is expected to do so in the course of the project.

Table: Fertilizer recovery efficiency in the 1st year of the nutrient management project

	N	P	K	Mg
BMP¹ treatment (fertilizers blended, then applied 4x per year)				
Nutrients supplied i.e. applied in fertilizers (kg/ha)	134.6	12.2	243.0	26.5
Nutrients removed in FFB ³ & fixed in trunk growth (kg/ha)	78.7	8.7	107.2	16.1
<i>Fertilizer recovery efficiency (in %)</i>	58.5	71.5	44.1	60.8
SEP² treatment (fertilizers applied singly as straights)				
Nutrients supplied i.e. applied in fertilizers (kg/ha)	129.2	11.7	233.3	25.4
Nutrients removed in FFB ³ & fixed in trunk growth (kg/ha)	68.5	8.3	87.2	15.9
<i>Fertilizer recovery efficiency (in %)</i>	53.0	71.2	37.4	62.3
<i>% Difference BMP versus SEP treatments</i>	+10.3%	+0.5%	+18.0%	-2.5%

BMP¹ = best management practice; SEP² = standard estate practice; FFB³ = fresh fruit bunches

This information is derived from:

Gerendas, J., B. Utomo, K. Martoyo, C.R. Donough, and T. Oberthür. (Submitted and accepted 2013). Effect of nutrient application frequency on nutrient uptake in oil palm production on sandy soils. In: PIPOC 2013, International Palm Oil Congress, - Green Opportunities from the Golden Crop, Malaysian Palm Oil Board, Kuala Lumpur.

References:

International Plant Nutrition Institute. 2012. 4R Plant Nutrition Manual: A Manual for Improving the Management of Plant Nutrition. p. 140. T.W. Bruulsema et al. (ed.). International Plant Nutrition Institute, Norcross, GA, USA.

International Plant Nutrition Institute. 2013. Bulk blending of fertilizers for improved fertilization in oil palm. June article. In: Planters' Diary 2014. IPNI Southeast Asia Program, Penang.