APPLICATION OF OIL PALM EFFICIENT NUTRIENT SYSTEM (OPENS)

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Soils require high fertilizer inputs to replace the nutrients removed by cropping. The soil holds the applied nutrients or else, looses them through soil erosion, leaching or volatilization as a gas. Therefore, much attention is given to efficiency of fertilizer recovery, which is dependent on many factors, and the major ones being the weather, soil type, site characteristic and agronomic practice. Recently, the fertilizer recommendation system developed at PORIM is being verified and validated using fertilizer verification block network. The effort is to improve the fertilizer recommendation system by applying the most reliable equations with inclusion of more recent information from the fertilizer verification block network.

OBJECTIVE

To achieve maximum profit by maximizing yield and optimizing cost of fertilization

TARGET

To ensure adequacy of oil palm nutrient for maximum palm oil production.

BENEFITS

Increase production per unit area, increase profit and reduce wastage and adverse impact on environment

THE SYSTEM

The relational diagram of PORIM OPEN System (OPENS) is shown in *Figure 1*. In this system, environmental factor is used to predict the site yield potential and simultaneously palm data are used to check the leaf nutrient balance for possibilities of limitation on nutrients uptake. The nutrients requirements in the oil palm plantation are worked out based on the potential yield, efficiency of fertilizer recovery and nutrient balance.

The amounts of fertilizer to apply are dependent on the efficiency of fertilizer recovery, which determines the given amount required to raise yield to the maximum profit. The profitability analysis using cost to revenue (C/R) ratio will take into account the prices of the fertilizer and palm oil. Potential yield response (PYR) is taken to indicate the maximum yield that is

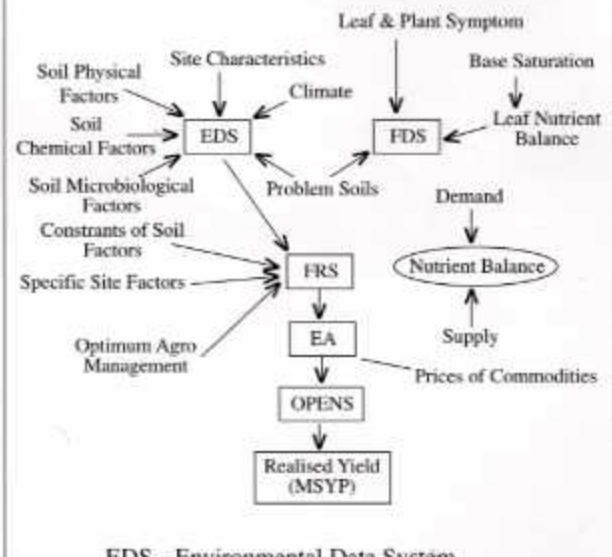

Figure 1. The system relational diagram.

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TABLE 1. PROFITABILITY ANALYSIS OF THE FERTILIZER APPLICATION

N	P	K	Mg	PY_0	MSYP	PYR	Fertilizer Cost	Extra Revenue*	C/R
	Fertilizer								
	(kg/palm/yr)			(FFB/t/ha/yr)			(RM/ha/yr)		
6	3	3	1	14	25	11	799.68	3850.00	0.21
9	3	3	1	12	30	18	946.56	6300.00	0.15

Notes:
PY_0 - Yield potential without fertilizer
PYR - Potential yield response
MSYP - Maximum site yield potential
C/R - Cost to revenue ratio
*Revenue calculated as PYR x FFB price

Commodities	Price(RM/t)
N = Ammonium Sulphate	360
P = Phosphate rock	330
K = Potassium chloride	690
Mg = Kieserite	660
FFB = Fresh fruit bunch	350

worth achieving by calculating the C/R ratio. Generally, where all fertilizers are required to be applied together, the C/R ratio is kept below 30%. This ratio is based on fertilizer alone and other production cost has not been considered. An example of the profitability analysis is shown in *Table 1*.

The recommendations for use of efficient fertilizer management system to achieve maximum site yield potential (MSYP) should take the following steps:

- Establish the yield potential
- Establish the most limiting nutrient
- Estimate the amount of fertilizers that must be supplied to achieve a maximum yield
- Consider the efficiency of fertilizer recovery
- Consider the amounts of nutrient that will be supplied inherently by the soil and legume cover
- Consider the nutrient supplied by oil palm residues recycled from the field (pruned fronds, male inflorescence *etc.*) and mills (effluent and empty fruit bunch)
- Consider appropriate agronomic practices to increase nutrient uptake and minimize erosion, leaching and immobilization of nutrients
- If necessary, supplement by mineral nutrient sources with enough quantity and quality fertilizers to meet the yield target
- Consider the effective method of fertilizer application and avoid wet season
- Demonstrate the economics and profitability analysis of the fertilizer application

CONCLUSION

The PORIM OPEN System is fundamentally sound and the application is now available for adoption by the industry and several companies have started to use it.

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