

DISCRIMINATORY FERTILIZER REDUCTION TECHNOLOGY

by: **MOHD TAYEB DOLMAT and
AHMAD TARMIZI MOHAMAD**

JUNE 2001

120

MPOB TT No. 105

MPOB INFORMATION SERIES

ISSN 1511-7871

Manuring is the largest cost item in oil palm cultivation and fertilizer is the most costly material input. Together they offer the greatest scope for cost reduction in the production of palm oil. The depressed crude palm oil prices for the past two years have driven many industry members to resort to cutting back their fertilizer programme in order to bring down the production cost and maintain profitability. Fertilizer reductions have been carried out without proper guideline with many of the growers oblivious of the possible negative consequences on the palms over short to long term periods. In view of this development, pragmatic manuring strategies have been formulated to provide guidelines on fertilizer reduction for oil palm based on scientific reasonings.

GUIDELINES ON DISCRIMINATORY FERTILIZER REDUCTION FOR OIL PALM

- It should be based on palm age, previous fertilizer application, soil chemical analysis and current yield level to calculate the cost/revenue ratio in the profitability analysis;
- No fertilizer cut-back for the first three stages of active growth is advocated, *i.e.* nursery, immature or one to three years after planting, and young mature stage or four to eight years after planting;
- Discriminatory fertilizer cut-back where applicable, is only for fully mature palms or more than eight years after planting;
- Nitrogen (N) is a very important growth factor and not accumulated. There should not be any cut-back on N fertilizer;

- A 100% cut-back on phosphorus (P) fertilizer can be done only if soil available P is more than 100 ppm. Proportionate cut-back can be done for values between 15 to 100 ppm;
- A 30% cut-back on potassium (K) fertilizer can be carried out if soil exchangeable K is more than 0.50 cmol kg⁻¹;
- It is recommended that at least 0.5 kg kieserite palm⁻¹ yr⁻¹ be routinely applied to maintain balance of bases and normal functions of magnesium (Mg). This is only applicable to palms planted on inland sedentary soils;
- Boron (B) fertilizer can be cut completely but on alternate year basis and maintain leaf B between 15 – 25 ppm;
- Complete fertilizer withdrawal can be done only in palms due for replanting in the next two to three years, *e.g.* palms in the 22 to 23 years of planting assuming replanting at 25 years;



Overall broadcasting of fertilizer by mechanization.

ISSN 1511-7871



9 771511 787001

Malaysian Palm Oil Board, Ministry of Primary Industries, Malaysia

P. O. Box 10620, 50720 Kuala Lumpur, Malaysia. Tel: 03-89259155, 89259775, Homepage: <http://mpob.gov.my> Telefax: 03-89259446



- Do not cut fertilizers if palms are in sub-optimal health condition with potential to improve;
- Frond 17 analysis can be used to some extent as guide on fertilizer reduction if soil data is unavailable. Reduce P, K and Mg fertilizers over short term period if nutrient levels fall within the optimum range as follows:

Nutrient	Range (%)	
N	2.56	- 2.85
P	0.161	- 0.177
K	0.90	- 1.22
Mg	0.24	- 0.30

Note: take into account the importance of maintaining nutrient ratios and balance of bases when deciding the quantum of reduction.

- Greater use of legumes and palm by-products such as fronds, trunk chips, empty fruit bunches, fibre, shell and palm oil mill effluent is strongly advocated.
- Reduce frequency of fertilizer application to the minimum by overall broadcasting the fertilizers in the weeded-circle, harvesting path and frond-pile areas. This can be achieved by ensuring that the ground area is free from dense vegetation, apply fertilizers during

Example:

PROFITABILITY ANALYSIS (FFB price RM 100 t⁻¹)

SOA	RP (kg palm ⁻¹ yr ⁻¹)	MOP	Kies.	Total	C	R	C/R
					(RM)		
3.0	2.5	3.0	0.5	9.0	575	1100	0.52
3.0	0	2.0	0.5	5.5	371	950	0.39
					204	150	

Note: in order to do the profitability analysis, data on yield responses to fertilizers are required and it is necessary to consult the agronomist.

CONCLUSION

Production of palm oil, unlike other mass production processes, cannot be turned on and off in accordance with market conditions, and a variable fertilizer schedule is undesirable. Blanket fertilizer cut-back is generally not advocated. However, where situations are desperate, a discriminatory approach in fertilizer reduction may be adopted. It should strictly follow the guidelines given because not all conditions in the plantations favour such reduction to be carried out.

months with moderate rainfall (150 – 200 mm) and where suitable, use mechanization to apply the fertilizers; and

- Carry out 'profitability analysis' to find out whether fertilizer reduction is justified.

PROCEDURES

1. Obtain the following information:
 - a. Current prices of fresh fruit bunches (FFB) and fertilizers.
 - b. Potential yield response (PYR), where

$$\text{PYR} = \text{potential yield with fertilizer} - \text{potential yield without fertilizer.}$$
2. Calculate 'cost/revenue' ratio (C/R), where

$$\text{C} = \text{cost of fertilizers.}$$

$$\text{R} = \text{additional revenue from fertilizer input (which equals to PYR x price of FFB).}$$
3. Compare C, R and C/R values before and after fertilizer reduction. Fertilizer reduction is justified if fertilizer cost saving is more than the loss in additional revenue and C/R is lower.

For more information kindly contact:

Director-General
MPOB
P. O. Box 10620
50720 Kuala Lumpur, Malaysia.
Tel: 03-89259155, 89259775,
Homepage: <http://mpob.gov.my>
Telefax: 03-89259446