1 Introduction

Although its economic products (palm oil and palm kernel oil) contain mainly carbon (C), hydrogen (H) and oxygen (O), the oil palm has a large requirement for nutrients. This is because there are often large responses to nutrient inputs (crop residues and mineral fertilizers), large amounts of nutrients are removed in fruit bunches, and there are usually inefficiencies in the recycling of nutrients contained in crop residues.

Over the past twenty years the expansion of oil palm cultivation has occurred mainly on low fertility status ‘inland’ or ‘upland’ soils on the islands of Borneo and Sumatra and in Thailand. Nutrient losses due to surface erosion and runoff are generally greater in these countries due to the predominantly hilly terrain, fragile soil structure and high rainfall. Thus, mineral fertilizers are of great importance to supplement poor indigenous soil nutrient supply, and large yield responses have been demonstrated in many fertilizer experiments carried out in the region, particularly on the poorer soils of Borneo, Sumatra and Thailand.

Unlike many other crops, a deficiency in the supply of most nutrients in oil palm and legume cover plants (LCPs) is manifested in:

- leaf deficiency symptoms,
- measurable differences in vegetative growth parameters, and
- variability in the species composition of the ground vegetation.

It is important that planters and agronomists acquire the knowledge and develop the skills to identify nutrient deficiencies in their plantations by observing carefully the

palm stand and the ground vegetation. This information can be used to corroborate information on nutrient requirements based on the results of fertilizer experiments, as well as soil and leaf nutrient analysis.

Under intensified management, and depending on local soil and climate conditions, mineral fertilizers account for 50–70% of field upkeep costs, 30–35% of variable costs and about 25% of the total cost of production. The assessment of nutrient deficiency symptoms requires a small investment in resources but provides the means to improve the accuracy of fertilizer recommendations and thus improve the efficiency with which fertilizers, the most costly production inputs, are used.

This pocket guide provides a tool for the identification of nutrient deficiencies and their underlying causes, as well as advice on their prevention and treatment. We have also described methods for conducting formal surveys to quantify the extent of nutrient deficiencies, the analyses of the survey results and the portrayal of the information in maps.