Future demand for maize and oil palm is projected to increase steadily due to the effect of rising populations and incomes on food, feed and fuel consumption. This demand should be met through increased production on existing cropland while conserving natural resources. This study was conducted to evaluate the prospects for sustainable intensification of maize and oil palm production in Southeast Asia through improved nutrient management. Strategies and tools for site-specific nutrient management were evaluated across the region in terms of their effect on productivity, profitability, sustainability and environmental quality.

The leaf color chart was found effective in detecting N deficiency in maize. Adjusting fertilizer N applications according to leaf color gave 0.80 t ha\(^{-1}\) more grain yield than fixed rates and US$ 182 ha\(^{-1}\) higher profit. There was no advantage in more than two split application of fertilizer N in terms of yield or agronomic efficiency in areas with low risk of N leaching. Yield with site-specific nutrient management (SSNM) was 1.0 t ha\(^{-1}\) higher than the current farmers’ fertilizer practice (FFP). Yield increases were associated with a 10% decrease in average fertilizer N rate, but with increased application of K at sites where the previous K rates were low. Average N use efficiency increased by 42% and profitability by US$167 ha\(^{-1}\) per crop. The Nutrient Expert (NE) for hybrid maize decision support software increased yield and profit of farmers in Indonesia and the Philippines. In Indonesia, NE increased yield by 0.9 t ha\(^{-1}\), which increased profit by US$270 ha\(^{-1}\) over the FFP. In the Philippines, NE increased yield by 1.6 t ha\(^{-1}\) and profit by US$379 ha\(^{-1}\) compared with FFP. Soil pH and soil organic carbon under oil palm plantations improved after four years of field trial with appropriate nutrient management practices. Leaf analysis was found to be insufficient for nutrient management in oil palm when used alone under a commercial production setting. To reduce decision uncertainty related to nutrient management, an approach using operational research and on-farm experimentation was proposed where routinely collected data on leaf
analysis, yield, weather and soil conditions on a large number of blocks over a longer period of time are used to provide more insight on the response of the crop to both management and uncontrolled variation under particular sets of spatial and temporal conditions at a commercial scale.