

Rawiwan Chotiphan 2009: Chemical Fertilizer Management Following Soil Analysis for Augmenting the Production of Cassava (*Manihot esculenta* Crantz) Planted in Fang Daeng Soil Series. Master of Science (Soil Science), Major Field: Soil Science, Department of Soil Science. Thesis Advisor: Assistant Professor Chaisit Thongjoo, Ph.D. 97 pages.

This study aimed at chemical fertilizer management base on soil analysis to improve cassava (*Manihot esculenta* Crantz) production planted in Fang Daeng soil series on late and early rainy season. Randomized Completely Block Design was used as an experimental design including 7 treatments, i.e., a) control/unfertilized treatment ( $T_1 = 0-0-0^*$ ); b) chemical fertilizer application based on soil texture as recommended by Department of Agriculture ( $T_2 = 16-8-16^*$ ); c) chemical fertilizers application based on soil chemical analysis as recommended by Department of Agriculture ( $T_3 = 16-8-16^*$ ); d-f) chemical fertilizers based on estimated uptake of 100, 50, 25% of applied nitrogen ( $T_4 = 12-18-86^*$ ,  $T_5 = 24-18-86^*$  and  $T_6 = 48-18-86^*$ , respectively) on late rainy season or ( $T_4 = 9-18-85^*$ ,  $T_5 = 18-18-85^*$  and  $T_6 = 36-18-85^*$ , respectively) on early rainy season and g) chemical fertilizers derived from mathematical model based on soil chemical analysis ( $T_7 = 72-9-85^*$ ) [ $^*$  kg N,  $P_2O_5$  and  $K_2O$  per rai, respectively].

Results revealed that  $T_7$  ( $T_7 = 72-9-85$ ) had the largest effect on plant height and weight of fresh shoot of cassava at 12 months for both planting seasons, and its height and weight was nearly the same as  $T_6$  ( $T_6 = 48-18-86$  or  $T_6 = 36-18-85$ ). In contrast, the control treatment ( $T_1 = 0-0-0$ ) had the smallest effect on height and weight of cassava for both planting season. Regarding the yield of cassava,  $T_4$  ( $T_4 = 12-18-86$ ) had the largest effect on fresh shoot yield on late rainy season, followed by  $T_6$  ( $T_6 = 48-18-86$ ) whose yield was similar to  $T_7$  ( $T_7 = 72-9-85$ ) and  $T_5$  ( $T_5 = 24-18-86$ ) respectively. Planting cassava in early rainy season we found that  $T_6$  ( $T_6 = 36-18-85$ ) had the largest effect on fresh shoot yield, followed by the yield of  $T_5$  ( $T_5 = 18-18-85$ ) and  $T_7$  ( $T_7 = 72-9-85$ ) that were similar to  $T_4$  ( $T_4 = 9-18-85$ ).

Regarding concentration of plant nutrients in cassava leaves on both planting season, it was found that  $T_4$ ,  $T_5$ ,  $T_6$  and  $T_7$  contained the high amount of N, P and K. Considering the concentration of plant nutrient in fresh shoot of cassava, it was found that  $T_4$ ,  $T_5$ ,  $T_6$  and  $T_7$  had almost the same N contents, while the control treatment ( $T_1 = 0-0-0$ ) had the smallest concentration of N, P and K in cassava leaves and fresh shoot yield. However,  $T_4$  ( $T_4 = 12-18-86$  or  $T_4 = 9-18-85$ ) showed the largest response on N fertilizer, on the other hand,  $T_7$  ( $T_7 = 72-9-85$ ) had the largest response on P fertilizer, and  $T_2$  ( $T_2 = 16-8-16$ ) and  $T_3$  ( $T_3 = 16-8-16$ ) had the largest response on K fertilizer on late and early rainy season.

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Thesis Advisor's signature

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