Effect of Different NPK Rates on Rice Yield in Pratesh Lang Soil Type in Cambodia

Kong Kea1,3*, Men Sarom1, Seng Vang1, Yoichiro Kato2, Akira Yamauchi1 and Hiroshi Ehara3
(1 General Directorate of Agriculture, MAFF, Cambodia, 2 IRRI, 3 Nagoya University)

The NPK are known macro elements that strongly affect to crop establishment and yield. In 1989, Cambodia Agricultural Research and Development Institute (CARDI) gave recommendation rate of fertilizer on rice production based on soil types. This recommended rate of NPK seems however low as compared to farmers’ practices nowadays and the rate recommended in the neighboring countries. The CARDI recommended rate for Prateah Lang soil type is 50kg N, 25kg P2O5, 25kg K2O/ha (T1 in Table 1) while farmers’ practice rates are 55–64kg N, 24–46kg P2O5, 30kg K2O/ha. However, the overuse of chemical fertilizer will lead to un-preferable plant growth, insect pest, disease and yield. Thus, we examined the effect of different NPK application rates on rice yield in the condition of Pratesh Lang soil type in Takeo province, Cambodia to investigate appropriate rates for improving rice production and economic efficiency.

Material and Methods This study was conducted from July to November in wet season 2013. A multi-locational trial with 6 treatments (T0-T5) of NPK rates in 5 locations and 3 replications was conducted. Table 1 shows the application rate in trial 1. N application in trial 2 to 5 was same with trial 1. For T2 to T5 in trial 2 to 5, P2O5 was applied at 30, 45, 60, 60kg/ha, respectively and K2O was applied at 45, 30, 15, 45kg/ha, respectively. Urea, DAP and KCl were used for fertilization. Split application was employed [basal: 20% of N, 100% of P and K, top dressing-1st: 40% of N (30DAT), 2nd: 40% of N (PI stage)]. Three-week-old seedlings of var. Phka Rumdoul were transplanted with 2–3 seedlings/hill with 20cm×20cm spacing. Plant length, tiller number and yield components were measured.

Results and Discussion Results from the experiment show that application of different rates of NPK affect to some extend of yield components. The tiller number per hill, panicle number per hill and spikelet number per panicle were the key factors that significantly affected to the yield. However, the other parameters had small effect or weak relation with the yield such as the filled grain percentage, 1000 grains weight and percentage of productive culms per hill. At least, in trial 3, 4, 5, the tiller number tended to increase with larger amount of N application. From the comparison between trial 1 and trial 2 and between trial 4 and trial 5, higher K would not be so effective when P was applied high enough. Through analysis of variance, the yield of non-use NPK, and CARDI recommendation gave significantly lower yield as compared with treatments that increase N from 60kg/ha and P from 30kg/ha. Even N increased up to 120kg/ha and P up to 60kg/ha and K up to 45kg/ha, the yield was not significant different and it would cause higher input cost in production. From these results, to increase rice production in the target area, farmers’ effort to increase just N and P input will be sufficient.