Optimum Fertilizer Rate for Yard Long Bean (*Vigna Unguilata* L) Production in Ultisol Jasinga

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ABSTRACT

Proper fertilization of a crop is knowing the crop nutrient requirement for production of maximum yield and the potential level of nutrient availability from the soil. Nitrogen, phosphor, and potassium availability is the most limiting factors for maximum growth and yield. Yard Long Bean (Vigna unguilata L.) were grown to determine optimum rate of N, P, and K fertilizer in Ultisol Nanggung, Bogor soil with low pH (5.5), low C-Organic (1.54%), very low N-total (0.12 %), low K content (0.29 me/100 g), but very high soil P_2O_5 concentration (19.2 ppm). The experiment was conducted at farmer site in Hambaro village-Nanggung, Bogor, Indonesia from January to April 2008. Treatments: N, P, K fertilizer rate of 0%, 50%, 100%, 150% and 200% from fertilizer recommendation rate (100 kg/ha N, 135 kg/ha P_2O_5 and 135 kg/ha K_2O). This experiment using Completely Randomized Block Design with four replications (each farmer field as one replication). Total plot = 15 x 4 = 60 plot. Plot size = 1.5 x 5 m. Yard long bean var. 777 planted in double row, 50 cm between rows, 25 cm within row, 2 seed per planting. Application of N to 200 kg/ha, P_2O_5 to 270 kg/ha, and K_2O to 270 kg/ha quadratically increased total and relative yield of yard long bean. Base on Y = -0,0013 x2 + 0,4188x + 53,506 for N, Y = -0,0012 x2 + 0,3699x + 51,89 for P_2O_5, and Y = -0,0005x2 + 0,2287x + 60,016 for K_2O the optimum rate for each nutrients were 169-208-309 kg N- P_2O_5- K_2O /ha. Fertilizer recommendation base on K threshold (no K) was 16-28-0 and N threshold was 0-4-0 kg N- P_2O_5- K_2O /ha. However, there was no fertilizer needed on P threshold. In recommendation base on optimum yield (169-208-309), percentage increase in cost (52,0) was higher than the expected increase in yield (40,88). According to the yield vs. cost rule therefore, the most economical recommendation would be 16-28-0 kg N- P_2O_5- K_2O /ha (K threshold).