

Potassium Increases Cassava Yield on Alfisol Soils

By H. Suyamto

Symptoms of potassium (K) deficiency are common in cassava grown on marginal soils in Indonesia. Consequently, a K fertility experiment was conducted in South Malang, East Java, in order to develop a set of balanced fertiliser recommendations.

Cassava is an important root crop to Java-Indonesia. Among tropical root crops, it has the highest ratio of K to nitrogen (N) in its harvested tuber and extracts the largest amount of K from soil. Typical N, phosphorus (P), K, calcium (Ca), and magnesium (Mg) removals per tonne of cassava root are 4.91, 1.08, 5.83, 1.83 and 0.79 kg/ha, respectively. Despite this large nutrient demand, cassava is often grown on marginal uplands (Alfisols) with low fertility. Traditionally, cassava farmers have not applied fertiliser, and attempts that are more progressive have only concentrated on applying N and farmyard manure (FYM). Average farmer yields are low at approximately 12 tonnes of fresh root/ha.

Table 1. Fertiliser treatments on cassava, Malang, East Java.

Treatments	Rates, kg/ha			FYM, t/ha
	N	P ₂ O ₅	K ₂ O	
N-P	92	36	—	—
N-P-K1	92	36	30	—
N-P-K2	92	36	60	—
N-P-K3	92	36	120	—
N-P-K3-FYM	92	36	120	10

Table 2. Effect of K and farmyard manure on cassava yield, Malang, East Java.

Treatments	Fresh root yield, t/ha	Root number per plant	Plant height, cm
N-P	11.88	7.6	109
N-P-K1	18.42	9.2	116
N-P-K2	22.80	9.5	138
N-P-K3	23.46	9.0	147
N-P-K3-FYM	29.84	10.0	184
LSD 0.05	9.1	0.9	ns*
CV (%)	25.1	6.3	26

*Not significant at 5% level.

A local variety of cassava (Menyok) was planted at a spacing of 1 m x 1 m in November 1996 at the beginning of the rainy season. Plots were 6 m² in size and were replicated three times. Fertiliser treatments were arranged as shown in **Table 1**.

Soil analysis before planting indicated low organic matter (1.1 percent), P (Bray 2) very low at 1.56 parts per million (ppm), and K very low at 0.07 meq/100g. Both Ca and Mg were high, with Ca at 9.7 meq/100g and Mg at 2.6 meq/100g.

Data indicate that K was a major limiting factor for efficient cassava production on marginal upland Alfisol soils. Application of N and P alone resulted in the lowest yield at 11.88 tonnes fresh root/ha (**Table 2**). Exclusion of K also resulted in the lowest number of roots per

plant at 7.6. Yields showed a curved response to successive increases in K up to 120 kg K₂O/ha (**Figure 1**).

Separate combinations that added either 30 or 60 kg K₂O/ha increased yields over the N-P treatment by 55 and 92 percent, respec-

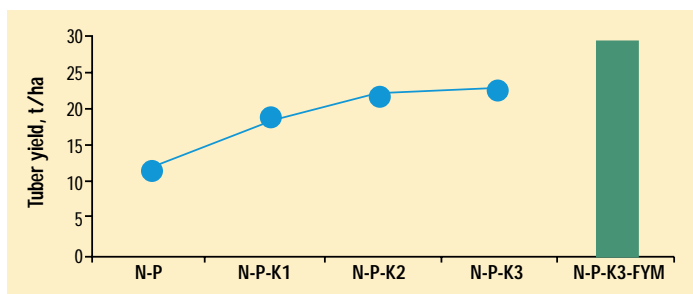


Figure 1. Cassava root yield response to successive increases in K, and yield obtained with further addition of FYM, Malang, East Java.

tively. The treatment that combined 10 tonnes FYM/ha with the highest rates of N, P and K resulted in 29.84 tonnes fresh root/ha. The number of roots per plant increased significantly by including 30 kg K_2O /ha with N and P, but no additional increase in root number was observed with higher rates of fertiliser or manure.

Recommendation

The study proved that cassava planted on marginal Alfisol areas responded significantly to K fertiliser. The application of 60 kg K_2O /ha in addition to adequate N and P should be recommended for this area. Further if available, manures in combination with inorganic fertiliser is a very effective part of efficient cassava production in Java. **BCI**

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Australia: Deep-Placed Potassium for Dryland Peanuts Grown on Oxisol Soils

Increasing incidences of potassium (K) deficiency for dryland peanut crops in Australia, particularly during extended dry periods, has prompted a study on K nutrient dynamics and fertiliser placement options on Oxisol soils. Native soil K reserves for high producing areas have been depleted from 50 years of cropping and a confinement of available K in the top 10 to 15 cm layer of dry soil. Researchers are working to characterise K uptake by peanut on these soils and are examining corrective management options.

Field trials found placement of potash in a deep band 25 to 30 cm below the surface improved mid-season K contents of crops grown on soils with initial subsoil K values below 0.20 cmol (+)/kg. Work continues on identifying appropriate rates and frequencies for deep-banded K in Oxisols. **BCI**

Source: White, J., M. Bell, N. Menzies 1997. ACIAR Food Legume Newsletter 26.

