How Cassava Responds to Fertilizer Application

Cassava is the third most important source of calories after rice and maize in tropical countries. In addition to its use as food, cassava is also largely used for animal feed and industrial products. Millions of people in Africa, Asia, and Latin America depend on cassava.

The 2014 (current) global average yield of cassava was 11.2 t/ha. In Southeast Asia, average yield increased significantly in the last 20 years from 11.6 t/ha in 1995 to 22 t/ha in 2014 (FAOSTAT, 2016). However, yields in 6 out of 10 countries growing cassava in this region are still below 20 t/ha, largely due to very low or no application of fertilizer.

In many regions, cassava has now been grown for decades and traditionally, many farmers do not apply fertilizer to cassava. Unlike other crops, cassava can grow even in very infertile soil. But when cassava is grown on the same area for many years without adequate application of fertilizer, the soil nutrient content gets depleted, resulting in very low yields (Figure 1a). Long-term cassava experiments in Southeast Asia showed that there were no significant responses to application of N, P, and K initially (from 1-3 years); but where cassava was grown continuously for at least 8 years, K became the most limiting nutrient in each of the sites (Figure 1b).

The short-term responses to applied nutrients depend largely on the original fertility characteristics of the soil as well as on the nutrient requirements of the crop. In long-term experiments, the response to particular nutrients may change over time, depending initially on the original fertility of the soil, but subsequently this will depend more and more on which nutrients are being depleted most by the removal of the harvested products. Analysis of nutrient concentration at harvest of three cassava cultivars in the Philippines showed that nutrient removal is largest for K and smallest for P. The average nutrient removal by the whole plant was 7 kg N, 2 kg P, and 11 kg K per ton of fresh root yield; and the average nutrient removal with the roots only was 1.2 kg N, 0.5 kg P, and 3.3 kg K per ton of fresh root yield (Pampolino *et al.*, 2017).

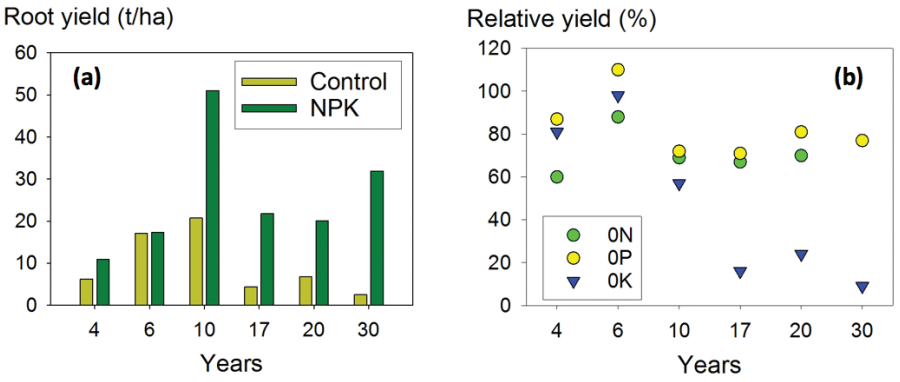

Figure 1. Effect of NPK application on cassava root yield (a) and the yield of cassava in nutrient omission treatments (0N, 0P, and 0K) relative to yield in NPK treatment (b) in long-term cassava trials in Southeast Asia (Data source: Howeler 2014).

References:

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