



Tropentag, September 18-21, 2016, Vienna, Austria

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Nutrient Requirements of Cassava under Different Management Systems in South-Kivu, D.R. Congo

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Abstract

Previous works have shown that cassava is highly responsive to fertiliser additions and benefits from improved management. Yet the yield responses of cassava to mineral fertilisers often remain highly variable and are not always clearly related to soil fertility levels. The objective of this study was to investigate and understand factors limiting yield responses of cassava to mineral fertilisers and their interactions with the different agricultural management practices in South-Kivu. Two types of experiments were carried out in multi-locational participatory farmer trials during two consecutive seasons (LR2014 and LR2015): The first type consisted of macronutrient (N, P or K) omission experiments including a manure treatment (FYM) as well as a full NPK, NPK+FYM and NPK+Ca-Mg-S-Zn treatments, to evaluate possible limiting nutrients to cassava growth and yield, and they were established with an improved cassava variety (sawasawa). A control and NPK+FYM treatments with a local variety (nambiyombiyo) were also included for comparison; The second type were leaf management trials with two factors including leaf harvesting effect as the main factor with 3 levels (no leaf harvesting, harvesting every 2 weeks, or 4 weeks, from 4 months after planting) and fertilisation effect (with or without fertiliser application) as the second factor. Fertiliser application significantly affected cassava growth and yields in the two types of experiments. NPK+FYM treatment was the best treatment as it gave the tallest plants throughout the growing period and significantly increased cassava root yield at harvest. Its fresh root yield increment was 26 % on average. The improved variety positively affected growth and yield of cassava with 52 % on average of root yield increment. Harvesting of leaves at 2-week interval reduced root yield relative to the control and 4-week interval treatments. In LR²015, leaf harvesting at 4-week interval significantly increased both cassava fresh biomass and root yields when fertiliser was applied (82 % and 40 % of yield increment compared with the control and the 2-week interval treatment, respectively). Results from compositional nutrient diagnosis (CND) approaches will be performed to determine nutrient disorders in cassava in the study area and their suitability to assess optimal nutrient conditions for cassava growth and yields.

Keywords: Cassava yield, leaf harvesting, mineral fertiliser, nutrient balances, organic input