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# Availability and use efficiency of major nutrients (N and P) by maize after one-year legume fallows in a tropical sandy soil (Lamto, Mid-Côte d'Ivoire)

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## Résumé

Recently, herbaceous legumes have been introduced in central Côte d'Ivoire in order to reclaim savannah soils which are still less cultivated by farmers. In these sandy soils which are susceptible to rapid loss of nutrient, efficient P and other nutrient use should be priorities. A two-year study was therefore conducted near the Lamto reserve with the aim of assessing (i) the potential of legume cover crops in improving P availability in a guinea savannah sandy soil and how this influences the N uptake by a subsequent maize crop, and (ii) the use efficiency of legume-derived P and N by subsequent maize compared to mineral fertilizers. Two groups of cropping systems were tested within a randomized complete block experimental design with three replications. The first included legume-based systems with *Mucuna pruriens*, *Pueraria phaseoloides*, *Lablab purpureus* and legume mix. The second consisted in four maize-based continuous cropping systems: maize fertilized with urea (U), maize fertilized with triple super phosphate (TSP), maize fertilized with both urea and triple super phosphate (U+TUSP) and fertilizer-free maize (Tradi), used as control. The efficiency of use of legume P and N by maize was estimated through two parameters: the apparent recovery of N and P in maize and the fertilizer replacement index (FRI). After one year, soil soluble P increased (+90%, on average) under legume plots while it decreased under continuous cropping (-40%, on average). Soil N content increased significantly by 15 to 23.6 % under legume-based systems, compared to the initial content while no significant increase was observed under the control. Maize grain yield varied significantly among treatments, with higher values for the legume plots. Nutrient uses were more efficient on legume plots as indicated by higher apparent P and N recoveries in maize as well as PFRI and NFRI which were superiors to the rates of mineral fertilizer applications. *P. phaseoloides* emerged as the best candidate for reclaiming the studied soils.

**Mots-Clés:** Herbaceous legumes, Savannah land reclamation, Sandy soil, Nutrient use efficiency, Côte d'Ivoire

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