

## Seasonal soil nitrogen dynamics management and its effect on rice agronomic performances in the rainfed lowland cropping system of Burkina Faso

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In the dry savannah zone of West Africa, poor farmers cannot afford the use of external inputs in their cropping system. So, crop production is based on soil nutrition potential. In the low input system in general and the rainfed lowland rice in particular, yield observed in farmer's field is far below the yield potential of released varieties. Rice paddy yield is closely linked to nitrogen (N) uptake and management become urgent specifically during the dry-to-wet season transition period (DWT) during which more nitrogen is expected to be lost. A field experiment has been carried out to assess the effect of pre-rice cover crops grown as "nitrate catch crops" (NCC) on soil N dynamics and on subsequent rice agronomic performances in Dano (Burkina Faso). NCC have been experimented in two neighboring area following water and nutrient inflows management. NCC significantly reduced the buildup of soil nitrate during the DWT instead of the bare fallow where up to 70 kg ha<sup>-1</sup> of nitrate have been released. Maximum N accumulation by NCC biomass was observed in the water and nutrient inflow (WNI) area and ranged from 73 kg ha<sup>-1</sup> with the *Panicum* (*Panicum maximum* L.) to 121 kg ha<sup>-1</sup> for the velvet bean (*Mucuna cochinchinensis* L.). The cowpea (*Vigna unguiculata* L.) recording 86 kg ha<sup>-1</sup> of nitrogen was accumulated. Rice agronomic performances have been improved by NCC incorporation. Considering the bare fallow as reference, paddy yield increased by 1030 kg ha<sup>-1</sup> when rice was grown after *Panicum*. As for the N-fixing legumes, paddy yield increase was estimated at 1257 and 2089 when rice was grown after the velvet bean and the cowpea, respectively. With regard to the efficacy of NCC in the immobilization of soil nitrate and their action on rice productivity, their integration in the low input cropping system could contribute to short term production increase and long term soil fertility maintenance.

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