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"Management of land use systems for enhanced food security: conflicts, controversies and resolutions"

Nutrient Management Strategies for Rice Production in the Kilombero Flood Plain of Tanzania

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Abstract

Tanzania is an important rice producer with about 16% of the total rice production area of East Africa. Some 75% of the rice is grown by smallholder farmers under Rainfed conditions in floodplain wetlands. Grain yields and returns to investments are modest with declining soil fertility being the main production constraint. Within the research project 'Wetlands in East Africa- Reconciling future food production with environmental protection', we investigate integrated nutrient management options for lowland rice in comparison to farmer's traditional production methods. Long-term field trials have been established in 2015 at Ifakara in the Kilombero District of Morogoro Region, Tanzania in three hydrological zones within the floodplain (fringe, middle, and center positions). Treatments in 2015 included inorganic fertiliser (urea), farm yard manure and green manure (*Lablab purpureus*). urea was applied at 60 and 120 kg N ha^{-1}. Both, farm yard manure and green manure have been applied at rates equivalent to 60 kg N ha^{-1}. Green manure has been incorporated into the soil after 40 days of growth and two weeks prior to rice transplanting. Grain yield and yield parameters, data on crop phenology, and nutrient uptake and use efficiency by rice have been determined. Environmental and economic impacts of the different management strategies are also being assessed for future integration into a decision support tool. First results indicate a strong response of rice on mineral N application and only a moderate response to organic N sources after one season. These responses differ in their extent by the hydrological conditions and tended to be least in the center and most pronounced in the fringe positions. Thus, the effectiveness of fertilizer strategies varies with the hydrological regime and technology targeting must be site-specifically differentiated for a sustainable future uses of floodplain wetlands.

Keywords: Flood plain, globE, nitrogen source, rice, small holders, sustainable

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