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"Reconcile land system changes
with planetary health"

Documenting the variability of management practices, differential environmental attributes and rice yields in the Kilombero floodplain of Tanzania

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Abstract

The Kilombero Valley wetlands in Morogoro region of Tanzania was recently designated and added to the Ramsar convention's list to improve its social, economic and environmental values. Through the Southern Agricultural Growth Corridor of Tanzania (SAGCOT), intensifying rice production is projected to contribute up to 70 % of the national rice needs by 2030 and improve the livelihood of smallholder farmers. However, the various programmes aimed to increase rice production have not achieved the goal to increase yield per hectare consequently to narrow the large yield gap that exist between the potential and actual yields. One of the main reasons for this setback is the absence of thorough studies to explain the relation of existing yield variability with the crop management practices and field environment. We conducted a baseline survey on farmers' management practices and assessed biophysical attributes as well as grain yields in 127 rice farms, located at different physical positions within the Kilombero floodplains (drought-prone fringe, middle and submergence-prone centre) in 2016.The survey combined with statistical analysis, made it possible to assess the production strategies for rice farms according to the surveyed attributes. Survey results showed rice grain yields to vary between 0.1 and 4.8 t ha^{-1} with a coefficient of variation of 54 %. Grain yields were affected more by field attributes than cultural practices which were shown to be largely similar among farmers. The findings highlight that rice in floodplain wetlands responds differently to technical interventions due to variability in field rather than management attributes and selection of and the determination of site-specific extrapolation domains is a prerequisite before intensification technology is recommended.

Keywords: *Oryza sativa*, Production constraints, SARO 5, Social-ecological systems, Wetlands, Yield gap

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