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Effect of Land Use on Phosphorus Fractions in Different Wetland Soils

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Abstract

Demographic pressure and upland degradation rapidly enhance the conversion of previously unused wetlands into agricultural production areas in East Africa. The quality of wetland soils and their suitability for agricultural use is determined by many factors such as the pH, the texture, the content of soil organic carbon and the availability of water and nutrients. Preliminary studies could show that the amount and the availability of Phosphorus appear to be key determinants of the resilience of wetland soils to intensified land use. By changing the land use system and consequently the aeration status of the soil (*i.e.* by drainage or irrigation), the amount of total soil P appears unaffected, while the share of P in different fractions (labile, extractable, organic, total) is hypothesised to vary as a function of wetland type and land use system. We compared wetland soils from an inland valley in Kenya and a flood plain in Tanzania under a wide range of land use types (unused, fallow/grazing, cropping with or without drainage/irrigation) regarding standard soil chemical and physical attributes as well as the availability and pool size of different organic and inorganic P fractions (Hedley fractionation). Additionally the dry biomass accumulation and P uptake by 4-week-old rice plants (*Oryza glaberrima*) grown in potted soils from these wetlands under flooded and drained conditions were determined. Changes in pool sizes of different P fractions under the diverse aeration and land use systems are seen to provide indicators for the resilience or vulnerability of wetland soils to agricultural use.

Keywords: Tanzania, hedley fractionation, Kenya, *Oryza glaberrima*, soil aeration status

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