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The impact of papyrus wetland encroachment on the spatial and temporal variability of stream flow and sediment export in the upper Rwizi catchment, Southwest Uganda

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During the past 30 years, human activities in the Lake Victoria basin are responsible for eutrophication of Lake Victoria via sediment-bound nutrients. This affects food security for millions on people. Addressing this problem in this densely populated region will require adequate catchment management strategies. However, sediment yield and runoff data to develop such a strategy are currently unavailable. Also in general, sediment yields for catchments in tropical environments are very scarce, especially in East-Africa.

Therefore, runoff discharge and sediment export measurements were conducted in the upper Rwizi, a representative catchment for the Lake Victoria basin which is located in Southwest Uganda. Land use in this catchment is characterized by grazing area on the high plateaus, banana cropping on the slopes and *Cyperus papyrus L.* wetlands in the river valleys. These papyrus wetlands are currently encroached and transformed into cropland. Eight subcatchments (99 km^2 - 2120 km^2), with different degrees of wetland encroachment, were monitored during the hydrological year June 2009 - May 2010.

Temporal and spatial variations in runoff discharge give strong indications that papyrus wetlands are crucial for buffering runoff and sediment discharge towards Lake Victoria. Subcatchments with intact wetlands show a slower runoff response to rainfall, smaller peak runoff discharges and lower runoff coefficients. Yearly runoff depths of subcatchment with intact wetlands are three to four times smaller compared to subcatchments with encroached wetlands. Suspended sediment concentrations (SSC) show a similar result, with significant smaller SSC in the subcatchments having intact papyrus wetlands. In the subcatchments where no encroachment occurred, annual area-specific suspended sediment yields (SSY) varied between 0,26 ton ha^{-1} $yr^{-1}$and 0,33 ton ha^{-1} yr^{-1} , while the SSY of the encroached subcatchments varied between 1,20 ton ha^{-1} $yr^{-1}$and 2,61 ton ha^{-1} yr^{-1}.

This study demonstrates that papyrus wetlands are crucial for buffering runoff and sediment discharges to Lake Victoria. Hence, measures should be taken to protect these wetlands.