



Tropentag, September 20-22, 2017, Bonn

“Future Agriculture:
Socio-ecological transitions and bio-cultural shifts”

Slope-valley Bottom Water and Nutrient Fluxes in an Inland Valley Wetland in Uganda

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Abstract

Changing rainfall patterns and reoccurring dry spells impose severe challenges on East African rainfed agricultural communities. Thus due to their prolonged plant water availability inland valley wetlands have become increasingly important for food security in the region. Yet a careful and knowledge based management is crucial for the sustainable cultivation of these fragile ecosystems. In small scale farming monetary resources for industrial fertilisers are constrained leaving nitrate as a limiting factor for crop development and making efficient management of naturally occurring nitrogen essential. This study investigates on the temporal and spatial distribution and the relocation of soil born nitrogen from the slopes to the valley bottom of an inland valley wetland in Uganda. In a plot study the effects of three land use types (bare land, semi-natural vegetation and patchy agriculture) on nitrogen content in soil and surface water is monitored using ion exchange resins and *in situ* quantification at different slope positions. Water fluxes from surface runoff and interflow are quantified on runoff plots and in excavations at the bottom of the slope. Soil moisture is measured using a PR² soil moisture probe. Nitrogen content in soil water and soil moisture vary between the three land use types and the different slope positions, with highest concentrations found on the bare plots and at the bottom of the slope. A sandy loam layer at the bottom of the slope is delivering water and nitrate to the wetland even during dry season. Nitrate concentrations in soil water at the fringe of the wetland though were found to be very low. Thus down slope positions before the fringe seem to be of special importance if nitrate was to be put into production before being lost for plants from the wetland due to anaerobic soil conditions. This research is affiliated to the GlobE-wetlands in East Africa project.

Keywords: Interflow, nitrate, Uganda, wetland