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

*C. Schepp, B. Diekkrüger, M. Becker, C. Leemhuis*

## Introduction

In Uganda the GlobE-wetlands in East Africa project explores the potential of inland valley wetlands for agricultural production.

For a sustainable cultivation in capital restricted small scale farming, careful management of naturally occurring nutrients, i.a. nitrate, is crucial.

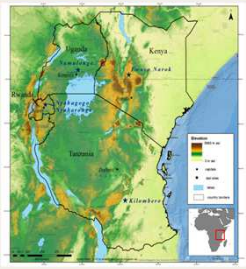
Surrounding valley slopes are expected to play a vital role in the delivery of water and nutrients to the wetland.

Comprehension and quantification of these slope water processes and affiliated nutrient transport are the central objectives of this study.

## Research questions and study site

- How much water do different runoff components (surface runoff, interflow) deliver to the wetland?
- Is there a relocation of nitrate along the slope?
- What's the situation like for different land uses?

- Namulonge, Uganda
- Undulating hills, with wetlands in valley bottoms
- Tropical climate, two rainy seasons per year
- Ferrasols in the upland and gley sols in the wetland



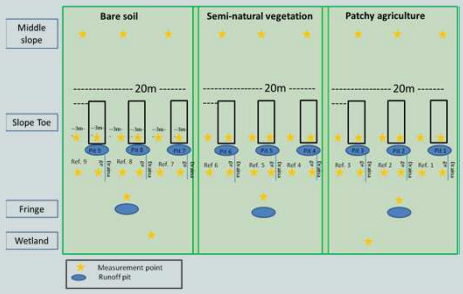

## Materials & Methods

- Plot study
- Three land uses: bare, semi-natural, patchy agriculture
- Measurement points at different slope positions
- At each point: PR2 (soil moisture), rhizons + nitracheck (nitrate in soil water), ion exchange resins (nutrient accumulation over growing period)
- Surface runoff plots (10x3 m)
- Interflow collection pits at the wetland fringe

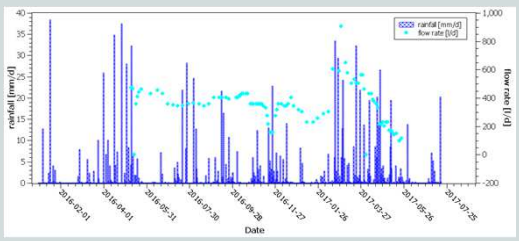
## First Findings

- **Landuse has a strong impact on nitrate concentration in soil water and in interflow**
- **Results suggest a relocation of nitrate towards the slope toe**
- **Very low nitrate concentration in the wetland compared to the upland**
- **Interflow connected to rainfall events but delayed in time**

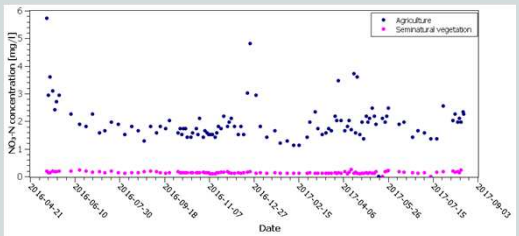
## Setup




## Results: interflow




Interflow [l/d] measured at the wetland fringe below the agricultural plot and daily rainfall [mm/d].

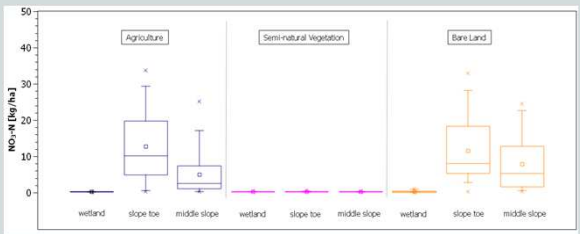



NO3-N concentration [mg/l] in the interflow at the fringe position for two different land uses

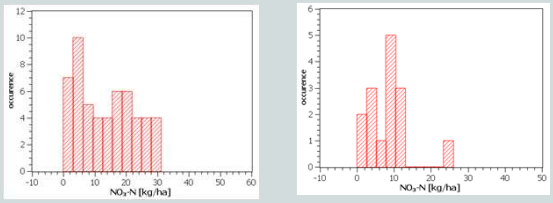
## Outlook

- Geoelectrical measurements to gain better understanding of flow pathways along the slope
- Upscaling of results

## Results: soil water




NO3-N [kg/ha] from soil water at different slope positions for all three landuses during three rainy seasons 2016 and 2017.




NO3-N [ka/ha] with contribution from slope water and without during three rainy seasons in 2016 and 2017.

Federal Ministry of Education and Research
Federal Ministry for Economic Cooperation and Development
GlobE Wetlands in East Africa
http://www.wetlands-africa.de
FKZ
031A250 A-H

Claudia Schepp
University of Bonn, Germany
Institute of Geography
s6clsche@uni-bonn.de

NaCRRI
REPUBLIC OF UGANDA
UNIVERSITÄT BONN
Cusanuswerk