

Special Session at the 9th INTECOL Wetlands Conference 2012

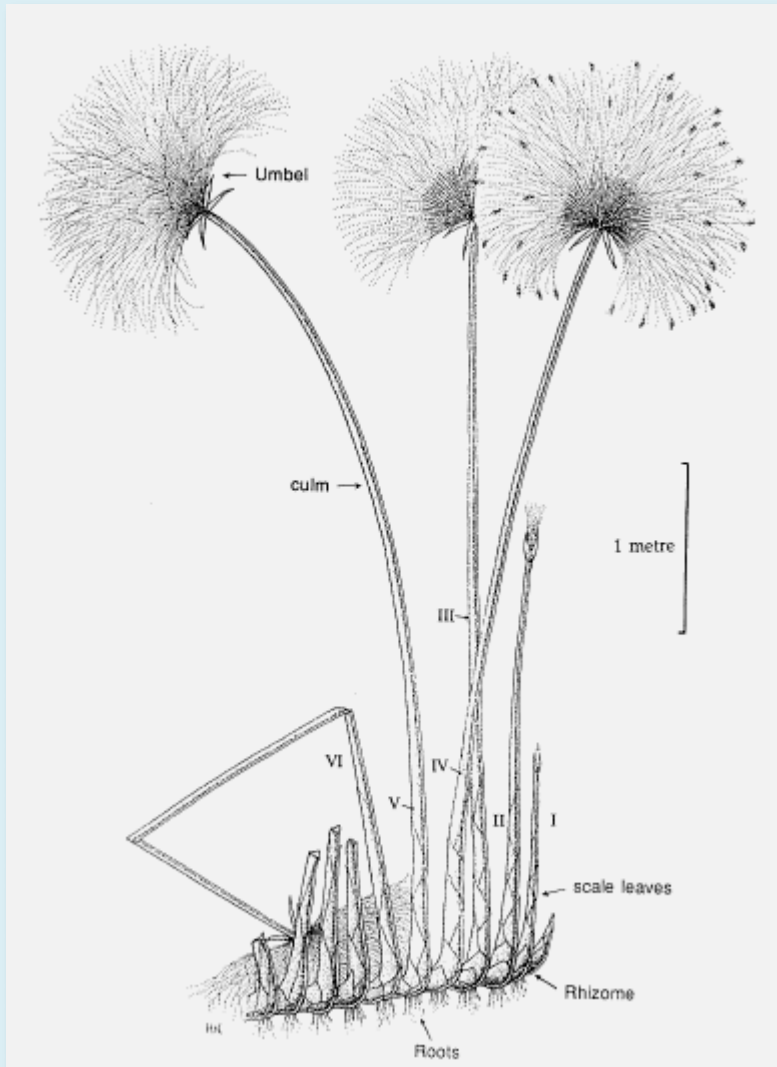
**The ecology of livelihoods in papyrus wetlands:  
balancing ecosystem functions and services in  
the context of local and global change**

Session organizers:

Anne van Dam UNESCO-IHE, The Netherlands

Julius Kipkemboi Egerton University, Kenya

# Cyperus papyrus



- 5 m high
- high productivity (C4 carbon fixation)
- rhizomes, rooted or floating mats
- riverine / lacustrine / floodplain





# Distribution of *Cyperus papyrus*



- Eastern and southern Africa
- Between sea level and 2000 m alt.
- Area coverage not known exactly
- Probably changing fast due to population growth and economic development

# Pressure on papyrus wetlands

- In some places in western Kenya, 34-50% of papyrus wetlands were lost between 1969 and 2000 (Owino and Ryan, 2007) due to agriculture and papyrus harvesting



Sondu Miriu floodplain, Kenya  
(photo: UNEP)



Bugesera, Rwanda



Nakivubo wetland, Kampala, Uganda





# Papyrus research

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### Introduction

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Rev Environ Sci Biotechnol (2011) 10:291–300  
DOI 10.1007/s11157-011-9255-6

### PROJECT UPDATE

## The ecology of livelihoods in East African papyrus wetlands (ECOLIVE)

Anne van Dam · Julius Kipkemboi ·  
Fred Zaal · J. B. Okeyo-Owuor

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### 1 Introduction

*Cyperus papyrus*, a fast-growing tropical sedge from central, eastern, and southern Africa (Fig. 1) forms extensive wetlands that are important to biodiversity and the livelihoods of millions of people. *Cyperus papyrus* (from here on “papyrus”) can grow as high as 5 m, and it occurs in nearly monoculture stands, creating extensive areas of wetlands in river valleys and near lake edges in eastern, central and southern Africa. In this project update, we review the ecological

characteristics and livelihood services of papyrus wetlands in East Africa and describe the interdisciplinary research project “The Ecology of Livelihoods in East African Wetlands” (ECOLIVE) that investigates the functioning of these wetlands. The ultimate goal of the ECOLIVE project is to examine how ecology and hydrology interact with livelihood activities in order to understand how sustainability of ecosystem services can be achieved.

Generally, papyrus wetlands occur in river valleys and on lake edges between latitudes 17°N and 29°S and between sea level and an altitude of about 2,000 m (Jones and Muthuri 1985). Papyrus does not occur in West Africa, probably because of the stronger hydrological seasonality of the rivers there (Thompson 1976, 1985). The total surface area covered by papyrus wetlands is not known and also varies seasonally. Extensive papyrus wetlands are found e.g. in the Sudd wetlands in Sudan, Lake Chad, around Lake Victoria, at Lake Naivasha in Kenya, Lake Kioga and many other wetlands in Uganda, in the Akagera river floodplain in Rwanda and the Malagarasi-Muyovosi wetlands in Tanzania, along the major rivers in Malawi, Zambia and Zimbabwe, in the Okavango delta in Botswana, and the Zambezi delta in Mozambique.

The importance of papyrus is not only a result of its vast areal coverage. Papyrus wetlands also provide vital ecosystem functions and services for millions of people and form a habitat for unique forms of biodiversity such as the Sitatunga or marshbuck (*Tragelaphus*

A. van Dam (✉)  
UNESCO IHE Institute for Water Education,  
Delft, The Netherlands  
e-mail: a.vandam@unesco-ihc.org

J. Kipkemboi  
Department of Biological Sciences,  
Egerton University, Njoro, Kenya  
e-mail: j\_kipkemboi@yahoo.co.uk

F. Zaal  
Amsterdam Institute for Social Science Research  
(AISSR), Faculty of Social and Behavioural Sciences,  
University of Amsterdam, Amsterdam, The Netherlands  
e-mail: f.zaal@kit.nl

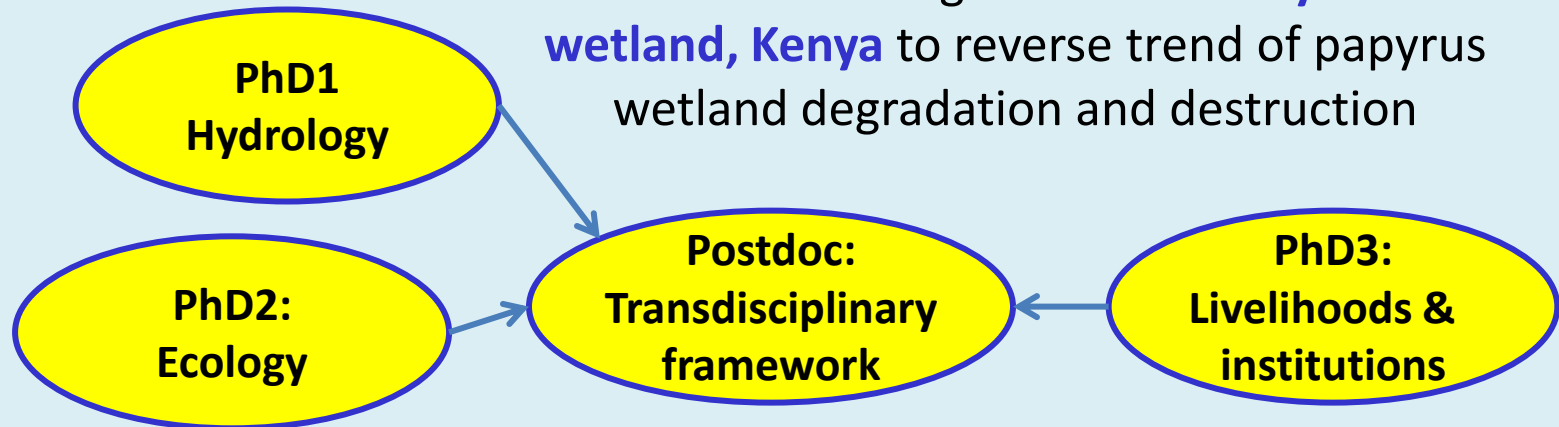
F. Zaal  
Department of Development Policy and Practice,  
Royal Tropical Institute, Amsterdam, The Netherlands

J. B. Okeyo-Owuor  
VIRED International, Kisumu, Kenya

# The Ecology of Livelihoods (ECOLIVE) project

## Objective

Integrate knowledge about hydrology, ecology, livelihoods and governance in **Nyando wetland, Kenya** to reverse trend of papyrus wetland degradation and destruction



## Partners


**UNESCO-IHE**  
Institute for Water Education



Egerton University  
Njoro, Kenya



VIRED International  
Kisumu, Kenya

 UNIVERSITY OF AMSTERDAM



ECOLIVE workshop, May 2011, Kisumu, Kenya

# The ecology of livelihoods in papyrus wetlands: balancing ecosystem functions and services in the context of local and global change

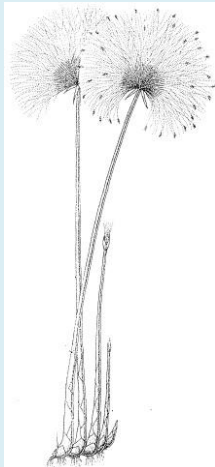
Tuesday 5 June 2012

## Session Agenda:

10:30 - 12:00 Papyrus wetland ecosystem functions, services and livelihoods (a)  
Moderator: Anne van Dam, UNESCO-IHE Institute for Water Education, The Netherlands

1:30 - 3:00 Papyrus wetland ecosystem functions, services and livelihoods (b).  
Moderator: J.B. Okeyo-Owuor, VIRED International, Kenya

3:30 - 5:00 Interdisciplinary research approaches for improving governance of papyrus wetlands.  
Moderator: Fred Zaal, Royal Tropical Institute, The Netherlands



# Response of Papyrus Wetland Ecosystem to Seasonal Changes in Hydrology and Livelihood Pressures

Priscah Rongoei  
Dept. of Environmental Science  
Egerton University, Kenya



Since 2009 working on PhD (UNESCO-IHE and Wageningen Univ.)  
2005 MSc (UNESCO-IHE)  
2002 BSc (Egerton University)

## Research Interests

- Biodiversity conservation, ecology, water quality
- Utilization of aquatic resources, wastewater management



## Groundwater-Surface Water Interactions in a Papyrus Wetland

Patrick S. Khisa

Water Resources Management Authority  
Kisumu, Kenya

Since 2009 working on PhD (UNESCO-IHE and TU Delft)  
2008 MSc (Univ. of Nairobi)  
1992 BSc (Univ. of Nairobi)

### Research Interests

- Floods, flood management and flood modelling
- Conservation and protection of water resources
- Recreational and environmental water demands in the Lake Victoria region



## Birds, People and Papyrus Swamps: Balancing Livelihoods and Biodiversity Conservation

Ilya M.D. Maclean  
University of Exeter, UK

2004 PhD (University of East Anglia)  
1998 BSc (University of East Anglia)



### Research Interests

- Model and predict the ecological consequences of environmental change
- Use remotely-derived data to facilitate predictions over meaningful scales or develop new algorithms to simplify processes
- Policy-relevance of research

## Effect of Vegetation Harvesting on Nitrogen and Phosphorous Cycling in Rooted Papyrus Wetlands

Edwin M.A. Hes

UNESCO-IHE Institute for Water Education  
Delft, The Netherlands

Working on PhD (UNESCO-IHE)  
1998 MSc (Wageningen University)

### Research Interests

- Wetland ecosystem functions and services
- Nutrient flows in papyrus wetlands
- Wetland management

