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

Mara River, Tanzania
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
The ecology of livelihoods in East African papyrus wetlands (ECOLIVE)

Anne van Dam · Julius Kiplangat · Fred Zaal · J. B. Okeyo-Owino

Published online: 15 October 2011
© Springer Science+Business Media B.V. 2011

1 Introduction

*Papyrus* papyrifera, 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. *Papyrus papyrifera* (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 new 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 Mutimur 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 Sudan wetlands in Sudan, Lake Chad around Lake Victoria, at Lake Naivasha in Kenya, Lake Kogo and many other wetlands in Uganda, in the Akagera river floodplain in Rwanda and the Mangani-Moyowosi 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 area 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 Sphagnum or marsh thistle (*Tragelaphus emm Tragelaphus emm*) and the flamingo (*Phoenicopterus roseus*).
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.

PhD1
Hydrology

PhD2:
Ecology

Postdoc:
Transdisciplinary framework

PhD3:
Livelihoods & institutions

Partners

UNESCO-IHE
Institute for Water Education

UNESCO

Egerton University
Njoro, Kenya

VIRED International
Kisumu, Kenya

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

9th INTECOL Wetlands Conference, Orlando, Florida
Special session: The ecology of livelihoods in papyrus wetlands
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