



The effect of seasonal flooding and livelihood activities on retention of nitrogen and phosphorus in *Cyperus papyrus* wetlands, the role of aboveground biomass

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Abstract With growing demand for food production in Africa, protecting wetlands and combining increased agricultural production with conservation of the ecological integrity of wetlands is urgent. The role of aboveground biomass of papyrus (*Cyperus papyrus*) in the storage and retention of nitrogen (N) and phosphorus (P) was studied in two wetland sites in East Africa under seasonally and permanently flooded conditions. Nyando wetland (Kenya) was under anthropogenic disturbance from agriculture and vegetation harvesting, whereas Mara wetland (Tanzania) was less disturbed. Maximum papyrus culm growth was described well by a logistic model (regressions for culm length with R^2 from 0.70 to 0.99), with culms growing faster but not taller in

Nyando than in Mara. Maximum culm length was greater in permanently than in seasonally flooded zones. Total aboveground biomass was higher in Mara than in Nyando. The amounts of N and P stored were higher in Mara than in Nyando. In disturbed sites, papyrus plants show characteristics of r-selected species leading to faster growth but lower biomass and nutrient storage. These findings help to optimize management of nutrient retention in natural and constructed wetlands.

Keywords Nutrient regulation · Regulating ecosystem services · Trade-offs · Constructed wetlands · Agriculture · Water quality

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