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"Management of land use systems for enhanced food security: conflicts, controversies and resolutions"

Monitoring Wetland Vegetation Regeneration in an Inland Valley in Uganda

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Abstract

With rapid population growth and degradation of upland fields, East African wetlands are increasingly converted into cropland. While fertile soils and seasonal or permanent water availability make wetlands highly suitable for crop production, such land use changes adversely affect biodiversity and functions of these ecosystem. Such effects may be counteracted by a recovery of natural vegetation during fallow periods.

We studied the dynamics of vegetation recovery within an agriculturally used inland valley in Central Uganda. The sampling plots were at three hydrological positions. Over two seasons we assessed biomass, vegetation structure and species composition and abundances at regular intervals.

Regeneration models are used to predict the biomass recovery after abandonment of cropland. The regular monitoring of seasonal and successional stage related changes in species composition will help to estimate the importance of fallow periods for biodiversity conservation and for restoring ecological functions as well as for the provision of Ecosystem Services that may depend on the successional stage. These include medical plants used by the local population, valuable forages and also flowers to support pollinators and hence pollination.

After six months, biomass regrowth was on average 1087±136 gm^{-2}, ranging from 764±47 gm^{-2} at the outer fringe to 1420±175 gm^{-2} in the centre of the studied wetland. The biomass recovery is significantly affected by the type of uses prevailing previous to fallow ($p < 0.05$). In early recovery stages, the vegetation was dominated by sedges, especially the annual *Cyperus difformis* in the wetter and the perennial *C. distans* in the dryer positions. During the dry season, these were gradually replaced by grasses such as *Setaria homonyma* and *Paspalum scrobiculatum*. Species abundant throughout the observed period were *Leersia hexandra* in the moister locations and *Ageratum conyzoides* towards the dryer fringes of the wetland.

The average number of species per plot was gradually increasing during the rainy season from 8.7 after two months up 15.8 after four months and then decreasing during the dry season. In conclusion the vegetation recovery and hence the resilience to anthropogenic disturbances is depending on hydrologic conditions and past uses with faster recovery in the moist centre of the wetland.

Keywords: Biodiversity, biomass regeneration, East Africa, fallow, growth models, inland valley, vegetation ecology, wetlands

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