Tropentag, September 18-21, 2016, Vienna, Austria

"Solidarity in a competing world — fair use of resources"

The 'Rhythm´ of Rangeland Management – Rest-Rotation Strategies in Simulated Savannah Vegetation Dynamics

Dirk Lohmann, Elise Münch, Florian Jeltsch

University of Potsdam, Plant Ecology and Nature Conservation, Germany

Abstract

Savannah rangelands are prone to widespread degradation associated with significant losses of important ecosystem services. Numerous studies have addressed this issue especially addressing to what extent different drivers cause this problem (i.e. the loss of perennial grasses and an increase in certain species of woody plants – so called shrub encroachment). Mechanistic simulation models have been successfully used to asses the impacts of land use and global change on the associated changes in vegetation dynamics.

In savannah rangelands promising and frequently discussed management methods consider spatial and temporal patterns of intense use alternating with times of rest. The underlying assumptions are based on the hypothesis that under natural conditions, large herds of ungulate herbivores migrating over vast spatial areas have short term, high intensity impacts on the system intermitted by longer periods of rest. Although of high relevance to actual land users, most rangeland models do not allow for an assessment of such impacts, as they often lack the abovementioned necessary resolution of processes like growth, removal of biomass and interlinked dynamics of above and belowground resources of plants.

We have implemented intra-seasonal herbivore impacts, growth and the dynamics of below-ground reserve biomass in an existing model and successful eco-hydrological of dryland vegetation dynamics. We used this adapted model version to assess different spatio-temporal strategies of rangeland management in semi-arid African savannah systems.

We can show that the sequence of grazing and resting periods has significant impacts on vegetation dynamics. This goes along with mid- and long-term changes of sustainable carrying capacities of these ecosystems for livestock production.

Keywords: *Acacia mellifera*, bush encroachment, eco-hydrological savannah model, livestock grazing, rangeland management, semi-arid savannah

Contact Address: Dirk Lohmann, University of Potsdam, Plant Ecology and Nature Conservation, Am Mühlenberg 3, 14476 Potsdam, Germany, e-mail: dirk.lohmann@uni-potsdam.de