
Session 1.8 Livestock and Grasslands

Oral Presentation

Title: Large scale impacts of grazing management under climate change

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Abstract: The potential of grasslands to sequester carbon and provide feed for livestock production depends on climatic conditions but also on management and grazing pressure. We use a global dynamic vegetation and agriculture model (LPJmL) to study spatially explicit feedbacks between grazing/mowing and primary productivity and impacts on soil carbon content under different management settings. Applying different animal densities as well as grazing durations, we quantify impacts on the carbon cycle due to climatic conditions and the grazing pressure and timing. Varying the density of grazing animals also enables to find local optimal densities which simultaneously enhance primary productivity and grass yield while maintaining soil carbon. We show that low animal densities increase grass productivity whereas high grazing pressure deteriorates the plants' ability to recover. The global application of this concept provides information on potential grass yields under varying climatic conditions to explore options for sustainable pasture-based livestock production.

Oral Presentation

Title: Impact of climate change on the livestock component of mixed farming systems: modelling evidence from regional integrated assessments across sub-Saharan Africa and South Asia

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Abstract: Mixed crop–livestock systems play an important role in global food production and livelihood provision of millions of rural households. Climate change is projected to alter the functioning and productivity of these systems. Although for many regions the impact of climate change is projected to be large, many uncertainties persist, in particular with respect to impacts on livestock and grazing components, whole-farm dynamics and heterogeneous farm populations. Using an integrated modelling framework we simulated fodder and grassland productivity for current and future climate scenarios. This data was subsequently used as input in a dynamic livestock model LIVSIM to investigate climate change impacts on animal productivity. The modelling framework simulates entire farm populations, thus capturing the effects of farm heterogeneity. Livestock-related output variables included milk production, herd dynamics, calving and offtake rates, and mortality rates. In integrated assessments, these livestock outputs are used in economic models at the household level. The modelling approach was applied across four distinct regions, including southern Africa, West Africa, Pakistan and India. This allowed capturing a wide diversity in farming systems and climate scenarios. Also various adaptation options targeting the crop, animal or grazing land components of mixed crop-livestock systems were investigated. Strong impacts of climate change and adaptation packages on livestock productivity were found in particular where impacts on feed quantity and quality were large. The differences in outputs were attributed to differences in growth-defining and growth-limiting factors across the four regions.