

Influences of Different Land Use Management on Net Primary Productivity and Belowground Carbon Allocation in a semi-arid Inner Mongolia Steppe

MSc Yingzhi Gao

Dr.-Vater: Prof. Dr. F. Taube

The aboveground and belowground productivity of Inner Mongolia steppe system are interlinked through complex feedback loops involving plants, sheep, soil and environmental factors. Due to the shift of land use decoupled with climatic change, it is important to understand the response of this steppe system to these new conditions. We gave the following conclusions about Inner Mongolia grassland based on three year's data: (1) rainfall variability and grazing intensity control the net primary productivity and herbivory in an interactive manner (2) mean annual precipitation is not always the most important factor determining the quantity of net production; distribution of precipitation and soil nutrient availability (e. g. N) can also significantly influence productivity (3) heavy grazing leads to significant declines in ANPP, BNPP and litter biomass, no compensatory and overcompensatory growth was observed and (4) heavy grazing that lead to a removal of more than 50% of ANPP in relative normal years, even 70% with dry climatic conditions, is very detrimental to sustainable and compatible with the maintenance of grassland condition indicating drought risks are further exacerbated by grassland degradation. (5) 50-70% of carbon gain was allocated to root system (6) Restoration measures of degraded grassland in this steppe ecosystem can include the application of small amounts of N fertiliser, especially in years of medium to high rainfall.