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“Bridging the gap between increasing knowledge and decreasing resources”

## Is Traditional Transhumance an Adapted Strategy or an Overhauled Way of Rangeland Management in the Chinese and Mongolian Altay?

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### Abstract

Changes in climate and modification in herd composition are assumed to affect the quantity and quality of fodder plants on pastures and consequently the transhumant livelihood system in the Chinese-Mongolian Altay Mountains. The management of a herd, typically consisting of goats, sheep, cattle, horses and camels, is characterized by seasonal grazing periods in the desert steppe, mountain steppe and alpine belt. Due to their economic importance for the herders, we tracked the movement of one representative cow and one goat herd with a long-duration global positioning system collar to record their grazing itineraries and activities from May 2012 to September 2013. To determine pasture productivity, 850 sampling locations were chosen to record above-ground biomass in the different grazing areas. In China, the temporal and spatial movement of herders was mainly ruled by the government at the local administration level, whereas in Mongolia herding strategies were primarily determined by the individual herders. In the Chinese Altay the herds moved around 285 km (cattle) and 572 km (goats), and grazed up to 11 different pastures per year. In the Mongolian Altay the cattle and goat herds moved around 389 km and grazed 6 different pastures. The biomass availability on the main spring, summer, autumn and winter pastures averaged 2010 kg ha<sup>-1</sup> in China and 1097 kg ha<sup>-1</sup> in Mongolia. The duration of stay for goats at the individual pastures ranged from 6 to 83 days in China and 40 to 103 days in Mongolia. Regulation of animal numbers and duration of stay on pasture as well as allocation of pastures to individual herders seem to maintain pasture quality in China. However, this system could prevent flexible adaptation to local environmental constraints. In contrast, the high number of especially cashmere goats and grazing of pastures before flowering of the herbaceous plants decreased pasture productivity in Mongolia. In conclusion, an optimized mixed species composition of the herds and a flexible adaptation to environmental constraints may foster the productivity and sustainability of the transhumance system in the Altay Mountains.

**Keywords:** Biomass production, Central Asia, communal pastures, GPS tracking