

Northern Eurasian C-land use-climate interactions in the semi-arid regions
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Abstract

Dramatic changes occurred in pastoral systems of Mongolia, China and Russia for past decades. Integrated assessment of these changes on environment and quality of life is essential for sustainability of the region. Integrated assessment entails determining the interactions and impacts of various management strategies on the environment and human systems. Recently, evaluation of the pastoral systems has been conducted in the region. Overview of these research project findings, integration of knowledge and delivery of this knowledge to scientists, policy makers and land users is critical for regional sustainable development.

Pastoral systems, where humans depend on livestock, exist largely in arid or semi-arid ecosystems where climate is highly variable. Thus, in many ways pastoral systems are adapted to climatic variability. It is plausible to assume direct connection between climate variability, ecosystem dynamics and nomadic land use system in Mongolia. Interaction between ecosystems and nomadic land use systems co-shaped them in mutual adaptive ways for hundreds of years, thus making both the Mongolian rangeland ecosystem and nomadic pastoral system resilient and sustainable.

We also recognize the pervasive role of demographic, political and economic driving forces on pastoral exploitation. The general trend involves greater intensification of resource exploitation at the expense of traditional patterns of extensive range utilization. This set of drivers is orthogonal to the above described climate drivers. Thus we expect climate-land use-land cover relationships to be crucially modified by the socio-economic forces mentioned above. Nevertheless, the complex relationship between climate variability and pastoral exploitation patterns will still form the environmental framework for overall patterns of land use change.

Key Findings

- Livestock analysis displays large regional differences which have large impact on land use and ecosystem dynamics
- Regional climate effects are emerging from MODIS analysis and long-term satellite data analysis
- Cropland output are regionally changing and are reflected in carbon fluxes and trace gas emission

Proportion of Social Science: 25%

Proportion of Carbon (66%), Water (10%), Nutrients (24%),

Key Words: 1) Research Fields: land use change, carbon exchange, pastoral systems, 2) Geographic Area/Biome: Central Asia, Mongolia, northernwestern China 3) Remote Sensing: MODIS, ETM, VEGETATION and 4) Methods/scales: Ecosystem modeling, site to regional scale.