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Ecosystem-Society Interactions on a Changing Mongolian Plateau

We undertook a multi-disciplinary project aimed at synthesizing data, knowledge, and quantitative models on ecosystem and social resilience to the changing climate and dynamic socioeconomic pressures placed on the fragile ecosystems of the Mongolian Plateau. Our models of natural system (NS) and human system (HS) processes and dynamics, as well as the interactions and feedbacks among them, make use of multiple data sources across the Plateau. Inner Mongolia, in China, and Mongolia have had similar variations in climate, ecosystem, culture, and traditions, but different institutions, land-use intensities, levels of economic development, and demographic changes in the recent past. Among the major lessons are: 1) the spatiotemporal variation of physical and anthropogenic changes, as well as their effects on the ecosystems and societies, appeared much higher than previously expected; 2) though spatially variable, overall grassland biomass has been increasing in the past 15 years as a result of climatic and management changes; 3) human influences on the Mongolian CNH system, especially those related to the major policy shifts, have been stronger than those of the biophysical changes, but that the significance varies over time and among biomes, as well as between Inner Mongolia and Mongolia; 4) grazing, mining, and land uses are strongly affected by and feedback to processes of urbanization, globalization, and economic development; 5) despite some differences in the overall system dynamics in the two countries, the availability of grassland resources in the future will be tied to regional trends in urbanization and national economic development priorities; and 6) extensive forest plantations across semi-arid and arid landscapes need to be critically evaluated with a sound scientific base. The most critical challenge facing the Plateau is similar to that of the broader Northern Eurasian region: societal well-being and health are inextricably linked to environmental variability, and mitigation and adaptive capacity are strongly affected by policy decisions within heterogeneous national and sub-national entities.