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Herder Observations of Rangeland Change in Mongolia: Indicators, Causes, and Application to Community-Based Management

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Abstract

Local observations of ecological change are important in developing tools for rangeland management and filling in gaps where quantitative data are lacking. Traditional ecological knowledge (TEK) is a potential source of information that can complement scientific knowledge. It may also allow policy makers and scientists to suggest responses that will be locally relevant, and therefore effective on the ground. We conducted 40 surveys with the use of closed-ended questionnaires followed by open-ended qualitative questions with herders in two *soum* (administrative districts), located in the steppe and forest steppe of Mongolia. Respondents were asked about their observations of rangeland change and its causes in the last 20 yr. Across the study areas, a strong majority (75%) of all herders reported that rangeland condition was much worse than 20 yr ago. Herders in both *soum* reported increases in undesirable plant species, declines in species richness, and the disappearance or decreasing abundance of specific desirable plant species. Comparing the two *soum*, more herders in the forest-steppe site (90%) reported that rangeland condition was much worse than reported by herders in the steppe site (65%). In qualitative responses to open-ended questions, herders identified multiple indicators of and causes behind degradation, including very heavy grazing. In a large, sparsely populated country like Mongolia, herders' observations may serve as an early warning of rangeland change, provide insights into causes of change, and identify key uncertainties. Community-based rangeland management organizations (CBRMs) could help to translate herder observations into action by participating in formal monitoring based on herder-identified indicators and implementing changes in management in response to observed change. However, herders cannot address all issues that might be contributing to troubling ecological trends without higher-level policy coordinating rangeland monitoring and herder movements at regional and national scales.

Key Words: adaptive capacity, local knowledge, nomad, participatory monitoring, pastoralist, traditional ecological knowledge

INTRODUCTION

Pastoralists in Mongolia have always lived in extreme environments, but in the past 20 yr herders have faced additional challenges to managing rangeland sustainably posed by economic, social, political, and environmental changes, including climate change. In Mongolia, all rangelands are state property, held in common and managed by local herders with little government oversight and involvement. Although national law authorizes local government to regulate stocking rates and seasonal movements, local authorities have little capacity or resources to

carry out this mandate (Fernández-Giménez and Batbuyan 2004; Fernández-Giménez et al. 2008). For this reason, herders' capacity and willingness to adapt their management to a changing environment depends in part on their ability to detect and respond appropriately to feedback from the ecological systems they manage at relevant spatial and temporal scales (Berkes et al. 2000; Reynolds et al. 2007). Adaptation also depends on functioning collective action institutions that provide enforceable guidelines governing rangeland use and ensure that all the users of a given area act upon this information in a coordinated fashion. This study investigates the nature of herder observations, and their explanations of causes of rangeland change, in two sites representative of two of Mongolia's dominant ecological zones, the steppe and forest steppe. In the context of emerging community-based institutions for rangeland management in Mongolia, we expect that herders' local observations, coupled with new community-based institutions, may play a key role in sustainable grazing management in a rapidly changing environment.

Current estimates of degradation in Mongolia, mainly based on remote sensing (Sankey et al. 2009; Hilker et al. 2013; Liu et al. 2013), point to sociopolitical as well as climatic causes; however, there is little scientific consensus on the extent or causes of recent rangeland changes in Mongolia (Addison et al. 2012). Further, the results of some field studies have not been consistent with conclusions from remote-sensing studies (Sternberg et al. 2011; Addison et al. 2012). Major economic,

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