

Modelling Integrated Impacts of both Climate Change and Anthropogenic Disturbances on the Pasture Grazing Capacity and its Vulnerability in Mongolia

Qinxue Wang^{1, *}, Tomohiro Okadera¹, Tadanobu Nakayama¹, Ochirbat Batkhishig², Dorjgotov Battogtokh², Uudus Bayasaikhan³

1 Regional Environment Conservation Division, National Institute for Environmental Studies, Japan

2 Institute of Geography and Geoecology, Mongolian Academy of Sciences, Mongolia

3 School of Arts and Sciences, National University of Mongolia, Mongolia

*Corresponding author. Email: wangqx@nies.go.jp

ABSTRACT

Mongolia owns the world's largest pastureland, which is vulnerable to future climate change and rapidly increasing anthropogenic disturbances, such as urbanization, cultivation, mining development and so on. It is critical to understand the integrated impacts of both climate change and anthropogenic disturbances on the pastureland. This study aims to evaluate the integrated impacts of both climate change and anthropogenic disturbances on pasture grazing capacity and its vulnerability in Mongolia. To achieve the purpose, we have developed an integrated model to evaluate the pasture grazing capacity (GC), grazing pressure (GP) and its vulnerability (VI). The model was applied to Mongolia, and the statistical values (maximum, mean, minimum, variability, change rate, etc.) of GC, GP and VI from 2000 to 2019 have been estimated in all administrative levels (Bag, Sum and Aimag) in Mongolia. The results revealed that climatic factors such as solar radiation, temperature and precipitation determine the land-surface water deficit status, which further determine the pasture forage productivity, grazing capacity and its vulnerability. Areas with relatively good surface water condition are more vulnerable to the rapid rising of grazing pressure. Finally, we also found that in the areas surrounding cities and mines, the effects of anthropogenic disturbances outweigh the effects of climate change.

Keywords: anthropogenic disturbances, climate change, pasture grazing capacity, vulnerability, Mongolia