

## **Adaptation knowledge and vulnerability of Mongolian social-ecological systems to climate changes**

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The factors, including overgrazing, loss of pastoral ecosystem's productivity and increased frequency of drought and zud, are leading to ecological vulnerability. Ecological vulnerability is an integrated calculation of climate change induced drought and zud's indexes and human induced pastoral use's index. Then the integrated assessment of vulnerability of social-ecological systems was calculated on ecological vulnerability index and social vulnerability index including UNDP's poverty assessment. We tried to assess an ecological vulnerability in temporal and spatial dimensions for the first time in Mongolia. Climate disasters and grazing intensity were two factors we accounted for this assessment. Ecological vulnerability is high when both zud risk (with previous summer drought) and overgrazing are high. Ecological vulnerability was high in Mongolian western three aimags (Hovd was the most vulnerable) and in the southern three Gov' aimags (Omnogov' was the most vulnerable). However, ecological vulnerability increased enormously since 1991. Ecological vulnerability increased almost everywhere, leaving only northern (except Bulgan) and eastern aimags. Dundgov', Uvs and Bulgan are added to the list of the most vulnerable aimags. It is likely that ecological vulnerability at country scale jumped to higher level since mid-1990s according to the long-term dynamics, making Mongolia more ecologically vulnerable. Climate change is impacting on water and forage resources decrease in Mongolia. Climate change impact differs in different ecological zones of Mongolia, interacting with human impact. The Gobi and dry steppe regions are impacted primarily by climate change. Vulnerability index high is more measure adaptation policy to climate change. Climate change adaptation policy should be different in different ecological zones. Climate change adaptation actions should be integrated with sustainable development programs in order to have better synergy.