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Land-use conflicts and trade-offs between mining, pastoralism, and crop production in Mongolia: A perspective

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Abstract

Mongolia's rapid economic growth has been largely driven by the expansion of the mining sector that currently accounts for 25.3 % of the GDP. Yet, mining increasingly overlaps with traditional pastoral systems and, in some regions, emerging crop production areas. This spatial overlap has intensified land-use competition. Despite extensive research on individual sectors, integrated assessments that jointly examine environmental change, livelihood impacts, and land-use trade-offs among miners, herders, crop farmers, and local communities are rare. This study aims to advance knowledge on land-use conflicts in Mongolia using a combined methodology that includes a literature-based SWOT analysis, a NDVI-based assessment of vegetation dynamics (2010–2025), and stakeholder perspectives gathered in the Zaamar Soum gold mining area during September and October 2025. The SWOT results indicate that interactions among mining, pastoralism, and crop production generate both synergies and trade-offs, yet ultimately lead to land-use conflicts. Mining contributes positively to local livelihoods, national income, and infrastructure development. However, it also imposes substantial negative impacts on environment and society, including water depletion, ecosystem degradation, restricted livestock mobility, and health risks for animals and humans, including, for example, noise and dust impacts that have been underexplored so far. Pastoralism supports socio-cultural values, and income generation but is increasingly constrained by land degradation and reduced access to grazing areas. In the study region, NDVI data points to 17 % to 45 % lower vegetation production in mined areas compared to non-mined regions over the period 2016–2025. Stakeholder perceptions support these findings, indicating that mining is linked to pronounced environmental degradation, disruption of seasonal migration, and health risks. Regarding the distribution and magnitude of mining-related benefits, uncertainties remain about their effects on employment generation and infrastructure development, which are rarely quantified, particularly for herders.

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Limited transparency in benefit-sharing mechanisms between the relevant stakeholders, unclear post-mining rehabilitation practices, and insufficient consideration of mine closure costs during licensing are governance gaps that also are rarely explored. Currently, the Trans-Net project (https://www.uni-kassel.de/forschung/trans-net/home.html) is addressing these trade-offs to gather more detailed data and inform reflection on governance options that eventually can support both mining-related economic gains and the long-term viability of pastoral and agricultural livelihoods.

Keywords: Land-use conflicts, mining governance, pastoral livelihoods