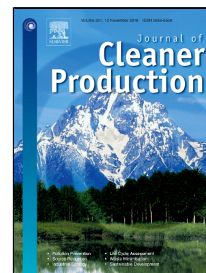


# Accepted Manuscript

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## Does ‘Forage-Livestock Balance’ policy impact ecological efficiency of grasslands in China?

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**Abstract:** Grassland has critically important ecological efficiency as well as economic values. While overgrazing and climate change have been reported to lead to the deterioration of grassland ecosystem functions and ecological efficiency, the implementation of a rational policy may mitigate such effects. The ‘Forage-Livestock Balance’ policy refers to balancing the relationship between forage productivity and grazing capacity of grasslands, and has been implemented in northern grassland areas in China since the year of 2000. In this study, we firstly examined spatio-temporal changes in the ecological efficiency of grass-based livestock husbandry in Hulunbuir, Inner Mongolia, China, using the Super-efficiency Data Envelopment Analysis method, and then analyzed the effects of the ‘Forage-Livestock Balance’ policy on the ecological efficiency. The Difference-in-Difference (DiD) approach was applied to investigate the differences of ecological efficiency in county-level outcomes between prior to and after the implementation of policy. The results showed that the county-level ecological efficiency in Hulunbuir was low in the year of 2000, thereafter it displayed an increasing trend from year of 2000 to 2015, though no significant differences were occurred in each of counties of Hulunbuir. Among the counties, Yakeshi county and Zhalantun county had the highest ecological efficiency, and Chen County had the lowest. The DiD analysis suggested that the ‘Forage-Livestock Balance’ policy had a remarkable effect on the ecological efficiency of grass-based livestock husbandry. Compared to traditional pasture management, the policy has greatly improved the ecological efficiency of grasslands. Our research results provide a useful reference for the sustainable development of grassland livestock management, which is an important countermeasure to improve the efficiency of grassland livestock husbandry, alleviate the pressure on grassland ecosystems, and ensure the living standards of residents in the context of climate change and the risk of recurring disasters.

**Keywords:** Grass-based livestock husbandry; Ecological efficiency; Forage-Livestock Balance;

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