

## Evaluation of fencing grassland and stopping grazing on grassland restoration in Inner Mongolia

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**Introduction** Grassland degradation has happened in many parts of China during the last twenty to thirty years. It is vital to protect these grasslands by taking steps to restore vegetation. Fencing grassland and prohibiting grazing have been regarded as the most effective means for achieving this and have been widely promoted by central and local governments. However, the results of these methods have not accorded with expectations.

**Materials and methods** The data in this article comes from two vegetation investigations in May and June of 2007 in Inner Mongolia. Sample plots were selected from four types of vegetation growing in typical grassland, desert grassland, desert and sandy area in grassland zone respectively.

**Results** In the short term, cessation of grazing yielded good initial signs of grassland restoration. Vegetation was restored to some degree or even grew abundantly in some places. However, in the longer term, these results differed from expectations and indicated that grassland fencing and grazing bans were inappropriate methods for restoring degraded grassland (Table 1).

**Table 1** Results of grassland fencing and grazing exclusion in sampled plots.

Sample plot locations	Original vegetation	Time since fencing and grazing exclusion	Results
1	Degraded <i>Leynus Chinensis</i>	two years  twenty years with some livestock in winter, cutting and burning	Increased production and proportion of <i>Leynus Chinensis</i>  Amount of withered grass was six times that outside the fence; species numbers per m <sup>2</sup> decreased by over ten; vegetation became <i>Stipa grandis</i> .
2	Desert grassland in Sunite Left Banner in Xilingol Prefecture  Degraded <i>Stipa klemenzii</i>	Five, nine and thirteen years	The production, species number, and proportion of original plants decreased; withered grass and indicator species for grassland degradation increased.
3	Desert in Alashan Prefecture  <i>Haloxylon ammodendron</i> , <i>Reaumuria soongolica</i>	Five and nine years	Production, length of green parts of shrub branches and proportion of green parts decreased; mortality caused by withering increased.
4	Low-lying in Hushandake Sandy Area, Xilingol Prefecture  Seriously degraded	Two to three years	Abundant growth due to good water conditions and accumulated manure. The production was over 100 times that before fencing.

Note: the result is concluded based on the average value of sampled plots.

**Conclusions** The grassland ecosystem does not only include grass, but also includes animals and herders. They have evolved together for thousands of years. The method of fencing grassland and stopping grazing has failed to restore degraded grassland because it excluded livestock and herders, who are important components in the grassland ecosystem. In order to protect grassland, it is necessary to consider advantages of livestock in grassland management and make full use of them.