

Evaluating alternative livestock production systems sustainability and farmer income in Taipusi Banner, Inner Mongolia

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Introduction Grasslands in western China are highly degraded in terms of the herbage mass available and species composition. Grassland degradation is largely due to excessive grazing pressure from high animal stocking rates. Many farmers believe that increasing flock or herd size results in higher income, despite reductions in per unit animal productivity at high stocking rates. To achieve the goals of grassland rehabilitation, improved animal productivity and increased farmer income will require a change in current management methods. This paper reports some results from a joint Australian and Chinese project which developed a farming systems model to evaluate alternative management strategies and policies for a typical Inner Mongolian grazing farm. The focus of this work was to identify strategies that are both more profitable and lead to a more sustainable use of the grassland resource in the long-term.

Materials and methods The case-study region for the analysis is Taipusi Banner (county) of Inner Mongolia (EL 114°51' ~ 115°49' ; NL 41°35' ~ 42°10') which is classified as a "typical steppe" grassland. 30 farms were surveyed within one village to identify a range of biophysical and financial factors based on data from 2005 to 2007. This information was used to parameterise a "typical" farm for this region of Taipusi Banner for a farming systems model developed as part of the joint Australian/Chinese collaboration (ACIAR project : LPS/2001/094). The model used a linear programming framework to identify optimal solutions for at least maintaining the current farm income for the grasslands management problem. Three individual stocking rates were tested : 0.2, 0.9 and 1.6 breeding ewes/ha. The model was solved to provide information on farm revenue, feeding costs and net income as well as grassland condition factors.

Results With increases in stocking rate there is a corresponding increase in livestock revenue due to the greater livestock numbers carried on the typical farm (Table 1). However, due to limitations in the grassland resource and other sources of available fodder, there is also a substantial increase in supplementary feeding costs to maintain livestock energy needs. This results in the highest net farm return from livestock production occurring at a stocking rate of 0.9 breeding ewes/ha. At high stocking rates, significant supplementary feeding costs occur which results in negative net farm income from livestock.

Table 1 The effect on farmer income under different stocking rates.

Stocking rate (breeding ewes/ha)	0.2	0.9	1.6
Total farm net return from livestock (¥)	4560	15339	-4389
Total revenue from livestock production (¥)	4560	16327	22499
Cost of supplementary feeding (¥)	0	703	25378

Conclusions This preliminary analysis indicates that the income of the typical farm can be increased by improving livestock management, in particular reducing stocking rates to around 1 breeding ewe/ha. This leads to an improvement in animal productivity and lower feed costs than often currently occurs in this region. Adoption of such a strategy will significantly reduce grazing pressure and over the longer term would allow for a recovery in the condition of the grassland.

References

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