



*Strengthening local capacity
in the economic analysis
of environmental issues*

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Restoring Inner Mongolia's Grasslands – A Policy Assessment Study

Grassland degradation is a major environmental problem in Inner Mongolia where climate change, overgrazing, and other pressures have led to significant environmental problems. These problems have also threatened the sustainability of the livelihoods of local herders. To help policy makers develop an effective approach to grassland management, a new EEPSEA study has examined the effect of the Chinese government's priority grassland conservation and management program on grazing intensity in the region.

The study is the work of Dr. Gao Liping from Georgia Southern University, USA. It finds that the government's policy to provide a subsidy to encourage local people to protect grassland has the potential to help restore grassland and to improve the sustainability of local people's livelihoods. It assesses the best level of subsidy to optimize the impact of this policy and recommends a number of policy approaches that could further help the local people.



A summary of EEPSEA Research Report No. 2016-RR16:
"Economic Analysis of Grassland Management Policy in Inner Mongolia, China,"
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The challenge facing grassland in Inner Mongolia

Grassland covers approximately 73% of the total land area of Inner Mongolia, which has one-fourth of China's total extent of this type of land cover. Grasslands have a unique ecological importance; it is also critically to the region's economy, which relies heavily on animal husbandry.

However, climate and socioeconomic changes have led to rapid grassland degradation in Inner Mongolia. Historically, government policies had caused overgrazing and subsequently accelerated the conversion of grasslands into croplands. Most researchers consider overgrazing as the main cause of grassland degradation in the region, with the number of cattle, sheep, and goats increasing from 1.75, 3.43, and 2.28 million in 1947 to 10.79, 77.17, and 23.74 million in 2014, respectively.

These changes have not just affected Inner Mongolia itself—sand storms and other environmental problems that have occurred in Beijing and

Northern China are believed to have been caused (at least in part) by inappropriate grassland management in Inner Mongolia.

The government's response

Since the 2000s, the Chinese government has taken actions to address the severe grassland degradation in the region through policy interventions. These have addressed issues such as grassland utilization, and also encouraged grassland restoration and poverty reduction. Most recently, in 2011, the Chinese government began to implement household grazing control and grassland protection subsidies for ecological protection and restoration. This initiative involved an investment of some USD 2.14 billion each year for five consecutive years, of which USD 0.65 billion have been invested in Inner Mongolia. This money has subsidized grassland ecological management, promoted the transformation of grassland husbandry, and increased herders' incomes.

This study examined the effectiveness of this latest government grassland program.

Specifically, it examined the effect of the approach on grazing intensity, livestock numbers, and on the livelihoods of local people. It also assessed whether current government policies have the potential to help reduce poverty in pastoral areas.

Assessing the impact of the policy

The study aimed to provide much needed scientific research and data to inform the economic analysis of grassland policy implementation. It also aimed to shed new light on how grassland policy influences herdsman's behavior. This aspect of the research is highly important, as past studies have failed to consider the importance of nomadic culture in enforcing grassland management policies.

In Inner Mongolia, nomadic culture is unique and, compared to agrarian cultures elsewhere in Mongolia, can play an important part in ecological protection and environmental care. It therefore has significant potential to foster the sustainable utilization of grasslands and to underpin sustainable economic development. Thus, it is extremely important for policy makers and politicians to understand the opinions of herdsman and other local residents when drafting future grassland policies.

The Inner Mongolia Autonomous Region

The Inner Mongolia Autonomous Region (IMAR) was chosen as the study area. The IMAR lies on the northern border of China and stretches from the northwest to the southeast, forming an arc with a total length of 3,000 km and an area of 1.18 million km². Over three-quarters of the region is made up of flat grassland.

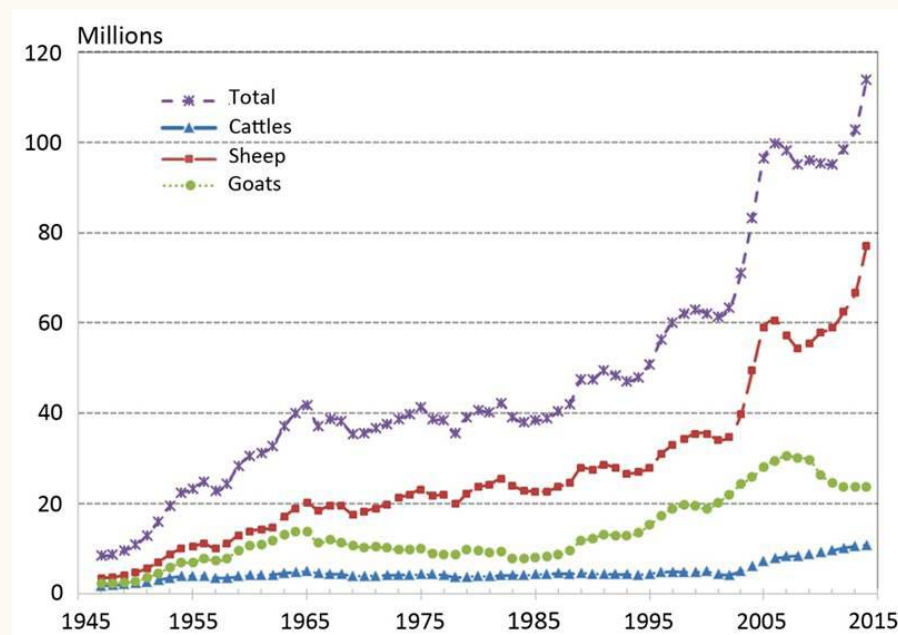


Figure 1. Livestock changes in Inner Mongolia, 1947–2014

Data source: Inner Mongolia Statistical Yearbook (2015)

Farming and agriculture, particularly sheep and goat herding, are the traditional economic activities in the region.

In the last few decades, the IMAR has been particularly susceptible to changing climatic conditions. The warming climate has led to the spread of pests and pathogens, including locusts. Climate change has also led to frost and hail, which have significantly harmed agricultural and livestock production. Increasingly hot, humid, and rainy weather in summer have caused dust storms and grassland degradation.

Institutional and policy changes have also had a significant effect on grassland and animal husbandry in the IMAR. For example, the substantial increase in livestock in the late 1980s was largely due to livestock and grassland tenure reform. Another substantial increase in livestock numbers since 2004 was caused, in part, by growing demand, which was driven by fast economic growth and market reform.

Finding out what local herders think

The information needed for the study was collected using a face-to-face household survey questionnaire, which was employed in 70 representative villages in Inner Mongolia. The survey was carried out in 2012 among 327 households.

These households represented 28 counties in 11 cities in 5 prefectures (leagues), namely, Alexa, Xilingol, Ulanqab, Hulunbuir, and Ordos.

Sample households had, on the average, 287 sheep-equivalent livestock units and 300 ha of grassland. The average stocking rate was 2.13 livestock units per hectare, and the average income per livestock unit was USD 194. Between 2010 and 2012, the average livestock holdings on a sheep-equivalent basis declined slightly from 290 to 287. The average subsidy for grassland protection across the study prefectures was USD 1,709, which is equivalent to 22% of the average household income. The average subsidy per hectare was USD 27.2.

There were significant regional variations. For example, the average subsidy per household in Hulunbuir (USD 2,773) was more than double that in Ulanqab (USD 1,102) and in Ordos (USD 1,217). Income per livestock unit ranged from USD 25 in Hulunbuir to USD 704 in Ulanqab. Livestock units per household in Hulunbuir were 4.8 times higher than that in Ordos (636 versus 132). Meanwhile, the stocking rate (livestock units per hectare) ranged from 1.71 in Hulunbuir to 3.88 in Ulanqab.

These stocking densities compare unfavorably with the upper limit for sustainable stocking density (of 1.3 sheep per hectare)

that other researchers have recommended. Although the optimal carrying capacity of grassland in Inner Mongolia has yet to be fully assessed, the average stocking rate of 2.13 across the prefectures suggests that overgrazing is an issue.

The impact of subsidies and grazing control

Overall, it was found that grazing intensity decreases when local household income increases and when the amount of subsidy that households receive for grassland protection increases. Likewise, a 1% increase in the grassland protection subsidy reduces grazing intensity by 0.168%–0.532%, and increases herders' income by 0.144%–0.670%. By way of comparison, each additional year of education increases herders' income by 8.7% and reduces grazing intensity by 3.6%.

The study assessed what level of subsidy would be needed to cut grazing intensity to a sustainable level (taken to be 1.30 sheep-equivalent units per hectare). It found that in order to achieve this goal, subsidies would need to be increased by 50%–396%, which equates to an added cost per hectare of between USD 5.69 and USD 51.68.

Overall, 53% of the households indicated satisfaction with the subsidy policy. However, it was also found that many herdsmen did not follow the policy

Table 1. Estimated cost to reduce grazing intensity to 1.3 sheep-equivalent units per hectare in Inner Mongolia

Prefecture	Initial Subsidy (USD/ha)	Initial Grazing Intensity (I^0)	Desired Grazing Intensity (I')	% Difference ($I' - I^0$)	Subsidy Elasticity (I^*/S^*) Achieve I'	% Increase in Subsidy to Achieve I'	Subsidy Required to Achieve I' (USD/ha)	Added Cost to Achieve I' (USD/ha)
	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)
Xilingol	24.47	1.77	1.30	–26.55	–0.532	50	36.71	12.24
Ulanqab	13.05	3.88	1.30	–66.49	–0.168	396	64.73	51.68
Ordos	9.69	1.98	1.30	–34.34	–0.348	99	19.28	9.59
Hulunbuir	8.49	1.71	1.30	–23.98	–0.358	67	14.18	5.69

requirement for grassland protection after they had received their subsidy payments. There were significant regional differences: only 29% of the surveyed households in Ulanqab indicated satisfaction with the policy compared to 81% in Hulunbuir.

Perhaps surprisingly, for the whole of Inner Mongolia, the study found that household grazing control did not show an obvious effect on livestock numbers (contrary to what the government hoped). However, it was found that this policy has had a positive impact during the first year of grassland subsidy policy implementation in the Xilingol and Ulanqab prefectures.

Helping herdsmen to contribute to conservation

The questionnaire survey also revealed that Mongolian herdsmen are overdependent on livestock raising. This means that they have limited options when it comes to finding alternative livelihoods.

Given the reliance of herdsmen on livestock raising, it is clear that further restrictions on grazing activities, such as regulations on the balance between grass and livestock, grazing prohibitions and rest-rotation grazing policies, would result in labor surplus. Therefore, the government should do more to improve the livelihood of low-income herdsmen and to develop other livelihood options for them. In addition, the construction of

infrastructure facilities in pastoral areas, especially education and health infrastructure, needs to be intensified.

The government should also promote technological advances in animal husbandry in the pastoral regions of Inner Mongolia, as this could help guarantee livestock quality and limit livestock production. To support and guide livestock production, the government should also establish a forage base and promote improved livestock varieties to increase the survival rate of herders' animals.

Given the noncompliance of some herders with subsidy policy requirements, there should be a better way of enforcing the grassland protection policy in Inner Mongolia. One suggestion could be to make the release of the subsidy conditional upon fulfillment of the household grazing requirement. This could be monitored using the official database of livestock numbers. It could also be based on an assessment of grassland conditions.

The importance of long-term grassland management

Overall, it was found that government policy does play a very important role in grassland protection and restoration. Prior to policy implementation, short-term economic development and poverty improvement were achieved at the expense of grassland desertification. It is clear that

government intervention is necessary to protect grassland and to subsidize livestock production for the long-term sustainable development in Inner Mongolia.

The study therefore recommends enforcing a long-term grassland sustainable management policy in order to restore grasslands and improve the environment. The sources of dissatisfaction with current policies should be carried out to provide useful insight into how to improve policies going forward.

The active participation of herdsmen should be encouraged in all aspects of the development and implementation of grassland protection policy. The implementation of government policy should also be adjusted to reflect changes in climate and herdsmen's activities. Education should also be used as a policy tool for achieving conservation goals.

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