Grassland Eco-Compensation in China: What can and what can not be monitored?

Hu Zhentong
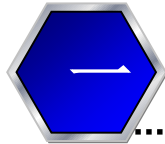
China Institute for Rural Studies, Tsinghua University

2016.11.24

Outline

清華大學中国农村研究院
China Institute for Rural Studies,
Tsinghua University

1、 Conditionality of eco-compensation

Eco-compensation（PES）
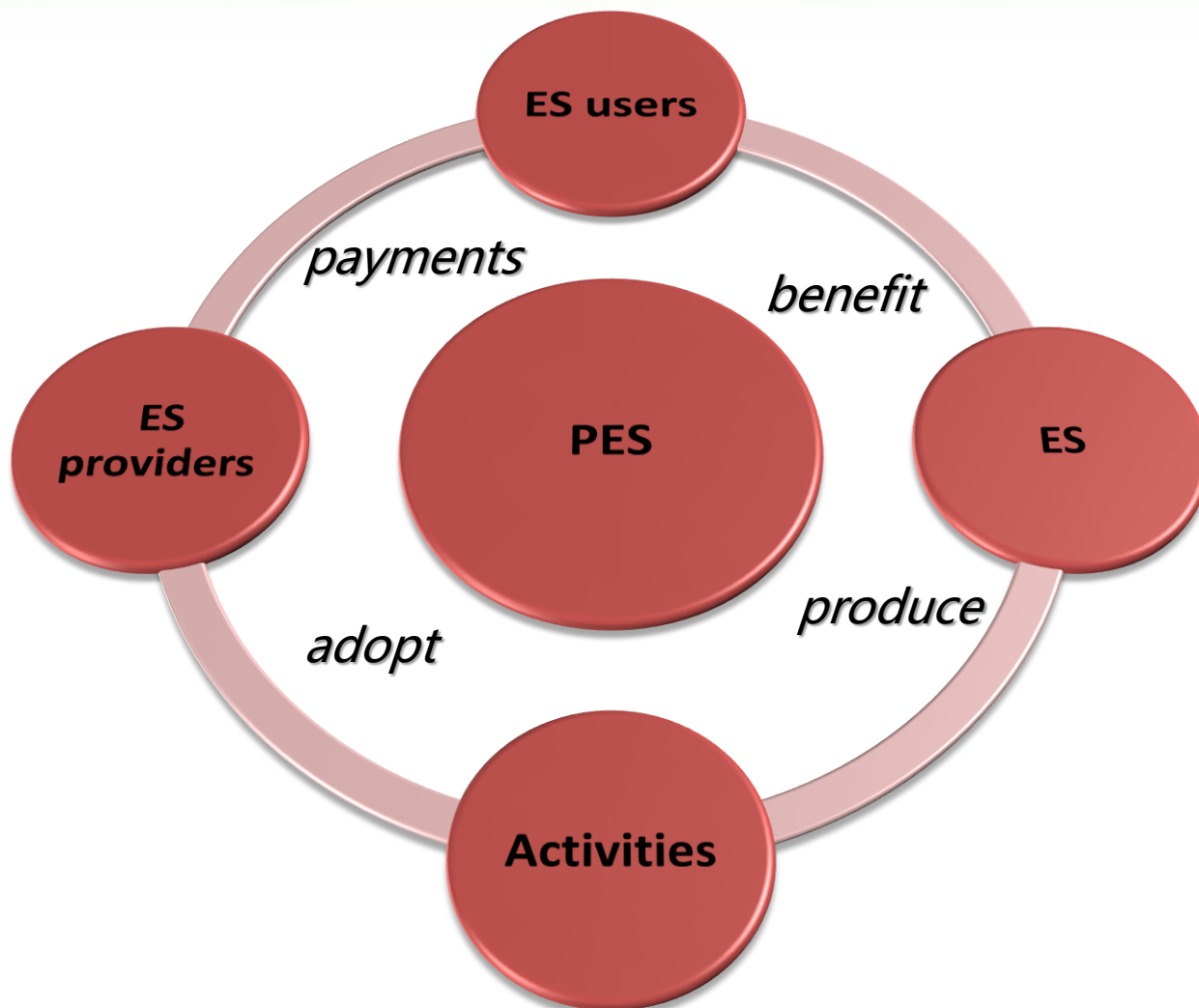
Activities、ES

- Activities： refers to agreed rules of natural resource management for generating offsite services. It has two main types:

  1）change land uses, for example, reforest in the cropland;

  2）retain existing land uses, for example, preserve forests.

- ES： generated by activities, concept of ES should be：

  1） a concept of flow, a concept of increment, generated by activities (change between two states)；

  2）three forms: physical quantities of ES , ES valuation , ES index .

清华大学中国农村研究院
China Institute for Rural Studies,
Tsinghua University

- **Conditionality of eco-compensation** refers to that payments are conditional on agreed rules of natural resource management for generating offsite services. Conditionality is critical to eco-compensation.

- **Three core questions** on conditionality research are :

  1) The extent to which the implementation of eco-compensation meets the conditionality;

  2) Payments to be conditional, payments is based on ES or based on activities;

  3) How to allocate the supervision right to guarantee the conditionality.

清華大學中国农村研究院
China Institute for Rural Studies,
Tsinghua University

	advantages	disadvantages	applicability
payments based on ES	Direct incentives, can take various measures to increase the supply of ES using traditional experience and knowledge;	1）ES providers do bear natural risk； 2）Compensation rates have risk premium； 3）If ES provider is not clear about the level of ES, it will be difficult to manage the land properly；	1）ES provided：natural risk is low； 2）Activities：Not clear, variety; supervision cost is high;
payments based on activities	ES providers do not bear natural risk;	1）Indirect incentives, causal pathways between activities and uncertainty of ecosystem services; 2）Information asymmetry, increased costs of supervising ES provider whether the agreed activities are adopted；	1）ES provided：natural risk is high； 2）Activities：Clear, single; supervision cost is low;

Payments of most of existing eco-compensation are based on activities.

- Taking Grassland eco-compensation as an example:

- 1) ecological assessment of grassland eco-compensation;

- 2) analysis of supervision and conditionality of grassland eco-compensation: the extent to which the implementation of grassland eco-compensation meets the conditionality;

- Focus more on analysis of activity.

2、 Situation of grassland eco-compensation

- Grassland, which accounts for more than 40% of China's land area, is China's largest terrestrial ecosystem.

- Severe degradation, in northern China, depredated grassland area accounted for 90%, and severely degraded grassland area for more than 50%.

- China established the basic principle of pastoral development which is "integration of production and ecological service provision with ecological conservation as the priority", and began to implement Subsidy and Reward Program for Grassland Ecological Protection in 2011,which was currently the most important grassland eco-compensation mechanism in China.

- Situation of Subsidy and Reward Program for Grassland Ecological Protection：

  1）five years as one cycle：2011-2015，2016-2020；

  2）Annual compensation funds are about CNY15 billion；

  3）basically complete coverage；

  4）two types of activities: grazing prohibited and grassland-livestock balance；

  5）compensation rates （2011-2015）：CNY 90/hm^2 and CNY 22.5/hm^2；

Implementation from 2011 to 2015

Table.1 Eight major pastoral provinces' grassland eco-compensation area and funds

Province	Total grassland area (10^6 hm^2)	Area of grazing prohibition (10^6 hm^2)	Area of balanced grazing (10^6 hm^2)	Total grassland eco-compensation funds (10^9 CNY)	Subsidies for grazing prohibition (10^9 CNY)	rewards for balanced grazing (10^9 CNY)
Inner Mongolia	68.0	29.5	38.5	3.52	2.66	0.87
Gansu	16.1	6.7	9.4	0.81	0.60	0.21
Ningxia	2.4	2.4	0.0	0.21	0.21	0.00
Xinjiang	46.0	10.1	35.9	1.72	0.91	0.81
Tibet	69.1	8.6	60.5	2.14	0.78	1.36
Qinghai	31.6	16.3	15.3	1.81	1.47	0.34
Sichuan	14.1	4.7	9.5	0.63	0.42	0.21
Yunnan	4.9	1.5	3.3	0.21	0.14	0.08
Sum	252.1	79.8	172.3	11.06	7.19	3.88
Percentage (%)	-	31.66	68.34	-	64.95	35.05

3、Ecological assessment

- Two methods：

- 1) direct measure (based on ES): ecological recovery situation of grassland, which is the most important and most fundamental indicator.

- 2) indirect measure (based on activities): completion situation of livestock reduction task, as both grazing prohibited and grassland-livestock balance performance for livestock reduction.

Study region and data

- Time：in July 2014
- Region：three banners (Counties) of Inner Mongolia, Alxa Left Banner, Siziwang Banner and Old Barag Banner
- Sample: 490 herdsmen

ecological recovery situation of grassland

Table 2: Changes of national natural grassland productivity, livestock capacity, temperature, rainfall

Year	2010	2011	2012	2013	2014	Growth Rate from 2011 to 2014
Total natural grassland productivity（10^8t）	9.763	10.025	10.496	10.558	10.222	4.7%
Total livestock capacity（10^8sheep unit）	2.401	2.462	2.546	2.558	2.476	3.1%
temperature	high	high	high	A little high	A little high	
rainfall	more	more	more	more	A little less	

1) After the implementation of grassland eco-compensation, national grassland ecological environment was improved, ways of grassland utilization became more reasonable.

2) How to separate the impact of climate factors inter-annual fluctuation and the impact of grassland eco-compensation is the key, difficult and limitation.

Table 3: Changes of average livestock overgrazing rates in national key natural grassland, pastoral counties, farming-and-pastoral counties %

Year	2010	2011	2012	2013	2014	Overgrazing rate decrease from 2010 to 2014	Percentage of livestock reduction completion
national key natural grassland	30.0	28.0	23.0	16.2	15.2	14.8	49
pastoral counties	42.0	39.0	34.5	22.5	20.6	21.4	51
farming-and-pastoral counties	47.0	46.0	36.2	17.5	15.6	31.4	67

- 1) average rate of grassland livestock overgrazing decreased significantly.

- 2) present situation of grassland overgrazing was not changed fundamentally, national key natural grassland, pastoral counties, farming-and-pastoral counties only separately completed 49%, 51%, 67% of livestock reduction task from 2011 to 2014, and in general, the task of livestock reduction was not completed well.

Completion situation of livestock reduction task: based on field survey

Table 4: Calculation results of livestock reduction completion situation   sheep unit

Region type	samples	Theoretical livestock reduction	Actual livestock reduction	Difficulty of livestock reduction	Proportion of livestock reduction completed (%)
Alxa Left Banner, grazing prohibited	89	193	153	Very big	79
Alxa Left Banner, balanced grazing	74	155	38	big	25
Siziwang Banner, grazing prohibited	60	253	30	Very big	12
Sum	223	197	82		42
Siziwang Banner, balanced grazing	104	74	-31	Small	none
Old Barag Banner	143	44	-80	Very small	none

- Present situation of grassland overgrazing was not changed fundamentally, sample counties only completed 42% of livestock reduction task from 2011 to 2014, and in general, the task of livestock reduction was not completed well.

Assessment result

- After the implementation of grassland eco-compensation, national grassland ecological environment was improved, ways of grassland utilization became more reasonable, average rate of grassland livestock overgrazing decreased significantly.

- Present situation of grassland overgrazing was not changed fundamentally, sample counties only completed 42% of livestock reduction task from 2011 to 2014, and in general, the task of livestock reduction was not completed well.

4、Weak supervision

- **Definition** ：Weak supervision refers to a state of supervision, in which the actual supervision probability is less than the minimum effective supervision probability, and makes herdsmen tend to not comply with the policy requirements, namely continue to grazing in area of grazing prohibited and continue to overgrazing in area of balanced grazing.

- **Performance**： continue to grazing in area of grazing prohibited and continue to overgrazing in area of balanced grazing.

- **Grassland eco-compensation presented weak supervision**: sample counties only completed 42% of livestock reduction task from 2011 to 2014.

- **three factors：**

- **1）** rates of grassland eco-compensation were low：less than the opportunity cost.

- **2）** default costs (penalty) were too low：also less than the opportunity cost.

- **3）** probability of actual supervision was low：livestock number supervision system based on the framework of grassland-livestock balance, supervision cost is high, the regulation is difficulty of supervision is big.

- Weak supervision not only impacts the herdsmen's current behavior choices, but also impacts the herdsmen's future behavior choices. Using the method of incomplete information dynamic game to analyze weak supervision's impact on herdsmen's behavior choices in the second compensation cycle (2016-2020), results are as follows:

- Weak supervision, which formed unfair (people who obey the rules and don't obey the rules get the same compensation fund) and may bring perverse incentives(people who were willing to obey the rules are also choose not to obey the rules), would greatly influence the realization of the goal of grassland eco-compensation.

China Institute for Rural Studies,
Tsinghua University

- **Preliminary evidence**：

- 1）dialogue：on the one hand, herdsmen expressed serious discontent for some other herdsmen's behavior of not obeying the grazing prohibited rules, on the other hand, they also expressed the hope of allocating more area of grassland grazing prohibited in the second compensation cycle (2016-2020);

- 2）case ： Ningxia province started policy of grazing prohibition since 2003, after more than ten years' implementation, secret-grazing and night-grazing has became a universal state. This case shows exactly the dynamic equilibrium results under weak supervision.

5、Conclusions and implications

Conclusions

- 1) After the implementation of grassland eco-compensation, national grassland ecological environment was improved, however, present situation of grassland overgrazing was not changed fundamentally, sample counties only completed 42% of livestock reduction task from 2011 to 2014, and in general, the task of livestock reduction was not completed well.

- 2) Implementation of grassland eco-compensation, which presented weak supervision, did not meet conditionality. Weak supervision resulted from three factors, which respectively were i) that rates of grassland eco-compensation were low, ii) default costs (penalty) were too low and iii) probability of actual supervision was low.

- 3) Weak supervision, which formed unfair and may bring perverse incentives, would greatly influence the realization of the goal of grassland eco-compensation.

- 1）reasonable rates of compensation should be set;

- 2）default costs should be increased;

- 3）the existing supervision system could be further improved.

Thank You !

Hu Zhentong

huzhentong1985@163.com

13581525795