

# **Beyond environmental policy impacts: joint-efforts on improving the effectiveness of pasture management in Northwest China**

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## **ABSTRACT**

Environmental degradation showed its most serious situation in the ecotones of farming and grazing in Northwest China, which had both significant negative impacts on local people's livelihood and inevitable damage on living conditions of habitants in other areas. Corresponding to the environmental problems, the government implemented several environmental protection policies, including the extreme policy of grazing ban. At the same time, farmers living in this area coped with the harsh environment and the enforced policies simultaneously. What are mutual interests between macro environmental policy makers and local people? What are the impacts of those policies on the pasture management effectiveness? How did policy maker, the farmer, other policy implementer, and other stakeholders develop an adaptive mechanism of pasture management during their interaction on Grazing Ban policy implementation? This article explored to answer those questions through a tracing study among 2001-2009, when grazing ban policy and relevant policies were implemented in Yanchi County, Ningxia Hui Autonomous Region in China, which is located in the middle part of the ecotone of cropping and grazing in Southwest China.

This article found that the interaction among stakeholders in policy implementation and the farmers' coping strategy on external institutions formatted the art of pasture management, which could not be discussed only through policy impacts assessment. With the analysis of farmers' correspondences and adjustment of their livelihood strategy while implementing policies, it was found that furtive grazing was used effectively by the farmers and their community in balancing environmental protection and livelihood development, when the policy makers tried to internalize the external costs and benefits of using grassland through policy of grazing ban. Furthermore, for a more sustained application of pastureland, the facilitated interactions and induced joint-efforts of the government departments, relevant NGOs and community people could make more effective pasture management.

**Key words:** pasture management, grazing ban policy, coping strategy

## 1. Introduction

Along with the marketing economy's penetrating in China, the natural environment, perceived as an essential resource to fuel economic growth, has attracted increasing attention from the state, and a variety of governmental policies and programs have attempted to address environmental issues. The term "ecological construction (sheng tai jian she)" has a particular importance in these initiatives, and it refers to state-directed efforts to improve the Chinese rural environment. In practice, the local government equates "ecological construction" with increased vegetation cover, and promotes such practices as the planting of trees, shrubs, and grasses, seeding on the degraded pastureland, fencing of pasture, and irrigation of agricultural land. Local governments have become important market players and have therefore played a more significant role in fostering economic development (Hong Jiang, 2006; Ribot, 2006). However, both the economic drive and top-down political evaluative mechanisms have promoted short-term gain from the landscape at the expense of long-term environmental sustainability (Hong Jiang, 2006). At the same time, grassland desertification situation was not alleviated as expected, for example, about 0.297 million square Kilometres -44.7% of land in Ningxia is desertified (SFB, 2005) and some 2.62 million square Kilometres of land in China-27.46% has already been devoured by desertification, within which 1.84 million is Aeolian erosion (SFB, 2005). Because more and more researches pointed out the best way of fallow land for natural rehabilitation, the government considered to stop grazing in the pastoral areas where there is the most serious degradation. Those pastoral areas in Inner Mongolia tested several types of pasture management, including seasonal grazing ban, rotation regulations, and extreme grazing ban, which are mostly promoted by the government and seldom regulated by local people<sup>1</sup>. Ningxia Hui Autonomous Region, being located in the middle part of interface area of cropping and grazing in Northwestern China, started to enforce the policy of Grazing Ban in the whole region since 1 January 2003<sup>2</sup> (Zhang Shuchuan, 2006). The impacts of the policy on ecological environment are very positive, in terms of the indicators of grass length, coverage, and times of sand storm or sand windy (Zhang Shuchuan, 2006). However, there appeared some unexpected reactions from the farmers and conflicts between those evaluation teams/supervisors and the farmers. Though the farmers reduced their sheep quantities, they did not stop grazing but insisted on furtive

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<sup>1</sup> Tracing back to the natural resource management since 1949, central government in China always played the key role from making laws and regulations to guiding and supervising the implementation. The farmers or herders get used to follow those top-down arrangements, with their own adjustment in a limited space. This kind of paradox is described in a very detailed way in Gao Wangling's book "A survey on China's Farmers' Resistance during People's Commune period" (Chinese Communist Party Press, 2006)

<sup>2</sup> This policy was based on the experiment of grazing ban in Yanchi County, which was initiated by the leadership group of pasture management in Yanchi, consisting of the governors of the county and staff members from government office, people's congress office, political consultation committee, policy research office, pasture station in Animal Husbandry Bureau, Science and Technology Bureau, Forest Bureau, and etc. The background of that initiative was induced directly from serious drought in 1999-2000, when the rainfall was only 160 mm in four seasons. Experiment of grazing ban in four townships was in 2001, and grazing ban was announced and implemented since 1 November 2002 in Yanchi County.

grazing at night when the supervision team might not keep their eyes on (Qi, et al 2005). There are many apparent cases showing the situation of the furtive grazing, for example, some of the farmers fall to sleep while grazing; another example, farmers were fined 5-20 yuan per sheep once being captured.

This is like an adaptive balance, though the stakeholders, including government officers, farmers and involved researchers, know that grazing ban policy is not implemented as it was designed. However, the key issue is that the objective of this policy was achieved to a large extent, and it is difficult to find the alternatives to break this balance. So it is valuable to explore the process of balance making and the motivation and the reality base for grazing ban implementation. This study is trying to answer one question for this exploration:

**How did policy maker, the farmer, other policy implementer, and other stakeholders develop an adaptive mechanism of pasture management during their interaction on Grazing Ban policy implementation?**

The purpose of answering this question is to find the advantage of this balance on sustainable pasture management and the challenge of building up a more adaptive mechanism for sustainable pasture management.

## **2. Decision making process analysis on Grazing Ban**

The whole decision making process is a very important reference for the further analysis on the motivation, objective, advantage or disadvantage of the stakeholders involved in Grazing Ban implementation.

The decision making process showed an institutional transition, which was a forced but not induced change. The original idea came from the leaders of Yanchi County because of the drought in 1999-2000, when the pressure on the farmers' livelihood was emergent, and the grassland could not become green anymore during almost 7-8 seasons. Learning from the exchange workshops with Inner Mongolia Autonomous Region, Gansu Province, and Shannxi Province, and corresponding to the regulations of the provincial governments' requirements on farmers livelihood improvement and pasture protection, leaders in Yanchi County organized a visiting group to go to around provinces or regions to study details of pasture management. This group found many experiences on different approaches for improving both pasture quality, and it drafted an official announcement on Rotation and Seasonal Grazing Ban in Yanchi and disseminated in the whole county in 2000. However, it was not implemented at all. During the early spring time, it was supposed to stop grazing, but the regulation was just on paper without matching monitoring system. Rotation grazing also needed pre-conditions, such as a piece of grassland with reasonable sheep quantities, but quantities of sheep at that time was exceeded the theoretical quantities<sup>3</sup>. Then the leadership group organized meetings again on one

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<sup>3</sup> In the Grassland Law, there is also regulation on the quantities of grazing, such as 1 sheep unit on

of the previous suggestion on totally grazing ban. For ensuring the possibility of this policy's implementation, county government organized several paralleling activities, which are: visiting around areas again focusing on grazing ban implementation; grazing ban experiments in 4 townships: Subujing, Gaoshawo, Ma'rzhuan, Hui'anfu; study on the farmers' reactions in those experiment townships. It was against by the local group, particularly the farmers who had large quantities of sheep, who worried about fodders.

### **Box 1 Reactions of the farmers to Grazing Ban idea**

Example 1. According to county arrangement, village committee announced the idea of grazing ban in Dageda Village in Gaoshaowo Town in 2001. But even the committee members did not get consensus on this idea, with consideration on fodders for sheep. It started planting grass and applied for projects, such as cattle production, pig raising, chicken raising, shed-building and fodder processing. There was only 20% being against this idea after four times of Committee meetings. So the village committee organized the villagers meeting for announcing grazing decision, but there were still more than 50% who did not agree. The committee did more advocacy and made more funding for the farmers. Grazing ban started, though without another villagers meeting.

Example 2. Representatives in Wanjigou Village suggested: could we implement seasonal grazing ban, representing the suggestion of 1000 farmers in our village? They submitted this suggestion to the County People's Congress in 2001, but no response. After two months implementing Grazing Ban, they submitted this suggestion to the county again, no answer either.

(Source: group discussion in Dageda village and Wanjigou village in August 2005, organized by Zhang Shuchuan)

Core decision making group found its possibility if matching some complementary measurements, for example, subsidies to the farmers for changing from grazing to shed-raising; a detailed and strong supervision for ensuring the practical implementation. According to previous experiences, the government believes that a kind of enforced policy could be adopted by the implementers after getting used to a new environment or they knew more and more about the advantages. So the decision on 'Overall Grazing Ban, Developing Shed-raising' 'Working Plan for Implementing Overall Grazing Ban and Developing Shed-raising' was announced in 25 July 2002. In the documents, 1 November 2002 was the starting time of grazing ban. The objective of this policy is: controlling desertification area to less than 15%, increasing vegetation coverage to more than 60%, increasing artificial planting grass to more than 1 million mu (66666.67 hectare), increasing shed-raising sheep to more than 1 million, production value of animal husbandry to 250 million yuan, income from animal husbandry accounting to more than 65% of total income of the farmers. This policy was submitted to the government office of Ningxia Hui Autonomous Region. Department of agriculture and animal husbandry and policy research office organized several visits to Yanchi and organized a meeting on "Ecological

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20 mu (about 1.33 hectare) grassland. However, it is just on paper. Not only the farmers/herders ignored this regulation, but also the administrators in some time, say in the middle of 1980s', encouraged the farmers to raise more livestock for generating income without considering this regulation.

construction in drought area in Ningxia" in Yanchi in August 2002. After the meeting, the Region also decided to implement the Grazing Ban in overall region starting from May 2003.

Aforementioned decision making process shows that the core team had the highest right of making final decision, but the reactions of local people and other stakeholders could complement the policy for avoiding some possible expenses.

### **3. Implementation Analysis on Grazing Ban**

There are different opinions on the effectiveness and efficiency of grazing ban, since the involved institute or interest groups all have their own rationale for doing judgment.

#### ***3.1 From government perspective***

The grazing ban has very effective and efficiency results, in terms of the objective of the grazing ban. Because of the main objective of ecological rehabilitation from implementing grazing ban, the improvement of the grass quality is the best criteria for assessing the effectiveness of this policy. As to the efficiency of this policy, the government has spent a lot on the policy implementation. Since the first test of the rotation and seasonal grazing was failed, the research group under the guidance of the pasture management leadership group concluded that complementary activities should be paid attention on leveraging farmers' livelihoods after giving up sheep grazing, which took more than 50% of farmers income (Qi, et al. 2005); at the same time, it is important to have strong supervision to make sure of everybody's behavior at the same track. So the investment of fund, including subsidies in cash and materials to the farmers and advocacy of the grazing ban, and investment of labor for controlling the grazing behavior were expected. From 2001 to 2004, the total investment on supporting farmers' livelihood improvement was 12 million yuan, and 198 working groups were organized by the government for supervising the process. There is another cost that was expected by the government to some extent also, which is the conflict between the working groups and the farmers. Actually, the farmers directed this conflict to town or township government, because the responsibility of supervision was allocated from the county to all town/townships. From the decision making process analysis, we already found that the farmers could not follow the policies regulations at all since they did not have the right to express their different opinions and to channel their suggestions to the policy. They would cope with the enforced regulations according to their own conditions. In the most serious time, there were more than 10 times conflicts between farmers and supervision working groups in one natural village in one month.

<p>Cost (valuable for producing benefit)</p> <ul style="list-style-type: none"> <li>➤ Investment Cost for improving farmers' livelihood</li> <li>➤ Investment cost for making the supervision effectively</li> <li>➤ Conflicts between the farmers and stakeholders</li> </ul>	<p>Benefit (invaluable)</p> <ul style="list-style-type: none"> <li>➤ Environmental rehabilitation</li> <li>➤ Farmers' livelihood improvement</li> <li>➤ Political performance</li> </ul>
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**Figure 1 Effectiveness of the Grazing ban in terms of government's judgment**

It is not so easy to calculate the cost and benefit in quantitative way, but there is a big weight on the ecological rehabilitation. Since all costs were within the tolerated level of the government, it is very valuable for the government to input the subsidies to the farmers.

### **3.2 From Natural scientists' perspective**

Those researchers focusing on the grassland protection made attention on the quality change only. From the results, it is already very successful. See table 1.

**Table 1. Change of grass quality**

Indicators	Sept. 1, 2001	Aug. 4, 2004
Height (cm)	18	34
Coverage rate (%)	30	86
Density (plant/m <sup>2</sup> )	56	136
Fresh grass (kg/mu)	68	188
Dry grass (kg/mu)	23	77

Source: Grassland Station in Yanchi County Animal Husbandry Bureau

However, from the observation, the technicians also talked about the possible negative impacts of total grazing ban. The regenerative capacity of grass might be not so good if without external incentive, such as the sheep's gnawing and dung's functions. There was also the comparative study on the grassland with furtive grazing the grassland without furtive grazing, which shows the former one grew better than the latter one (Qi, et al, 2005).

So the researchers suggested that the appropriate grazing is very important for the

sustainable utilization of pasture. In other words, pure grazing ban is not under the rationale of the scientific criteria. However, the farmer reaction according to their interests matched to this scientific requirement, which showed in ‘furtive grazing’ describing in the following text.

### **3.3 From farmers’ views**

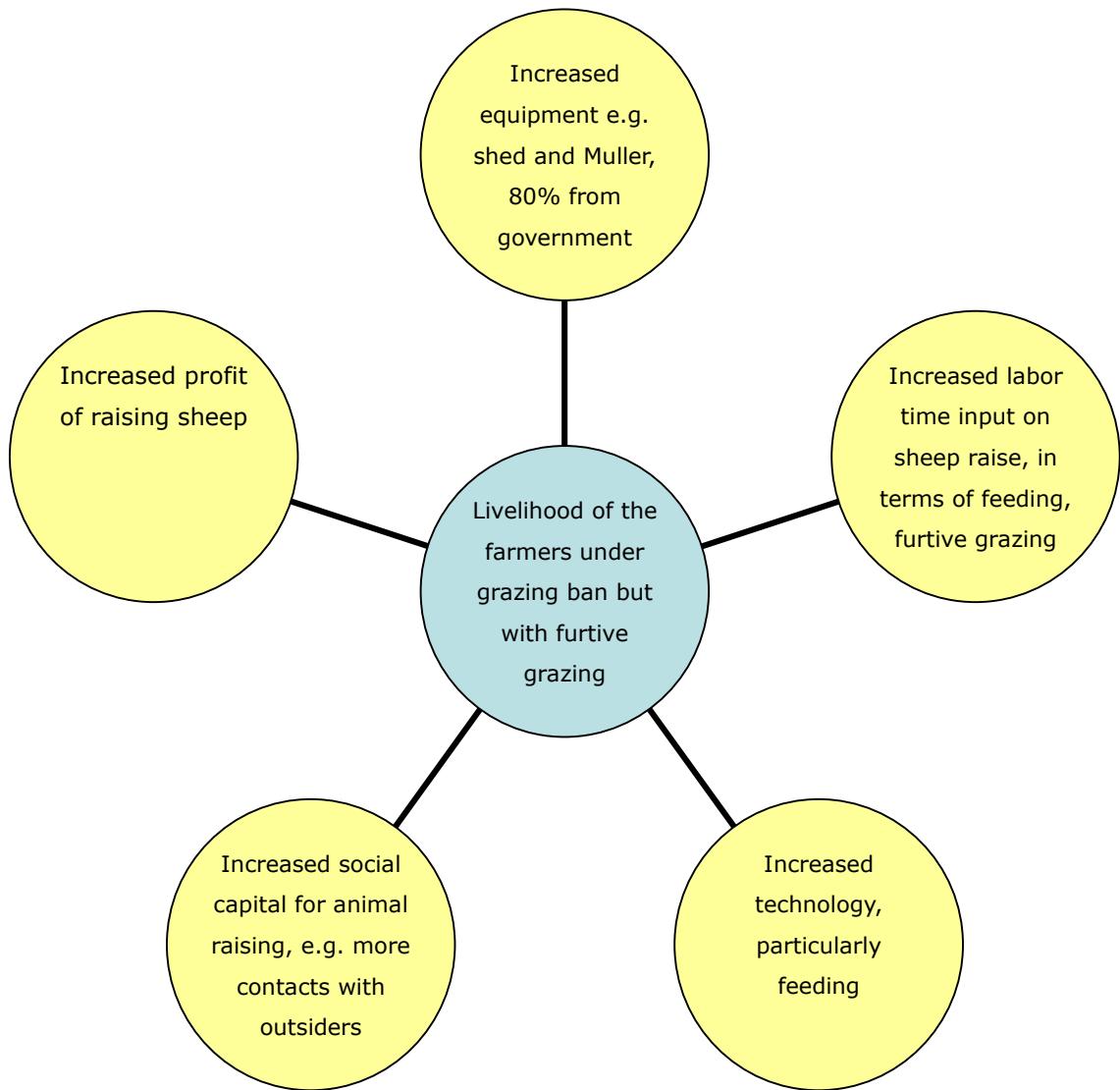
There were changes of the farmers’ attitudes and views on grazing ban. At the beginning of this policy implementation in 2002, the supervisions were very strict and the farmers could not do anything for grazing. So they judged that the policy is not so efficient if considering their loss of income. Calculating the fine they had to pay, they made more loss. At that moment, they also mentioned that the grass did not get good growing because of the reasons the specialists already pointed out. Along with the rehabilitation of the grass and the increased conflicts between the working group and farmers, the supervision team started to have a relax; the farmers also learned how to cope with the supervision from above, for example, they organized the households-collaborated grazing team to go for grazing at night, and they also made some inter-linkage with village committee for informing the checking activity. So the farmers’ assessment is as: ‘without furtive grazing, no benefits for the farmers to raise sheep; but there is benefit if with furtive grazing’. In a survey in 2004<sup>4</sup>, 74.3% interviewee goes to furtive grazing often; 38% spend 4-5 hours for grazing per day in Summer and Autumn, 38.9% spend 3-4 hours for grazing per day in Winter and Spring. 88.7% thinks that furtive grazing contributes income increasing, within which 48.8% thinks it is large extent income increasing induced from furtive grazing. 45.5% were not caught for fine or were fined with only less than 100 yuan in total during furtive grazing; 17.2% were fined more than 500 yuan.

The profit difference is very apparent before grazing ban, implementing grazing ban strictly and implementing grazing ban with furtive grazing. If calculating at one sheep unit, the profit with free grazing could be 27 yuan in average; with totally grazing ban, the profit was minus 34 yuan; with furtive grazing, the profit achieved 58 yuan in average.

In general, the farmer livelihood could be improved with furtive grazing, see figure 2.

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<sup>4</sup> The samples were 198 households in 14 natural villages, 9 administration villages, 7 townships/towns. Among the natural villages, there are 5 natural villages with the area of grassland per capita is smaller than 50 mu (3.33 hectare), 5 natural villages with 50-100 mu (3.33-6.67 hectare), 4 natural villages with more than 100 mu (6.67 hectare).



**Figure 2 Change of farmers' capitals under grazing ban but with furtive grazing**

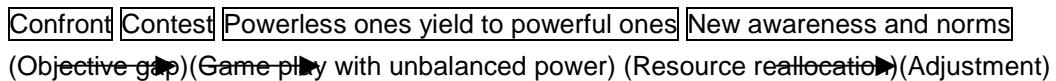
Though the general conditions are very good, the tough reality that the change of the grazing habit of the farmers is still the high cost of their livelihood that is not so easy to be calculated in quantities. We explored furtive grazing adjustment and farmers views on their expect future of grazing in our further analysis.

#### **4. How the adaptive mechanism was built-up?**

Firstly, there was a new balanced mechanism of pasture management after implementing grazing ban policy. Secondly, the stakeholders are making efforts on a more adaptive mechanism of pasture management.

##### **4.1 Balanced mechanism of pasture management**

A balanced mechanism of pasture management exists currently, at high cost of farmers' normal production habit and the input of the government on facilitating alternatives of the farmers. The whole process is a process of game playing among different roles with unbalanced strength. In this process, county government is one important stakeholder with powerful rights, which accumulated respects and allocated resources from previous administration history. Figure 3 shows how the balance could be made up.



**Figure 3 Process of making new balance in pasture management**

Due to objectives gap, local people resisted the policy of grazing ban at the beginning, which means the breaking of the previous balance of multiple-strength. So the farmers tried their best to express this disagree and even suggested alternatives (see box 1). Departments at different level of government tried to reallocate some resources to facilitate to change farmers' perceptions, which efforts were through subsidies, persuading advocacy, face to face discussion, suggestions for livelihood alternatives activities, etc (12 million yuan during 2001-2004 showed this effort to some extent). At the same time, the capacity of mobilizing human resources to make the grazing ban practical also showed to the farmers that previous balance won't exist anymore. So the farmers, without so much power and capacity to mobilize resources, had to compromise firstly. The first reaction was to reduce the amount of sheep they used to raise, by average 30% per household. At the same time, the government sides realized the serious cost was not the investment or human resources input, but the conflicts between the farmers and those supervision teams, which could induce high potential on the stable of rural society. However, the more important issue is that the impact of the grazing ban on ecological rehabilitation was very significant (see table 1). So the government started to reduce the pressure on monitoring and supervision. Human resources in supervision team went to supervise the farmers with less time, only toward evening period rather than the whole night every week.

New norms came out with both farmers and government staff members' behavior adjustment: farmers going for grazing after evening; supervision team going for supervision sooner or later before dark; supportive production projects continue go to the villages with increased 20% comparing with free grazing period.

#### ***4.2 Efforts on exploring a more adaptive mechanism of pasture management***

Though this new balance is accepted by various institutes and people at appearance, the compromise of the farmers are not considered as normal, which will be showed from the following responses in experiment area. So the stakeholders did not stop to look for a more adaptive mechanism with rationale based on the reality. Since 2004,

the region government supported the pasture researchers to do the research on the efficiency of different types of pasture management; those researchers are from grassland station and political consultation research office. But it was based on the grazing ban pre-condition, and the farmers were only the assistant for the researchers to graze the sheep in regulated time and place, and the experiment grassland was not open to the farmers. Without involving farmers' participants, the results of the research just stopped on the ideal background and not practical. So it did not show much policy linkage in terms of policy suggestion. In 2005, an NGO, Ningxia Centre for Environment and Poverty Alleviation, who had worked in Yanchi for environmental protection and integrated rural development for several decades, together with China Agricultural University, started to facilitate a multiple dialogue among the government staff, particularly grazing ban office in Yanchi, the farmers, particularly in the villages that villager had the experiences of collective pasture management and with larger area of pasture, and the grassland specialists. During this multiple dialogue, various stakeholders got a consensus that farmers could manage to protect the grassland with current support from the government, if they could come to an internal regulation on community resources and organize the supervision by themselves. The simpler way is to change the furtive grazing into open but regulated grazing in daytime. One village, Gufengzhuang village, also made a community pasture management regulation, with the help from outside (Li, et al, 2006). This research result and corresponding suggestions on open grazing were submitted to the governor of Yanchi county and also be transferred to the region governor. In 2006, Yanchi government got the support from the region and started to do an experiment in Dashuiken Town, involving all 4146 households, 106 natural villages in 15 administrative villages, with regulations on the rotation, group collaborative grazing and grazing certificate (this is to differentiate this open grazing area and other areas still with grazing ban). Our study followed to evaluate the results of this experiment and found that it did not continue in 2008 and 2009 because of the drought weather in 2008 made the officers worry about the possible grassland degradation, since they thought that with open grazing, the grassland could be damaged more than with furtive grazing.

#### ***4.3 potential and challenge for a more adaptive mechanism***

From the reactions of the stakeholders in the experiment of open grazing in Dashuiken Town, it was found that there are potential for a more adaptive mechanism of pasture management if with open access to grazing, but there are also challenges for making sure of the relatively stable environmental performance. In a field study in 2009 in three villages in Dashuien, we found that:

4.3.1 Main potential of a more adaptive mechanism is showed from the adaptive grazing activity of the farmers in experimental area and the expectation of the farmers in non-experimental area

The grazing time was already adjusted to less time, comparing with the 'era' before grazing ban. The farmers explained from three aspects. Firstly, after accumulating the experiences of these years from furtive grazing, the farmers knew that less moving of sheep could save their energy for increasing productivity. Secondly, during furtive grazing, sheep used to go out in cool duration and they could not tolerate high temperature; so if grazing in noon time, sheep won't eat. Then it is not appropriate to graze in noon time with higher temperature, which saved the grazing time to 1-2 hours. Thirdly, since several households in one area with consistent regulations on livestock numbers and rotation, monitored by an external group, then several farmers could take the rest time for doing off-farm work, which could complement the livelihood to a big extent. The farmers also found the advantage of doing collaborative grazing in the way of organizing themselves to several households together. This also enhanced their co-supervision on limiting the amount of sheep grazing, rotation, and grazing time.

At the same time, the farmers came back to a normal production time as before, most of them showed their willingness on continuing to obey the current grazing regulations. The farmers interviewed in other town/townships expressed their supports on open grazing with regulated requirements and they hoped that the government could extend this test to overall implementation in the whole county.

#### 4.3.2 The awareness of natural scientist on involving farmers into the whole experiments improved their views on grazing management with integrated perspective

During the process, the researchers did not consider the farmers as the research target only, not like several years' before when they did that pure technical experiment. For example, the discussions with the farmers on the pressure of livestock on the grassland help them to adjust the optimum amount in the grassland with quality differences.

#### 4.3.3 The government representatives' realization on the heterogeneous of the farmers enhanced the trust system between outsiders and the farmers

Because of the close negotiation and discussion with the farmers and the researchers, the government representatives realized that the farmers are not homogenous and they might present in different behavior, so a correlated monitoring system involving different farmers are important.

#### 4.3.4 Uncertainty of the balanced results on the environmental protection and livelihood improvement built the obstacles for further action on open grazing

From farmers' side, there is still 27.5% households' supporting free grazing, which means that a open grazing might bring back to previous pasture management situation, with heavy load to the grassland. From the government's side, it is not

clear that current management approach is sustainable. Active external and internal interaction system could be changed if with the change of key participants and key factors. For example, 2008's drought showed the fluctuation of the weather that could make environment more fragile. So how to make the external and internal monitoring or supervision system integrated with consistent effectiveness is still a big challenge.

## 5. Conclusion

Public policies formation relies on the stakeholders involved and their interactions, even in high centralized system. Powerful ones' adjustment corresponding to reactions from local level timely could promote the effectiveness of the implementation even without consensus during the policy making. In this grazing ban policy case in Yanchi, at the cost of capital, human resources and conflicts with the farmers, grazing ban with policies package achieved its ecological objective. The actors in the policy implementation process are all active to react to each others strategy, so a new balance could be made if the positive reactions could be accepted in some time. In Yanchi case, the adaptive mechanism of pasture management includes: farmers' furtive grazing and accordingly adjustment of grazing behavior, researchers efforts on innovative methods, policy makers' adjustment of monitoring and practical design. Since this mechanism is still with high cost of farmers livelihood, which is do grazing at night, there is need for building up a more adaptive pasture management mechanism.

Although a more adaptive mechanism could be built upon the change of the actors, there are also many challenges, one of which is to make a sustainable pasture management in a certainty situation. In this aspect, pure economic balancing formula could not be the only judging criteria, and the cultural and social factors should be included, such as the trust building up for a more collective or community-based management scheme.

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