

Property Regime and Grazing Policy: Adaptations to Institutional Change in Grassland China

Lu Yu

Abstract: This paper analyzes farmers' adaptations to grassland related institutional change, mainly on grassland reform and grazing policy change. Institutions of Sustainability (IoS) Framework is employed for institutional analysis to understand the way local people respond to institutional change and the reasons underlying decision making processes. The findings reveal that existing institutional setting fail to balance the economic, social and environmental systems. The exclusion of locals from current policy making process and unstable policy jointly puts grassland users in decision making dilemmas.

Key Words: grassland reform, institutional change, adaptation, grassland governance, China

1 Introduction

Grassland is a dominant terrestrial landscape, resource and ecosystem in China. There are 393 million hectares of grassland, accounting for 40 percent of national land area (Dong et al., 2007). Grassland services the ecological system and socio-economics of the region by supporting diverse species of animals and plants (Le et al., 2007). It is widely perceived that the sustainability of grassland governance and locals' livelihood are under the threat of accelerating grassland degradation (Banks, 2001; Banks, 2003; Wang, 2007). Located in the east of Ningxia Hui Autonomous Region, Yanchi County is in transition zone between Ordos Plateau and Loess Plateau, as well as the transition zone from arid steppe to semi-arid grassland. It has a continental climate with average 272 mm rainfall per year (Qi et al., 2006). It has 855,000 hm² lands in total, among which 557,000 hm² is grassland. About 79.3% of its total land, however, is suffering from serious desertification. Responding to local environmental problems, grassland decentralization reform (also known as Household Responsibility System reform) was implemented in 1990s. The reform redefined grassland property arrangement by assigning land-use rights to households under the collective ownership system. Moreover, local government implemented several policies to protect ecological environment such as grazing ban policies and grazing open pilot project. This paper does not attempt to explore the impact of these institutions on the improvement of grassland but instead focuses on farmers' adaptations in institutional change to illustrate two levels of adaptations, namely individual day-to-day actions and collective action.

Nowadays, increasing scholars are paying attention to issues related to arable land tenure in rural China (Slangen et al., 2008; Brandt et al. 2002; Kung et al.1997). Comparatively, grassland and its governance are under-researched. This paper will contribute to heated debate on land use in China by extending to this more extensive and more vulnerable grassland regions. Current literature and existing case studies appear to focus on farmers' economic activities, most of which are based on the assumption of profit maximization (Kong, 2007; Song, 2002; Bi et al., 2010), which, however, is not the only factor influencing farmers' action, especially regards to natural resource use. Informal institutions (e.g., norms, cultures) will also exert a huge impact on grassland users' decision making. Moreover, these researches fail to take the interdependence among actors into consideration. In addition, farmers still face the trade-off between a long-term sustainable use of their resources and short-term considerations of profit maximization (Prager et al, 2011), which should also be included into analysis. To promote the sustainability of

ecological environment and socio-economic system of the region, this paper would contribute to better understanding farmers' adaptations based on institutional analysis.

The rest of this paper is organized as follows: Section 2 explains the methodology used in this research and the Institutions of Sustainability (IoS) framework employed for institutional analysis. Section 3 illustrates grassland related institutional change in surveyed area. Section 4 shows the way local people response to the change of policy and grassland property regime. Discussion about properties of transactions, governance structures, and institutional change are contained in Section 5. The last section states concluding remarks

2 Methods

The core issue of this research is to understand farmers' adaptations to grassland related institutional change, which needs to be guided by a framework that could integrate the special property of institutional analysis into nature-related sectors and solve problems within certain conditions. Institutions of Sustainability (IoS) framework (Figure 1) has been proved to be a useful analytic framework to identify particular institutional features supportive (or detrimental) to the sustainable use of natural resources (Prager,2011) and integrate the properties of transaction actors with diverse attributes, institutional changes and governance structure into analysis. In addition, although the property right of grassland has generally changed to Household Responsibility System after property right reform, its collective attributes remain the same since a huge amount of grassland is still controlled and managed by communities or groups in practice regardless of their *de jure* property regime. Therefore, actors are facing with a set of potential decisions that may cause jointly benefit or cost to other actors and affect others' opportunities to address goods or services in an either incompatible or synergistic way. IoS framework takes into consideration the interdependence both between ecological and social system as well as between actors. Farmers' adaptation on grassland governance is viewed as a transaction, the unit of analysis.

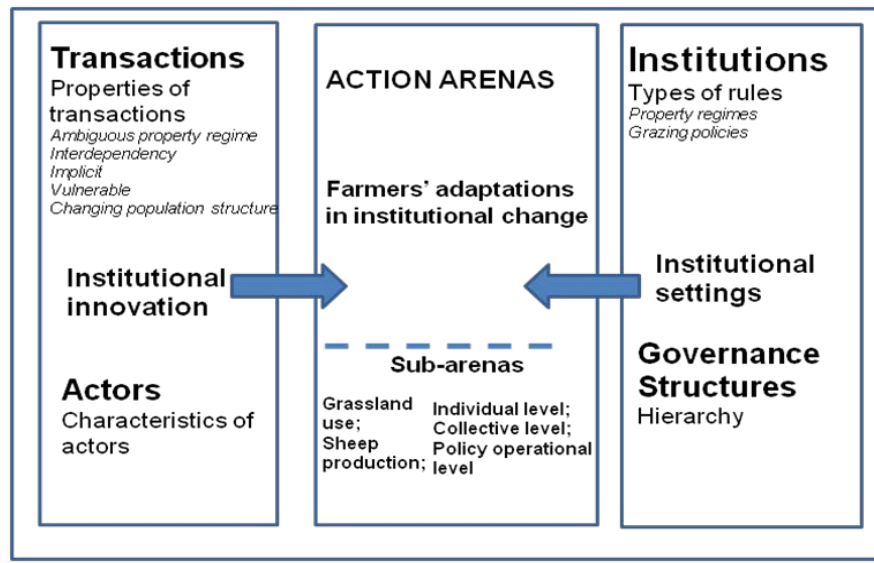


Figure 1: Institutions of Sustainability (IoS) framework (adapted from Hagedorn, 2008)

In this research, the action arena is roughly defined as grassland governance. The main actors are local farmers and administrators. The actions related to grassland governance mainly take

place in the following sub-arenas: 1) At individual household level, questions concerns decisions about fence building, illegal grazing, grassland lease and migration; 2) At collective level, concentrates on how local people organize themselves to manage grassland. As to four exogenous factors that identified in IoS framework, the paper will focus on following aspects: 1) the properties of transactions related to grassland governance, which would then influence rule making and adaptation; 2) the attributes of actors involved in action arena (e.g. household structure, off-farm working opportunity and grassland area); 3) institutions, mainly grazing ban policy and grassland property right reform; 4) governance structure which affects rule implementation. Hierarchy will be the main governance structure of focus because of its dominating role in grassland governance in researched areas.

This article is based on cases study conducted in Yanchi County. Twelve villages were selected with local government and a NGO to cover diverse physical attributes of grazing situation in July and August, 2010 (Table 1). The selection criteria included scale of grassland, fence situation, location and policy situation. We took average grassland per person in a village as an indicator. The sample covered villages with more than 100 mu¹ grassland per person, less than 100 while more than 50 per person and less than 50 mu per person. Fence situation of grassland is included as an indicator of de facto management units: collective fence to village, collective fence to groups of household and individual fence. Grazing policies implementation is also considered during case selection. Four pilot villages with grazing-open policy (in 2006 and 2007) and eight villages with the grazing ban policy since 2002 have been selected.

Table 1: Attributes of selected villages

	Scale of grassland (unit: mu/person)			Fence situation			Location		Cultivation type	
	Less than 50	51-100	More than 100	Village	Group	Household	In hilly	In plain	Without irrigated lands	With irrigated lands
Observation	4	4	4	2	6	4	3	9	5	7
Percentage (%)	33.3	33.3	33.3	16.7	58.3	25	33.3	66.7	41.7	58.3

3 Institutional context

3.1 Grassland property regime

The grassland is broadly defined as common-pool resource, since each person's use of a resource system subtracts units of that resource from a finite total amount available for harvesting while hard to exclude other beneficiaries from benefits (Ostrom, 2005). However, common-pool resources are not automatically associated with common-property regimes, or with any other particular type of property right regimes. It may be owned by national, regional or local governments, by communal groups or by private individuals or corporations (ibid.).

Yanchi grassland provides a good example to show the diversity of property regimes over common-pool resource. In 1990s grassland decentralization reform was implemented, after the introduction of Household Responsibility system for arable land (Lin 1992), which defined

¹ In research area, the usual unit used in describing grassland size is mu. 1 hectare equals to 15 mu.

farmland tenure arrangement by assigning land-use rights to individual households, despite the ongoing collective ownership of land (Banks et al., 2003). Grassland is managed under a similar HRS, albeit with slight differences due to the unique features of grassland, such as difficulties in demarcation (Banks et al., 2003). The decentralization reform aimed at contracting grassland use right to households, while the heterogeneity of villages such as grassland area, cultivation type, and location promotes the emergence of diverse property regimes in practice. The degree of grassland allocation varied from contract to individual household or group with several households, to remaining *status quo* situation (i.e., owned and managed by community). Until 2003, 317,000 hectares grassland (about 86.6% of its total grassland) had been contracted, among which 56,000 hectares grassland had been allocated to individual households, and 261,000 hectares to groups.

Without specific and visible boundary of grassland, however, *de jure* grassland property regime is hard to be put into effect. Some grassland officially contracted to groups is still grazed and managed by community, and some contracted to individual households is controlled and managed by group or even community. Grassland fence is a technology usually used for local government's subsidy and its relatively lower cost. Therefore, it is reasonable to define *de facto* grassland property regime based on fence situation regardless of its *de jure* property right. Grassland with village fence shares the same attributes of common-property regime. Grassland with individual household fence could be classified to quasi private-property regime. As to grassland with group fence, it is categorized to group-property regimes.

3.2 Grassland use policy

As shown in Table 2, different grazing policies have been introduced in last decade. In 2002, grazing ban policy (GBP) was implemented to forbid all activities on grassland including grazing. The impacts of the regulation is quite positive in terms of grass length, coverage and frequency of sand storm, but it also forced a great number of local people out of their traditional livelihood, as well as intensified conflicts between the government and locals. And grassland desertification problem has far from been solved (Qi et al, 2006). Considering these problems, the local government implemented a grazing-open pilot policy in some villages in 2006 and 2007. Villagers in pilot areas were given the access to grassland, but the number of sheep allowed for grazing is assigned by county government according to village's grassland quality, and then allocated to individual households by village committee in the form of grazing quota based on family size. In 2008 this project was suspended due to the extreme drought and is expected to restart in 2011.

Table 2 Information of different regulations in Yanchi, Ningxia

	Grazing ban policy	Grazing open pilot project	
Time	Since November, 2002	2006	2007
Scope	Whole county with 8 towns, 98 administration villages, 675 natural villages	One administration village with 10 natural villages, covering 1001.2 hm ² grassland	Fifteen administration villages with 96 natural villages, covering 54906.6 hm ² grassland
Main content	All activities related to grassland were banned; captive breeding was highly recommended and would be subsidized.	In pilot area, it is legal for local people to graze on grassland. Grazing quote was assigned by county government to each household based on the quality of grassland in his village. Rotational grazing was encouraged by government.	

Source: data collected in empirical research (2010)

4 Results

Adaptations are analyzed as transactions at individual level. Participants interact in light of the internal and external incentives they face to generate outcomes directly in the world (e.g., decision about how much, when and with what technology to appropriate resource units) (Ostrom, 2005). Individual adaptations are constrained by certain rules followed by all community members consciously or unconsciously. Their decision making is based on other actors' attitude and possible response.

Illegal grazing

Illegal grazing widely exists although the implementation of GBP. In the first few years when official monitoring of illegal grazing was extremely intensive and rigorous, illegal grazing rarely existed. While because of the high financial and labor cost for monitoring, frequent conflicts between herders and governments occurred, and the gradually improvement of environment, the implementation of GBP tends to be loose in recent years. Due to the looser monitoring, illegal grazing happened frequently in recent years. More than 54% of the interviewees admit that they were grazing everyday in 2010 (Table 3). Rush hour for illegal grazing is mid-night from 23 to 4 o'clock. Herders could escape easier from being caught in the evening because they are familiar with local geography while the monitoring committee is not.

Table 3: Probability of Illegal Grazing in 2010

		Every day	Frequently	Sometimes	Seldom	In total
2010	Number(households)	60	22	16	13	111
	Percentage (%)	54.1	20.22	14.2	11.48	100

Source: data collected from field research in 2010

Considering the relatively few off-farm work opportunities of grassland region, the implementation of GBP dramatically changed traditional livelihood of local people. Evidence from field research shows that a same policy may yield entirely different types of actions since what actions are physically possible, what outcomes can be produced... are affected by the world being acted upon in a situation (Ostrom,2005:22). Farmers in mountains are more likely to graze illegally than farmers in plains, especially those near highway. Wide and spatial distribution, geographical complexity and diversity of grassland cause high labor and finance cost for official monitoring. As a Chinese old saying implies that "The heaven is high and the emperor is far away" (*Tian Gao Huang Di Yuan*), which means central government's policies are hardly fully implemented in local areas, and one enjoys relative freedom when live far from the central authority. After the implementation of GBP, most of villagers living near to highway or close to county moved to cities or changed to captive breeding sheep. As they explained, illegal grazing is often caught and severely punished, so it is irrational to take this high risk. In some villages, especially in remote mountainous areas, herders even created a "spy system", in which a single person or a group of people "spies" government monitoring teams. Herders are informed the moment governmental monitoring committee was detected. Besides, substituted livelihood opportunities are rather limited in mountainous area, putting local people in a dilemma of either migrating to cities or grazing illegally with the risk of being fined.

In pilot areas where the grazing open policy was implemented in 2006 and 2007, illegal grazing existed in another way. The grazing quota was assigned by government to restrict the grazing amount. In order to herder more sheep, some farmers divided sheep into certain groups,

and keep sheep amount of each group less than the assigned permission. They herded different groups in different periods, however, the total amount of sheep grazing significantly exceed the quota. It is difficult and costly to check this kind of illegal grazing due to frequent sheep trading and difficulty to distinguish sheep.

Fence building

Fuzzy boundary of grassland hinders the implementation of *de jure* property regime, therefore leading to diversified property regimes. In Yanchi, village fence has been built in almost all villages with the financial support from county government in the beginning of grassland reform. At that time, material cost for fencing was completely covered by the government. Local people provided only labor. Group fence was also built in the same way during that period. However, the construction of group and individual fences is far from finished, especially in villages with little grassland or in remote areas. Some of them have never been integrated in to household responsibility system.

As Ostrom (2003) stated, whether it is difficult or costly to develop physical or institutional means to exclude non-beneficiaries depends both on the availability and cost of technical... and the relationship of cost of these solutions to the expected benefits of achieving exclusion. Exclusion by fencing is relatively costly considering the low productivity of grassland especially regards to the implementation of grazing-ban policy, and the interdependence among actors make transaction more complicated. Village fence were usually a mandatory requirement of village committee with the support from county government. But the construction of group fence needs voluntary approval from all group members. The decision of any households matters in group decisions. After the implementation of GBP, the economic value of grassland has been suppressed, diminishing the incentive for fence construction. As an interviewee mentioned 'the market value of grassland greatly decreased since grazing activity has been banned. Why should I pay for something from which I cannot get benefit?' Household fence were usually built in recent year due to the increasingly loose monitoring and sanction for illegal grazing. One of the driving forces of fence construction is the great reduction of labor demand for managing grazing activities. In some villages with individual household grassland fence, illegal grazing (i.e., supervising the sheep throughout the night) has been substituted by a new way: herders send sheep into their own grassland in the evening, go back home and leave sheep unguarded all night, and then herd sheep back in early morning. As one herder said, sometimes they were caught by monitoring committee and fined, but it works out since it greatly reduces working hours and workload, which means they can take other jobs during the day. Additionally, grassland fence contributes to grassland lease by decreasing the cost of monitoring, bargaining and decision making.

Grassland lease

Grassland lease exists to eliminate the gap between the amount grassland actors need and possess by leasing in or leasing out grassland (Yu et al, 2011). Grassland lease refers to a transaction mechanism through which grassland use right is voluntarily leased among rural households. The term 'transaction' follows Common's definition which defines transaction as a unit of lease of legal control, that is, to involve the transference of property rights (cited in Hagedorn, 2008). Considering the compulsory constraint originated from GBP, no grassland leasing should exist in villages. However, illegal grazing completely changes this assumption. The likelihood and way of grassland lease changed in last decades due to the emergence of

illegal grazing. During certain periods, grassland lease declined dramatically, and boomed in some areas while depressed in other areas at the same time.

Leasing contract provides a physical arena for grassland use right lease. It defines the boundary of transaction: what is leased during the transaction, how long is this transaction valid, and what are the responsibilities of tenant and landowner (Yu et al., 2011). There are different types of grassland leasing existing in survey area, and the most popular one is oral agreement within a short period, usually one or two years, between two households living in the same village. Only 22% of households leased in by written agreement, and all of these agreements simply consist of time, price and contractors, but having no specific terms about responsibility of contractors and sanction for violation. Mutual trust based on past experience is one of the essential factors influencing contractors' decision making. Another type of grassland lease is to rent both grassland and farmland. It happens in villages with irrigation farmland. Due to severe scarcity of farmland, the comparatively higher economic value of farmland generates farmland leasing market before the appearance of grassland lease. Under such circumstance, grassland is taken as a bundled product of farmland lease, and this kind of lease contract tend to be more formal (i.e., sign by in written agreement).

In general, grassland with fence to a smaller unit is more likely to be leased than grassland with fence to a larger unit. In villages without specific fence, the probability of grassland lease (0) is lower than that in villages with group property with fence (12.9%) or quasi-private property (34.2%). Statistics of grassland fence situation and grassland lease reveal that, out of all grassland leased, those with household grassland fence takes up 60.87%, higher than that with group grassland fence (39.13%). The overall p value is less than 0.05, which implies that there is significant difference of the mean of number of grassland leasing among different grassland fence situation. However, grazing quota lease is quite popular in pilot villages regardless of grassland property regime. Grazing quota provides a well-defined arena for grassland lease. In surveyed area 67% of grazing quota lease found are located in villages of group-property regime, which is significantly higher than that in area without grazing quota system (12.9%), namely non-pilot villages of grazing open policy. The result also demonstrates a positive correlation between grassland area and grassland lease. The percentage of grassland lease in areas of per capita average grassland less than 50 mu is 11.1%, from 50 to 100 mu is 17.6%, and more than 100 mu is 28%.

Migration

Migration widely exists in rural China, especially in western China, which dramatically influences the grazing pattern in last decade. This paper will not explore reasons of migration, but explain its impact on grassland management. About 47.8% of local people migrate to cities in Yanchi County, and most of them are young so that the majority of residents left are the elderly and children (Table 5). The change of resident structure caused great difficulties for people left. After the implementation of grazing ban policy, work opportunities are quite limited, and the situation is worsened by those people's physical condition. Grazing was regarded as the last livelihood for them, especially for those without subsidy from government or remittance from children. Some used to hire commercial herder to graze sheep before. But now with more and more people moving out of villages, it is either too expensive or difficult to hire a commercial herder. On the one hand, once caught, there is a dispute on whether the herder or sheep owner should pay for the fine. On the other hand, grazing in midnight (from 11 pm to around 4 am) is much more dangerous and exhausting, and is out of the ability of an old person.,

but with increasing migration, it became hard to contract a young herder. Labor shortage greatly increases the cost of herding, which diminishes contracting herders. In short, migration changes the traditional grazing pattern by changing population structure of village.

Table 5 Migration Situation in Yanchi

	1	2	3	4	5	6	7	8	9	10	11	12
Resident Population	130	90	180	200	110	50	160	130		60	100	65
Registered Population	170	180	254	374	210	150	330	253		147	300	300

Source: data collected from field research in 2010

5 Discussions

5.1 Property of transaction related to grassland

As Hagedorn (2008) stated that physical world (and the related physical properties of a transaction) is as important for institutional analysis as the social world (and the related physical characteristics of actors). It is hard to exclude the influence of physical world during institutional analysis related to natural resource use. The properties of nature-related transactions can only be assessed on a case-by-case basis (Hagedorn, 2008). The property of actions related to grassland is shaped by its special attributes.

(1) Ambiguous property regime.

It is difficult and costly to establish private exclusion such as grassland fence since it is larger and more spatially dispersed than that of cropland, especially of grassland in mountain area. It is economically infeasible to build private exclusion considering its relatively lower productivity. In addition, difficulties in demarcation and remoteness of residential quarters, making the implementation of national grassland policies more difficult (Banks et al., 2003).

The diversity of property regimes makes the situation more complicated. Grassland contracted to group might be managed either by group as a whole, or by individual household in the area under the regulation of grazing open policy-by allocating grazing quota to individual household. Herders graze sheep according to household grazing quota regardless of grassland property. Besides, as explained above, fuzzy boundary of grassland leads to ambiguity of property regime. It is quite common in practice that grassland contracted to group in *de jure* property right system is owned and managed by community. The diversity of property regime promotes remarkably diverse adaptive behaviors in grassland governance in the context of institutional changes.

(2) *Interdependence*. Interdependence is a common property shares by most of the transactions related to natural resource including farmland, forest, water catchment and grassland. Almost no decision is immune from the influence of other actors and the wider environmental system. For example, once a grassland lease contract works, this transaction would not only lead to a transfer of resource unit between tenant and landowner, but also affects other actors due to the interconnectedness of the natural system in various way - both desired and problematic - resulting in a complicated action situation. For grassland owners having neighboring grassland around the contracted land, the risk of having the grassland occupied or grazed increased. The situation would be much more complicated when grassland lease contract exists between a household and a group of households in group property regime. Households' decision about

illegal grazing is also influenced by other households. Actors have to predict others' action and its impact on neighboring actors as well as wider environment during decision making process.

(3) *Vulnerability*. Grassland is quite sensitive to climate change, which is unforeseeable and hard to predict. The frequent extreme climate events that happened in recent years exacerbate this problem. For example, the grazing open pilot project was suspended by the severe drought of 2008, which interrupted users' production plan. Since these events are excluded in policy design in most cases, the vulnerability of grassland makes locals' decision making more difficult.

(4) *Implicitness*. Most transactions are implicit, considering the fact that usually transactions are conducted among households in the same village, their relationship and kinship are the key factors influencing transactions. Most of actions related to other actors (e.g., collective action) are executed by reputation mechanism without specific responsibility documented in contracts. Mutual trust based on past experiences is one of the decisive factors influencing contractors' decision making.

5.2 Governance structure

Governance structure affects rule implementation in direct or indirectly way, therefore it is necessary to included governance structure in institutional analysis. Hierarchy is the dominant governance structure that influences rule implementation in this case. Local people are excluded in decision making process in current top-down governance structure. The policy is criticized for its failure to taken locals' livelihood into consideration. Though incompatible with local traditional livestock production, GBP was implemented in 2003. It did not provide substitute livelihood for locals. Captive breeding, though it is highly recommended by county government, has not been widely accepted for its high cost². The grazing open policy was introduced in October, 2006, but it did not match with the production plan of villagers since the open grazing period was too short for them to adjust their production. Locals are not informed in advance about policies to be implemented but have to accept new institutional setting even if it is harmful to or even against their traditional livelihood. All the decisions of adaptation are made on the basis of existing institutional setting and personal expectation of future institutional change. Local people trapped in such condition try to find the gap between rules in law and rules in use. An old saying says that the inferior will have measures what can encounter any policy from the superior (*Shang you zheng ce, xia you dui ce*). Usually, these measures are not permitted by existing policy and difficult and costly to monitor (e.g., illegal grazing). The lack of communication between policy makers and local people make some policies ineffective in practice.

Unpredictable and changing policy greatly suppresses incentives for sustainable grassland governance. Bromley (1992) assets that we are not pushed by the circumstances of the past or the present, but rather we are moved by the desire to alter future states we might occupy. Current policy making process highly decrease farmers' ability of prediction of future. Without the motivation of a foreseeable and plausible outcome in the future, farmers' actions tend to be conservative. The way of policy making, as unstable and unpredictable, is widely condemned by local people. The unstable and yearly-decided grazing policy increases the uncertainty farmers faced during decision making. Any decision making without knowing the coming policy is

² An analysis based on cost-benefit comparison between captive breeding and illegal grazing by Qi(2006) shows that average cost for keeping an adult sheep increased by 100 RMB from grazing to captive breeding.

hardly satisfied and usually risky. Grassland users were not informed in advance about which policy will be adopted in the following year since the grazing policy is re-decided every year by the local government, which causes difficulties to make plans of future grazing pattern, such as leasing in grassland to expand production scale or change to captive breeding. The uncertainty of grazing policies makes any decision about grassland use more risky, therefore grassland users focus more on short-term consideration of profit maximization instead of long-term sustainable use of resources. For example, nobody would like to lease in grassland unless they are officially informed that a grazing open policy would be implemented in the future.

5.3 Institutions

Daily renegotiated working rules are dynamic. The analysis of the relationship between local adaptation and institutional change shows that the two are inter-connected. Institutional change arises when prevailing institutional arrangement is not suited into new circumstances and setting. Following the transaction-interdependence cycle (Hagedorn 2008: 379), institutional and organizational change will continue until the actors involved accept the outcomes of the public and private orders.

As to policy change, actors' decision making process is based on their judgment of the advantages and disadvantages of each feasible decision considering the constraints of policy in use. They are heterogeneous with regard to a range of attributes like family structure, grassland location and size, expectations, income and off-farm income resource and grassland management factors. Bromley (2006:34) states that human being is pragmatic who craft current institutions to regularize prior issues. At the same time, locals modify their behaviors to adapt to rule-in-use. As analyzed above, each actor's action is not isolated, but interdependent with others' decision. Individual reactions not only influence their own livelihood, but other actors and even the wider ecological situation. Their reactions jointly affect the path of institutional change, which in turn influences individual decision making in the future. For example, tense conflicts between locals and government and widely existing illegal grazing forced the government to enforce a pilot project about open grazing. Institutionalized transactions represent transfers of entitlements or constraints on goods or resources which implies that they become regularized by institutions and governance structures (Hagedorn, 2008). As transactions are institutionalized, actors will adjust their choices to the new rules and enforcement mechanism (Hagedorn 2008). In conclusion, the interaction among various adaptations has an important impact on institutional change, as what it does to them.

As to property regimes, it is hard to test the effect of property right regime since it is followed by the implementation of GBP. It is difficult to answer the question of whether this individualized reform would contribute to degradation alleviation as policy maker expected. Common property regime does work under certain circumstance, and existing literatures provide successful or unsuccessful cases for common-pool resource governance by different groups such as government, communal groups (Ostrom, 1990; Banks, 2003). As Bromley (1992) argues that to install or to support a particular property regime on the basis of its ability to resist external pressure is the wrong approach, especially when that pressure arises in a manner that is quite unrelated to the nature of the property regime itself. The special attributes of grassland have been underestimated during institutional changes. Some important questions arise considering the attributes of villages and the diversity of grassland in terms of location and quality: Does it make sense to assign grassland to individual household in villages with limited grassland area, such as 20 mu per person? Could such small grassland be a viable economic unit? Does self-governance

suffer from the change of property regime as Gupta (1964) (cited in Bromley, 1992) said that a change in the institutions of land property led almost immediately to the decay of this self-governance? Could a village be an autonomous decision-making unit to adapt to changing condition on the basis of properties of natural resource? An institutional arrangement should well match with the properties of the biophysical systems it impacts upon.

6 Conclusions and recommendations

Adaptation is a dynamic process, it is influenced by external incentives, institutional constraints and internal physical conditions. Locals' behavior changes to adapt to outside institutional change. Farmers' decision making process is based on the available action space contingent on current institutions and their personal state. Concerning current institutions, there are some problems needs to be aware: 1) The top-down policy making process excludes local people from decision making process and the livelihood of local people has not been taken into consideration, which jointly result in unexpected result(e.g., illegal grazing) and conflict between local people and government. 2) A changing and unpredictable institutional setting makes local people's decision making more difficult, especially regarding long-term decision making related to natural resource use. If, on the contrary, locals' attitude or participation could be considered in policy making process, they could better adapt to policy changes. 3) Externally urgent pressure, such as environmental problems or climate events, forces policy makers to put environmental protection as a priority or even take it as the only indicator, thus, failing to balance economy, society and environment under such circumstances. It is unfair to simply blame local people for degradation and force them to sacrifice for ecological environmental protection.

In an institutional analysis related to natural resource use, it is essential to examine the physical properties of related transactions based on case to case analysis. We should keep in mind that no transaction is isolate, but related to others. For example, the popularization of migration worsen the grazing situation in local level, and then obstructs the enforcement of grazing-open policy and intensify the conflict between government and villagers. Additionally, the characteristics of communities and actors should not be excluded from analysis. Institutions must be based on the characteristics of relevant natural resource, the attributes and objectives of the actors that interact with these natural resources. Our research draws the conclusion that institutions will not function if they do not match the specific setting of designated areas.

Literature cited

- Agrawal, A. and Clark C. Gibson, Environment and Disenchantment: The role of Community in Natural Resource Management, *World Development*, vol27, 1999: 629-649.
- Agrawal, A. and Lemos, M. C., A greener revolution in the making? *Environmental Governance in the 21st Century*. Environment, 2007:36-45.
- Brandt, L. Huang, J. Guo, L. Rozelle, S, Land Rights in Rural China: Facts, Fictions and Issues, *The China Journal*, Vol 47, 2002 :68-97
- Banks, T., and C. Richard, Community-Based Grassland Management in Western China Rationale, Pilot Project Experience, and Policy Implications, *Mountain Research and Development*, Vol 23(2) ,2003: 132-140
- Banks, T, Property rights reform in rangeland China: dilemmas on the road to the household ranch, *World Development*, Vol.31, No.12, 2003:2120-2142
- Bromley, D.W., The Commons, Common Property, and Environmental Policy. *Environmental and Resource Economics*, Vol.2, No.1,1992:1-17

- Bromley, D.W., *Sufficient Reason: Volitional Pragmatism and the Meaning of Economic Institutions*, Princeton, USA. Princeton University Press, 2006.
- Bi, J., Zhu D.L. and Wang X.F., Literature Review on Farmer Behaviors during the Farmland Preservation Process based on Domestic Studies in China, *China Land Science*, Vol24(11), 2010:77-80, *in chinese*
- Commons, J.R., *Legal foundations of capitalism*, Madison: University of Wisconsin Press, 1968
- Dong, S. K., G. H. W., Farmer and Professional Attitudes to the large-scale Ban on Livestock Grazing of Grasslands in China, *Environmental Conservation*, Vol 34(3), 2007: 246-254.
- Hagedorn, K. Particular requirements for institutional analysis in nature-related sectors, *European Review of Agricultural Economics*, Vol 35(3), 2008: 357-384.
- Ho, P. (2000). China's Rangelands under Stress: A Comparative Study of Pasture Commons in the Ningxia Hui Autonomous Region, *Development and Change*, Vol31, 2000: 385-412.
- Jones, S. and Craswell, G., *Environment, Development and Rural Livelihoods*, Bath, Bath Press, 2004
- Kung, J.K and Liu, S., Farmers' Preferences regarding ownership and land tenure in post-Mao China: Unexpected Evidence From Eight Counties, *The China Journal*, Vol 38, 1997:34-63
- Kong, X.B., Liu, L.W., Qin, J., Miao, Y.X., Theory and Methodology for the Construction of Arable Land Quality Evaluation System Based on Household Behaviors, *Progress in Geography*, Vol 26 (4), 2007:75-85, *in chinese*
- Krister, P. Andersson and Ostrom, E., Analyzing decentralized resource regimes from a polycentric perspective, *Policy Science*, Vol Feb, 2008: 71-93.
- Lin, J. Y. Rural Reforms and Agricultural Growth in China, *The American Economic Review*, Vol 82(1), 1992: 34-51.
- Nelson, R., Regulating Grassland Degradation in China: Shallow-Rooted Laws?, *Asian-Pacific Law & Policy Journal*, Vol 7(2), 2006: 385-417.
- Ostrom, E., *Governing the Commons: The Evolution of Institutions for Collective Action*, Cambridge, Cambridge University Press, 1990
- Ostrom, E., How types of Goods and Property Rights Jointly Affect Collective Action, *Journal of Theoretical Politics*, Vol15, 2003:239-263
- Ostrom, E., *Understanding Institutional Diversity*, Princeton, Princeton University Press, 2005
- Prager, K., Schuler, J., Helming, K., Zander, P., Patinger, T and Hagedorn, K., Soil degradation, farming practices, institutions and policy responses: an analytical framework, *Land Degradation and Development*, Vol22, 2011: 32-46.
- Qi, G.B. and Hu, X.P., Research of the Grazing Behavior under the Grazing Ban Policy: The Research Case of Yanchi County in Ningxia, *Journal of China Agricultural University (Social Sciences Edition)*, Vol2, 2006:12-16, *in chinese*
- Schlager, E. and E. Ostrom, Property-Rights Regimes and Natural Resources: A Conceptual Analysis, *Land Economics*, Vol68(3), 1992: 249-262.
- Slangen, L.H.G and Polman, N.B.P., Land Lease Contracts: Properties and the Value of Bundles of Property Rights, *Wageningen Journal of Life Sciences*, Vol55(4), 2008:397-412
- Song, G.W., Remarkings some Researches on Farmers' Action, *Journal of Agrotechnical Economics*, Vol4, 2002: 59-64, *in chinese*
- Tyle, R, S., *Comanagement of Natural resources: Local Learning for Poverty Reduction*. International Development Research Centre., 2006