

# A review of China's rangeland management policies

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YanBo Li, Gongbuzeren, and WenJun Li

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Drylands and pastoralism

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*Keywords:*

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In China three major rangeland management policies have caused large-scale changes for pastoral societies and rangeland ecosystems: the Rangeland Household Contract System (RHCS), ecological construction projects (ECPs), and the Herder Settlement Policy (HSP). This report reviews government and academic perspectives on the impacts of these policies on ecosystems, animal husbandry, livelihoods, and pastoral society, as well as on the causes of policy failures. The perspectives of two schools are diversified. Based on the findings, we argue that the negative outputs of these policies may ultimately stem from one significant root: the vague understanding of pastoralism among policy makers.

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# Background

1

Sustainable rangeland management is a critical concern in China, affecting 41.7% (400 million ha) of China's total land area (MOA, 2010), and approximately 17 million herders and agro-herders (ECOAHYB, 2011). China's rangelands represent a significant and ecological landscape, fostering critical ecological functions that affect both global and regional ecosystem processes. Furthermore the vast verdant pastures provide a home to millions of herders who interact within a complex social and biophysical environment in pursuit of their livelihoods. Although only a limited proportion of national livestock production comes from pastoral areas (beef 9%, mutton 17%, wool 24% cashmere 33%) (ECOAHYB, 2011), animal husbandry is still the primary livelihood source for local herders (MOA, 2011a).

A growing body of academic literature in China understands pastoralism as a coupled social-ecological system where the livestock production system, the socio-cultural organization, cultural norms and knowledge, and the management system of the rangeland resources have co-evolved with ecological variations (Li and Li 2012; Wang, et al. 2009, 2010; Dalintai et al., 2012; Li and Zhang, 2009). Thus pastoralism is characterized by the sustainable use of the rangeland resources, maintaining herders' ability to both benefit and better adapt to dynamic climatic conditions and ecological variability (Li and Huntsinger, 2011; Gu and Li, 2012; Zhang and Li, 2008; Xie and Li, 2008; Wang and Li, 2012).

Nevertheless, rangeland management policies and the dominant academic paradigm perceive mobile pastoralism as a backward, inefficient and irrational economic entity. (ECOAHYB 2002; State Council, 2002; Zhang, 2012). Such perceptions are based on the assumption that pastoralism can lead to rangeland degradation, due to overgrazing caused by unclear property rights, open access to resources and low investment in rangeland conservation. Applying this logic, a series of rangeland management policies including the Grassland Household Contract System (GHCS), Ecological Construction Projects (ECPs) and the Herder Settlement Policy (ESP) have been implemented, bringing great reform to pastoral rangeland management systems. (Li and Zhang, 2009; Wang et al., 2010).

In the mid 1980s, GHCS was initiated in China's main pastoral areas, and now has application in six main pastoral provinces in north-western China.<sup>1</sup> By 2011, the total contracted rangeland areas accounted for 79% of China's usable grassland<sup>2</sup> (MOA, 2011b). The GHCS portrays overgrazing of the 'open-access' rangeland

system as the primary cause of rangeland degradation. The objective of the policy is therefore to clarify property rights to households by controlling livestock numbers according to the perceived grassland carrying capacity. The assumption is that such an approach will restore and prevent further rangeland degradation.

Awareness of the potential impacts of rangeland degradation among policy makers has increased since the late 1990s following a series of disasters including sandstorms and flooding. An often cited statistic is that 90% of China's grassland is degraded to some extent, with degradation increasing at a rate of 200km squared/year (State Council, 2002). Consequently, several ECPs were implemented in the north-western pastoral regions in order to prevent further grassland degradation. Within these regions, grazing was either prohibited for a full year (grazing ban) or for the duration of spring growth periods (grazing rest) in an effort to restore the degraded area. Where grassland degradation is less serious, rotational grazing and stocking rate controls were implemented. By 2011, grazing had been excluded from 40.33 million hectares of grassland in the main pastoral areas, representing about 15% of useable grassland in these areas being taken out of use (MOA, 2011b). Since the grazing bans and grazing rests greatly constrained pastoralism and thus the main livelihood option of local herders, the government provided subsidies aimed at actively encouraging herders to switch to intensive animal husbandry practices based on pen raising and feeding systems, or even to move off their pasture altogether in search of alternative livelihoods. The object of such projects is to reduce the overall grazing pressure and to conserve and even restore grasslands.

Since the 1980s, herder settlement policy has been implemented, focusing on the construction of livestock sheds and houses in the winter pastures (Wang, 2006). In 2008, China had a total of around 3.9 million herder households (ECOAHYB, 2009), as well as 414,000 non-settled nomad households, of which 40.5% were to be settled by the end of 2010. (NDTR et al, 2012). In 2012, under the 12<sup>th</sup> five-year plan (2011–2015), the remaining 59.5% of nomad households are to be settled (NDRC et al, 2012) under the Nomad Settlement Project. The objective of this policy is to settle herders into better conditioned houses with the provision of social services to improve livestock production, herder living conditions (improvement of medical and education services) as well as to reduce the grazing pressure on grassland ecosystems.

<sup>1</sup> These include Inner Mongolia, Xinjiang, Tibetan Autonomous Regions, Qinghai, Sichuan and Gansu.

<sup>2</sup> In China the government mostly uses 'grassland' in policy narratives to refer to both rangeland and artificial grassland, while academic sources mostly use 'rangeland'. Thus in this paper we use grassland when citing government perspectives and use rangeland in other cases.

These policies have brought great reform to pastoral society and have had a strong impact on grassland ecosystems. The impact and effectiveness of these policies are not only of great concern to the herders and governments who are directly involved in policy implementation, but also to the many other people in China who benefit from the ecosystem services provided by the rangelands. Consequently, the sustainability of future pastoral development and grassland ecosystems depend heavily on current management policies, development frameworks and perspectives. Accordingly, this review paper analyzes the development of government and academic literature concerning this goal, with a view to generating recommendations for more effective future policies for rangeland management.

# Methodology

2

This paper reviews both government and academic literature concerning the impact of rangeland management policies and their changes over time. It focuses on three main policies: 1) GHCS; 2) ECPs; and 3) HSP. The narratives and perspectives portrayed by government policy as well as academic literature regarding these three policies will be examined. Government literature in this case was derived from original policy reports, including the National Animal Husbandry Year Book from 2001–2011, National Grassland Monitoring Report from 2006–2011, Ministry of Agriculture (MOA), National Development and Reform Commission (NDRC) reports on rangeland management policies, and finally key relevant official government speeches. The analysis conducted aimed at answering three key questions: 1) how does the government perceive pastoralism and what narratives are used to represent pastoralism 2) what is their understanding on policy impacts; and 3) what were the generated recommendations for further improvement of the policies.

Regarding the academic literature, we conducted a bibliometric analysis focused on research articles authored by academic researchers and published in Chinese academic journals. All related and qualified articles are collected from China Academic Network Publishing Database, the largest journal database in China (<http://epub.cnki.net/kns/default.htm>). A total of 88 papers on GHCS, 136 on ECPs and 72 on HIS were collected.

We conducted three types of analysis for each paper: impact analysis, cause of failure analysis and reliability of conclusion analysis. For impacts analysis, the impacts of the policy were categorized into four aspects: 1) rangeland ecosystem; 2) herder livelihood;<sup>3</sup> 3) animal husbandry; and 4) pastoral society.<sup>4</sup> For

each aspect, we categorized the authors into their respective category, those being positive, negative, and ineffective. Positive impacts referred to those instances where policy achieved its planned improvement in the above four aspects, ineffective impacts means that the policy failed to achieve its expected objectives, while negative impacts mean that the policy was in some way damaging. In cause of failure analysis, the academic narratives about the causes of policy failure were analyzed and placed in two groups: 1) improper policy implementation, where the literature characterized the policy as reasonable though flawed in implementation; and 2) flaws in policy, where failures were attributable to a weakness of the policy itself. As the methods used as part of this research were quite diverse, a reliability of conclusion analysis will be offered on each of the four main aspects analysed.

For each aspect of the above mentioned analysis, we conducted a statistical analysis examining changes within the literature. First, in order to reflect changes within the academic literature, we divided the publications into several time periods according to any change in research focus of the authors' perspectives. Secondly, in the policy impact analysis, we calculated the number of perspectives on each of the four aspects separately during each period, comparing the proportion of positive/negative/ineffective perspectives to identify the dominant viewpoints expressed within the academic literature. For the cause of failure analysis, the perspectives on the causes of policy failure in each paper were generally consistent in the four aspects; accordingly we calculated them based on the number of papers for each group.

<sup>3</sup> Livelihood in this case refers to income sources and level, living conditions and living costs of an individual household.

<sup>4</sup> Pastoral society in this case refers to the social relationship among herders and between herders and local government, cultural norms and customs.

# Results

3

## 3.1 Narratives of Grassland Household Contract System

### 3.1.1 Government perspectives on the Grassland Household Contract System

From the government's perspective, the aim of GHCSs is 'to promote the rational use of grassland resources and grassland construction' (Bai 1984). Furthermore, this system is based on the understanding that overgrazing and overstocking are the cause of grass land degradation; 'large-scale grassland degradation and desertification have resulted from a long term emphasis on increasing animal stock at the expense of grassland protection, and from a failure to consider the ecological aspect of grassland management, protection and utilization. Such behaviour has resulted in unplanned over grazing, reclaiming of grassland, occupation of grassland, and digging and collecting woods in other vegetations without any willingness to invest in grassland protection and improvement. ... therefore the purpose of implementing a 'double contract system'<sup>15</sup> is to coordinate the responsibilities, rights and benefits of livestock production and grassland management, as well as other issues resulting from 'eating from the big pot'<sup>16</sup> (Zhou, 1984). Similarly, then Chairman of the Inner Mongolia Autonomous Region, declared in 1985 that the 'Double Contract System is the engine of pastoralism development', claiming 'only when the grasslands are contracted to individual households will herders invest their money and time in grassland improvement. This is the only path to intensive animal husbandry.' (Buhe, 1985).

Government holds rather a positive view on the effects of the GHCS. Former Director-General of Department of Animal Production Jia Youling stated in a 2001 report that 'The implementation of the GHCS is essential to grassland protection and improvement. After grasslands are contracted to households, huge changes are observed in herders' perspectives, with increasing stewardship and responsibilities over grassland protection'. Additionally, the herders' way of life and production has reformed with the implementation of the GHCS, with an increase in herder settlements that has altered transhumance mobility in tracking availability of water and forage, promoting economic and social development within the pastoral regions. Results indicate that the GHCS constitutes an effective approach to combating grassland degradation, maintaining ecological balance and achieving sustainable pastoral development. In addition, granting long term and stable use rights as well as management

rights to herders through the GHCS greatly promotes rational use of grassland resources, contributing to economic development in pastoral regions and facilitating social harmony. (Jia, 2001). Announcements on further promotion of GHCS by MOA<sup>17</sup> in 2007 (MOA, 2007b) and a report by Zhang Xiwu (2008), former director of the Grassland Monitoring and Supervision Centre of MOA, also expressed similar narratives.

According to government literature, associated problems and issues arising from the GHCS are caused by flaws in its implementation. For instance, Zhang Xiwu (2008) stated in his report: 'In areas where this policy had been implemented there still existed many problems, such as unclear property rights and the lack of regulation in contract procedures and rights transference systems, which threatens the legal rights of the herders and is harmful to the sustainable use of grassland resources and the development of local economy and society. Such problems include: 1) incomplete implementation of the GHCS; 2) poor management of the contract procedures; and 3) poor development of basic infrastructure for grassland improvement.'

Since 2011, government officials have begun to realize that several observed failures as well as negative impacts of the GHCS are associated with improper design of the policy itself. For instance, Ma Youxiang, present director of Grassland Monitoring and Supervision Centre for MOA stated, 'due to insufficient understanding of the unique characteristics of the grassland, GHCSs are confined to limitations that not only fail to solve the issues threatening sustainable grassland use, but also result in further overgrazing' (Ma, 2011). Notwithstanding, the government continues to recommend 'further implementation of the GHCS and a clarification of its use rights, in order to fulfil the contract rights and to protect herders right to benefit' (Ma, 2011). A degree of flexibility in its implementation procedures was suggested. It is stated that the implementation of GHCS should occur 'in accordance with the local situation [...] grasslands should be contracted to households wherever possible'. Although an emphasis is maintained on the need to implement GHCSs in all pure pastoral regions, he also stated 'it's more appropriate for grassland use in agro pastoral regions to contract grassland to several households together (Ma, 2011).' Similarly, under the newly launched system of Subsidy and Reward for Grassland Conservation (SSRGC), the largest payment for ecosystem services program aimed at China's grasslands instigated to date, states that 'the grazing ban system does not necessarily entail clarification of physical boundaries of grasslands among individual

<sup>15</sup> Double contract system refers to contract or sale livestock to households and GHCS

<sup>16</sup> A rhetorical expression for the 'tragedy of the commons' used by the Chinese

households' (Ma 2011). Additionally, the government 'recommends reinforcing support for the development of herders' cooperatives to facilitate a larger organizational scale of grassland management.' (Ma, 2011)

These diverse and changing government perspectives demonstrate some of the essential findings about the impact of GHCSs. Firstly, government literature and narratives highly support the effectiveness of GHCS in generating positive impacts. Secondly, as the policy has developed over time, the narratives portray negative impacts of the policy, including problems such as ill defined rangeland property rights, rangeland fragmentation and unsustainable pastoral development and issues of policy implementation, including lack of funding support and weak administration. Finally, in response to these failures, the government narratives recommend greater flexibility in the implementation of the GHCS based on local contexts. In addition, government narratives support re-allocation of rangeland resources not only through rangeland transfer systems, but also through cooperative and collective tenure management.

### 3.1.2 Academic Perspectives

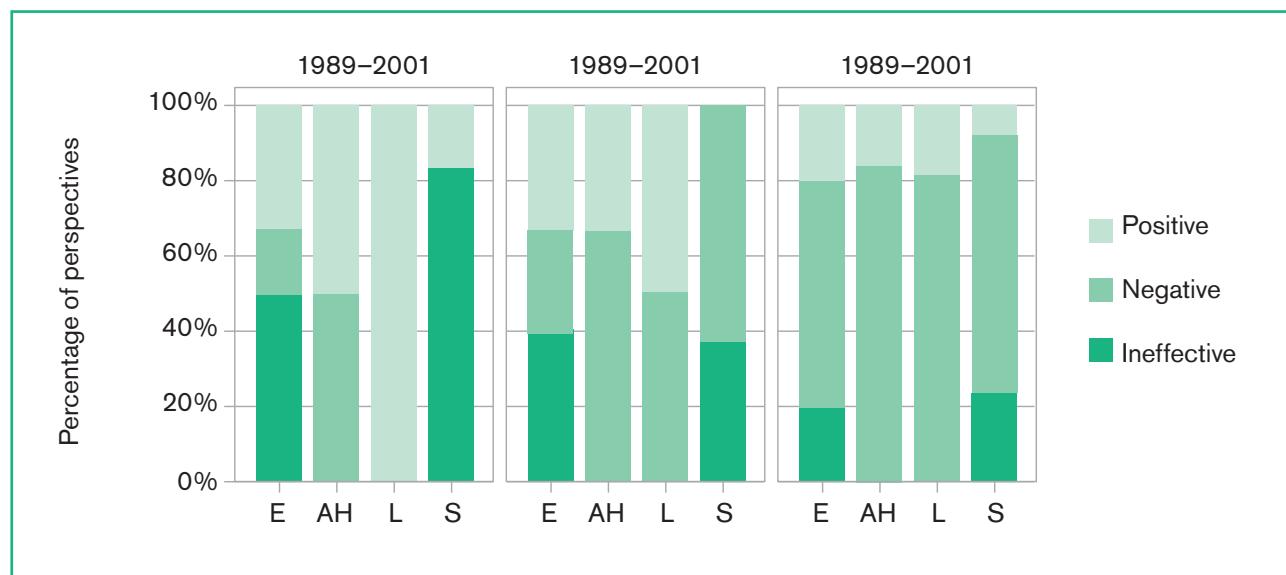
Between 1989 when the first paper concerning the GHCS was published and 2012, a total of 88 academic papers have been published on the GHCS and re-aggregation of rangeland resources, with 71 of them focusing on the grassland contract system. In this time, several changes can be observed in their research focus. Before 2001, all but one of the academic papers focused on the impact of the GHCS on grassland ecosystems, animal husbandry and herder livelihoods. Since 2002, some scholars have begun to explore the essential role of collective ownership over rangelands in protecting ecosystems and herders' rights in grassland management and utilization. Since 2008, there has been an observable increase in studies focusing on the rangeland transfer system and re-aggregation of rangeland resources. Therefore, according to the changes witnessed in perspective and focus of the academic literature, the analysis of GHCS impact was split into three time periods: 1989–2001, 2002–2007 and 2008–2012. The number of papers published during the periods examined has increased significantly. In addition to papers that explicitly studied rangeland re-aggregation and development of GHCS, a total of 68 papers focused on the impacts of the GHCS on socio-economic and ecological conditions (see details in Annex A1). Among these, a majority focused on ecological impact (96% of total papers), while a high percentage also studied the impact GHCS had on animal husbandry (54% of total papers) and pastoral society (41% of total papers).

Compared to the government narratives, academic perspectives are less optimistic about the ecological and socio economic impact of the GHCS. Among academic literature over the whole period (1989–2012), those presenting a positive impact of the policy on ecosystem, animal husbandry, herder income and pastoral society stood at 28%, 28%, 33% and 7% respectively, with those presenting a negative impact standing at 40%, 72%, 65% and 52%.

There are some key positive impacts of the GHCS that are commonly highlighted. Contracting rangeland to individual households is understood to effectively bind the responsibility, rights and benefits of rangeland management to individual households. The assumption underlying this approach is that it effectively solved the 'tragedy of the commons', providing herders with more incentives to invest in rangeland protection and improvements. The reasoning is that this would facilitate rangeland conservation and restoration. At the same time, contracting rangelands to individual households was understood to induce even more distribution of livestock on pastures, which is seen as beneficial to controlling livestock numbers based on the carrying capacity of the rangeland. Furthermore, the GHCS clarified property rights of the rangelands, which could act to prevent invasions by outsiders as well as encroachment by other land-use practises such as agriculture. Regarding animal husbandry, since the costs and benefits of rangeland management were bonded under GHCS, herders have increased their investment toward achieving economic efficiency, initiating a shift toward intensive systems, increased off-take and commoditization of livestock, improved ability to cope with natural disasters and promoted the specialization of the pastoralism industry. Furthermore, rangeland management at the household level generates more flexibility in production approaches. With regard to livelihoods, implementation of the GHCS is understood to have improved herders' well being through access to social services and modern amenities in herder settlements, as well as through increased income linked to improved production efficiency. Regarding pastoral society, the implementation of GHCSs clarified the physical boundaries for grassland access, thus reducing internal grazing conflicts. The gap between rich and poor herders was reduced due to a more equitable use of rangeland resources.

Figure 1 however indicates that the portrayal of these positive impacts is decreasing over time, with the percentage of positive perceptions reducing across the three periods from 33% on ecological impacts, 50% on production impacts, 100% on livelihood aspects and 17% on social aspects during the first period, to 20%, 16% 18% and 8% respectively in the third period.

Figure 1 Comparing percentage of academic perspectives of the GHCS impacts on ecosystem (E), animal husbandry (AH), livelihood (L) and society (S) within each of the three periods



The academic literature that demonstrates the negative impacts of the GHCS developed the following narratives. It was stated that GHCS did not accommodate the dynamic and heterogeneous characteristics of rangeland ecosystems. Specifically, the research posits that the contract system which applies fencing strategies induces fragmentation of rangeland ecosystems, thus interfering with wildlife interaction. It found that by contracting rangelands to individual households, the level of grazing concentration varied wildly among different grazing parcels, resulting in unbalanced grazing pressures on a spatial scale. Specifically, this research found that livestock mobility decreased after implementation of GHCS and that thus grouping of livestock in certain centralized parcels resulted in long term trampling and over grazing, ultimately leading to rangeland degradation. Research has also found that the population levels have decreased for large livestock such as horses and camels whose grazing movements require a larger spatial landscape. Concomitantly, sheep and goat populations have increased since herders prefer them for their more rapid reproductive cycle.<sup>7</sup> As a result, the research argues, livestock diversity has reduced as stock composition has become more uniform. In addition, the research argues that individual household contracts provide a rapid increase in pastoral production cost for fence and well construction, and suggests that the household is not a suitable sized social unit for the effective management of rangeland, nor can it adequately adapt to the demands of the market economy and large-scale animal husbandry. Therefore, given these associated issues, researchers

argue that the costs of livestock production and herder livelihood have increased while their ability to cope with natural disasters has been weakened. Meanwhile, the literature suggests GHCS has failed to protect herders' rights over their contracted grassland in the face of government induced land expropriations such as the grazing ban, grazing rest and the exploitation of mineral resources. Furthermore, the literature posits that regarding pastoral society, the GHCS has effectively weakened the community collective organization, increased conflicts among households and hampered their reciprocal interactions. The long term contract system at household unit is unable to adapt to the population changes in households. The GHCS and rangelands transfer system promotes the conversion of herders traditional cultural norms and perspectives in worshiping nature into the needs of commoditization of the rangelands, which further caused threats to the rangeland ecosystem. As indicated in Figure 1, the percentage of academic literature presenting such negative impacts has increased over the three periods, with their percentages rising from 17%, 50%, 0% and 0% in the first period, to 27%, 50%, 63% and 0% in the second period, and finally to 60%, 84%, 83% and 69% in the third period.

It is important to note that the majority of academic study carried out on the impact of GHCS is based on second hand data and deductive reasoning, with only limited studies applying case study analysis using first hand data. According to the reliability of conclusion analysis (see Annex A2 for details) on the literature generating negative impacts of the GHCS, over 50% of academic papers applying first hand data with case

<sup>7</sup> Such conclusion was cited from the reviewed studies which were conducted mostly in Inner Mongolia. Such situation may not apply to other pastoral regions in China. For example, in Tibetan regions, many herders chose yaks over sheep as yaks generate subsistence needs with less labour investment.

study analysis using specific percentages stands at 45% on ecosystem, 57% on animal husbandry, 64% on livelihood and 64% on pastoral society. On the other hand, among the academic literature presented on positive impacts, the percentage of papers that are based on case study or on site surveys only stands at 21%, 0%, 20% and 50% in the four aspects respectively, while 38%, 27%, 9% and 8% of the literature in all four aspects made conclusions without providing any evidence or reasoning, or with serious flaws in their deduction. It is clear that the majority of the papers presenting negative impacts of the policy are based on case studies and first hand data, while those presenting positive impacts are more often based on deductive reasoning or inference. Thus the actual positive impacts of the GHCS might be overstated by the existing academic literature.

Scholars' perspectives on the causes of policy failures have shifted greatly over the past two decades (see Figure 2). During 1989 to 2001, most of the papers (885) attributed the policy failure to improper implementation, while understanding the policy itself to be effective. However, over time such perspectives have decreased, and increasingly papers argue that the policy itself is unreasonable considering the social and ecological characteristics of grassland and pastoral society. Now, percentages on the latter perspective (515) are slightly higher than for the former one (49%).

Diverse academic perspectives demonstrate some key findings on the impacts of the GHCS and the causes of policy failures. Firstly, the percentage of literature identifying positive impacts was dominant during the first period, though the percentage of literature demonstrating negative impacts on ecosystem, animal husbandry, livelihood, and society has increased in each period when compared to the positive and ineffective impacts, and become dominant in the last period. This has been accompanied by a decrease in a percentage within the literature depicting positive impacts during the last two periods. Additionally, the papers presenting positive impacts mostly applied second-hand data and deductive analysis, while over 50% of the papers generating negative impacts adopted primary data and utilised case studies, somewhat bolstering their validity. Secondly, although most papers attribute policy failures to improper implementation during the first two periods, the percentage of such literature has gradually decreased, and increasingly the literature identifies problems in the policy itself as being the root cause of failure. Finally, an emerging consensus among the academic literature suggests that the GHCS causes rangeland fragmentation, thus advocating the re-aggregation of rangeland resources in future GHCSs development.

Figure 2 Percentage of academic perspectives on the causes of the negative impacts of GHCS.

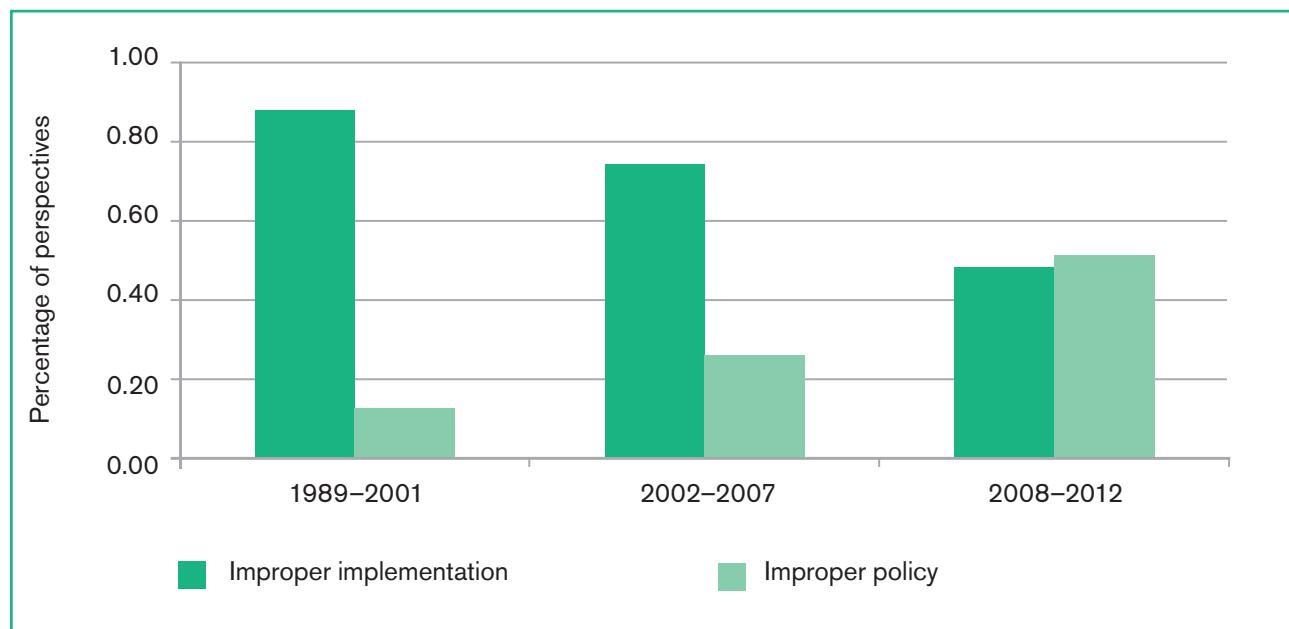


Table 1 National grassland monitoring reports of the 'retiring livestock to restore grassland' program impacts on vegetation (2007–2011)

COMPARE WITH NON-PROJECT AREA (INCREASED %)			COMPARE WITH PRE-PROJECT CONDITION (INCREASED %)		
Year	Coverage	Height	Above-ground biomass	Coverage	Above-ground biomass
2007	15%	47%	58%	9%	26%
2008	14%	60%	68%	—	—
2009	12%	36%	75%	6%	18%
2010	12%	38%	44%	3%	8%
2011	10%	43%	50%	4%	11%

Data sources: National Annual Grassland Monitoring Report (MOA, 2008,2009,2010,2011a, 2012).

Table 2 Narratives in Government reports on the evaluation of overall condition of grassland in China

YEAR	NARRATIVES OF OVERALL EVALUATION
2007	Ecological conditions in project areas have been improved, though the overall rangelands conditions are tending worse. Degradation is exacerbated in certain areas.
2008	Obvious restoration are observed in project areas, though overgrazing is still serious, and damage actions, such as overexploitation, reclaim and illegal expropriation of the rangelands, continued. The task of grassland restoration remains a big challenge.
2009	The trend of exacerbated degradation of grassland has been controlled to some extent. Obvious improvements are observed in some areas.
2010	The trend of exacerbated degradation of grassland has been effectively controlled, though the condition of 'local improvements while overall conditions are exacerbated' maintained.
2011	Overgrazing is still serious. The overall grassland conditions are still in tense situation. Grassland restoration works are in crucial stage.

Data source: National Annual Grassland Monitoring Report (MOA, MOA, 2008, 2009, 2010, 2011a, 2012)

## 3.2 Narratives on Ecological Construction

### 3.2.1 Government Perspectives

According to the 'National Grassland Monitoring Report' developed by MOA in recent years (see Table 1), the ECPs have effectively restored degraded grassland. Taking the examples of 'retiring livestock to restore grassland' program, the largest ECP in China's grasslands, the policy was found to have achieve an improvement in grassland coverage, height and above ground biomass production in the project areas when compared to non project areas as well as pre project grassland conditions. At the same time, the grassland monitoring reports published by MOA in these years

stated: 'the ECPs provide an effective model and leading role for adjacent regions to improve their socio-economic condition and grassland conservation. The grassland conditions within the project areas as well as in the surrounding regions have obviously improved. Increases in both income generation and poverty alleviation have been witnessed by the herders. ECPs effectively facilitate the shift into intensive animal husbandry in pastoral areas, and strongly promote sustainable development of ecosystem, society, and economy in local regions.' (MOA, 2008,2009,2010,2011a,2012)

However, as to overall grassland conservation and condition (see Table 2), even though years of ecological constructions have been implemented, the report found that 'the overall overgrazing issues are still active, and rangeland degradation, desertification and salinization

are continuously expanding. Rangeland degradation conditions are severe. Grassland restoration work is in a crucial stage.' (MOA, 2012).

According to government perspectives, the existing issues and negative impacts of ECPs on herder livelihood have resulted due to insufficient government subsidies. Using the example of the 'retiring livestock to restore grassland' program, as stated by the relevant responsible officials from the NDRC, 'the problems and issues of the program include: 1) The focus current programs place on restoration of grassland condition without consideration for subsidy measures pertaining to livestock production and livelihood, such as artificial grass reseeding and construction of livestock sheds. Additionally, herders lack of forage supplies and conditions for intensive animal husbandry after the implementation of the grazing ban and grazing rest their long term livelihoods are in trouble; and 2) difficulties collecting supporting funds. The majority of the program areas are located in remote and poor areas where the minority ethnic groups are concentrated. Local governments have limited financial capacity to supply the supporting funds for initiation of the ECPs (Zhu, 2011). Similarly, according to the No. 1 Document of Central government published in 2011 (State Council, 2011), and the inner Mongolia No.1 Document of 2010 (IMARG, 2010), due to the implementation of the grazing ban, grazing rest and rotational grazing systems, herders have had to sacrifice high costs for grassland protection. Due to an unfair initiation of supporting policies for pastoral development when compared to agricultural areas, incomes from intensive animal husbandry in pastoral regions are lower than in agricultural areas. In addition, the pastoral regions are located in the remote and marginalized areas where material costs for livelihood and production are higher than in agricultural regions, meaning the net income for herders is generally lower than for their counterparts in agricultural regions. Owing to this, in 2010 the state council increased subsidy for ECPs with the initiation of a system of subsidy and reward for grassland ecosystem conservation. This policy maintained the ecological construction project while improving herder livelihood through: 1) providing 6 yuan per mu for the total 'grazing ban' area; 2) providing 1.5 yuan per mu for 'forage-livestock balance' area; 3) increasing the subsidy for herders initiating improvements in the livestock production system such as the breeding system, intensive livestock production system, artificial grass re-seeding for feeding system; and 4) providing vocational training and improvements in their educational development to diversify herder livelihood.

Several key findings can be summarized from the government literature on ECP impact and further development. Firstly, grassland degradation within the project areas has been to an extent reversed. Secondly, though parts of the grasslands have witnessed an

improvement, China's overall grassland condition has continuously degraded. Finally, emerging narratives indicate that ECPs prioritize grassland ecological protection while failing to offset the shortage in forage supplies and therefore can act to jeopardize herder livelihood as well as pastoral production.

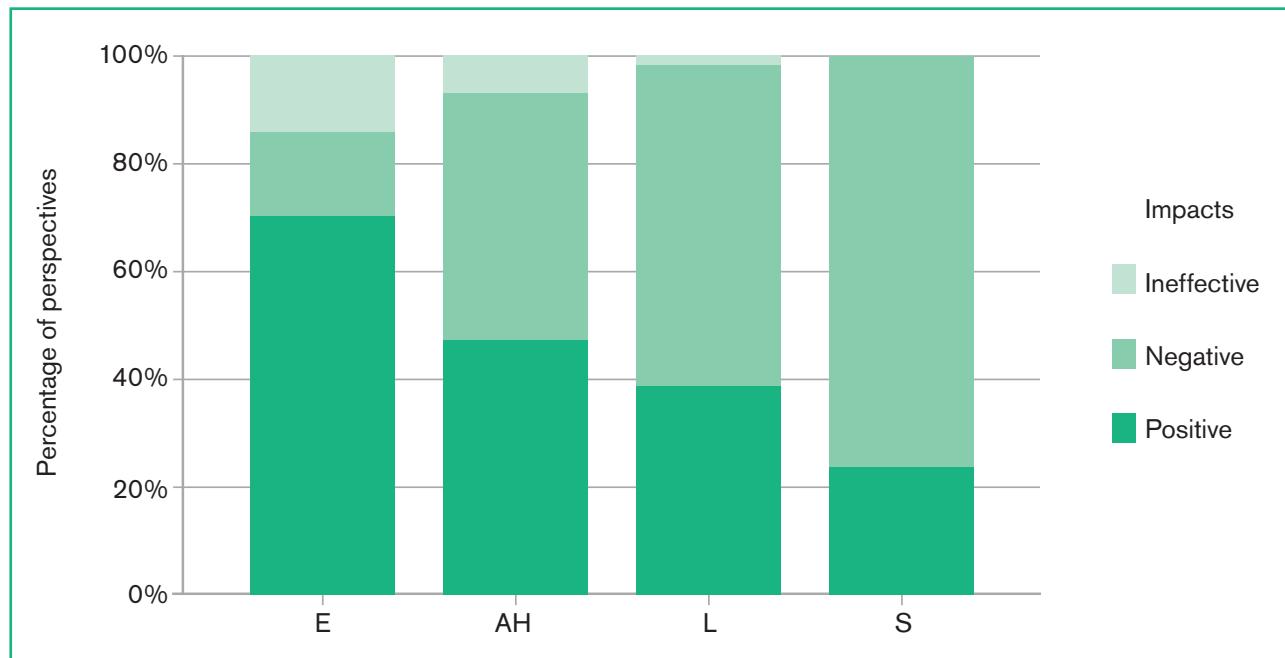
### 3.2.2 Academic Perspectives

Academic studies of ECPs were initiated in 2002, as of 2012 136 papers focusing on ECPs have emerged, exploring the implications of grazing bans, grazing rests, and 'retiring livestock to restore grassland' programs. Among them, 103 papers discussed policy impact, while the rest centralized their focus on policy design and implementation processes, without necessarily mentioning their impact. Among the 103 papers (see Annex B1 for details), ecological impacts represent the main interest (present in 87 papers, 84% of total papers), followed by impacts on herder livelihood (56 papers, standing for 54% of total papers), while comparatively little is focused on social impacts (18 papers, 17% of total).

Among academic studies on the impacts of ECPs, the majority of the literature identified positive impacts on the ecosystem, while literature presenting negative impacts was dominant on aspects of herder livelihood and pastoral society (See Figure 3). With regard to ecological impacts, 72% of the academic literature presented positive impacts by stating that the ECPs initiated effective protection and restoration of grassland degradation, as reflected by the increase in vegetation height, coverage and biomass production, increase in the percentage of perennial vegetation, decrease in frequency of dust storms, and increased biodiversity as well as water storage functions. Conversely, 13% of the literature states that the ECPs generate negative impacts on the ecosystem. They contended that grazing pressures were shifted to non project areas during the implementation of ECPs, increasing degradation in these regions. Additionally, they stated that planting artificial grassland would ruin original vegetation and exhaust ground water as well as soil fertilization, and that long term exclusion of grazing would be harmful to vegetation regeneration. Finally, around 14% of the academic literature demonstrates that as illegal grazing activities are common, any grazing ban or grazing rests would not be adhered to, thus EPCs would not improve the grassland conditions.

Regarding animal Husbandry, 47% of the literature presents a positive impact, stating that ECPs promoted a shift from extensive pastoralism into intensive animal husbandry with an improvement in basic infrastructure and increased livestock sales as well as breeding systems. On the other hand, the improvement in basic infrastructure and development of intensive livestock feeding systems inevitably increased production

Figure 3 Comparing percentages of perspectives of ECP impact on each topic



costs (including increased costs of foraging, labour investment and the cost of basic infrastructure itself), and thus reduced the net benefit from pastoralism. This is the reason 46% of the literature states that ECPs generated a negative impact on animal husbandry. In addition, 7% of the literature demonstrated that due to the poor conditions of current pastoral production, herders encountered a shift into intensive animal husbandry, and thus the policy was not able to achieve its expect impact.

38% of the academic literature suggests that ECPs generated positive impacts on herder livelihood. These sources contended that after the initiation of ECPs, government subsidy increased herders' income. Along with the shift into intensive animal husbandry and increase in non-pastoral employment, especially owing to emigration from pastoral areas into towns under ECPs, herders' income has increased in the long term. In addition, an improvement in natural environment under ECPs also helped to improve local people's living environment.

Conversely, 60% of the academic literature demonstrates a decrease in herders' livelihood. They stated that 1) increased costs in livestock production and labour investment induced a decrease in the net incomes of herders, at least within the short term; and 2) due to ill developed industry within the areas, their resulted a lack alternative employment as those herders resettled under ECPs were unable to find a sustainable livelihood. Their reliance on a government subsidy while experienced an increased cost of living compared to their previously pastoral area, poverty issues were expanding among the resettled herders.

In terms of social impacts of ECPs, only 24% of the academic papers help positive perspectives. The literature demonstrates that an improvement in income generation and a parallel development of intensive animal husbandry facilitates harmonious pastoral society and development, reforming the backward traditional concepts of the herders. In addition, the implementation of ECPs facilitated the rangeland transfer system, thus the poor could generate income through the lease of their pastures. ECPs promoted resettlement of herders through urbanization, thus improving access to educational and medical services. Notwithstanding, 76% of the literature argues that ECPs generated obvious negative impacts on pastoral society. The most direct negative impacts witnessed were increased conflicts between local government institutions and herders which generated critical challenges for local governance, as herders under ECPs generally resorted to illegal grazing in order to reduce production costs. Furthermore illegal grazing often led to conflicts over grazing land among herders. In addition, the grazing ban threatened the livelihoods of marginalized people (e.g. the poor, the undereducated, elders, women). Due to an obvious reduction in pastoralist income after initiation of the grazing ban, main labour forces of the families went in search of alternate employment, leaving the old and children uncared for, acting to weaken family ties. The shift toward intensive animal husbandry caused a change in cultural customs and identities, as traditional institutions were subject to reformation. Furthermore, those herders who resettled under ECPs who were unable to find proper jobs often became involved in criminal and gambling activities. These pressures acted to weaken traditional pastoral culture.

According to the reliability of analysis (see Annex B2 for details), except for the ecological impact, the positive impacts of ECPs on the remaining three aspects may be overrated. Among the total papers asserting positive impacts of ECPs on animal husbandry, herder livelihood and pastoral society, the percentage of papers based on case studies or surveys stood at only 37%, 44% and 0%. Conversely, over half of the papers presenting the negative impacts of these three aspects were based on case studies and surveys, the percentages standing at 81%, 70% and 54% respectively. Considering the validity of evidence and reasoning, academic studies might have overrated the positive impacts of the ECPs on animal husbandry, herder livelihood and particularly pastoral society.

Regarding ecological impacts, 62% of the papers presenting positive impacts were based on case studies and/or direct ecological monitoring, while those presenting negative impacts were mainly based on deduction and lacked monitoring evidence. However it is important to note here that among the 71 papers presenting positive impacts on the ecosystem, the majority of studies applied indicators of short-term changes on grassland vegetation. The indicators used to support ecological improvement were mainly aboveground biomass (in 42 papers), vegetation coverage (in 40 papers), vegetation height (in 31 papers) and the proportion of perennial grasses in vegetation communities (in 22 papers). These indicators are sensitive to both precipitation changes and grazing, and are thus unreliable in reflecting the long term ecological impacts of grazing bans and grazing rests. Additionally, as commonly grazing within the program areas was transferred to non program areas, the vegetation conditions in the project areas do not necessarily reflect the overall grassland conditions.

The majority of papers focusing on ECPs largely argued that the flaws, failures and emerging issues are associated with the improper implementation of ECPs, with very few of them expressing that these failures result from an improper design of the policy itself. As such, we did not conduct a cause of failure analysis here. In general, the bibliometric analysis of academic literature on ECP impact showed that ECPs had achieved an effective impact on grassland restoration, while generating obvious negative impacts on herder livelihood and pastoral society. The majority of academic literature asserted that ECPs generated positive ecological impacts in project areas, especially improvements in vegetation, though flaws in the methods, i.e. only focusing on changes in short term vegetation indicators in project areas while lacking the study of non project areas, partly weakened the reliability of such conclusions. Regarding socio economic impacts, the academic literature demonstrates negative impacts on herder livelihood had overridden those demonstrated positive impacts, and

most literature asserts that serious negative impacts on pastoral society resulted from ECPs. According to the research focuses and conclusions of these academic studies, it can be concluded that ECPs prioritized ecological protection, and failed to pay enough attention to herder livelihood, society and culture. Consequently, even though the policy improved grassland condition, it worsened herders' living conditions, increased social conflicts in pastoral areas and threatened cultural diversity.

### 3.3 Herder Settlement policy

#### 3.3.1 Government Perspectives

Government literature highly supports the view that the HSP generated positive impacts on herder livelihood and local society while protecting grassland ecosystems. According to the 'National plan for grassland construction, protection and use' (MOA, 2007c), 'the HSP has improved the conditions of basic infrastructure for settled herders including the improvement of housing conditions, livestock sheds, forage plantations, forage shelters and drinking water condition for both the livestock and the people. The HSP has further improved herder living conditions, shifted pastoralism into an intensive system, reinforced abilities to cope with natural disasters, improved overall livelihood and helped herders achieve a harmonious life'. Furthermore, according to the '12<sup>th</sup> five year plan for the implementation of nomad settlement project' (NDRC et al. 2012), HSP provided supportive facilities such as drinking water, electricity and transportation systems, brick houses, livestock sheds, and fodder cultivation equipment that stabilized livestock production and strengthened herders' ability to cope with natural disasters.

At the same time government literature increasingly recognized problems and issues associated with HSP at a regional level. For instance, according to the 'survey report on the herder settlement situation in Xinjiang' (XUARDRC, 2011), government literature recognizes various issues that can arise from HSP, such as: 1) due to lack of funding, the subsidy for housing construction is low, basic infrastructure is in poor condition and cannot support livestock production, thus most herders participating in HSP need to maintain the mobility of their livestock to bolster income, in this fashion over 60% of herders still maintain semi-transhumance and four seasonal livestock mobility in Xinjiang; 2) most construction costs for herder settlement are born by the herders, and thus, as herders sell their livestock to fund housing construction, they return to poverty; and 3) many settlers, unable or unwilling to cope with urban life, have returned to pastoral areas leading to increased

grazing pressure. The report went on to summarize the causes of this failure, including 1) limited government subsidy for housing that leads to construction of poor quality houses; 2) most of the settlement costs such as house construction are to be paid by the herders, and thus many herders have to sell their livestock to cover the cost. Learning from this, some changes in government perspective have been explored regarding further development of HSP. According to the recently launched '12<sup>th</sup> five year plan for the implementation of a nomad settle project' (NDRC et al, 2012), three different herder settlement models based on the distribution of pastoral regions, their biophysical characteristics and customs of livelihood have been advocated; 1) building new small scale settlements at suitable sites in current pastoral areas; 2) moving to a near township while keeping livestock 3) resettling herders in new locations either near township or country. These recommendations are to be bolstered, the report claims, by increased government subsidy to support the construction of infrastructure, artificial grass reseeding to support livestock production, as well as an increase in social services such as education and healthcare.

The government narratives presented several findings regarding their understanding of HSP impacts. Firstly, literature regarding HSPs described more positive impacts on the improvement of herder livelihood including income generation, living conditions, and social services. Secondly, the government literature acknowledges certain negative impacts of HSP and explains such failures as manifestations of limited funding support and improper policy implementation. Thirdly, a more flexible adaption to local situations and contexts is to be considered when implementing HCP in the pastoral regions.

### 3.3.2 Academic Perspectives

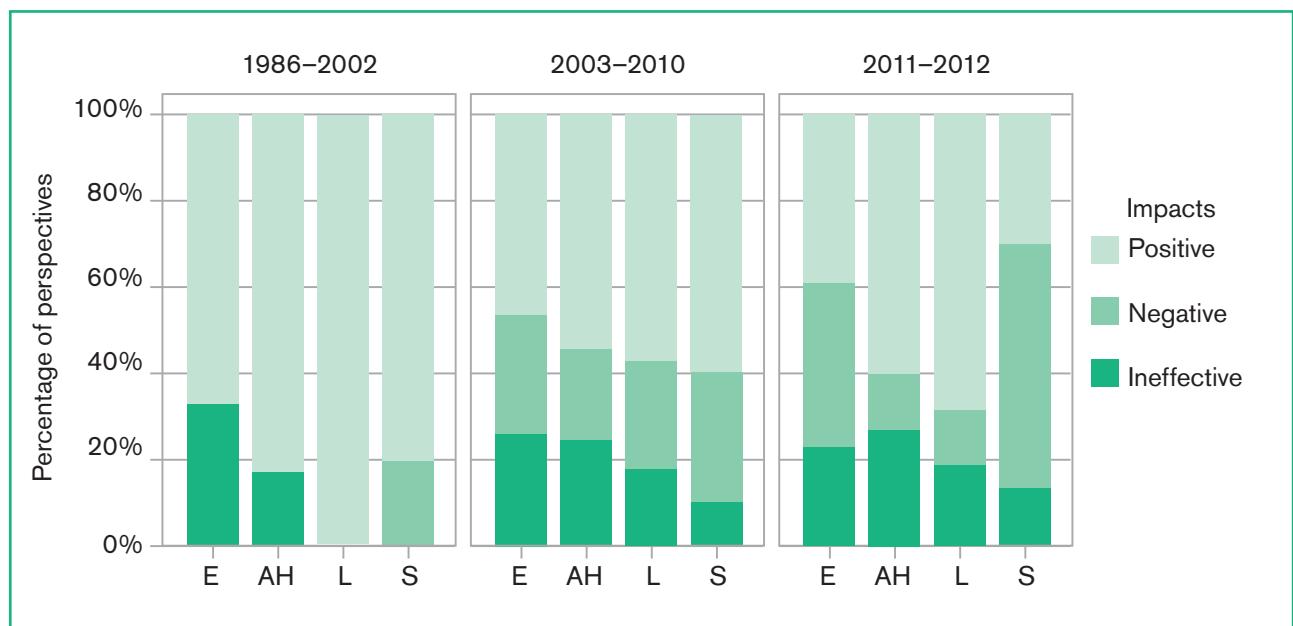
Between 1986 and 2012, a total of 72 research papers regarding herder settlement policy in China have been published. During these 26 years, several major changes have been witnessed in the focus of these academic studies. Mainly the literature focused on the impact of HSPs on livelihood improvement, particularly in terms of poverty alleviation of those living in harsh environments. Since 2002 there has been a shift as studies have began to apply anthropological perspectives to focus on the dilemmas of cultural disappearances with the advent of settlement, and the need for these settlements in order to improve livelihoods in the first place. Some studies even question the necessity of settling herders as a precursor to receiving social services, while others observed a rise in negative social implications such as crime in the settlement area. After the initiation of SRGEC in 2010, academic studies began to focus on the role of HSP in rangeland ecosystem protection through livelihood

diversification and a shift toward intensive animal husbandry to reduce grazing pressure. Based on these changed academic perspectives, the impacts of HPS can be categorized into three periods: 1986–2002, 2003–2010, and 2011–2012. Among these papers, those that explored the impact of HPS on ecosystems, animal husbandry, herder livelihoods and pastoral society stood at 58%, 68%, 71% and 31% of total papers respectively. (see Annex C1).

According to Figure 4, during the first period a high percentage of academic literature presented a positive impact on ecosystems (67%), animal husbandry (83%), livelihood (100%) and society (80%), while only 20% of the literature demonstrated negative impacts on society, and 33% and 17% demonstrated ineffective impacts on ecosystems and animal husbandry. From 2003 to 2010 however, even though the literature arguing positive impacts still stood for the majority percentage, the proportion of academic literature demonstrating negative impacts had increased to 27% (ecosystem), 21% (animal husbandry), 25% (livelihood) and 30% (pastoral society) of total papers published. In the last period, major changes were observed regarding the percentage of academic papers focusing on social impacts. During this period, 57% of academic literature supported the idea that HSP generates negative impacts on pastoral society, while 14% demonstrated ineffective impacts and only 29% described positive impacts. Concurrently, literature presenting negative impacts on ecosystems have increased from 0% in the first period to 27% in the second, finally rising to 38% in the final period. During the final period perspectives are relatively evenly split between perceived impacts, standing at 38% (positive impacts), 38 % (negative impacts) and 23% (ineffective impacts). Percentages depicting negative impacts on animal husbandry and herder livelihood have reduced in the third period compared to the second.

Over these periods, the academic narratives characterizing the positive impacts of HSP can be categorized into three main groups. Firstly, the implementation of HSP through the building of housing, livestock sheds, the provision of forage, social services and government subsidies supporting livestock production and herders' income generation. Secondly the narratives stated that the nomadic existence enjoyed by herders, characterized by living in tents and regularly moving around the pastoral regions, was harsh and unsanitary, and therefore the implementation of HSP has facilitated herders' access to housing and bettered living conditions. Thirdly, HSP supported herders shifting into intensive animal husbandry and diversification of livelihood in order to reduce the pressure of population group and initiate rangeland protection.

Figure 4 comparing percentages of HPS literature impacts on ecosystem (E), animal husbandry (AH), livelihood (L) and Society (S) within each of the three periods



Academic literature presenting negative impacts of HSP can be categorized into the following groups; 1) HSP reduced livestock mobility by inducing concentrated grazing near settlements, thus leading to rangeland degradation in these areas; 2) livestock production after herders settled to a large extent being dependent on external forage supplies and intensive breeding systems, the cost of livestock production correspondingly increased; 3) income disparity sharpened as many families became reliant on government subsidies for livelihood. This led in turn to an increase in a variety of social issues such as crime; 4) HSP exacerbated serious threats to pastoral culture. After herders settled, previous social networking among the herders was weakened, leading to increased internal conflicts as reciprocal interaction among herders began to disappear. Many of the younger generations lost interest and knowledge about pastoralism and rangeland management systems.

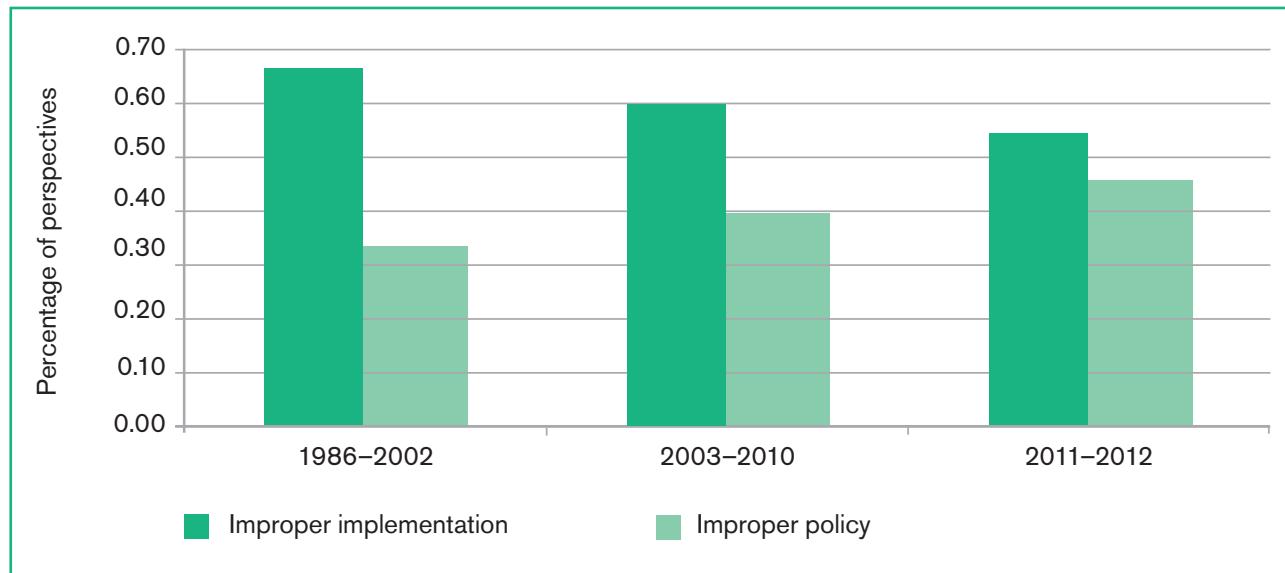
Considering the reliability of the evidence, biased methodology may have contributed to an overestimation of positive impacts (Annex C2). Only 26%, 30%, 23% and 23% of papers that presented positive impacts of HSP on ecosystems, animal husbandry, livelihood and society were based on primary evidence. A majority were based on deductive reasoning and second hand data (59%, 54%, 63% and 62%) and some even employed unclear sources of data and evidence. Conversely, papers presenting negative HSP impacts on ecosystem, animal husbandry, livelihood and society demonstrated the opposite trend, with 67%, 67%, 70% and 71% utilising primary evidence. This suggests that

the papers presenting negative impacts of the policy come to more reliable conclusions compared with those presenting positive impacts.

As to the causes of policy failure, dominant perspectives argued that the negative impacts of HSP were caused by the flaws in policy implementation (figure 5), such as the lack of funding as well as inadequate monitoring of actual implementation practices. The percentage of such perspectives has decreased over the three periods, from 67% in the first period (1986–2002) to 55% in the last period (2011–2012). On the other hand, others have argued that the negative impacts of HSP were caused by flaws in the policy itself, as the policy perception and framework of settling herders and stabilizing livestock productive systems did not fit the highly variable ecosystems. The percentage of such perspectives increased from 33% during the first period, 40% in the second period, to 45% in the last period, only slightly lower than the improper implementation perspective (see figure 5).

Academic papers demonstrated some of the critical findings about HSP impacts. Firstly, on the whole the literature demonstrated a positive impact on livelihoods and pastoral production throughout the three periods analysed, though the questionable methodology used to an extent weakened the strength of such arguments. Secondly, negative impacts on pastoral society identified during the first period became more prominent as time progressed and more research was carried out. Thirdly, the percentage of literature demonstrating positive ecological impacts has decreased from the

Figure 5. Percentage of academic perspectives on the causes of the HSP failures



first to the third period. It must be noted that as the percentages of literature demonstrating the positive, negative, and ineffective impacts on ecosystem were fairly evenly distributed at present, the ecological impacts of HSP remain unclear. Finally, the majority of academic literature still stated that the negative impacts of HSP were caused by improper policy implementation, though a growing percentage simultaneously argued that such policy failures were also in part due to flaws in the policy itself.

# Conclusion

4

## 4.1 Conclusions

After nearly 30 years of rangeland management policy reforms, extensive research emanating from both academic and government sources has proliferated in order to understand the impacts of these policies. The GHCS, ECPs and HSP constitute major rangeland management policies that have brought great reforms and changes to pastoralism and rangeland management systems. Generating comprehensive conclusions about their impacts is incredibly challenging in a short review paper. Nevertheless, analysis of government and academic literature regarding policy perceptions, impacts and the causes of policy failures does demonstrate some critical findings that provide substantial information and guidance for future rangeland management policies and research.

Regarding the impact of GHCS, the government and academic literature generated several major findings. Firstly, both government and academic narratives assert that the policy has generated positive impacts, though as the policy has developed over time the literature has depicted critical challenges that have arisen, such as negative impacts on ecosystems, animal husbandry, herder livelihood and pastoral society. This critical lens is particularly evident within the academic literature. Academic research demonstrating negative policy impacts came to prominence between 2008 and 2012. During this time, those academic studies that continued to present positive impacts were mostly based on second hand data and deductive reasoning, while literature generating negative impacts relied on primary data. From this we can infer that the positive impacts of the policy may be overrated within academic literature as a whole. Secondly, government literature generally perceived policy failures as caused by improper implementation, while the academic literature, especially during the last period, strongly suggested that failures were largely down to flaws in the policy itself. Thirdly, both government and academic literature came to an emerging consensus that GHCS caused rangeland fragmentation, and thus re-aggregation of rangeland resources were recommended as a strategy for further development of GHCS.

Considering the impacts of ECPs, government and academic literature contended that the policy generated positive impacts on ecosystems. A large proportion of academic literature argued that the ECPs generated negative impacts on herder livelihoods, social connections and pastoral culture. Government literature began to recognize the negative impacts of ECPs on herders' livelihood and attributed such failures to insufficient government subsidy. Even though the majority of academic literature argued that ECPs generated obvious negative impacts on pastoral society, such impacts had not yet attracted the necessary attention from government. From both government and

academic literature and narratives, it can be concluded that ECPs prioritized ecological protection while failing to pay sufficient attention to herder livelihoods, local society, and culture. Consequently, even though the policy improved ecosystem conditions, it had injurious consequences for herder livelihoods, increased social conflicts and marginalised traditional culture.

Regarding the impacts of HSP, both government and academic literature generally argued that policy had achieved effective improvements in herder livelihoods and animal husbandry. Ecological and social issues associated with HSP became emerging topics within academic studies. At present, although the ecological impacts of the policy are still highly debated among scholars, the negative impacts of HSP on pastoral society have been rather obvious. Therefore even though HSP has improved the livelihoods of individual herders, it has induced social divisions and led to the marginalization of traditional culture on a larger scale. Although academics have conducted numerous studies to explore these social issues, the government has not acknowledged such problems yet. Furthermore, although academic literature arguing the causes of policy failure are improper policy design has increased, the dominant government and academic literature still demonstrates that associated negative impacts of the HSP were caused by flaws in the implementation of policy.

## 4.2 Discussions

This review paper has analyzed the many diverse impacts of three important rangeland management policies by examining both academic and government produced literature, as well as documenting changes in said literature witnessed over time. The findings of this review paper may provide critical guidelines and help inform more prudent development of China's rangeland management policies in the future, as well as hopefully eliciting further research and discussion.

The property rights system laid the foundation for rangeland management. At present, increasing academic studies have emphasized the rigidity and dysfunctionality of GHCS, and argue that the negative impacts of GHCS are more a factor of flaws in the policy itself rather than flaws in the implementation of the policy. Increasingly, the literature argues that GHCS has not accounted for the dynamic characteristics of rangeland ecosystems, and that the policy itself has thus become a cause of the negative impacts, particularly those of rapid fragmentation of rangeland ecosystems. (Zhang and Li, 2008; Yan, 2005; Gongbuzeren, 2008).

Concurrently, although government recognizes some negative impacts of GHCS, their reports still generally emphasize the need to simply implement GHCS more effectively, seeing the policy as a precondition for

facilitating ecological construction projects and rational use of rangeland resources. The government literature recommends the rangeland transfer system and herder cooperatives development as key approaches for their aggregation of rangeland resources, framing these as central to solving the current negative impacts of GHCS on ecosystem and animal husbandry. The central approach promoted in the government literature is for greater clarification of rangeland property rights through GHCS followed by facilitating re-aggregation of rangeland resources through the rangeland transfer system. In this way, the implementation of the policy is meant to solve the issues of rangeland fragmentation which itself has resulted from GHCS. This logic is based on the assumption that a market mechanism is the best tool for achieving efficient allocation of resources.

However, given the challenges of implementation, and the negative impacts of this policy observed to date, one must ask whether the market can realistically replace the traditionally customary institutions and achieve a truly efficient allocation of rangeland resources.

As part of this process of 'creating problems, then solving problems', there runs the risk that some crucial aspects of society, such as indigenous knowledge, may disappear. If so, this may make the costs of grassland re-aggregation too prohibitive. The study has revealed how the abundant literature surrounding rangeland management demonstrates that GHCS does not allow for the dynamic and heterogeneous characteristics of the rangeland ecosystem. Furthermore, it has shown that there are negative impacts stemming from the policy itself, not only from its improper implementation. Is it therefore necessary to continue implementation of the GHCS in all pastoral areas, only to take reactive action after the policy generates further negative impacts? It is particularly crucial to consider this question in many pastoral areas in Xinjiang and Tibetan regions where GHCS is only in the early stages of implementation, and where social capital and customary institutions for rangeland management are still functioning well. This is compared to Inner Mongolia, where GHCS is fully operational and has largely replaced customary institutions. Considering the path-dependence of institutional change, it is especially critical to explore more appropriate approaches for re-aggregation of rangeland resources.

With regard to ECPs, the impacts of policies were varied, with improvements observed in terms of ecological conditions while obvious harm was incurred on local herder livelihoods and pastoral society.

According to both government and academic literature, the ECPs prioritized ecosystem protection and conservation, while failing to provide enough attention to herder livelihoods and pastoral society, thus resulting in improvements in ecosystems while social welfare declined through herder livelihood constraints, with a

marginalization of culture witnessed as a consequence. Emerging academic literature in China argues that pastoralism is a complex interlinked social-ecological system where herder livelihoods, grazing activities and cultural diversity are intimately linked to the dynamic ecosystems of the grasslands. Policy that decouples such systems actually increases failure in both ecosystem and herder society (Li and Li 2012; Xie and Li, 2008; Gu and Li, 2012).

As population pressures and economic activities have continued to expand, conflicts between people and ecosystems will continue to present a problem. It is therefore necessary to set some limitations on economic activities to ensure environmental protection. However, in the case of the grasslands, one must ask whether achieving this objective necessarily requires an antagonistic relationship between grassland ecosystem protection and pastoral production. Emerging research will enable us to make informed decisions as to whether the best approach to solve the issues of grassland protection is to treat it as a separate goal to promoting sustainable livelihoods for local people. Specifically we can then begin to ask what the social costs of such an approach may be. Through this research, decision makers can begin to see that the management of herder livelihoods and ecosystem protection as a coupled system is critical to generating favourable policy outcomes in the future.

With regards to HSP, literature reviewed as part of this research demonstrated obvious improvement in the livelihoods of individual herders but increasingly negative impacts on pastoral society. It seems that HSP focused on improving the material living conditions of individual herders, while failing to pay attention to the spiritual and cultural elements such as social networks and cultural traditions. Several studies demonstrate that HSP failed to understand the values of cultural diversity and complex social organization (Li and Zhang 2009; Wang, et al, 2010). Furthermore, these studies argued that the indigenous knowledge of herders has resulted from long term interaction with dynamic rangeland ecosystems, and that it is therefore important to utilise this knowledge for sustainable use of rangeland resources. Under HSP, the herders were treated as isolated individuals while their complex systems of social networking and reciprocity were ignored (Yeh, 2009; Fogin, et al. 2008). While it ignores cultural values, HSP also failed to benefit many herders through diversification of income sources, nor did it provide the majority with better access to social services (Yeh, 2009). Therefore, given these negative impacts, the question remains as to how best support herders' adaption to changing socio economic contexts, and crucially for policymakers, how to provide social services to them while maintaining their culture of mobile pastoralism as a facet of cultural diversity within China.

Incorporating these aspects into effective rangeland management strategies requires further in depth study.

Although a rich diversity of government and academic literature has emerged to narrate the impacts of China's three major grassland policies, the failure of these policies may be ultimately summarized as one essentially significant issue: the vague or unclear understanding of the basic nature of pastoralism among policy makers. Under the dominant paradigm of modernization, the question of whether to support continued pastoralist production and institutional arrangements remains crucial, and if the answer to this is in the affirmative, how best this is to be achieved.

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In China three major rangeland management policies have caused large-scale changes for pastoral societies and rangeland ecosystems: the Rangeland Household Contract System (RHCS), ecological construction projects (ECPs), and the Herder Settlement Policy (HSP). This report reviews government and academic perspectives on the impacts of these policies on ecosystems, animal husbandry, livelihoods, and pastoral society, as well as on the causes of policy failures. The perspectives of two schools are diversified. Based on the findings, we argue that the negative outputs of these policies may ultimately stem from one significant root: the vague understanding of pastoralism among policy makers.

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