

# Rangeland management in the Qilian mountains, Tibetan plateau, China

Luming Ding<sup>1</sup> Xiaojing Qi<sup>1,2,\*</sup> Ruijun Long<sup>1</sup>  
Tingting Yang<sup>1</sup> Jean-François Tourrand<sup>2</sup>

## Keywords

Sheep, yak, rangeland, household, governance, land policy, Tibet, China

Accepted: 21 December 2014; Published: 25 March 2016

## Summary

In the past, several tribes from Northern and Central Asia, such as Tibetans, Yugurs, Mongols and Hans, traveled through and settled in the Qilian mountains. Because of the high altitude (on average 3000 meters) the main land use is the rangeland, pastured by yaks and sheep herds. Before the 1949 Chinese Revolution, the pastoral system was based on complex agreements between breeders' tribes and the monasteries that controlled the rangeland. Since the 1950s, the collectivization of the land and the herds abolished this system. Rangeland degradation worsened because of the concentration of herds. At the beginning of the 1980s, the Household Contract for Responsibility System (HCRS) policy aimed at both improving livelihoods and rangeland management. HCRS progressively became the pillar of land, resource and livestock management, by adopting a collective action involving the households, the community leaders and the local governance. Recently, new policies related to the local demand have been implemented. Sixty years after the revolution, the Qilian mountains' people succeeded in implementing a socioeconomically efficient farming system. However, this system presents two main weak points: the poor sustainability of rangeland management and the low interest of young generations for rural activity. In order to face these challenges and produce key elements for policy makers, some scenarios of future farming systems have been built and debated with local stakeholders in order to improve the sustainability of rangeland management.

■ How to cite this article: Ding L., Qi X., Long R., Yang T., Tourrand J.-F., 2015. Rangeland management in the Qilian mountains, Tibetan plateau, China. *Rev. Elev. Med. Vet. Pays Trop.*, **68** (2-3): 69-74

## ■ INTRODUCTION

The Qilian mountains are located in the North-Eastern Qinghai-Tibetan plateau, along the ancient Silk Road (Figure 1) at an average altitude of 3000–4000 meters and with a peak at 5500 meters. At this altitude, rangeland is the only land use. Few crops can grow in the lowlands of the valleys, especially in Hexi Corridor (ex Silk Road). In the past, because of their location several ethnic groups passed through the Qilians, and many of them settled and are still present today, especially Tibetans, Yugurs, Huis, Mongols and Hans. Up to the middle of the 20th century, rangeland management was defined

1. International Center for Tibetan Plateau Ecosystem Management, Lanzhou University, Gansu Province, China.

2. Cirad, UPR Green, 34398 Montpellier, France.

\* Corresponding author  
Email: qixj0318@gmail.com; qixj11@lzu.edu.cn

 <https://creativecommons.org/licenses/by/4.0/>

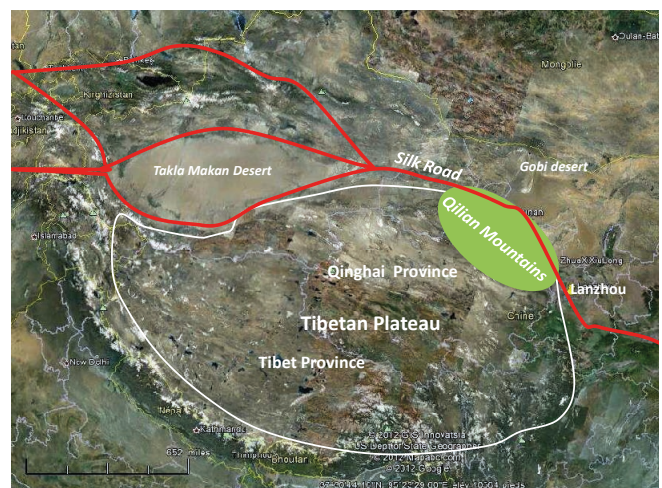


Figure 1: Location of the Qilian mountains in the Northeast of the Tibetan plateau, Gansu Province.

through a complex set of agreements and partnerships between herders' tribes and the monasteries that were the landowners (Zhang et al., 2007; Brown et al., 2008; Squires et al., 2009).

The 1949 Chinese Revolution, followed by the 1966–1976 Cultural Revolution strongly impacted the traditional people and rangeland management, mainly land and herd collectivization. In the span of a few years, probably because of the lack of control over rangeland management, serious degradations occurred, particularly near new urban areas and watering points for people and herds. At the beginning of the 1980s, specific public policies, such as the Household Contract Responsibility System (HCRS), were implemented to reduce the degradation of the Chinese rangeland in view of its major role in the national water supply, and thus avoid strong soil erosion with severe consequences on flows and floods downstream. HCRS still defines today the dynamics between the three key pillars of rural society, i.e. herders' households, community and local governance, and their link to national policy makers. Thirty years later, the challenge is yet to be met. However, change occurred at different scales, including the pasture plot, collective rangeland, herder's household and global governance. In this context, this study aims at describing the main trends of animal husbandry in the last decades and presents some future scenarios for sustainable development drafted with the local stakeholders.

■ MATERIALS AND METHODS

Based on the literature review and the local research team's knowledge, two contrasted research sites were selected in order to have a better overview of the livestock diversity in the Qilians: i) Tianzhu County and ii) Huang Cheng township in Sunan County (Figure 2). The contrast concerns four factors relevant to livestock production:

- Location, on the eastern and western slopes of the Qilians, respectively;
- Distance, 300 and 800 km, respectively, from Lanzhou, capital of Gansu Province and main urban area to trade products and purchase inputs, and other cities along the Silk Road, such as Wuwei, Zhangye and Yong Chang, which have significant local markets;
- Rainfall, around 400–500 mm in Tianzhu and 700–800 mm in Huang Cheng, a factor that determines rangeland productivity;
- Settlements, with a majority of Tibetan and Han breeders living in Tianzhu, and Yugur herders living in Huang Cheng.

The research sample was built by selecting 35 key informants, 17 in Tianzhu and 18 in Huang Cheng. They came from various

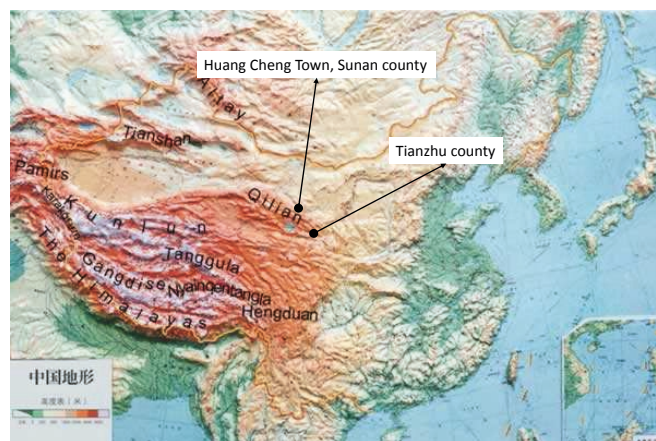


Figure 2: Location of the two research sites along the Hexi Corridor (or Silk Road).

sectors of the livestock supply chain, covering the spectrum from farm to fork, including twelve breeders, five community leaders, two agribusiness managers, four input providers and traders, eight scientists and technicians from development and funding agencies, and four policy makers. The individual interviews were mainly held with breeders and policy makers, whereas group interviews of two or three stakeholders were conducted with traders. Moreover, two workshops were held with technicians from local development agencies. The interviews were centered on the following topics: perceptions of the past and current livestock situation in the area, scenarios for the future, hopes and fears of local people working in the livestock sector, main debates and conflicts regarding animal production, and new projects linked to animal husbandry in the area.

The average time for an interview was around two hours, and longer with farmers and agribusiness managers because of the time spent on the visit of the farm or of the enterprise. Following each interview, we wrote a two to three page report to document the main data collected, as well as relevant and complementary information given by the informants (Figure 3).

Data analysis was carried out by two complementary ways. Firstly, an overview of the mental model regarding livestock activity was drafted for each key informant and group of key informants based on reports from the interviews. Secondly, we drew up a table comparing the viewpoints of the different key informants regarding the main questions which structured the interviews.



Figure 3: Interviews with an agribusiness manager (1) and breeders (2, 4), and informal workshops with traders (3) in the Qilian mountains.

■ RESULTS

The three main results revealed by this study were: i) the rangeland provides the main part of the feed for the herds, even though some alternatives are being developed; ii) the herders' livelihoods improve considerably because of strong support from public policies, especially with the implementation of HCRS as a partnership between herders, community and local governance; and iii) the weak rangeland management and low attractiveness of animal husbandry to young people are the two main future challenges.

It is noteworthy the rare information key informants gave on pre-Chinese-Revolution times, as if that period had no effects on the current and future situations. This is surprising since there was a significant change in landownership, access and management during the first years of the Chinese Revolution and throughout the



decade of the Cultural Revolution. The lack of historic references may be partially linked to the young age of the stakeholders, since many of them were born after that period. Only one key informant, member of a recognized breeder family since before the revolution, provided details about the change at that time, especially on land and herd collectivization, and consequently the new land access and relationship between breeders and the local communities, and the migration of some of them. On the other hand, the literature describes rangeland management before the Revolution as bringing a great harmony in the socioecosystem (Zhang et al., 2007; Wang et al., 2010), and the efficiency of breeders' practices in managing the rangeland that was owned by the monasteries; a situation like a pre-Revolution paradise.

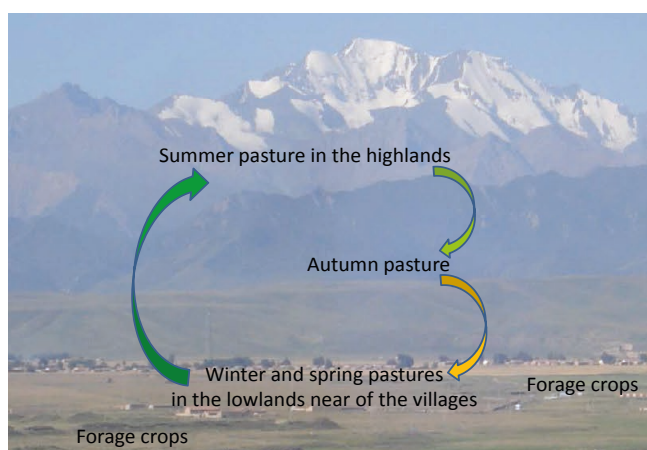
### ***Rangeland, as main feed provider, pillar of animal husbandry***

In general in the Qilians, each household manages his herds of sheep and yaks, which are the main and sometimes only source of income. Usually, the couple is the only labor in the farm. Sometimes, grandparents help when they live in the household and are able to do so. Children also help when they are not in school, or during vacations for those going to the university.

Sheep are of Merinos (locally called fine-wool sheep) and Tibetan breeds. The household chooses to have one or the other or both according to its objectives, strategies and practices. Yaks are of black or white Tibetan breed, especially in Tianzhu. Goats are present in a few herds. Usually, the herds are composed of around 150–200 ewes and 25–40 yaks, with some smaller and others with as many as 300–400 ewes and 80–100 yaks. Some households only have sheep, mainly for lack of labor.

Figure 4 shows the seasonal mobility of the households and herds of Huang Cheng, according to feed availability in the rangeland in the course of a year. It is a classic seasonal mobility in mountain areas with alpine meadows. In Huang Cheng, stakeholders noted the presence of small differences between households and villages. They related to the farm location, the distance between the farm and pastures, and the size of pastures. In Tianzhu, many pastures were common, but the seasonal mobility was more or less the same depending on weather conditions.

At the end of spring, i.e. end of May and June depending on grass growth, both herds and herders move to summer pastures. They stay there for about two months. Each household has a tent with



**Figure 4:** Seasonal mobility of people and animals in the villages of Huang Cheng town, Sunan County in the Qilian mountains.

basic equipment (see further on). Because of the cold and the snow, people and animals cannot survive there during winter. So, at the end of summer, sheep and people move to the autumn pastures at a lower altitude, where weather conditions are better and feed is still available. The yaks usually stay in the summer pasture, as they can better resist the cold. However, every day or so, one person of the family goes to check up on them. From mid-autumn, just before the first frost, sheep and herders' families go back to the villages. The sheep graze on winter pastures. During the same period, the yak herds move to the autumn pastures, substituting the sheep herds. Depending on weather conditions, the rangeland and farm productivity, the yaks stay there all winter or move to the winter pasture where the sheep herds are. During winter and spring, the weakest animals are supplemented with oat forage grown in the lowland during spring and summer. Figure 5 summarizes the herd feeding system throughout the year.

According to the evaluation of local stakeholders in the counties of Tianzhu and Sunan, the Qilians herds are mainly fed by grazing (more than 80–85% of sheep and more than 95% of yaks). Although the cultivated forage represents a small part of the feeding system, it is still essential for the weak animals to survive. This justifies the herders' strong interest in having cropping areas. Moreover, a family who has more forage than needed can easily sell it in the local market or in other regions, which contributes to a significant additional income.

Because of the low number of family members working on the farm, all the labor is centered on herd management. Daily main tasks consist of i) quick checkups on all animals, possibly twice or thrice a day, during early morning, daytime and in the evening, ii) several daily checkups during lambing and calving to assist the females and care for the newborn, iii) caring for weak or sick animals, mainly the females and the young calves and lambs, and iv) forage feeding during winter and spring. Other activities are more flexible in term of time, e.g. treatment of the animals, maintenance of fences and equipment, marketing, and purchasing of inputs. These activities have to be integrated in the schedule of daily tasks. As mentioned by some stakeholders, it is interesting to notice that the herders spend the major part of their working time managing the herd and do not have time to manage the rangeland, which is nevertheless the pillar of their livestock activity.

### ***Strong public policy support to breeders' people in the Qilians***

According to Zhang et al. (2007) the Household Contract Responsibility System has been implemented in pastoral China as a set of policies based on the successful experience in cropping areas, and aims to improve the productivity of animal husbandry. From an environmental point of view, the result has been an increase in rangeland degradation (Banks, 2001; Han et al., 2008) since contextual differences between cropping and breeding areas have been ignored (Williams, 2002). However, during the interviews, most of the local stakeholders considered the implementation of HCRS to be a success in the Qilians because of the significant support to breeders in adapting their farming system to global change, including social as well as micro- and macro-economic changes.

The allocation of cropland for forage production and winter pasture between households seems to have been the most significant policy. The breeders can decide whether to reduce or increase the size of their herd according to the herd requirements since they become the direct managers of their winter and spring feed resources. They can also decide to rent more land in order to increase feed or produce forage to be sold. Land allocation has been decided upon according to the size of the household. It is

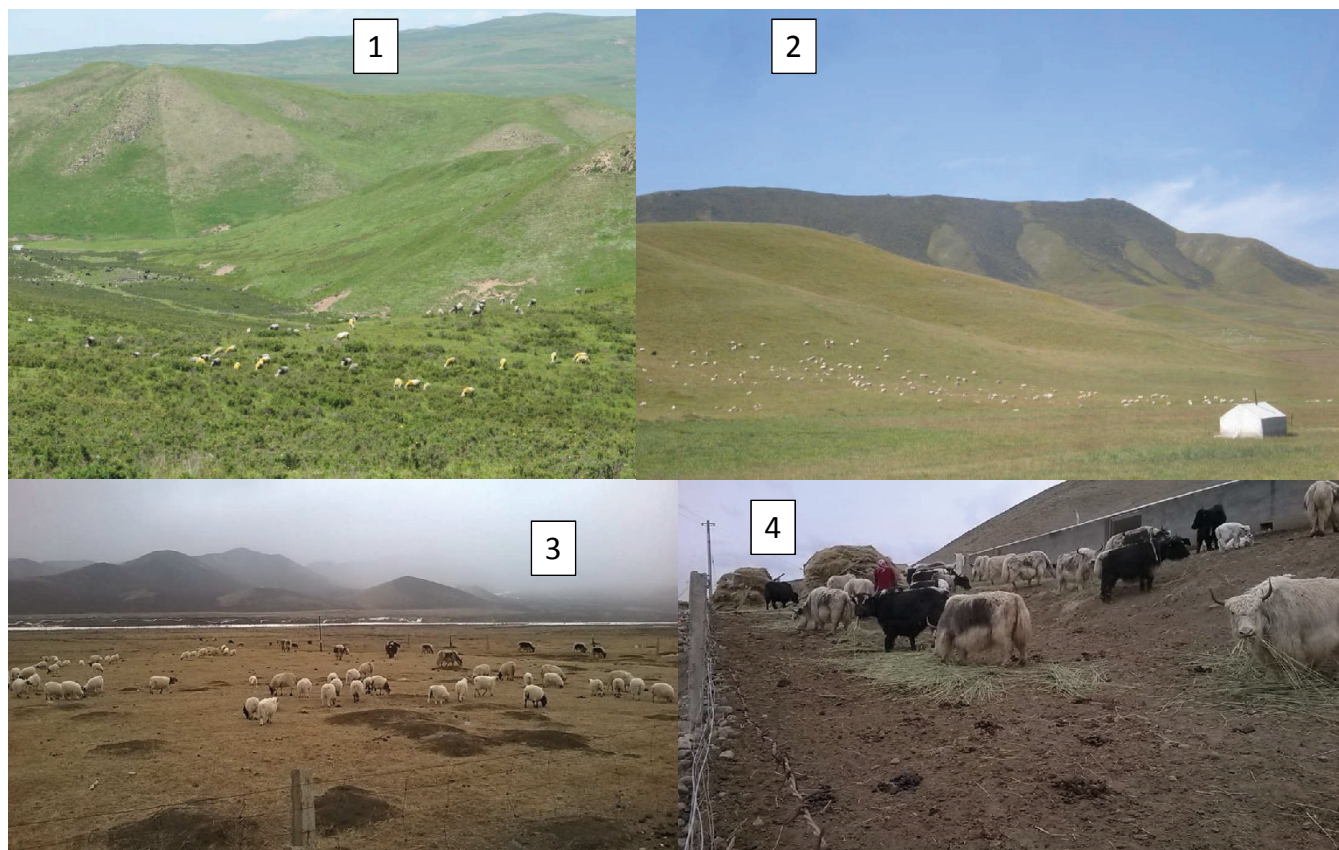


Figure 5: Summer pasture (1), autumn pasture (2), winter pasture (3) and supplementation of female yaks (4) in the Qilian mountains.

in function of the zone and can change according to the demand of new households and the retirement of old breeders. It is a land allocation and not a landownership. The land cannot be sold but it can be rented, as it is the case for some old breeders who thus complement their pensions.

In the village of Huang Cheng town, Sunan County, the average pasture per household is around 170 ha, 220 ha for winter pasture, and 3 ha for summer and autumn pasture and cropland. The most important demand of farmers without individual winter pasture allocation, who thus only have access to the common winter pastures, is to have land allocation at household level, at least for the winter pasture. This enables them to manage better the rangeland at household level according to their herd requirements.

The land allocation of summer and autumn pastures seems less significant because of the bigger availability of pastoral resources during these seasons. However, several breeders consider that they need contracts for summer and autumn pastures in order to avoid herd concentration in the best places. With these contracts, the households could manage their summer and autumn pastures according to their objectives, strategy and knowledge, under control of the community.

In addition to land allocation, households receive financial subsidies according to their pasture area. The subsidies are fixed per unit of land: around 220 €/ha [110 yuans (¥) / mu] for cropland, 60 €/ha (30 ¥/mu) for winter pastures and 2.78 €/ha (1.39 ¥/mu) for summer and autumn pastures. The land subsidies per household in Huang Cheng are around 1362 € (10,220 ¥), with reference to the farm budget which is around 16,256 € (121,921 ¥), corresponding to the sales of lambs, yak bulls, culled ewes and female yaks.

Besides land allocation and subsidies, another significant policy is the financial support allocated per household to improve livelihoods

and invest in the farm. Each household has access to funds to build a greenhouse/stable to shelter the herds during winter and spring, and to build tents in summer and autumn pastures. Depending on the situation, the part of the subsidies dedicated to the tents is around 30–50%, which amounts to 200 € (1700 ¥) approximately, from a total price of 450 € (4000 ¥). Nowadays, tents in the alpine meadows are more comfortable and well equipped with a bed, a small table, a few stools, one or two small chests or shelves for storage, and a stove for cooking and heating. Some have one or two solar panels to store energy to watch satellite TV and charge cellular phones.

Although the subsidy is lower to build a new house, it is still significant amounting to 15–20% of the cost. Moreover, households can have access to apartments built in a town near their village, whether to reside there or to move in upon retirement. Households also have access to interesting loans to buy motorcycles and three-wheel tractors.

Several other infrastructure policies also impact on the local development. For instance, road construction and maintenance facilitate access to the market and inputs. Trail maintenance is particularly important, because of long distances between the villages and alpine meadows, i.e. in general 15–40 km, sometimes 60–70 km and up to 100 km. Many antennas have been erected for cellular phones in the Qilians. Furthermore, since 2004, to the already existing free primary education, the elementary school has also become free.

### ***New challenges: efficient rangeland management and better attractiveness for youth***

Over the last three decades, the two main weak points of the local development system in the Qilians have been the poor rangeland management and the low attractiveness for the new generation.



The HCRS policy aims to reduce rangeland degradation by controlling the rate of animal stocking in order to adapt it better to rangeland productivity. According to local stakeholders, up to present time the strategies adopted by the breeders have not integrated the control over the animal stocking rate on their pastures.

Two main reasons explain this disturbance. Firstly, rangeland degradation is a real constraint for the breeders because it reduces the production of feed and consequently the productivity of the herd. However, the reduction in rangeland degradation is a complex or long term process based on specific strategies and several friendly practices for vegetation use and protection. In contrast, HCRS subsidies help sustain herd productivity with minimal interaction with rangeland management. Therefore the breeders adopted the easier strategy based on subsidies and did not apply sustainable practices for rangeland management. Secondly, there is a lack of stocking rate control. The adoption of sustainable rangeland management practices is hindered by two constraints: the apparently poor knowledge about the right practices at local scale and the considerable need for investment in infrastructures, equipment, inputs and labor.

Furthermore, sustainable practices of rangeland management are usually more difficult to implement in common pastures because of the higher complexity of collective governance in relation to a single household. In contrast, the easier implementation at individual level does not mean better efficiency. Currently in the Qilians, rangeland management entails common practices such as the coordination and mutual assistance to move to the summer pasture and face the winter period, and the collective work to build fences and greenhouses. This mutual assistance extends beyond the same family to include friends and people in the same village. In conclusion, the complexity at the collective level offers some relevant opportunities and should not therefore be seen as a constraint.

The second weak point in the system developed in the Qilians is the poor interest of the new generation in becoming herders like their parents. Moreover, almost all parents consider that animal husbandry is not a good option for their children. They perceive the future of their children in urban areas. For this reason they seek education qualifications for them and stipends to attend the university since the yearly tuition of 2000 € (17,000 ¥) amounts to one third of the family income. Many breeders belong to minorities; they believe that once their children are qualified, they will be better integrated in the society. Consequently, almost none of the young people are interested in becoming breeders like their parents. They use the same arguments as their parents', talking about the hardship of labor for example during the calving and lambing periods, and the seasonal migration in the alpine meadow.

To face the low interest of young people in the pastoral system, a new policy was recently implemented to improve the efficiency of the livestock farming system and to offer rural jobs in urban areas, especially targeting the new generation. This policy supports breeders who decide to join their skills and means of production to fatten lambs and bulls in feedlots, based on irrigated forages in the villages, small towns or in city suburbs. Parents are in charge of breeding through their pastoral system in the countryside and some children are responsible for fattening in feedlots located in suburban areas. In order to encourage breeders to collaborate among themselves and build significant animal husbandry units, this policy is available only for herds of more than 500 bulls or 3000 lambs to be fattened. Some breeders are thinking of implementing dairy farms based on a similar integration system. During the milking period, the dairy cows stay in the barn and are fed with irrigated feed. The dried cows and the heifers are reared in the rangeland.

## ■ DISCUSSION

What about the future of livestock in the Qilians? In their analysis of public policies in the Chinese rangeland, Wang et al. (2010) discussed the strong and strategic commitment of the national governance i) to reduce rangeland degradation by a better care of natural resources, and ii) to improve the livelihoods of pastoral people who have been using these resources to feed their herds since the beginning of the 1980s. The same policy is expected to be applied in the following years because of the major role of these rangelands in China's water supply. Our results show significant livelihood improvement in the rural area of the Qilians, mainly because of the direct and indirect subsidies to breeders' households. Consequently, these households are expected to contribute in the effective implementation of a sustainable rangeland management. Moreover, reducing the stocking rate is not the only way to avoid rangeland degradation. Other efficient practices of sustainable rangeland management exist, namely the daily and weekly control of the pasture area, and grass growth time between two pasturing seasons. Three scenarios have been projected hereafter.

### *Current trend scenario*

The farming population is aging progressively and there is a lack of intergenerational knowledge transmission because the young prefer urban jobs and urban life. The short and medium term impact of this trend is an increase in farm land size (because of land availability) by re-allocation or renting to retired farmers. However, a serious labor issue could emerge considering the current high workload of households and the lack of workers who are competing for urban jobs. On the medium and long term, the lack of farmers and workers will be a serious challenge.

### *Rangeland management scenario*

Land would be reallocated in order to determine the most sensitive or degraded rangeland areas, restore them, and adopt common pasture management based on a strict control and on raising breeders' awareness. This scenario needs to succeed because of rangeland degradation and the impacts of rangeland management practices on a large scale. From the farmers' point of view, it will not be easy to define and implement a collective rangeland management regarding the use of common pasture. This may pose a greater challenge in terms of research and extension.

### *Intensification scenario*

There would be an added value, through subsidies, to practices that reduced the stocking rate, as it is the case for the current double system based on lambing and calving on the rangeland, and fattening in feedlots with irrigated forage. The advantage of this scenario is its appeal to the young.

## ■ CONCLUSION

Rangeland degradation, especially around villages, was caused by the abolishment of the traditional system through land and herd collectivization during the Chinese Revolution of the 1950s, followed by a difficult period for breeders' families up to the 1980s. Over the following three decades, HCRS implementation led to a progressive and significant improvement of livelihoods in rural areas. However, the great challenge of rangeland degradation persists. Sustainable rangeland management could be the next scenario for local development plans in the Qilians. This requires an efficient set of sustainable practices with regard to the technology

used but also human development, mainly participative methods to discuss, test and assess adapted innovations. Policy makers are ready to finance and encourage such practices because of the strategic function of the Chinese rangeland in the national economy.

### Acknowledgments

We wish to thank the Cai Yuan Pei project under the Science Fund for financial support of this study, MOUVE project ([www1.clermont.inra.fr/mouve/](http://www1.clermont.inra.fr/mouve/)) and LiFLoD network ([www.liflod.org](http://www.liflod.org)).

### REFERENCES

- Banks T., 2001. Property rights and environment in pastoral China: evidence from the field. *Dev. Change*, **32**: 717-740
- Brown C., Waldron S., Longworth J., 2008. Sustainable development in Western China: Managing people, livestock and grassland in pastoral areas. Edward Elgar Publishing, Cheltenham, UK, 294 p.

Han J.G., Zhang Y.J., Wang C.J., Bai W.M., Wang Y.R., Han G.D., Li L.H., 2008. Rangeland degradation and restoration management in China. *Rangel. J.*, **30**: 233-239

Squires V., Lu X., Lu Q., Wang T., Yang Y., 2009. Rangeland degradation and recovery in China's pastoral lands. In: Rangeland stewardship in Central Asia: Balancing improved livelihoods, biodiversity conservation and land protection (Ed. Squires V.). CABI Publishing, Oxford, UK, 219-234

Wang M.P., Zhao C.Z., Long R.J., Yang Y.H., 2010. Rangeland governance in China: Overview, impacts on Sunan County, Gansu Province and future options. *Rangel. J.*, **32**: 155-163

Williams D.M., 2002. Beyond great walls: Environmental, identity and development on the Chinese grassland of Inner Mongolia. Stanford University Press, Stanford, USA, 251 p.

Zhang M.D., Borjigin E., Zhang H., 2007. Mongolian nomadic culture and ecological culture: on the ecological reconstruction in the agropastoral mosaic zone in Northern China. *Ecol. Econ.*, **62**: 19-26

### Résumé

**Ding L., Qi X., Long R., Yang T., Tourrand J.-F.** Gestion des parcours dans les montagnes du Qilian, plateau tibétain, Chine

Dans le passé, les Monts Qilian ont été traversés et peuplés par diverses peuplades d'Asie centrale et du Nord, en particulier les Tibétains, les Yugurs, les Mongols et les Hans. En raison de leur haute altitude (en moyenne 3000 m), l'élevage de yacks et de moutons sur parcours y constitue la principale activité. Avant la Révolution chinoise de 1949, la gestion des parcours reposait sur des accords complexes entre les tribus d'éleveurs et les monastères, ces derniers contrôlant le foncier. Depuis les années 1950, la collectivisation des terres et des troupeaux a détruit ce système. La dégradation des parcours s'est aggravée en raison de la concentration des troupeaux. Au début des années 1980, une politique spécifique, le *Household Contract Responsibility System* (HCRS) visait à améliorer à la fois les conditions de vie en milieu rural et la gestion des parcours. Basé sur l'action collective impliquant les ménages, la communauté et la gouvernance locale, le HCRS est progressivement devenu le pilier de la gestion territoriale. Récemment, des mesures complémentaires ont été mises en œuvre pour répondre à la demande locale. Soixante ans après la révolution, les Monts Qilian ont réussi à mettre en place un système agraire efficient du point de vue socio-économique. Cependant, il présente deux faiblesses majeures : la faible durabilité de la gestion des parcours et le peu d'intérêt des jeunes pour le milieu rural. Pour faire face à ces défis et établir des éléments clés pour les décideurs, des scénarios alternatifs de systèmes agricoles ont été élaborés et discutés avec les acteurs locaux afin d'améliorer durablement la gestion des parcours.

**Mots-clés :** ovin, yack, parcours, ménage, gouvernance, politique foncière, Tibet, Chine

### Resumen

**Ding L., Qi X., Long R., Yang T., Tourrand J.-F.** Gestión de pastizales en las montañas de Qilian, Meseta Tibetana, China

En el pasado, diferentes tribus del norte y centro de Asia, como los Tibetanos, Yugurs, Mongoles y Hans, recorrieron y se establecieron en las montañas Qilian. Debido a la gran altitud (3000 metros de media), el uso principal de la tierra es en pastizales, pastoreado por hatos de yaks y ovinos. Antes de la Revolución China de 1949, el sistema de pastoreo se basaba en acuerdos complejos entre las tribus de criadores y los monasterios que controlaban los pastizales. Desde la década de 1950, la colectivización de la tierra y los rebaños abolieron este sistema. La degradación de los pastizales se agravó debido a la concentración de los rebaños. A principios de la década de 1980, la política del Sistema de Contratos Domésticos de Responsabilidad (HCRS) tuvo como objetivo mejorar tanto medios de vida como la gestión de los pastizales. HCRS se convirtió progresivamente en el pilar de la tierra, manejo de los recursos y del ganado, mediante la adopción de una acción colectiva que involucra los hogares, los líderes de la comunidad y el gobierno local. Recientemente, se han implementado nuevas políticas relacionadas con la demanda local. Sesenta años después de la revolución, la sociedad de las montañas Qilian tuvo éxito en la implementación de un sistema de cultivo socioeconómico eficiente. Sin embargo, este sistema presenta dos debilidades principales: la escasa sostenibilidad de la gestión de los pastizales y el escaso interés de las nuevas generaciones en la actividad rural. Para enfrentar estos retos y producir elementos clave para los políticos, se han construido algunos escenarios futuros de sistemas de producción y discutido con los actores locales con el fin de mejorar la sostenibilidad de la gestión de los pastizales.

**Palabras clave:** ovino, yak, tierra de pastos, hogar, gobernanza, política agraria, Tibet, China