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Source: Mountain Research and Development, 26(3):209-213.

Published By: International Mountain Society

DOI: [http://dx.doi.org/10.1659/0276-4741\(2006\)26\[209:ITSALI\]2.0.CO;2](http://dx.doi.org/10.1659/0276-4741(2006)26[209:ITSALI]2.0.CO;2)

URL: <http://www.bioone.org/doi/full/10.1659/0276-4741%282006%2926%5B209%3AITSALI%5D2.0.CO%3B2>

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Innovation to Support Agropastoralist Livelihoods in Northwest Yunnan, China

Andreas Wilkes

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Many upland communities in northwest Yunnan, China, are agropastoralist. Agropastoralist livelihoods in the region are characterized by close interactions between crops and livestock, and by seasonal transhumance. Agropastoralist communities are relatively marginalized by technical service agencies and policy making processes. The Center for Biodiversity and Indigenous Knowledge (CBIK), a local NGO, has been working with communities and extension

agencies to develop approaches to innovative technical and institutional interventions that support sustainable livelihoods. The present article describes the issues faced by agropastoralists in the region, the approaches promoted by CBIK (participatory technology development and co-management of rangelands), and issues faced in scaling up these approaches to influence local government policy and extension practices.



Livelihoods in northwest Yunnan

Northwest Yunnan, China, is rich in both ethnic and biological diversity of global significance. The region, much of which has been included in the Three Parallel Rivers World Natural Heritage Site, is a global biodiversity hotspot. The Yangtze, Mekong, and Salween rivers flow through this region at close distances to each other. The mountain ranges between each watershed host a range of ecological zones, from arid valley floors through deciduous and evergreen forests, to alpine mosaic at altitudes of up to 6500 m. The region is also home to more than 10 ethnic groups, including the Tibetan, Yi, Naxi, Lisu, Pumi, Bai, and Nu ethnic groups. Poverty levels are high in the upland areas, and livelihoods are affected by a variety of risks. While many organizations' interest in the region focuses on environmental and biodiversity conservation, a concern for livelihood sustainability is essential if conservation efforts are to meet the interests of local populations.

For many upland communities in the region, livestock—including yaks, cattle, sheep, goats, pigs, pack animals, and poultry—play essential roles in livelihoods. Agropastoralist livelihoods in the region can be characterized by 2 features: the importance of crop–livestock interactions, and transhumance. Animal manure and traction power are essential to maintaining agricultural yields. Much of the agricultural harvest is in turn used to provide fodder grains for livestock. When the main crops are growing near the villages in summer, livestock are herded to alpine meadows. This not only

ensures that livestock do not damage the crops, but also makes use of the nutritious natural fodder available at higher altitudes.

Many rangelands in northwest Yunnan are forest rangelands. Forests are also important for providing bedding for livestock pens, which is then applied to the fields as fertilizer. Non-timber forest products (NTFPs) are often a major source of cash income for meeting households' consumption needs. In addition to providing manure and plowing services, livestock also provide herders with a variety of products, including wool, milk, butter, and meat, some of which are sold for cash. Many villagers comment that small livestock, such as chicken and goats, are used like 'small change' with which to purchase daily necessities. Larger livestock are often only sold when a major investment is planned, or in case of emergency.

Members of agropastoralist communities often have rich indigenous knowledge relating to animal husbandry. Surveys have found that experienced herders are able to list and elaborate on the properties of more than 50 species of fodder grass (Figure 1). A range of indigenous practices can be found that enhance animal productivity, such as feeding chicken or goat meat to cows after they have given birth, thus increasing milk yields and promoting ovulation. Traditional social arrangements between relatives and neighbors are a common way of mobilizing labor for herding. Given that the availability of natural fodder resources varies greatly over space and time, most transhumant communities have their own—traditional or more recent—arrangements for managing the use of grasslands.

FIGURE 1 A farmer using his local knowledge in evaluating the characteristics of the exotic black rye grass (*Lolium perenne*) in comparison to local fodder sources and in experimenting with different planting methods. (Photo by Andreas Wilkes)



FIGURE 2 Technician explaining the Villager Experiment Groups to assembled villagers.
(Photo by Andreas Wilkes)



"I've learned how to chat with the villagers and build relationships with them ..."
(A grassroots technician)

Economic and policy changes

While the day-to-day management of livestock often still relies on traditional knowledge and institutions, northwest Yunnan has been changing rapidly in recent decades. These changes have brought both opportunities and threats to agropastoralist communities.

With rapid overall economic growth and investment in basic infrastructure in the region, economic opportunities have increased for many. For some communities, non-traditional activities, such as truck driving, have become important sources of income. Other communities have been able to make use of local resources to benefit from tourism, or collect marketable NTFPs, such as matsutake mushroom. Along with these changes, animal husbandry has also changed. In some communities, fewer households are grazing on the alpine meadows in the summer, as the attraction of alternative income sources makes the traditional herding patterns more difficult to sustain. In some cases, this has been putting pressure on grasslands at lower elevations, which are now grazed all year round. Elsewhere, increased marketing of livestock products has introduced

new diseases with which indigenous veterinary medicine is unable to cope.

Recent natural resource policy changes have also affected agropastoralist livelihoods. A ban on commercial logging was enforced in 2000, removing the main cash income source of many communities. The government has also taken active measures to promote the conversion of steeply sloped farmland to forest. In some communities this has reduced fodder supplies and made free-range grazing difficult, as the newly planted saplings must be protected.

Despite their efforts, veterinary and animal husbandry service agencies have not been able to meet the needs of communities in many areas. Technicians spend little time in the villages and often have a poor understanding of community members' needs. They often only engage in extension activities when project funds become available, and mostly promote technologies that superior agencies think are needed, rather than what the communities themselves feel they need. Alpine grasslands are not an important resource for animal husbandry in the other parts of Yunnan, so with regard to research on grassland management and the development of appropriate management practices, Yunnan has lagged behind other parts of China.

Innovation for sustainable livelihoods

Since 2003, CBIK (a local NGO devoted to biodiversity conservation and community development in ways that draw upon local cultural resources), working in partnership with provincial and local animal husbandry bureaus, has been implementing the 'Enhancing the Livelihoods of Agropastoralists in NW Yunnan' project. Funded by the International Development Research Centre (IDRC) in Canada, the project aims to enhance the capacities of villagers, technicians, and other stakeholders to develop appropriate technological and institutional interventions to support agropastoralist livelihoods. Supporting innovation has been a focus of the project's activities.

In order to address the gap between service agencies' activities and community

FIGURE 3 A woman observing whether her cattle like to eat silaged cornstalks. (Photo by Andreas Wilkes)



needs, CBIK staff have been facilitating local extension agencies to engage in fruitful collaboration with local communities. The main approach adopted is Participatory Technology Development (PTD). Following participatory surveys, technicians help interested community members to form Villager Experiment Groups, each of which focuses on developing appropriate solutions to specific problems (Figure 2).

Establishing Villager Experiment Groups

Following participatory surveys, villagers identify the main problems affecting livestock raising. Survey results are shared at a village assembly, and problems selected as the focus for future experimentation. Villager Experiment Group members are recommended by the assembly. To date, groups have been formed around fodder supply, chicken disease prevention and treatment, and pig raising. Because women are mainly responsible for raising pigs and chickens, most experimenters are women (Figure 3). Publicly announced group rules stipulate that members must share the results of experiments. If experiments are successful, they must also make a plan for how to let other villagers have access to the skills and technologies needed. Farmer-to-farmer training and community-managed revolving drug funds are among the mechanisms devised by villagers to extend successful technologies (Figure 4).

The importance of local knowledge

In this process, we have been encouraging both community members and extension workers to pay attention to the potential of local knowledge. For example, villagers in Bahang hamlet were almost unanimous that winter fodder shortage was a major problem affecting cattle health and milk yields. A group began to experiment with exotic fodder grass species. Although the grasses grew well, several of the farmers rejected them. They explained that cattle health depends on maintaining 'vital energy,' and that although the grasses were good, they were not as restorative of 'vital ener-

"People without silage fodder, their cattle died in the heavy snowfall. Even though I have the biggest number of cows in the hamlet, they all survived the snow. Everyone can see the benefits now." (A farmer who experimented with silage fodder)

"Before, we could never eat the chicken we raised—they always died before we had the chance. This year we ate more than 10!" (A woman experimenter)

FIGURE 4 Project staff discussing establishment of a revolving drug fund with villagers. (Photo by Gao Zhixiong)



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gy' as traditional winter fodder crops such as turnips (*Brassica* spp) and radish (*Raphanus* spp). Further discussions revealed that to grow more of these crops, they needed fencing for arable fields close to their houses. The project then facilitated groups of households with adjacent fields to erect temporary fences using locally available bamboo, and to plant thorny plants around these fences that will grow into permanent hedgerows.

In another community where exotic grasses had been accepted, but where bamboo was not available, the logging ban had made it difficult for villagers to fence the plots effectively using timber fencing. Following discussions with villagers and local technicians, the project invited a specialist to train villagers in how to propagate live fencing material by taking cuttings from locally available plant resources. After 2 years of experimentation, villagers have now mastered

the propagation of these plants and have set their own regulations stipulating how many plants each household must plant in order eventually to be able to replace the rotting timbers of the pasture fence.

Rangeland management

The management of natural grasslands is another focus of the project. In some communities where grazing on alpine meadows in the summer months has decreased in recent years, pressure on lower altitude rangelands has increased. One sign of this is the intrusion of non-edible plants (such as rhododendron) into these rangelands. Traditionally, prescribed fire was used to control these plants, but this measure has been restricted by regulations aiming to prevent forest fires. The project has been working with experts and community members to evaluate the impact of different fire regimes on the structure of grassland plant communities, with the aim of producing a prescription for fire use that is acceptable to both forestry departments and community members.

In another community, the spread of a species of dock (*Rumex nepalensis*) has reduced the productivity of some major summer pastures used by herders from several hamlets (Figure 5). On the one hand, we have been engaging in collaboration with volunteer villagers to develop methods to control the plant. On the other hand, we have assisted the community in developing and implementing a temporary ban on grazing in the worst affected areas, and in developing management regulations for pasture use in general. These activities have attracted the attention of government departments with whom CBIK is now discussing the adoption of co-management as an approach to grassland management on a wider scale.

Issues and perspectives

The space for local NGOs to work in China is perhaps not as great as it is in some other countries in the region. In recent years, however, the Chinese government has become increasingly aware of the potential of NGOs to provide services which the government itself is either not providing or incapable of providing. Many NGOs, on the other hand, see great potential in the government, given the geographical reach and greater resources that it can command. The challenge for NGOs such as CBIK is how to transfer successful experiences and working approaches to the government.

CBIK's collaborations with local veterinary and animal husbandry service agencies are beginning to show that participatory approaches to technology development can be applied by government technicians with agropastoral communities. But before these approaches can be institutionalized as common procedure in grassroots extension agencies, many issues must be worked through, such as the compatibility between a participatory approach and the standard target-driven project appraisal procedure used in government projects.

Similarly, promoting grassland co-management at a local policy level is another challenge. In recent years the dominant approach supported by the Chinese government has been to support de facto privatization of pasture, often accompanied by fencing in order to be able to define property boundaries and calculate stocking rates. In some provinces, grazing on natural pastures has been banned outright. Even after practical approaches to initiating co-management regimes have been developed, influencing the wider policy environment will be necessary before fruitful dialogue between communities and government agencies can be fully recognized as a beneficial approach to dealing with the issues that agropastoralist communities face.

"If we continue learning, in 1 or 2 years' time our overall skills level will have risen. So even though the funding is small I'm very pleased to have the chance to work with CBIK." (An official)

"In the 1950s we were shunned for being 'landlords' and no-one would help us. Now the project works with us. I would have never imagined this before." (A woman who took part in grass experiments)

FURTHER READING

Reports of CBIK project activities and related research can be found at http://www.cbik.ac.cn/cbik-en/cbik/our_work/livelihood/idrc.htm.
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