



Time for change at the top

Tibet is on the highest plateau in the world but its people have some of the lowest incomes. Developing a dairy industry may help narrow the gap, reports **Rebecca Thyer**

Steeped in tradition: a dairy farm among the peaks of Tibet.

On the roof of the world, demand for dairy products such as milk, cheese, yoghurt and butter is increasing at a rate of 20 percent each year. To meet Tibet's growing demand, dairy goods such as butter are being imported. Meeting this demand domestically could not only help Tibet's farming communities increase and diversify their income, but could also lead to significant export opportunities to other parts of China.

At an average of 4875 metres (more than 16,000 feet) above sea level, Tibet is on the highest plateau in the world. However its people survive on the lowest incomes in Asia, with most relying on subsistence farming.

And like many customs in Tibet, agricultural practices are steeped in tradition. Generally, there is little research devoted to agriculture and limited scope to adapt to rapidly changing lifestyle expectations, production goals and market opportunities.

However, by updating farming practices and assisting Tibet's agricultural and animal scientists, three ACIAR-supported projects aim to move the region from a subsistence-based agricultural

structure to one where farmers not only meet domestic demands but also have the potential to market their products elsewhere in China.

The projects – increasing milk production, intensifying grain and fodder production and improving rodent control (see facing page) – are different in approach but share the same goal of improving agricultural practices and therefore communities' wealth.

In collaboration with the Tibet Academy of Agricultural and Animal Sciences and the Tibet Livestock Research Institute, ACIAR's 'Increasing milk production from cattle' project is looking at cow nutrition.

The project leader, Dr Alan Kaiser from the NSW Department of Primary Industries, says cow nutrition is a key issue to resolve: "Poor cow nutrition is currently the major constraint to increased production.

"So, developing better feed systems (and an annual feed calendar), utilising crop residues, forages and by-products, will substantially improve nutrition and milk production – creating conditions for establishing a specialist dairy sector in Tibet."

Controlling the pika without poison

Scurrying around in the Tibetan grasslands is the native plateau pika, a small, furry mammal related to rabbits and hares that is often blamed for the degradation of the grasslands, the major component in livestock diets. These small creatures compete with livestock for food and can spread disease. Improving their management is vital if Tibet is to improve its rates of agricultural production. Until now, Tibetan farmers used non-specific toxins to control these animals, but these methods can also harm other mammals in the grasslands.

Under the ACIAR project *Improved management of small mammals in Tibetan grasslands*, techniques are being developed to improve the efficiency of rodent control.

The project's leader, Dr Roger Pech from CSIRO Sustainable Ecosystems, says: "Grasslands are used for livestock grazing, and because of the huge increase in the number of livestock between the 1950s and 1970s, grass is now less than one centimetre high in most places."

These changes have resulted in conditions that favour small mammals; pikas are usually found in short grass. "The big increase in livestock numbers has changed the landscape, so problems with small mammals are occurring more often than they used to. And Tibetan reaction has been to treat the symptom and not the cause," he says. "In this case they poison the pikas, but this doesn't address what's changing the landscape."

"Although the project's most direct outcome will be advice on better control, our ultimate aim is to improve the grasslands for production. We want to come up with an ecological way of managing the pest to allow farmers to run productive livestock."

Dr Pech says that Tibetan farmers currently spend a lot of money on control, but research is needed to establish if this is effective.

"We also need to address whether grasslands can be looked after better to stop problems arising as they currently do."

Dr Pech says work carried out with two Tibetan scientists and their colleague from Qinghai showed there was little difference between pika numbers in untreated areas and areas with recent control – so current control programs appear to have limited impact. And current methods for conserving grass for livestock, by fencing areas to let them grow, are benefiting pikas.

"We expected to find that areas that are grazed all year and have shorter grass would have more pikas. But we didn't find this at all. We found that areas that were fenced in the summer to conserve forage for winter had more pikas."

Dr Pech says that farmers may need to move to a system of longer grass and fewer animals before there is a shift in pika numbers. "It may be better to have fewer, but healthier animals."

However, social changes are also having an impact on the region and researchers are mindful of the effects they may have on the agricultural industry. For example, the system of land tenure is changing so that more property is privately owned and therefore fenced. "We want to show people what effects fencing will have – it's important knowledge for them. So we are also looking at fenced versus unfenced areas and whether this can change the management of the land."

Dr Pech says more people are also embracing town life. "Changes in land tenure make people more sedentary and therefore cause changes in the landscape. Nomadic systems have evolved for a reason and fencing, through privatisation, makes a nomadic lifestyle impossible."

"It's not hard to get the researchers thinking about new things, but taking them beyond that is. Many of them have never done on-farm research with key measurements before," Professor Coventry says.

His visits to Tibet are timed strategically to coincide with winter and spring sowing. "Winter crops of wheat and barley are sown in October, while short-session spring crops of wheat, barley, pulses or corn are sown in April."

Weed management, tillage and varietal choice are areas that have been identified for improvement. "It all sounds simple, but the culture and tradition of farming makes change difficult."

Professor Coventry says making any changes, such as updating varietal choice, needs to be done with consideration for the whole package. "If we update a variety but then do little with weed control, the change will make little difference."

Likewise, both project leaders stress that transferring knowledge to emerging agricultural scientists and working with farmers to show tangible benefits will be essential in further developing Tibetan agriculture.

In a linked project, 'Intensifying production of grain and fodder in Central Tibet farming systems', Professor David Coventry from the University of Adelaide is exploring ways to improve feed systems for all livestock, not just dairy cows, as this is integral to improving agricultural production.

He says that while cropping in central Tibet's river valleys provides sufficient produce for human needs, there is little excess for use as fodder. But there is scope to intensify production during Tibet's limited, but productive, growing season.

Professor Coventry says improving animal feedstock is important in alleviating poverty, as animals provide a significant income source. "Most farmers produce enough grain for their own needs. If they can produce more, they can improve animal productivity and therefore get a disposable income. This extra money can also be put back into the land, allowing them to purchase things like fertiliser and increasingly improve production rates."

Dr Kaiser agrees: "Feed is the most limiting factor for milk production." As little milk is produced on the hills, his team is looking at developing an industry on the valley floors, where milk production can be integrated with crop production. "Our starting point is to examine the link between feed inputs and milk production on 100 smallholdings spread through the valleys of central Tibet," he says.

Currently farmers undertake a 'cut-and-carry' operation, where cows are mostly tethered and food is brought to them. There is limited grazing. Dr Kaiser's team is looking at making use of more land for dairy production, producing forage crops that can be preserved and examining the use of crop residues and by-products.

"But we are also considering grain," he says. "Grain prices are low relative to milk prices, so it could be economical for dairy farmers to use grain supplements to improve energy intake. Our starting point is to develop a feeding system appropriate for Tibet that can be further refined as a specialist dairy sector develops. It is about developing a milk production system for the future, but also satisfying the immediate need. The project will improve the productivity of the farmer, providing better incomes, and more milk will be available for local markets and for improving human nutrition."

Currently, there are very few specialist Tibetan dairy producers, he Dr Kaiser, and the government is aiming to develop a farming sector that specialises in milk production. To emphasise the clear link between feed and milk production and to encourage the adoption of better feeding practices by farmers, the first part of the three-year project is being conducted on farms.

"This participatory approach will have real benefits for farmers," he says. "They won't only have to rely on research results. Instead, they can see the tangible benefits from better cow nutrition under typical farming conditions. As a result it is more likely that the technology will be adopted by the farming community."

Professor Coventry also believes it is vital to involve local researchers and farmers. "The first phase of our project involves building human capacity. Last year, three young scientists were involved in the project, which helped build their language and research skills, and they created an 'on-farm' research plan. This year two new scientists, who are already in Adelaide, will look at building on this plan."

He says it is important that Australian researchers not only create a dialogue with their Tibetan counterparts, but that they also build up a relationship with the farmers.

"In developing Tibetan research capacity, it can't be in isolation from the farmers, and for that reason we need to train ethnic Tibetans, so they can converse easily with the farmers."

It is also important that Tibetan researchers follow a farming systems approach.