CIRNMA: People's Choice Award at CGIAR Innovation Marketplace 2004

As the wind begins to whip and the sun settles on the altiplano, the flat highland plain more than two miles above sea level in Peru's Puno department, Eli Paredes knows it is time to start rounding up his cattle for the night.

A few years ago, he would merely have made sure the cows were tethered for the night and then gone about his other chores, leaving the animals outside to face rain, hail and freezing cold altiplano nights.

The traditional way of tending to cattle in Ticani, where Paredes lives, and neighboring villages began to change two years ago with the start of a program sponsored by the Center for Research on Natural Resources and the Environment, CIRNMA, a local non-governmental organization. The dairy program involved constructing stalls and new water troughs for cattle, and growing better-quality fodder for use in the dry season, when pastures are barren.

Paredes and his neighbors eke out a living under adverse conditions. Buffeted by alternating years of flood and drought, exacerbated by hail, extreme temperatures and altitude, they have generally just produced enough to feed their families. The altiplano is one of the poorest areas of Peru, historically looked down upon due to its distance from the capital and its mostly indigenous population. Nearly 90 percent of heads of households in Puno speak a language other than Spanish, Peru's official language, as their mother tongue.

While protecting cows from the cold may seem like a simple step, it has had major impact on Paredes' income, and the effect has rippled through the economy in Ticani and the surrounding countryside.

"Before the program, our cows were giving two liters of milk a day. Today, they are producing between five and six liters daily. Our goal now is to double production in the next year," said Paredes.

Dairy farmers weighing the milk for sale

Keeping the cows warmer at night has led to the higher milk production, which in turn has boosted income for farmers and bolstered the entire dairy industry. Farmers like Paredes are earning on average an additional $140 per month, an important increase given that per capita annual income in Puno is only $1,260. Puno is the third poorest of Peru's 24 departments, with 78 percent of its 1.3 million living in poverty.

The farmers in Ticani and other villages are supplying a small cheese factory, also part of the CIRNMA project, which absorbs 98,000 liters of milk to produce 12,200 one-kilo blocks of cheese annually. The cheese-maker is earning an average of $240 monthly, while vendors selling the cheese have increased their monthly income by $103.

Local economies are being bolstered by dairy production

The dairy project is only one component of a much broader program spearheaded by CIRNMA to examine traditional systems of livestock and crop production and natural resources management on the altiplano and use them as the basis for new methods that increase income and reduce poverty. Although CIRNMA receives international assistance from a number of sources, since its founding in 1992 it has been most closely linked to the International Potato Center, based in Lima.

"The potato is the central element of the diet in the altiplano. No effort to reduce poverty, however, can focus simply on one crop or product, but the entire system. We are interested in how families and communities relate to the market and making this market relationship more equitable for them," said Roberto Valdivia, CIRNMA executive director.

The underlying methodology of the program is to identify products with a comparative advantage and help farmers develop the tools necessary to penetrate or create markets for these products. The program's components have developed in different ways, but each has allowed participants to increase their incomes while involving them fully in the process.

The principal target of most of the programs – dairy, tuber, meat and fish production – is to fill niches in the local market, including Puno and the neighboring departments of Arequipa, Cusco, Moquegua and Tacna. The component focusing on quinoa, a high-altitude grain, is geared not only for local consumption, but the national and international market as well.

Fields of gold

Quinoa has played a key role in the diet of the altiplano for millennia, supplying inhabitants with protein and vitamins otherwise scarce at such high altitudes. The World Health Organization rates the quality of protein in quinoa as equal to that in milk, and it contains high levels of potassium, riboflavin and niacin.

The quinoa program developed by CIRNMA and participating communities is multi-pronged, aimed at improving the product, increasing family incomes and promoting the benefits of the grain. The first step in the process is for farmers to join together in an association, because CIRNMA only works with organized communities and not individual farmers.

Once the farmers are organized, CIRNMA staff members provide technical assistance for improving crop yield and the final product, as well as work with the

farmers to create their own productive associations. For the past few years, they have also been working with farmers to make the transition toward organic production, thereby creating a new and more profitable niche market for the grain.

CIRNMA has also created a for-profit company to work specifically with quinoa, buying the grain from farmers, processing it and making contacts for sales in Peru and abroad. The quinoa processing plant can hold up to 100 tonnes quinoa at any given time. Its 16 employees carefully shepherd the quinoa through a series of steps from removing a bitter residue formed on the grain to protect it from the intense altiplano sun to packaging it for sale. The processing plant like the farms where the quinoa is grown has been approved by, Biolatina, an organic certification company. Last year, the plant produced 20 tonnes of organic quinoa. Farmers participating in the quinoa program receive a higher price for the grain. CIRNMA pays farmers an average of $0.50 per kilogram of quinoa, which is nearly double the production cost. Local traders pay about $0.30 per kilogram.

Quinoa stalks ripen in the Puno sun

Nearly 200 farmers took part in an early December 2004 workshop on organic quinoa production sponsored by CINRMA. The participants were given quality-control worksheets to detail the steps undertaken in the current quinoa cycle, which will end in April-May with the harvest. CIRNMA has already negotiated one 5-tonne shipment of quinoa to a Japanese company and is hoping to finalize several more.

Of the farmers who have received organic certification or are in the transition phase toward organic production – the transition period takes three years – Petrolina Waira stands out not only for her enthusiasm for the program but also the results obtained on her small farm.

Yield from Waira's three hectares of quinoa has been increasing since her community first began working with CIRNMA in 1998, nearly tripling in six years to 1,500 kilograms per hectare. She has taken the lead for the program in Vilque, west of Lake Titicaca, where she lives in a traditional mud-brick home with her husband and two children. She has converted a small room into a meeting house for the 18 farmers in her area involved in organic agriculture. The farmers meet once a month to discuss production and new techniques, such as composting or worm-raising.

"CIRNMA's technical assistance has improved production and allowed us to implement new techniques. We are now fully organic, which is better for our health and the land. Our ancestors never used fertilizers or pesticides, we are returning to our roots," she said.

Sweet conservation

On the southeast side of Lake Titicaca, Sofia Marquez is working with another traditional crop under the auspices of the CIRNMA program. She is the manager of one of seven small cooperatives that have formed in Yunguyo, near the Bolivian border, to process oca, a local tuber, into marmalade.

This program is aimed at improving the livelihoods of local residents while at the same time conserving the oca (Oxalis tuberosa). Yunguyo was identified as the site of the project because of the number of varieties of oca found there. Puno is the principal producer of oca in Peru, with 29,000 tons grown on slightly more than 4,000 hectares. There are approximately 1,800 hectares of land in Yunguyo planted with oca.

CIRNMA began working in Yunguyo and surrounding area in the early 1990s, looking for ways to preserve the oca. The organization's research, which focused on family production, found that the different varieties of oca changed with each harvest. Valdivia said that one family, for example, worked with nine varieties of oca in 1994, while researchers counted seven varieties the following year and 16 varieties in 1996.

Oca is traditionally grown for family consumption with the excess bartered for other products or sold in weekly farmers' markets common throughout the Peruvian highlands. Marquez said that women would make homemade marmalade when there was an abundance of oca, but no one ever considered marketing it.

Sorting oca for marmalade production

The oca project, which got underway in 2003 with cooperation from the World Bank, involves 42 families in Yunguyo who have formed seven farming cooperatives that grow oca. The cooperatives have formed a company, Yungauyo, to produce and sell oca marmalade, under its own brand name, Wiñaymarca, which means "eternal place" in English. The cooperative produced 7 tons of marmalade in 2004.

To make the project more manageable, the participating families and CIRNMA technicians decided to focus on three different colors – yellow, reddish and purple – of different oca varieties.

The seven cooperatives take turns one day a week producing oca marmalade in a small plant they equipped with low-interest loans from CIRNMA. The immediate goal is to sell the product locally and slowly expand to the neighboring departments of Cusco and Arequipa, where oca is also consumed. If all goes as planned, the cooperatives will earn roughly $11,000 from their marmalade.

"We all work together, because we are all benefiting," said Marquez. "The only way we are going to get ahead is by developing our own industries."

Getting the marmalade business off the ground has been slow, because of the reams of paperwork needed to register a company, obtain health and sanitary permits and, most importantly, legal recognition from the tax agency, SUNAT, to sell products and emit receipts. It took more than 12 months for Yungauyo to receive all the necessary paperwork. The cooperatives began selling their marmalade in November 2004.

"We did not want to start without having all the paperwork done. We wanted everything to be legal," said Alexander Cuadros, a former CIRNMA staff member now working fulltime with Yungauyo.

A new use for Titicaca

In nearby Juli, farmers growing potatoes, oca and other crops are supplementing their monthly income with help from Lake Titicaca. A project to raise trout in fish farms, started years ago by CIRNMA and the International Potato Center as a way of improving local diets by adding a new source of protein, has grown into a cross-border program taking advantage of Puno's principal resource – Titicaca, the world's highest navigable lake that covers 8,200 square kilometers.

Carlos Leon-Velarde, an agricultural systems specialist at the International Potato Center and link to CIRNMA since its start, said the families involved in the trout project have basically dictated its development. The first change came when participants noticed that other fish-farming projects were working faster if the fish were fed prepared pellets. They started feeding their trout pellets. The next step was to move to the lake and to form associations.

"The lake is our most important resource, but we were not using it. We decided it would be better to have the trout in lake pens. They develop faster and are healthier," said Alberto Muje, vice president of the Juli Association of Trout Producers, which groups together 24 families.

Juli trout farmers checking the cages

The Juli association, which was formally incorporated in 2003, is producing 24 tons of trout annually, selling most of the fish in Cusco, Peru's top tourist draw. With a loan from CIRNMA, the association has installed modern cages and built a 76-meter conveyor belt that carries the trout from boats up to a small processing plant. The trout are gutted, filleted and iced for the 150-kilometer trip to a packing plant at CIRNMA. Each family in the Juli association is earning approximately $800 annually from trout.

"This program is extremely important in terms of income for these families. They are nearly doubling their annual income," said CIRNMA's Valdivia.

The 24 families meet every 15 to deal with basic chores, such as ensuring the cages are clean, but also to plan for the next fish harvest. The association has recently invested $10,000 to import hundreds of thousands of trout ova from the United States to guarantee the program's future.

"We are improving the process and our business every day. The new conveyor system and preparation facility, where the fish are cleaned, will improve things more. Working in a large group is not always easy, but we have not had any problems," said Muje.

"Andean appetizer"

The newest component in CIRNMA's program focuses on alpacas, an Andean camelid related to the llama and used for fiber (wool) and meat. The organization has recently installed a small plant to process alpaca meat into smoked meat and other products. The organization is actively looking for community associations or group interested in producing alpaca-based products as part of a new micro-enterprise.

The project got underway in May 2004 and, so far, has trained 40 people in how to make sausages, hotdogs and smoked meats using alpaca meat.

"Our idea is to get groups to use the plant to produce a product that can be sold locally. We have tested the smoked meat in restaurants and hotels catering to foreign tourists and the reception has been quite good. Our idea is that the smoked alpaca can be served with locally produced cheese as a kind of Andean appetizer," said Valdivia.

Leon-Velarde said the production of alpaca meat is a solution to several problems. Alpaca herders thin their herds, eliminating males and keeping females for reproduction. The adult males that are eliminated are generally used to make a jerked meat, known as *charqui*. The jerked meat may be sold, but more likely than not it is kept for family consumption or for bartering. It is also prepared in conditions that could lead to illness. This new business could improve the way the animals are slaughtered, as well as create a new source of income.

Organized groups working with CIRNMA are studying the possibilities of getting involved in this new enterprise. The groups producing oca in Yunguyo, which have only recently started selling their product, are already looking at smoked alpaca meat as a way to diversify.

"We have to continue looking for opportunities. The work we have done to organize the oca marmalade has taught us that we can operate a business," said Sofia Marquez.

Her enterprising spirit is exactly the kind of result Valdivia and the other staff members at CIRNMA hope for from the project.

"Our goal is to work with associations that produce quality products that have a space in the market. This is the only way to overcome poverty on the altiplano. Our projects have already bolstered family economies and are beginning to have an impact on the region," said Valdivia.

(Author: Lucien O. Chauvin, December 2004)