

Improving the performance of indigenous sheep breeds

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In the semi-arid regions of the Andes, in Peru, Bolivia and northern Chile, ancient pastoral systems are part of daily life. In *Región Inka*, located on the eastern side of the Andes mountain range in Peru, sheep keeping is part of a traditional culture that is characterized by strong family ties and community structures. People live in *comunidades campesinas* or farm communities that have their own organization and are represented by elected community members. The communities own the land and are responsible for the management of common resources including land and water. Families are given access to land on a usufruct basis and all families have access to the communal pastures. Collective labour based on principles of reciprocity, cooperation and solidarity is the rule.

Being a mountainous region at tropical latitudes, *Región Inka* displays diverse landscapes at different altitudes. At altitudes of between 3000 and 4500 metres, there are two distinct eco-regions: the *Qheswa*, characterized by a temperate climate, where people grow crops such as maize, potatoes, broad beans and grain crops as well as keeping livestock, and the higher, colder *Puna* area, where people depend on extensive livestock keeping with sheep, alpacas or llamas. Indigenous breeds of sheep are the most important livestock component and they are usually taken care of by women and children, who accompany the herds on their grazing trips. Women are very attached to their sheep: *the sheep help in every way*, they say. Sheep provide a family with meat, wool and manure. The wool is used for the production of crafts (woven textiles, ponchos, etc.). The sheep provide money to the family in times of need, since they can be sold at any time of the year. Sales of meat, wool and crafts also provide an important source of income and help mitigate the risks involved in farming.

A perfect fit

Indigenous animal breeds are extremely valuable for millions of small-scale farmers worldwide. They often perform much better than “improved” breeds, because of their good adaptation to specific natural and social environments. This is also true for

indigenous breeds of sheep in the Andes, which are very sturdy and resilient. They are adapted to climatic extremes because they possess a good thermoregulation capacity. The sheep also resist tiring walks over long distances and are adapted to the steep and irregular terrain. They have the capacity to survive periods of food shortage by using their body reserves, but once food supplies are available again they quickly recover their strength. Their foraging behaviour is very efficient and they are capable of finding sufficient grasses and herbs even in areas with sparse vegetation and their digestive systems are adapted to the different types of vegetation in the area. They are also resistant to infectious and parasitic diseases common in the area, such as *Fasciola hepatica*, and intestinal problems caused by worms.

Indigenous sheep have a good reproductive capacity, partly because females come into heat independently of the season. The females also have a well-developed maternal instinct and are easily milked and the animals’ lifespan is long.

These excellent physical characteristics form the basis for their economic significance for the farmers. The sheep thrive in, and generate value from, the extensive marginal areas of the high Andes, with minimum use of external inputs. They make good use of harvest residues such as stubble, straw and dead leaves. Sheep raising is relatively uncomplicated, without much investment needed.

Attempts have been made to introduce “improved” sheep breeds (Corriedale or Hampshire Down) into the area, but without success. Predictably, the improved breeds were not adapted to local conditions, including the limited animal husbandry practices. In addition, the meat of improved breeds was not accepted, because it is much fattier and stronger tasting than the lean meat produced by indigenous sheep.

Recovering from neglect

In Peru indigenous livestock breeds have been consistently neglected at policy level and by field technicians. This is also true for indigenous breeds of sheep, even though they represent a major part of the total national livestock. This long-term neglect, expressed in the lack of research and extension programmes to improve animal husbandry practices for indigenous sheep, has led to a very low productivity per head.

Within flocks the individual animals are often closely related to each other as a result of the absence of any conscious programme of selection and breeding. In addition, farmers have traditionally regarded their sheep as a savings bank rather than an animal for production purposes. They often sell the biggest animals, thereby creating a negative selection and reducing the quality of their flocks and their productivity.

However, this has started to change as different actors, including the farmers themselves, have become aware of the situation and have started to work on improving the indigenous breeds. One of these initiatives was started by the NGO *Asociación Arariwa del Cusco* and the association of indigenous sheep breeders *Asociación de Criadores de Ovinos Criollos* (ACOC). Together they identified three major work areas: selection and

Photo: Author

breeding of indigenous sheep; training of breeders; and access to niche markets. On this basis they developed a programme for the improvement of indigenous sheep in the *Qheswa* and *Puna* areas. While these two organizations are the driving force, other actors, such as the Agricultural University, the Ministry of Agriculture and other NGOs, have also become involved.

Breeding

There is a great, yet untapped, genetic production potential for indigenous sheep in the country, which is expressed through the high variation in milk capacity, live weight, and fertility observed in the country's sheep herds. The members of ACOC realized that it was necessary to set up an exchange system between different flocks for breeding animals. This would overcome the high level of close blood relationships within the flocks, which depresses productivity and increases the number of genetic defects. They established a number of criteria to guide the breeding programme and make it effective:

- Elimination of the most common genetic defects
- Selection within each flock of females based on milk production, live weight, fertility and total annual weight of lambs per female at the time of weaning;
- Selection of lambs for breeding purposes based on the increase in live weight, development and conformation.

Special care was taken in this selection process to avoid losing the traits of sturdiness of the indigenous breed.

Training

A second objective of the association is to provide education and training to the breeders, both women and men. Farmers need to change from "sheep owner" to "sheep breeder", something which does not happen overnight but requires a gradual process of awareness raising and improvement of knowledge and skills. This process needs to be facilitated by technicians who can collect and process information and feed it back to the breeders. The breeder needs to learn to perceive changes and to interpret them, and thereby improve his/her knowledge. It is a process whereby breeder and animal evolve hand in hand. The technician also provides guidance in the socio-cultural process of change in which husbandry practices are adapted and a relationship to the market is developed.

Marketing

Another objective of the ACOC is to obtain more benefits from markets by selling better quality products (animals for breeding purpose or meat) at a better price. Market access has been enhanced through participation in local and regional livestock fairs, where member farmers can offer good quality products and show that they are good breeders. At the same time the ACOC is trying to develop certain niche markets. The meat of indigenous sheep has several advantages over imported meat produced on industrial farms: it has a better taste, is produced in the region and can be sold as "ecologically produced".

Arariwa stays involved in ACOC's activities. It supplies a technician who monitors and assists the selection and breeding activities. *Arariwa* is also involved in the technical training of farmers, for example on animal health, feeds, general husbandry, and the NGO assists in the marketing programme.

Progress and plans

At present the ACOC represents a total of 132 breeders and the association makes use of 24 herds for selecting animals. During the past ten years of selective breeding the average birth weight of the lambs in these herds has increased from 2.5 kg to 3.9 kg,

and the average weight of the ewes has increased from 29.7 kg to 37.3 kg. Daily weight increase in lambs has increased from 97 g per day to 123 g per day.

Table 1 shows some of the major traits of the six herds that have been in the programme for more than seven years.

Table 1. Important traits of six sheep herds at the end of 2004, after a seven-year selection period.

Characteristics	Average	Minimum	Maximum
Live weight adult ewe (kg)			
- Herd A (n = 25)	26.3	20.4	32.7
- Herd B (n = 46)	27.1	20.9	29.5
- Herd C (n = 55)	28.1	21.8	34.5
- Herd D (n = 47)	31.3	24.5	43.1
- Herd E (n = 26)	28.9	22.7	34.5
- Herd F (n = 56)	31.7	24.5	38.1
Age at time of first delivery (months)	20	11	30
Daily increase in live weight (in grams)			
of lambs in the 1 st month after birth	119.5	42	232
Lambs that survived until weaning (%)	91.8	82.9	97.9
Live weight (kg) of female lambs			
at weaning time	13.73	11.8	17.3
Live weight (kg) of male lambs			
at weaning time	14.91	11.2	17.6
Ponderal productivity of ewes (kg)	8.26	4.32	13.7

Source: Programme for improvement of indigenous sheep breeds (Asoc. Arariwa)

Ten years of breeding through selection has led to an improvement of several production and fertility traits of indigenous sheep, an increase in the productivity of the flocks, and an improved income from selling slaughtered animals or animals for breeding purpose. Members of the ACOC have received training on aspects of breeding and on improved animal husbandry techniques related to feeding, reproduction and veterinary care. They are now in a better position to carry out further improvements in the management of their livestock, including proper selection and exchange of breeding animals, elimination of poorly producing animals, primary veterinary health care (parasite control and proper dosing of medicines).

A start has been made to access the niche market of "ecologically produced" meat for high-class restaurants and for the tourism industry. Much progress still needs to be made but ACOC and *Arariwa* feel that there is a lot of potential and that it is worth making the effort. Firstly, sheep meat has to become part of the gastronomical menu of the restaurants frequented by tourists. Another "bottleneck" is setting up a production chain that complies with the sanitary requirements of this market. This requires an adequately designed and equipped slaughterhouse that guarantees hygiene, appropriate slaughtering techniques and cutting of the meat, proper drying and conservation in a cold room, and efficient distribution and sale to the restaurants. Some advances have already been made: chefs of prestigious restaurants in the city of Cusco were provided with meat of lambs of three different ages. They found the meat to be excellent, and the restaurants have shown interest in helping to develop a production chain that meets the criteria of hygiene and efficiency. ■

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