



Review of the literature on Pastoral Economics and Marketing:

South America

Report prepared for the World Initiative for Sustainable Pastoralism, IUCN EARO
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Transhumant pastoralism in South America

General features

Pastoralism, the use of extensive grazing in rangelands for livestock production, is one of the key production systems in the world's drylands. However, throughout much of its long history its reputation has been unflattering, its practitioners marginalized by sedentary cultivators and urban dwellers. Pastoral societies have risen and fallen, fragmented into isolated families or constructed world-spanning empires and their demise regularly announced, often in the face of entirely contrary evidence of their persistence. Of course, pastoral groups in South America are not an exception.

Transhumance is the regular movement of herds between fixed points to exploit seasonal availability of pastures. This is precisely the case alongside the South American Andes, a vertical movement, usually between established points and linked through routes that sometimes are very ancient. There is a strong association with higher-rainfall zones; if the precipitation is such that the presence of forage is not a problem, then herders can afford to develop permanent relations with particular sites, for example building houses. Horizontal transhumance is more opportunistic, with movement between fixed sites developing over a few years but often disrupted by climatic, economic or political change.

In South America, transhumant pastoralists often have a permanent homestead and base at which the older members of the community remain throughout the year. Transhumance is often associated with the production of some crops, although primarily for herders' own use rather than for the market. In many temperate regions, where snow is likely to block animals' access to pasture, haymaking is an important component of the system.

In the Andes, indigenous pastoralism was virtually ignored until the 1960s and the herding of south American camelids (llama, alpaca, vicuña y guanaco) was erroneously considered to be a borrowing from European traditions. But Andean pastoralism is now known to be extremely ancient (Rick 1980).

Research into the origins of pastoralism in the Andes remains sketchy. The domestication of the llama and alpaca appears to have developed from the earlier hunting specialization. Hunters who followed herds of wild animals in their movements between seasonally available pastures shifted to a pattern of transhumance.

There is a good evidence for the importance of pastoralism in the Inca Empire (and before). The importance of the herding of camelids was crucial in terms of food, cloth and transportation (see point 1.2. below)

The incorporation of the Andes into the Spanish Empire had a number of impacts in indigenous pastoral populations. The introduction of European diseases, warfare, and the disruption of native systems of production brought about massive depopulation. European animals, particularly sheep, cattle and goats, were introduced into formerly agricultural lands. The economy developed around two new centres after the discovery in the mid-sixteenth century of silver mines in the Bolivian 'altiplano', and mines in the central Peruvian highlands which produced mercury, essential to the amalgam process for extraction of silver. A series of complementary economies developed to support the mines with food-stuffs, equipment and cloth. In this period, herding populations were important in two ways : they transported goods and ore to and from the mines, and they produced wool which was woven into cloth to supply the mines. Groups of full-time caravan leaders developed, using mules in lower elevations and llamas in the higher ones. Sheep and alpaca wool was collected as tribute from pastoral populations.

In the late colonial period and in the decades after independence private estates known as 'haciendas' developed. These combined variously agriculture and livestock raising, were owned by individuals or institutions and were worked by resident labour force, or 'peones'. A number were predominantly or exclusively pastoral.

In general terms, South American pastoralism is confined nowadays to the semi-arid regions of the Andes in a habitat known as 'puna' or 'altiplano', between 3700-5000 meters above the sea level. This type of herding is found in south and central Peru, west of Bolivia, north of Chile and north-west of Argentina.

The activity of pastoralists is also important in the Patagonian Andes, in the south of Argentina (north of the Province of Neuquén and south of the Province of Mendoza), in areas and landscapes that, according to their altitude and ecological features, can not be considered as 'puna'. The activities of these pastoralists present some peculiarities and will be further developed in point 2.2.2 of this paper.

All in all, pastoralists activities in South America are present in four countries (Argentina, Bolivia, Chile and Perú¹). In Argentina and Chile it occupies marginal areas, and their economic relevance lies in their capacity to activate economic niches (goats in Northern Chile and Southern Argentina; camelids in Northern Argentina). Bolivia and Perú are, for historical, cultural and geographical reasons, in the heart of South American pastoralism and the importance of pastoralist activities is more relevant in both economies.

Incas and camelids

As it was mentioned above, nowadays pastoralism in the Central Andes Region is directed related to the eco of the indigenous culture (mostly, but not only, Incas) which, in terms, is tightly linked with the breeding of camelids. For these reasons, it is relevant to the purpose of this study to present a brief reference to the characteristics and uses of these animals.

However, it should be keep in mind that pastoralism in South America not only deal with camelids but mainly with goats and sheep, as it will be developed in point 2 of this paper.

The Camelidae family consists of a small family of mammalian animals. There are two members of Old World camels living in Africa and Asia (the Arabian and the Bactrian) and four members of the New World camels living in South America (llamas, vicuñas, alpacas and guanacos). The six of them are all very well adapted to their respective environments: the camels in harsh deserts of Africa and Asia; and their South American cousins inhabit the highlands and bush area of South America. Most of these species have been integrated into, and play very important roles in lives of the indigenous people. They have been traditionally used for transport of people and things, hides and fibres for clothing and other textile articles, and in many cases they supply meat and milk products, etc.

Camelids are in the taxonomic order Artiodactyla (even toed ungulates), sub order Tylopoda (pad-footed), and Family Camelidae. The south American camelids include two wild species, the vicuña (*Vicugna vicugna*) and the guanaco (*Lama guanacoe*). The native peoples of the Andes domesticated these animals and though selective breeding developed the llama (*Lama glama*) and the alpaca (*Lama pacos*).

Each of the South American camelids has unique qualities, value and can be used as a source of a wide range of services and products useful to humans. The animals are medium sized, with the males being somewhat larger than the females. Their heads have a straight profile. They have no horns or antlers. They have large eyes and thick lashes. The ears are long and pointed. One obvious feature that is different from camels is the lack of a hump as their backs are straight. They walk on pads not hoofs. Since they live in cold, dry places, they have very dense, wooly coats. They may kick or spit if threatened.

Llamas

Llamas are medium sized animals, averaging 115 kilograms. They are used for fiber and as unusual pack animals in many countries around the world. They are environmentally sensitive and intelligent. They are also extremely gentle and used as pet therapy because of their calming effect. They seldom bite or butt and they have no horns, hooves, or claws to do injury. They are alert, curious, adaptable, and predictable with docile, disarming temperaments. They are adapted to high altitudes because their haemoglobin, a constituent of red blood cells, can absorb more oxygen than that of other mammals.

Llamas were also used by the ancient Inca civilization in South America. Archaeological evidence indicates that they have been domesticated from the wild guanaco approximately 5,000 years ago. Many llamas and alpacas were sacrificed to the gods every year by the

¹ It is also possible the presence of mobile pastoralism in the highlands of Ecuador (known as 'páramo'). This paper does not include this geographical area, but further research is recommended.

Incan culture. The meat would then be distributed to the crowds. Llamas were also an integral part of the Inca's workforce. As pack animals they contributed vastly to the building of their irrigation systems, roads, and temples. They were also used to carry loads in the Inca's mines.

Llamas are still used today by the indigenous peoples of South America for packing and transporting goods, fibers, and for meat. Mostly the males are used as pack animal. They usually carry up to fifty pound loads. Stallions can carry up to 35 kilograms for about 25 kilometers (a day's march for a llama). Male pack animals are not sheared. Their heavy wool coat acts as a saddle blanket by cushioning their loads. It has been suggested that the llamas were selectively bred as pack animals leading to a larger stronger animals than their wild parent. The females are sheared, but llama wool is inferior to the alpacas and is often used to make rope. Llamas only allow themselves to be loaded when they are part of a group. Llamas provide meat, wool, hides for sandals, and fat for candles. Their dung can be dried and used for fuel. South American herders use most parts of a llama's carcass.

Alpacas

Alpaca's roots also go back to the Inca civilization, where they were considered a "prize" Studies indicates that the vicuña was the ancestor of the alpaca, which was domesticated 6 or 7,000 years ago. Their coats make the finest quality wool. Alpaca fibre was woven into robes used by Inca royalty. They also provided food, fuel, clothing, and transportation for this culture in an otherwise extremely hostile environment. Alpacas still thrive in the harsh climates of the Peruvian, Bolivian, Chilean and Argentinean highlands where scorching temperatures in the day plummet to sub-freezing at night. They prefer low humidity and altitudes between 4,000 and 5,200 meters. At lower altitudes, especially below 3,400 meters, external parasites such as lice and mange make the wool short and uneven and reduce yields.

Alpacas are small compared to llamas, approximately 90 cm at the withers. Piebald colour patterns are much rarer than in llamas, and alpacas usually have a tuft of hair on their forehead. Their life span is 15 to 25 years. Their weight is in average 90 kilograms.

Annual wool production in adult animals averages 1.3 kilograms. The colours of wool include different tones of white, cream, fawn, tan, grey, brown and black. Some alpacas are of a uniform colour, usually white, but many have piebald coats with patches of different colours. It has a cellular structure similar to hair and is more resilient and much stronger than Merino sheep wool. It is highly sought after in Britain, Europe, and Japan. The 'cria' (young alpaca) fibre is extra fine and lustrous and commands a higher selling price. Their wool quality is only slightly lower than the vicuña. The black coats are usually the heaviest.

In South America, shearing is usually done before the rainy season in November and December. After seven years of age, alpacas are used primarily for meat. In 1972, there were about two million living in Peru and 50,000 in Bolivia.

Alpacas are inexpensive to feed. They have three stomachs which enable them to be very efficient at digesting what they eat. They are more fastidious feeders than llamas, being very earth-friendly by grazing meticulously throughout the pasture. They prefer free range pasture to confinement in a stall or barn. They have sensitive feet and prefer soft, moist ground with tender grasses. They also enjoy pools and puddles for wallowing. A lack of adequate ground moisture is thought to lead to a fatal foot disease and rainless years often lead to higher mortality rates. No special food is required for them except in winter or in late pregnancy when all they need is good quality hay and low protein pellets. Alpacas will spit on one another if sufficiently angered, but will rarely spit on people.

Guanacos

Guanacos are the larger of the two wild camelids species. They stand about four feet tall at the shoulder and about 1,5 meters to the top of the head. They have a body length of up to 1,8 meters with an approximately 25cm long tail. They can weigh up to 100 kilograms. Their woolly coat is tawny to brown and their head is usually grey.

Wild guanacos thrive in the plains of northern Peru to southern Patagonia. They often live in the mountains and altiplano areas above 4,000 meters. Usually herds of several females travel with one male; however, leaderless herds of males of up to 200 have been found. The

guanaco can run at speeds up to 25 kilometres per hour and they are also strong swimmers. Their mating season is during August and September. They have a ten to eleven month gestation period. The babies can run soon after birth and are weaned at six to twelve weeks.

Vicuñas

Vicuñas are smaller than guanacos and weigh only about 50 kilos. Vicuñas thrive in the mountainous regions of Northern Peru to Northern Chile at altitudes above 4,500 meters. They are up to 90 cm at the shoulder and usually have a light brown coat with a yellow-red bib. They are very social animals. There are male dominated family groups. Non-territorial males form groups of both young and disposed older males. Vicuñas are less easy to tame than the guanaco because they are extremely shy. These animals are less adaptable to different environments. The native people do harvest the wool of these animals. They drive them into an enclosure, shear them, and release them.

Current exploitation of camelids in the Central Andes

The wool of the vicuña is the most valuable commodity in the high Andean plains. So says Nicolás Maidana, a farmer in Cienaguillas, a 'puna' village of 200 people in Jujuy, the most north westerly province in Argentina, which borders both Chile and Bolivia. The local herd of some 900 vicuñas used to be a pest here, he says. They tore down fences, gnawed at the pastures and brought disease to local flocks of llamas. But now, he says, "they are an important resource for us. Once we started capturing and shearing them, we can see an economic return".

He is not alone. In 2003, Maidana and dozens of his fellow farmers in these wild mountain lands joined in a roundup of vicuña in Argentina. Each animal yields around 250 grams of fine, golden wool. Once cleaned and woven, it fetched up to us\$ 100 in European markets and some probably will end up in coats for sale in Milan and other cities.

The Inca banned the hunting of vicuñas, which had probably been going on in the Andes for at least 10,000 years before their empire was established. The wool was too precious to pass up, so they devised a harvesting technique called the 'chaku'. During this vast communal activity, tens of thousands of people would spill out across the hill sides, forming human chains to round up and corral thousand of vicuñas. Shepherded into enclosures, the vicuña would be sheared of their wool, then released into the wild. Everyone of the millions of vicuña living there could expected to be shorn every two or three years. It was an exquisite exercise in what is called today sustainable management.

With the arrival of the Spanish conquerors, the Inca world collapse and vicuñas began to be hunted with firearms. This led to the abrupt decline in the numbers of vicuña population. In last three decades of the XX Century, and thanks to a protective legislation, the number of vicuñas began to recover.

There may be as many as 250,000 vicuña in the 'puna' today. More than half are in Perú. Conservation scientist and governments of the vicuña homelands decided that the best way to prevent a breakdown of the conservation strategy was to allow peasants to make money out of living vicuñas. "We decided to bring back the 'chaku' technique from the Incan empire. This gave a chance for local poor communities, which often earn less than us\$ 500 a year, to benefit from the golden fleece", says Cristian Bonacic, an Oxford trained veterinarian.

'Chakus' has also become a tourist attraction. But it may be that economic success will have a negative impact, as the commercial positive results if this activity is encouraging methods of intensifying and privatizing the wool harvest. By degrees, the vicuña is being turned into a farm animal. In Chile they are breeding vicuña in captivity. And here and there in Argentina, these animals are being captured and domesticated on vicuña farms. There are big concern among conservationists about the result of this tendency.

But it is clear that pastoralist activities are strongly linked to wool market. Not only with vicuñas (as it was described in this point) but also with alpaca, sheep and goats (as it will be developed in point 2 of this paper).

Generally speaking, there is a tendency to promote pastoral products in the region. However, these policies present differences in their goals as well in their achievements, and they are not necessarily tailored to pastoral groups but consistent with the new trends in the general

promotion and empowerment of marginalized social groups (of which pastoralists groups are part).

For example, in the South of Argentina, governmental officers (mostly from the Instituto Nacional de Tecnología Agropecuaria and from the Government of the Provinces of Mendoza and Neuquén) are promoting initiatives in favor of the "crianceros": marketing of cashmere fiber, marketing of goat meat, etc. The weak side of these specific initiatives is the lack of continuity.

Overview of pastoralism in some South American countries

The Central Andes

The highlands of the Central Andean Region (shared by Perú and Bolivia) are the most important location of pastoralism in South America. The area, known as 'puna' or 'altiplano' is dominated by bunch grass and, in its drier portions, low thorny shrubs. Within this highlands, three regions may be distinguished: the central Peruvian highlands (Departments of Huanuco, Pasco, Junín, Lima, Huancavelica y Ayacucho); the southern Peruvian highlands (Departments of Cuzco, Apurímac, Arequipa, Puno, Tacna and Moquegua); and the Bolivian 'altiplano' (which includes portions of the Department of La Paz, Oruro and Potosí).

These three regions share not only a similar environment but other features as well. They have a common history which goes back over a thousand years to include major pre-conquest civilizations, the Spanish Empire and independent republican governments. There is also a strong degree of cultural and linguistic unity.

As it was mentioned above (point 1.2), historically pastoralism in the central Andes is related to camelids. However, in the XVII the Spanish introduced sheep and cattle. Cattle are susceptible to pulmonary edema above 3,500 meters and those that are kept are the most part fed year around at permanent residents areas.

Conversely, sheep has become the most numerous herd animal (20 million sheep versus 7 million camelids in the whole Central Andes) because the Andean area has become increasingly integrated with the world market system where mutton and wool are readily marketable items, but where llama wool and alpaca and llama meat do not have an acceptable market. The sheep, however, have poor adaptation to the available forage, and suffer cold and altitude stress. Productivity is low for sheep living at high altitude as contrasted to lowland sheep in developed countries (average wool yield for altiplano and puna sheep is only 1 kilograms annually, versus 4 kilograms in developed countries). Only a few out of the over 100 breeds of sheep which exist all over the world are represented in the Central Andes, primarily the 'Criollo' (or native sheep), the 'Merino' and the 'Corridale'.

The movement of herds correspond to the alternation between the rainy season (November-March) and the dry season (April-October). A kind of vertical transhumance is carried out: in general the animals graze in lower areas during the rainy season, taking advantage of the growth of annual grasses and forbes and the fresh shoots of perennial bunch grasses. They also avoid the snow and hail that occur during this period. In the dry season they go to the 'bofedales', or permanent pastures located at higher elevations.

An important aspect of the transhumance which has only recently been described is the irrigation of pasture. In some areas herders draw canals from springs or streams adjacent to 'bofedales' and flood areas containing the bunch grasses characteristic of the 'puna'. After several years, the characteristic 'bofedal' vegetation develops.

The alternation of rainy and dry seasons affects other activities of the herds as well. Alpacas and llamas are mated in December and January, and the young are born 11.5 months later. Their birth early in the rainy season assures that they will be exposed to relatively little frost and that females, feeding on abundant pasture, will have sufficient milk to nurse them through the critical early months. Shearing takes place in November or December; again, the lack of frost limits the risk of cold stress, and the abundance of fodder allows the wool to grow back rapidly. There is a major slaughter in April or May, when the animals are at their fattest and healthiest. The reduction of herds at this time lowers the demand on the limited 'bofedales'.

One outstanding aspect of traditional pastoral adaptation is the system of relations which herders from the 'puna' maintain with agricultural peasants in other zones, such as the Pacific

coast, intermontane valleys and the agricultural areas of the 'altiplano'. In many areas, herders set forth trips with llama caravans, often travelling for days or weeks at a time. They carry pastoral products (dried meat, wool, textiles) and purchased products (salt, candles, cooking pots) to agricultural areas, where they barter for grains, tubers, fruits and vegetables.

Regarding social organization, it is important to point out the presence of the 'ayllus' or community as a key factor in herd management.

Finally, it is important to point out that both in Perú and Bolivia pastoralism is, generally speaking, associated with indigenous groups.

In points 2.1.1 and 2.1.2 we will develop issues which are specific to pastoralism in Perú and Bolivia, respectively.

Peru

Peru has three distinct ecological zones: a dry coastal desert, the Andean highlands or 'Sierra' and the jungle of the Amazon Basin. In all regions, livestock production is an important activity.

Livestock production is particularly important in the Sierra, home of 41% of the population of the country. Virtually all of Peru's sheep, llama and alpaca are found here; 70% of the nation's cattle are also produced in the region. These animals depend on permanent pastures and fallow lands for most of their food. In fact, about 86% of the land in the mountains is used exclusively as pastures.

The poorest Peruvians are Indian farmers and herders who live in independent communities or "Comunidades Campesinas". These communities contain more than 60% of the Sierra's rural population as well as the poorest segment of the agricultural population. Over 90% of the land held by these communities is native rangeland and the communities hold over 40% of the Sierra's grazing land. The management of these lands follows transhumant practices. In these communities livestock depend upon natural pastures and crop residues for food. Arable land is used to produce food for peasant families rather than forage for livestock.

Under Spanish rule from the sixteenth to the eighteenth century, virtually all the wool produced in the Andes was consumed in the Andes. Wool exports began to expand at the time of the independence in the 1820s. In England, the center of the Industrial Revolution, yarn and textiles were among the first products whose production was mechanized. The demand for wool grew. Transportation improvements, in particular steamships and railroads, allows wool from distant areas to be shipped to England. This rise in demand was not steady. In both XIX and XX centuries, there were decades which saw declines in the prices which Peruvian wool received and the quantities of it which were exported. Nevertheless, the general upward trend is clear. However, according to international standards, sheep wool from the Andes was of lower quality (as the fiber was short, dirty, greasy, kempy and uneven in length). This was not the case of alpaca wool: Perú and Bolivia kept the monopoly of its production, as all efforts to raise these animals in other areas failed.

The military government which took power in 1968 instituted administrative reorganization and a broad set of reforms. The Agrarian Reform Act, passed in 1969, was one of the most important. Though weakened, it has also been less modified than many others reforms by later military leaders and by the civilian regime that return to power in 1980. Unlike earlier, more timid agrarian reform programs in Perú, this one sought a major reorganization of the countryside. Large 'haciendas' and plantations were expropriated. The result was a combination of state participation and worker management, which eventually did not bring either great expansion of agricultural and pastoral production or massive participation of the rural population.

Another important governmental intervention in the 70s was in the field of the wool market. In 1975, two social property were set up, ALPACAPERÚ and INCOLANA, for the marketing of alpaca and sheep wool, respectively. The government believed that it could earn revenue through the sales and offer better prices to the producers by avoiding several levels of intermediaries. However, they run into several difficulties (unwillingness of herders to collaborate because of the strength and personal character of their ties to local buyers, internal management problems, and shifts in the government policies which no longer

favoured social property enterprises) and never come to dominate wool-buying as it was originally expected.

Apart from the transhumance in the central and southern zones of Perú, there is also another type of transhumance in the north (Departments of Tumbes, Piura and Lambayeque), related to goat livestock.

In northern Perú, the rainy season happens from December to March, but they are highly variable and very much affected by El Niño phenomenon. The average precipitation is between 100 to 500 mm, depending to the zone, followed by eight months of drought. Morning and evening fog is very important as a source of humidity.

These harsh climatic conditions are apt for the extensive breeding of goats, in private or community owned lands. Pastoralists follow a horizontal movement in the search of better pastures, including in areas covered with a dry forest.

Bolivia

Bolivia presents three ecological zones: the highlands (or 'altiplano'), the valleys and the tropical plains. Pastoral management is present in the 'altiplano'.

The Bolivian wool marketing system appears to have developed (since the middle of the nineteenth century) as an adjunct to the southern Peruvian one. In Bolivia, the alpaca-producing areas are located in the Eastern and Western Cordilleras, close to the Peruvian border. Apparently, a great deal of Bolivian wool was smuggled out through southern Perú and Chile and this smuggling limited the development of commercial firms based on wool trading in Bolivia.

Another reason for the relatively less development of wool marketing in Bolivia was the fact that elites during the period 1880 to 1920 were more concentrated in mining. These elites made also some investment in lower agricultural zones, but there are few cases of investments in wool-producing areas.

In Bolivia the agrarian reform took place in 1953, soon after the 1952 revolution. The National Revolutionary Movement (MNR) came into power in alliance with disaffected progressive sectors in the military; it was by no means a mass party or a broader-scale popular uprising. Nevertheless, the revolution touched off considerable mobilization in mining areas, the larger cities and some agricultural areas. The chief regions of rural agitation, the area around Lake Titicaca and the valley around the city of Cochabamba, were primarily agricultural and dominated by 'haciendas'. The agrarian reform in Bolivia established the expropriation of 'haciendas' and the creation of peasants syndicates. The reform took a very different character in some regions in comparison with others. Generally speaking it had a relative impact in pastoral areas.

Bolivia has also developed a policy towards the intervention in wool market. From 1978 it developed the Corporación Boliviana de Fomento Lanero, which became the only legal alpaca wool purchaser in Bolivia, though wool continue to be smuggled into Perú by private buyers.

Southern Andes

Pastoralism has also a presence in Southern Andes, both in Chile and Argentina. Both countries present two different areas. A first area, located in the north of Chile (close to the border with Perú and Bolivia) and in the north-west of Argentina, present patterns of mobile pastoralism which follow what it has been said for the Central Andes. A second area, located in the central-north of Chile and south of Argentina, present specific characteristics, which will be developed in points 2.2.1 and 2.2.2.

In the case of Chile and Argentina, pastoralism is not directly related to indigenous population.

Chile

The IV Region of Chile is the centre of goat production in the country.

Goats were introduced in Chile by the Spanish and its exploitation was located from the very beginning in marginal areas of the country. According to 1997 census, 41.5% of the goat

livestock in Chile is located in the IV Region. Furthermore, 178 Comunidades Agrícolas (which combine communitarian and individual ownership of the land) are located in the Region.

The management of the herds follows a transhumant vertical pattern, including 'campos de veranada' (summer fields) and 'campos de invernada' (winter fields).

In recent years, apart from the use of hair and meat, milk (and the production of cheese) was included

Argentina

Argentina occupies the 80% of its territory in activities related to agriculture, livestock and forestry. Cattle is concentrated in the Pampa Region (the richest of the country) with 50% of the 49 millions heads. The 85% of the production are consumed in the country. Sheep livestock is concentrated in the Patagonia, with 60% of the 14 millions heads. Sheep are mainly used for their wool, which are exported (50%). Goat livestock (3,5 millions heads) is characteristic of the arid and semiarid zone. They are bred for their meat, milk, leather and – more recently – for their hair².

In Argentina, livestock activities are mostly carried out according to sedentary patterns. However in the Puna Region (north west of the country) and in the Andean Patagonia (south west of the country) mobile pastoralism is widespread, following traditional habits. In both regions, pastoralists make their living mainly from camelids (only in the north), goat and sheep livestock (less importance have cattle, horses and mules).

Pastoralists live in difficult conditions, with high indicators of poverty and little or no access to social services (health, education, technical assistance). In general, only the family members manage the transhumant activities. However, some herders from the Andean Patagonia might occasionally hire other peasants to take care of the livestock.

Pastoralists adopt transhumant patterns; this is to say they move their cattle periodically, according to the seasons. There are 'campos de veranada' (summer fields) and 'campos de invernada' (winter fields), linked by 'huellas' (tracks). The "campos de veranada" are located in the upper valleys (1200 meters above sea level, in the case of Patagonia; 3000 to 4200 in the case of the Puna). The "campos de invernada" are located in the plateau and lower valleys (800 to 1200 meters above sea level), in the case of Patagonia; or in lower gorges or valleys (2000 to 2800 meters above sea level), in the case of Puna. In some cases, there are transboundary movements, between Chile and Argentina, and vice versa.

There are no specific policies, institutions or legislations oriented to pastoralism, such as a "pastoral code". However, there are many rules that regulate the movement of livestock.

The lands managed through a pastoralist approach are severely degraded, both in the Puna and the Andean Patagonia. But pastoralist management is not the cause but the consequence of this degradation process.

Mobile patterns of livestock management have their origin in indigenous habits as well as in the ecological conditions of the "campos de invernada", unable to sustain a sedentary management.

The best lands have been assigned to medium and big size produces. As a result, the lands in which pastoral activities are carried out are fragile and very vulnerable to land degradation process. In fact, the implementation of transhumant patterns helps to avoid impairing the situation.

There are many barriers to pastoral land management. The most important is the perpetuation of the myth that nomadic pastoralism is an archaic form of production, aggressive to the environment.

² Goats in the Provinces of Neuquén and Mendoza also produce 'cashmere'. Government technical staff and 'crianceros' organizations are developing activities to improve the shearing and commercialization of this fiber. It is estimated that a potential of 65 tonnes/year of 'cashmere' might be obtained from the 350,000 heads existing in northern Neuquén.

The educational system, in which the people who provide technical assistance to pastoralists, are shaped, is prepared to deal with "traditional sedentary" management.

Another problem is that public policies tend to be shaped only to sedentary livestock management. Most of the policies targeted to pastoralist groups try to shift them into something different.

It is important to point out that almost the 20% of the heads of goats in Argentina (620,000 out of a total of 3,500,000) are located in the province of Neuquén and managed according to transhumance patterns.

The future

It is not easy to assess the future of pastoralism in South America. In fact, the situation varies from country to country, closely related to the importance of this practices in the different societies.

In Perú and Bolivia, where pastoralism has more relative importance, relevance and visibility, the future is more clear and the sector receives the benefits of protective and/or promoting policies. On the other hand, Chile and Argentina, pastoralism has a marginal and "survival" characteristic and if protective policies are not put into practice, a decline of the activity can be foreseen.

Identification of knowledge gaps

In comparison with similar types of mobile pastoralism in the rest of the world, publications on pastoralism in South America are few and scattered. They mostly follow a historical or anthropological approach. And geographically they are concentrated in the Central Andean region.

When the potential of livestock production within the countries is analyzed, the particularities and contributions of mobile pastoral systems is nor assessed, neither recognized. For example, the importance of wool exports from Perú not always take into consideration the essential roll played by herders of llamas, vicuñas and alpacas. Or, in Chile and Argentina, it is ignored the fact that a significant share of the national production of goats is produced by 'crianceros'.

As a result, it is difficult to estimate the contribution of pastoralism to national economies in South American countries, for example, in terms of percentage of GDP.

In general terms, there is a lack of applied research in the field of pastoralist production systems. As a consequence of the misperception of pastoralists activities, most of the patterns of technical assistance and capacity building are tailored for sedentary systems of agricultural and livestock production.

Finally, there is a general lack of research and studies to assess the impact in pastoral communities and markets of the neo-liberal policies applied in the four countries during the last twenty years. These new policies implied a withdrawn of the intervention of governmental agencies in markets and (in some cases) a reduction in the quality and quantity of technical assistance.

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Bendini, M.; Tsakoumagkos, P.; Destéfano, B.. 1994. "El trabajo trashumante". En Bendini, M. y Tsakoumagkos, P. (coordinadores) Campesinado y ganadería trashumantes en Neuquén. GESA-UNC. Editorial La Colmena. Buenos Aires.

This paper presents a thorough analysis of the pastoralists in the Province of Neuquén (in the south of Argentina). It describes the regional features and deals with the spatial organization, social structure and economic activities of the 'crianceros' (this is the name by which transhumant pastoralists of Neuquén are known).

Of particular relevance is the analysis of the different types of crianceros, according to the size of their herd.

Bendini, M.; Tsakoumagkos, P.; Destéfano, B.; Merli, R.. 1994. "Comercialización de lanas y estrategias autogestionarias". En Bendini, M. y Tsakoumagkos, P. (coordinadores) Campesinado y ganadería trashumantes en Neuquén. GESA-UNC. Editorial La Colmena. Buenos Aires.

This paper presents an analysis of the "Programa Provincial de Esquila y Comercialización de Lanas", a governmental initiative to promote marketing strategies to improve the trade of wool. The study covers the period between 1975 to 1985.

Bendini, M.; Tsakoumagkos, P.; Pescio, C.; Nogues, C.. 1994. "Los crianceros y las alternativas frente a la erosión del suelo". En Bendini, M. y Tsakoumagkos, P. (coordinadores) Campesinado y ganadería trashumantes en Neuquén. GESA-UNC. Editorial La Colmena. Buenos Aires.

This paper presents an analysis of the characteristics of the activities carried on by the 'crianceros', a description of the evolution of land degradation in the area of transhumant activity and a survey on the perception of land degradation from the point of view of the crianceros. Finally, the paper suggests a number of technical solutions, describing their social and economic impact.

Bendini, M.; Pescio, C.. 1994. "Orientaciones de las políticas agrarias". En Bendini, M. y Tsakoumagkos, P. (coordinadores) Campesinado y ganadería trashumantes en Neuquén. GESA-UNC. Editorial La Colmena. Buenos Aires.

This brief paper gives an outline of the issues that a consistent rural policy should take into consideration: alternative policies to include poor people from rural areas, resignification of natural resources, strengthening of 'crianceros' organizations, government commitment and civil society participation

Bendini, M.; Tsakoumagkos, P.; Nogues, C.. 2004. "Los crianceros trashumantes del Neuquén". En Bendini, M. y Alemany, C. (coordinadores) Crianceros y chacareros en la Patagonia. Cuaderno GESA 5. GESA-UNC-INTA-NCRCRD. Editorial La Colmena. Buenos Aires.

This paper is an updated version of "Bendini, M.; Tsakoumagkos, P.; Destéfano, B.. (1994)". In the conclusion, it states:

"Hemos caracterizado a los crianceros como campesinos ganaderos que producen y participan en la exportación de lana, chivitos y corderos, pelo caprino, cueros, en una modalidad trashumante. La participación de estos crianceros en la oferta total de productos caprinos ha sido tradicionalmente significativa, especialmente en el pelo. Sin embargo, la dinámica de los procesos de descentralización y privatización, las políticas sectoriales y fundiarias e inevitables de apropiación territorial selectiva, modifican y ponen en riesgo su sobrevivencia (...).

Los principales problemas a los que se enfrentan los crianceros son: limitaciones de suelos, pastizales y agua; limitaciones institucionales en materia de legalización del acceso a la tierra, dentro de los usos y costumbres propias de las comunidades locales; la pobreza rural y el escaso desarrollo de alternativas económicas para estos productores y sus familias (...).

El desempeño en el largo plazo de los crianceros trashumantes ha podido ser caracterizado como epopeya, ya que lograron persistir frente a enormes dificultades y sin políticas diferenciadoras acordes a estas dificultades."

Browman, D., 1981. "Agrarian reform impact on llama and alpaca pastoralism in the Andes". In Salzman, P. (editor) Contemporary nomadic and pastoral peoples: Africa and Latin America. Studies in Third World Societies # 17. Department of Anthropology, College of William and Mary. Williamsburg.

The article describes the effect that national policies in Bolivia and Perú had on pastoralists communities and production system.

In the conclusions, the author says that "both in Perú and Bolivia, agrarian reform have had little impact upon production, but have had marked impact upon the organization and structure of marketing (...) Impact of Agrarian Reform has been, in general, negative upon the indigenous pastoral sectors of the high grasslands of both countries".

Browman, D., 1987. "Pastoralism in Highland Perú and Bolivia". In Browman, D. (editor) *Arid land use strategies and risk management in the Andes. A regional Anthropological Perspective. Westview Special Studies in Social, Political and Economic Development. Colorado.*

The focus of this paper is upon several different approaches taken recently in the Andean high altitude grassland to attempt to increase livestock productivity, with observations relevant to the success and failures of these approaches. The summary of this paper states:

"In the arid lands of Peruvian puna and Bolivian altiplano, four different approaches have been attempted to improve productivity by national development planners: (a) improvement of arid land carrying capacity (by improving water supplies and improving pasturage); (b) improvement of herd animals (by disease control, selective breeding and introduction of new stock types); (c) improvement of services to pastoralists (agricultural extension services and marketing schemes); and (d) attempts to 'improve' the functioning of the pastoralists themselves (by setting up government collectives). In all these cases, there has been little success, in large part because of the unquestioned acceptance by development planners of mechanization and high technology as the only methods of improvement, and as the only "rational" strategy. No consideration has been made of alternative strategies.

The social and institutional constraints to proper range use are greater than purely technical ones; the major obstacles to improve drylands management are to be found not in the technical sphere but in the socio-cultural sphere. Development strategies thus need to take into account the sociological limits as well as ecological limits. To reduce the number of animals in an attempt to increase the quality of meat and wool involves high social and economic costs. There is no cheap substitute for the fertilizer produced by the current herds, fertilizer which is essential for the success of the altiplano crops. Fewer animals would mean lower standard of living for the herders, resulting in a major political problem. Higher quality animals will require fodder supplements. Hopes that improving productivity will directly funnel additional resources into the national market might well be frustrated. Results at the local level indicate that families with larger flocks enjoy higher standard of living (more meat in the diet, more animals for social and ritual purposes, greater purchasing power). Thus increases in production might in large part simply be siphoned off as improved standards of living at the local level, rather than benefiting the national market. Any development strategy that would substitute fewer but 'better' animals would be viewed as 'irrational' by the agro-pastoralists and pure pastoralists, until a mechanism is found to replace the current insurance and other economic factors of large herds, that is, to reduce risk to a manageable level."

Brown, P., 1987. "Economy, ecology and population: recent changes in Peruvian Aymara land use patterns". In Browman, D. (editor) *Arid land use strategies and risk management in the Andes. A regional Anthropological Perspective. Westview Special Studies in Social, Political and Economic Development. Colorado.*

This paper analyzes the dynamics of the ecological transformation of traditional Peruvian Aymara economic practices. In first place, it describes the "altiplano" environment as well as traditional Aymara subsistence patterns in this environment. The author points out that many of these traditional patterns are still in existence, in whole or in part, in many Aymara communities today, as the process of change (above all, in the organization of labor, and in land patterns) is an uneven one, affecting families and communities in varied and multiple ways.

Castillo, G., 2003. "La vuelta de los años: Reseñas y perspectivas sobre las comunidades, el pastoreo y la trashumancia en la región semiárida de Chile". En Liveanís, P. y Aranda, X. (editores científicos) *Dinámica de los sistemas agrarios en el Chile árido. Universidad de Chile – IRD – Universidad de La Serena. Santiago de Chile.*

This article presents a historical study of the trilogy pastoralist/goat/community in the "IV Region", in the North of Chile. Castillo begins by going back to the introduction of goats by the Spanish conquerors, in the XVI Century, and outlines the different changes in goat herd management as time went by. Nowadays, this activity is located in marginal areas of the Andean landscape.

Castillo points out that goat herding was, in XIX Century, the most important economic activity in the region (with the exception of mining).

Finally, he attracts the attention to the lack of literature related to Chilean 'crianceros' issues.

Cialdella, N.; Dubroeuq, D.. 2003. "La trashumancia de cabras en Chile: un modo de gestión adaptado a las zonas áridas". En Liveanis, P. y Aranda, X. (editores científicos) Dinámica de los sistemas agrarios en el Chile árido. Universidad de Chile – IRD – Universidad de La Serena. Santiago de Chile.

This article presents a detailed study of the transhumant management of goats in the community of Las Ramadas (Province of Limarí, IV Region, Chile). The aspects analyzed are: territorial structure, communitarian management, transboundary issues, summer and winter strategies, etc.

Cortes, H.. 2003. "Evolución de la propiedad agraria en el Norte Chico (Siglos XVI-XIX)". En Liveanis, P. y Aranda, X. (editores científico) Dinámica de los sistemas agrarios en el Chile árido. Universidad de Chile – IRD – Universidad de La Serena. Santiago de Chile.

An analysis of the origin and historical evolution (from XVI Century to XIX Century) of agricultural property in the Elqui valley (IV Region, Chile).

Of particular importance is the description of the appearance of two new subjects in the XIX Century (medium and small farmers and the "Comunidades Agrícolas") and its impact in agricultural production.

Del Rio, Walter. 2005. Memorias de expropiación. Sometimiento e incorporación del indígena en la Patagonia. Universidad Nacional de Quilmes Editorial. Buenos Aires.

A complete analysis, from a historical perspective, of the changes in land ownership, in favor of big farmers and against the interests of indigenous people. The study covers the period from the start of the occupation of the Patagonia by the Argentine government (in 1872) until 1943.

Gil Moreno, Raquel. 2004. Caravaneros y trashumantes en los Andes meridionales. Instituto de Estudios Peruanos. Lima.

A historical analysis of mobility and production systems in the Argentine Puna, relevant to asses continuity and changes against the present situation.

Guillet, David, 1987. "On the potential for intensification of agropastoralism in the arid zones of the Central Andes". In Browman, D. (editor) Arid land use strategies and risk management in the Andes. A regional Anthropological Perspective. Westview Special Studies in Social, Political and Economic Development. Colorado.

In the Central Andes one finds three main vertical production zones: a maize zone up to 3,500 meters in altitude, characterized by intensive agriculture and irrigation; a tuber and indigenous cereal zone, based on agro-pastoralism, in the range of 3,500 to 4,100 meters; and a pasture zone from the upper limits of agriculture to approximately 4,700 meters. When viewed from this perspective of "vertical production", it becomes immediately apparent that each zone has a peculiar trajectory of response to population pressure and market forces. This paper examine the potential for intensification of production in the middle, agro-pastoral zone. It describes different alternatives for agricultural intensification (e.g. terracing, modification of sectoral fallowing, higher yielding per unit value crops) and pastoral intensification (e.g. increasing the number of animals, introducing efficiencies into organization of herding, cultivation of fodder) and the combination of both.

Göbel, B., 2002. "La arquitectura del pastoreo: Uso del espacio y sistemas de asentamientos en la Puna de Atacama (Susques)". En Estudios Atacameños 23. ISSN 0718-1043 Versión on-line. En <<http://scielo-test.conicyt.cl/>>

This paper presents a description of pastoral systems in the Province of Jujuy (North of Argentina) and a description of pastoral settlements. Furthermore, it analyzes the significance and perception of the environment and spatial relations from the point of view of pastoral people.

Madariaga, M., 2004. "El trueque en los sistemas agrarios campesinos". En Bendini, M. y Alemany, C. (coordinadores) *Crianceros y chacareros en la Patagonia. Cuaderno GESA 5. GESA-UNC-INTA-NCRCRD. Editorial La Colmena. Buenos Aires.*

This paper presents an analysis of barter activities in the Province of Neuquén. It describes the historical background and present features of an activity which is effect not only of the scarcity of money but cultural reasons.

Martinez Alier, J. 1992. "Hacia una historia socio-ecológica: algunos ejemplos andinos". En Sevilla Guzmán, E. y Gonzalez de Molina, M. (editores) *Ecología, campesinado e historia. Ediciones de La Piqueta. Madrid.*

This article presents an analysis of the relation between the poor people in rural areas and the protection of the environment. By presenting many historical antecedents (the cases of mining in Bolivia, sugar cane in Cuba, guano and fish flour in Peru), states the idea of "an ecology of the poor" as a driven force towards sustainable development in the rural areas of Latin America.

McCorkle, C., 1987. "Punas, pastures and fields: grazing strategies and the agropastoral dialectic in an indigenous Andean Community". In Browman, D. (editor) *Arid land use strategies and risk management in the Andes. A regional Anthropological Perspective. Westview Special Studies in Social, Political and Economic Development. Colorado.*

The common view of peasant agropastoralism is one of a "harmonious whole" composed of two fully integrated and mutually supportive productive "parts": cultivation and herding. This paper describes the two principal pasturing patterns and certain herd-subdivision variants upon these patterns within the indigenous agropastoral community of Usi, in the high Andes of southern Perú. Discussion centers upon community internal variation in the utilization of arable and non-arable lands for herding, and upon the labor allocation concomitants of these land use choices. In the process disintegrative as well as integrative interfaces between pastoralism and agriculture in these realms are highlighted along with some of the strategies adopted by the autarchical peasant household.

Orlove, B. 1997. *Alpacas, Sheep and Men. The wool export economy and regional society in Southern Perú. Academic Press. New York.*

In this book the author presents a complete analysis of the wool cluster in the region of Sicuani, in the South of Perú. It deals with the production and distribution systems, and the roll of herders, artisans, middlemen and the international connection.

According to the author, "despite the apparently archaic quality of their technology, institutions and habits, despite that fact that their lives seem more attached to pre-Columbian Andean and medieval European traditions than to a modern industrial one, they are part, as we are, of a single world-system that is a specific point in its history. Like many others rural people in the Third World, they have accommodated their society to the rhythms imposed by an export economy. Their dominance of wool exports in the region has transformed the relations that people have with each other, with the land, and with the national government".

This book applies the "sectoral model", offering several analytical constructs, including the unit (e.g. peasant household, artisan shop, retail firm) and the sector (e.g. peasants, artisans, traders) composed of these units. It traces the economic and political conflicts that follow the incorporation of the region into the world wool economy in the late nineteenth century. "Landlord against peasant in the countryside, landlord against trader in town; the export economy directly engendered these conflicts, and they determined the metamorphosis of a closed, isolated, localized society into an open one, integrated into national politics as well as global economics", summarizes the author.

Orlove, B., 1981. "Native Andean Pastoralists: Traditional Adaptation and Recent Changes". In Salzman, P. (editor) *Contemporary nomadic and pastoral peoples: Africa and Latin America. Studies in Third World Societies # 17. Department of Anthropology, College of William and Mary. Williamsburg.*

This article is essential to understand the characteristics of pastoral populations in the Central Andean (Perú and Bolivia). It presents the ecological and historical background, analyzes the

social organization of pastoralist groups and the impact of what the author calls “forces of change”.

Of particular relevance is the analysis of the changes in the international wool market, national policies and in labour markets.

Among shifting national policies, the author points out the impact of the agrarian reform (in the fifties in Bolivia, in the sixties in Perú), of the establishment of government wool marketing wool boards, the tightening of national borders and the participation of international development agencies.

The article also deals with changes in production systems and community organization.

In the “Summary and conclusions” Orlove writes:

“Key elements in the traditional adaptation of Andean pastoralists include a dispersed settlement pattern, vertical transhumance, irrigation of pastures, a bilateral kinship system with some patrilineal emphasis, differential control of rainy and dry season pastures, and inter-zonal barter. These elements are integrated into a pattern of resource utilization shaped by seasonal changes in the availability of pasture and daily and annual cycles of herd management. They lead to a great emphasis on the importance of personal ownership of animals, although extremely large herds are not always as strongly desired in the Andes as among pastoral peoples in other regions of the world. Because of the importance of controlling dry season pasture, residential mobility is somewhat less in the Andes than in other regions.

This adaptation provides the context on which planned and unplanned forces of change have operated. They have been the articulation of the region with the international wool market, and the growing influence of national governments. These have led to the expansion of haciendas, operating somewhat differently in the central and southern highlands of Perú and the Bolivian altiplano. The agrarian reform in both countries consolidated earlier developments in pastoral areas, giving some official legitimacy to traditional forms of local-level social and political organization in Bolivia and maintaining the division between communities and large, somewhat capitalized estates with a work force owning ‘huacchos’³ in Perú. The tenacity with which herders have sought to retain community pastures and ‘huaccho’ herds can be explained not only by universal economic rationality but also by particular features of Andean pastoral production systems. To give up one’s own herds and one’s personal rights to ‘bofedales’⁴ is both to participate no longer in a certain social order and to place oneself in extreme personal dependence on hacendados or employees of agrarian reform agencies without recourse to other support.

Some writers have described this tenacity as individualistic. It does emphasize individual ownership of some resources, but this ownership is subject to group control and defense. Herders can unite in order to protect their resources. As Mayer (1981) and Guillet (1981) point out, the opposition of individualism and collectivity is an artificial one in this case.

(...) The similarities in culture in culture and social organization between pastoral and agricultural groups in the Andes can be seen as a continuity of pre-Columbian traditions, as a consequence of economic and political domination in the Spanish colonial period, and as a result of economic forces and national government policies of the independent Latin America republics. All of these perspectives have a certain validity. The strength and resilience of the traditional pastoral adaptation, and its ability to make successful use of a harsh environment and to offer control of resources, also merit considerable attention.”

³ The ‘huacchos’ are the animals owned by a peon.

⁴ The ‘bofedales’ are seeps formed along glacial moraines, where aquiferous strata overlie less porous ones. ‘Bofedales’ contain succulent vegetation throughout the year which can provide browse during the dry season, when bunch grasses and other plants which rely on rain fall provide little fodder.

Pearce, F. 2006. "Going for gold in the Andes". In Masood, E. and Schaffer, D. (editors) Dry. Life without water. Harvard University Press. Cambridge, Massachusetts and London.

This article analyzes the revival of the chaku tradition in the Central Andes, the shearing of vicuñas, its impact in pastoral communities and its prospective.

Perez Centeno, M. 2004. "¿Hacia una nueva ruralidad? Estrategias familiares y los programas de intervención en Coyuco, Neuquén". En Bendini, M. y Alemany, C. (coordinadores) Crianceros y chacareros en la Patagonia. Cuaderno GESA 5. GESA-UNC-INTA-NCRCD. Editorial La Colmena. Buenos Aires.

This article presents a case study of participation and self-organization of pastoralist groups in Coyuco, a spot in the Province of Neuquén.

Ramirez, I. 2003. "Evolución y perspectivas de la producción caprina en la IV Región de Coquimbo". En Liveanis, P. y Aranda, X. (editores científicos) Dinámica de los sistemas agrarios en el Chile árido. Universidad de Chile – IRD – Universidad de La Serena. Santiago de Chile.

This is a work on the evolution and perspectives of goat production in Chilean IV Region. The article takes into consideration the present number of goat heads, milk and cheese production and sanitary conditions. It also deals with the communities (its social, cultural and productive organization).

The author considers that, in its present situation we are in the presence of a vicious circle of over exploitation and poverty. However, he propose some courses of action, such us improvements in the production and organization of the pastoralists.

Rolando, N.. 2003. "Diagnóstico y perspectivas de la situación agropecuaria de la región de Coquimbo". En Liveanis, P. y Aranda, X. (editores científico) Dinámica de los sistemas agrarios en el Chile árido. Universidad de Chile – IRD – Universidad de La Serena. Santiago de Chile.

This article presents an overview about the agricultural production in the IV Region, in Chile. In particular, it deals with the most relevant aspects of livestock in the Region.

Tiscornia, L. 2004. "Organización y acción colectiva. El caso de la "Mesa de Organizaciones Campesinas" en la Provincia del Neuquén". En Bendini, M. y Alemany, C. (coordinadores) Crianceros y chacareros en la Patagonia. Cuaderno GESA 5. GESA-UNC-INTA-NCRCD. Editorial La Colmena. Buenos Aires.

This paper presents an analysis of the experiences of "collective action" in the Province of Neuquén, in particular describes some cases of self-organization of small farmers and crianceros (Mesa de Organizaciones Campesinas, Asociación de Crianceros Unidos, Cooperativas, Asociaciones de Fomento Rural)

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