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SUMMARY – The role of the dairy sheep sector in the Spanish Basque Country needs to be evaluated from a holistic point of view. As sheep production is still today based on grazing practices and local resources, the environmental and geographical features of the region condition the production system. This is reflected in an important diversity of farming systems, not only in terms of management practices, but also in their relation to the development structures available, the breeding scheme implemented, and, presumably the profitability of the activity. In this sense, data recorded and analysed by the Technical and Economical Advisory Programs are discussed. The incidence of the current market conditions and existing subsidies has also been considered.

Key words: Dairy sheep, production systems, Basque Country, economical data.

RESUME – *"Aspects environnementaux et économiques du système d'ovins laitiers au Pays Basque". Le rôle du secteur laitier ovin au Pays Basque espagnol doit être évalué d'un point de vue holistique. La production ovine étant aujourd'hui basée sur le pâturage et l'utilisation des ressources locales, les aspects environnementaux et géographiques conditionnent le système de production. Ceci se traduit par une grande diversité de systèmes d'élevage non seulement en termes de pratiques de conduite du troupeau, mais aussi en relation avec le développement des structures disponibles, le schéma de sélection mis en place, et probablement la rentabilité de l'activité. Dans cette perspective, les données enregistrées et analysées par les services de conseil technique et économique sont discutées. L'incidence des conditions actuelles du marché et des aides financières existantes est également analysée.*

Mots-clés : *Ovins laitiers, systèmes de production, Pays Basque, données économiques.*

Introduction : Presentation of the region and objectives

The Basque Country is a small region (7300 km^2) divided into three provinces (Bizkaia, Gipuzkoa and Alava) with a total population of 2.2 million people. Located in the north of Spain, a range of mountains running in a east-west direction divides the Basque Country into two basins. The Atlantic basin, to the north, has smaller mountain ranges pointing to the coast, which separate deep valleys. The Mediterranean basin, with the flat highlands of Alava, is located to the south. Despite the lesser altitude, the land slopes more steeply at the Atlantic basin (on average more than 30%).

The climate is usually described as Atlantic. On average, rainfall ranges from 800 to 1500 mm/year, but differences are also observed between both basins, the Atlantic being wetter than the Mediterranean one. The temperature is warm, average monthly temperatures ranging from 3 to 22°C. However, some features of transition to continental are observed in areas of the Mediterranean basin (for instance winters are colder and summers are hotter).

All these features contribute to a concentration of people in the valleys. As a consequence, 46% of the total surface is classified as an objective 5b areas (3330.1 km^2), most of the land being more suitable for livestock or forest purposes than for agriculture. In addition, 12% of the territory is protected for environmental reasons.

The objective of this text is to give a general over view on the situation and the future if the sheep dairy sector in the Basque Country in relation with environmental and socio-economic aspects. Bibliography and statistical references are used and discussed.

The sheep dairy sector in the Basque Country

Dairy sheep population and location

The sheep population in the Basque Country is estimated at 320,000 animals, 1.8% of the 18 million sheep in Spain (DAP-GV, 1999). More than 85% of the census belong to local dairy breeds: Latxa and Carranzana. However, their population size has suffered a slight decrease in recent years in favour of meat breeds, which nowadays represent 13% of the total. Nevertheless, contrary to other productive basins in Spain, the presence of foreign dairy breeds is nearly zero (0.7%).

Dairy sheep are located within areas with more than 1000 mm rainfall/year, which according to several authors (Creus *et al*., 1984) are the most significant areas for grass production. There are around 4600 flocks in the region, giving an average of 60 females per flock. However, just 172 flocks (4% of the total) form the Breeders Associations of Latxa and Carranzana, and constitute 25% of the total population of sheep, with an average flock size of 372 females.

Livestock systems

The livestock systems of the Latxa and Carranzana breeds in the Basque Country can be defined as dairy systems, despite the medium level of production achieved. This is partly conditioned by the characteristics of the production system. Two different periods can be found along the productive cycle, although feeding is mainly based on grazing throughout them.

From early or middle-summer to late-autumn, after the end of the milking season, flocks free-graze on mountain pastures. These are communal rangelands where natural mating and most of the pregnancy take place under fully extensive conditions. This traditional practice is still carried out by between 75 and 90% of the flocks (Urarte *et al*., 1989; Hanoq *et al*., 1993). However, this period is mainly characterised by a decrease in the body condition score of the animals (Oregui *et al.*, 2001).

The length of this grazing period depends on the characteristics of the flock, for they are taken down to the farms, usually located in the valleys, one month before the impending lambing season. In this sense, important differences have been reported regarding the main features of the lambing season (Ruiz, 2000).

The traditional livestock system can be described by the concentrated lambing season in winter (from January to March), which attempts to profit from grass growth in spring. This is supposed to decrease the necessity of indoor feeding with home-made forages (hay or silage) and purchased foodstuff (concentrates, cereals), and to allow a profitable production based principally upon grazing. Moreover, the first lambing usually occurs when the sheep are 2 years old. This type of traditional management is mainly practised on flocks located in areas where winter conditions are especially hard.

An alternative management system is characterised by a long lambing season, beginning as early as October or November and finishing in April or even May. Such a management strategy is related to a higher use of artificial insemination, and gives higher fertility results in yearlings. These practices are more common in farms that are located in areas with softer winter conditions (lowlands, valleys, coastal, etc.), where sometimes even winter grazing is possible.

Lambs are raised by natural suckling during 20 to 30 days until they are slaughtered at 11 kg, and sheep milking begins. So, differences in the date of the start of lambing are reflected in the date of the start of the milking season. However, differences are not so obvious at the end, and different duration of the milking season are clearly noticeable.

During some periods throughout their stay at the valley, the feeding management of the sheep must be semi-intensive or even intensive, coinciding with lambing, suckling of lambs, or the beginning of milking. Later, as grass availability increases, so does the contribution of grazing to cover the nutritional requirements of the sheep during the milking season. So, differences in the characteristics of the lambing season obviously affect the importance of grazing in fulfilling the nutritional requirements of the flock during the whole productive season. According to some results obtained

from simulation studies (Oregui and Ruiz, 2002), 75% of total energy requirements during the milking season can be covered from grazing under a concentrated lambing season pattern in comparison with only 52% when lambing begins in November.

Technical indexes

The average indexes of the flocks attached to the Breeding Programme for milk production can be observed in Table 1. Fertility for adult sheep is in agreement with the data reported by several authors (Urarte *et al*., 1989; Oregui *et al*., 1997; Ruiz *et al*., 1997). However, an increasing tendency to improve fertility of the yearlings has been observed under some management practices (Ruiz, 2000), reaching an average fertility of 35% in 2000 (Table 1).

Table 1. Main indexes corresponding to the flocks collaborating in the Breeding Programme.

	1996	1997	1998	1999	2000
Fertility (%)					
Adult ewes	85.3	87.5	87.1	85.1	83.3
Yearlings	25.4	25.9	29.0	29.6	34.5
Lambs born per lambing	1.27	1.28	1.31	1.28	1.28
Lambs mortality (%)	3.22	3.17	3.52	3.26	3.37
Live lambs per present ewe	0.92	0.94	0.97	0.92	0.92
Milked ewes (%)					
/Lambed ewes	81.7	82.4	83.1	84.3	84.9
/Present ewes	61.2	63.1	64.5	63.3	63
Lactation (days)	152	152	154	154	158
Total milk (l)	143	148	150	147	149
Milked yield (l)	106	110	112	110	115

Average prolificity is 1.28-1.3, which is also within the values reported by the same authors. As a consequence of an average 3.25 % mortality of the lambs, a numerical productivity of 0.92-0.95 living lambs per present ewe is achieved.

As for milk yields, it should be pointed out that the data refer only to sheep that had sufficient milk records (test-days) for their lactations to be calculated to fulfil the purposes of the breeding scheme. Thus, they show the improvement achieved during the last 5 years within the framework of the Breeding Program for the Latxa and Carranzana breeds, that is longer lactations and higher yields. Moreover, a slight trend towards intensifying milking can be noticed by the percentage of sheep that are milked in relation to the total number of animals that lamb. The importance of milk sales within the flocks attached to Technical and Economical Advisory Programs (TEAP) will be discussed later.

The lack of data concerning flocks outwith the Breeding Program makes evaluating their role quite a speculative task. On average, they have a lower size (4000 flocks and 200,000 ewes, which means just 50 ewes/flock). Many of them, encouraged by the existing subsidies, may just be kept to profit from the grass produced upon very small surfaces, and milking can not be practised at all. In such flocks, milk or meat production is bound to be aimed mainly for self-consumption or a very limited complementary income to other activities (other livestock, industry, etc.). In this case, they could be considered as "low-specialised dairy sheep" farms.

In addition, it would be quite pretentious to think that every specialised dairy flock takes part in the Breeding Program. In fact, there are farms where most of the incomes come from milk production, but for different reasons they are not included in the development structures raised around this sector. The incidence of traditional management practices within this sample is expected to be important.

The market : Milk production and prices

Milk is regarded to be the most important product of the Latxa and Carranzana breeds. Annual production in the Basque Country is estimated in 10.4 million litres (3.3% of Spanish production). Most of it is destined for the production of Idiazabal cheese, a high quality product controlled by the corresponding Label of Origin. Around 47% of the milk is transformed at small cheese making factories on the farms, and a similar amount is sold to dairy factories also for cheese making. Only 5% of the milk is directly sold to the consumers without further transformation (DAP-GV, 1999).

The average price of the milk paid by dairy factories to the farmers is around 0.83 €/l (Fig. 1A), a slowly increasing trend being observed during the last years. As for cheese, although average price is estimated in 9.2 €/kg of cheese, there are important differences depending on its origin: from 8 €/kg for industrial cheeses, to 12 € when the product is home-made, high-quality, and well-known by the consumer. In addition, the increasing trend in price is more evident in the case of cheese sales than for fresh milk.

As a consequence of productive seasonality, the price of lamb evolves throughout the year (Fig. 1B): highest prices (>4.5 €/kg LW) correspond to early-autumn when the availability of lambs is at a minimum, but they are important for farmers until Christmas. The lowest prices (<3 €/kg LW) occur during the remaining months of winter. Generally speaking, average prices weighted by the availability of lambs in the market have only increased by 1.8% per year during the last 5 years.

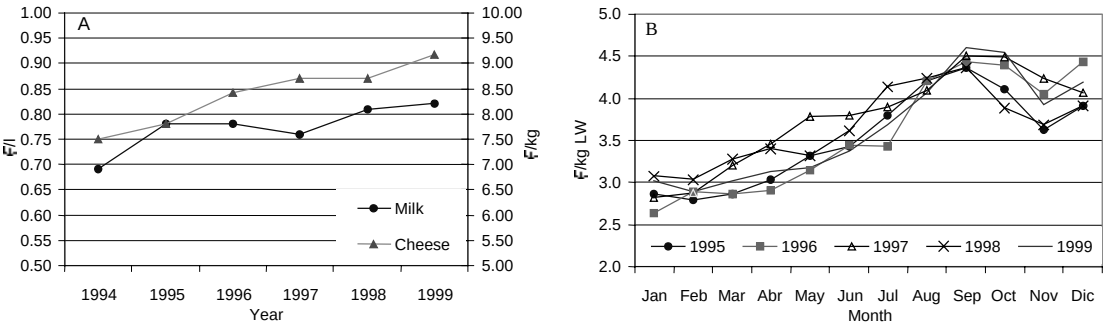

Fig. 1. Average trends for the prices achieved by the dairy sheep farmers in the Basque Country throughout the last five years. (A) Milk (€/l) and cheese (€/kg); (B) Lamb prices (€/kg live weight).

Finally, the wool of the Latxa sheep is classified as being of coarse quality. After a very brief period of 3 years when prices increased to 0.5 € per kg in 1997, they have decreased again to 0.11 in the summer of 2000. Consequently, wool can not be considered as a product of the Latxa and Carranzana system, but as a residue of other productions.

Economic indexes in flocks under advisory programs

Data coming from Technical and Economical Advisory Programs (TEAP) (Tables 2 and 3) show a 20% increase in milk production, not only per flock (which could just be related to a bigger flock size) but also per present sheep (Nafarrate *et al*., 2001). This improvement can be partially explained by the annual genetic improvement achieved within the framework of the Breeding Program, estimated at 2% (Ugarte *et al*., 2000).

However, there are other factors that have undoubtedly exerted a positive effect on those higher yields. First, feeding expenses have increased despite the lower price of concentrates, which supposes a higher use of purchased foodstuffs.

Part of the higher fixed costs were due to an increase in the use of artificial insemination, which can help to explain the improvement in fertility. Thus, higher replacement rates and more rapid genetic advances can also be expected.

Table 2. Main characteristics of the sample of farms under Technical and Economical Advisory Programs in the Basque Country (Nafarrate *et al.*, 2001)

	1997	1998	1999
Farms	34	34	46
Human labour units	1.9	1.8	1.75
Flock size (number of sheep)	384	425	382
Fertility (%)	0.79	0.78	0.82
Annual milk yield (l)			
Per sheep	62.4	67.8	74.7
Per farm	23,760	28,575	28,673
Lamb sales (kg LW/ewe)	7.4	7.4	8.6
Milk price			
From milk sales	0.89	0.93	0.94
From cheese sales	1.47	1.51	1.53
Cheese price	9.31	9.43	9.57
Concentrates price	0.20	0.20	0.18

Table 3. Economical indexes for the sample of farms under Technical and Economical Advisory Programs in the Basque Country (Nafarrate *et al.*, 2001)

	1997	1998	1999
Total Incomes from productive activity	102.54	116.17	123.60
Milk + cheese sales	76.53	86.60	95.48
Lamb + wool	23.57	24.40	26.07
Variable Costs	41.05	41.97	43.15
Feeding Cost	26.90	27.50	30.35
Purchased feeding	25.11	25.30	27.44
Fixed Costs	42.08	45.53	48.50
Amortisation	18.35	18.76	18.75
Gross margin upon purchased feeding (subsidies excluded)	74.09	85.01	93.85
Gross margin (subsidies excluded)	61.49	74.19	80.46
Net margin per ewe (subsidies excluded)	19.41	28.67	31.97
Net margin per farm (subsidies excluded)	7,243.20	12,620.56	12,424.87
Subsidies received per ewe	20.46	24.21	32.60

These aspects are in accordance with the effect of certain management practices already pointed out before (Ruiz, 2000). For instance, the earlier start of the lambing season (middle or late autumn) by means of insemination allows longer milking seasons and higher milk yields per sheep (Ruiz *et al*., 2000). Furthermore, as some of the lambs can be sold for better prices, the average amount received per sheep can be increased. These factors could partially compensate for the lower role of grazing, and even improve the economic results in some farms. However, farmers should evaluate beforehand the sustainability of these practices from a systemic perspective before deciding whether to alter the lambing pattern or not. In this sense, the design of decision support systems could help to improve the effectiveness of TEAP.

In relation to the incidence of the market, the higher prices received for the milk or cheese sold are leading to higher total incomes and margins, despite higher fixed costs (due to investments) and variable costs (dependency on purchased feeding). Moreover, the level of profitability depends to a great extent on the commercialisation strategy for the milk, as the price increases with the value

added at the farm level. Usually, the price obtained per litre of milk when home-made cheese is directly sold to the consumer, is nearly double that of milk sold to dairy factories. Fresh milk sales direct to consumers can contribute to the improvement of the incomes compared with selling to dairy factories, as it gives a better price, but this is seldom the only method of commercialisation for the farms.

As for subsidies (FEOGA, ICM, etc.), the amount received per sheep in this sample of flocks under TEAP is comparable to the net margin obtained with the productive activity (from 20 to 32 € per sheep). However, as this group of farms is considered to be among the most productive and possibly the best managed ones, the incidence of subsidies is bound to be much higher in lesser productive flocks. According to some technicians, around 44% of the total number of flocks could disappear in the absence of existing subsidies.

Conclusions

The role of the dairy sheep system for the Basque Country is important as a source of income for families located in areas with low value for other purposes. This system is also responsible for the management of large areas of the territory and conservation of the landscape, which are sometimes also important for leisure activities.

In general terms, the dependence of the dairy sheep sector on subsidies is remarkable, even within the sample of farms under TEAP.

According to the results achieved by the TEAP, the improvement of every process related to the productive activity (nutrition, reproduction, genetics, etc.) seems to be a key for increasing current productivity levels. In this sense, organisation of training courses adequately fitted to the farmers' needs is considered to contribute to the professionalism of the sector.

In addition, as more than 67% of the farmers are responsible for the direct commercialisation of their production, new marketing strategies allowing higher added value for the products should be searched for.

However, alternative tools aimed at improving the management and profitability of traditional systems should also be searched for. In this sense, the development of new tools for advisory (Decision Support Systems) and for a more profitable and sustainable management of the farms appears as an interesting option.

References

Creus, J., Fillat, F. and Gómez, D. (1984). El fresno de hoja ancha como árbol semi-salvaje en el Pirineo de Huesca (Aragón). *Acta Biológica Montana,* 4: 445-454.

DAP-GV (1999). *Anuario Estadístico del Sector Agroalimentario CAV 1997-98*. Departamento de Agricultura y Pesca del Gobierno Vasco. Ed. Servicio Central de Publicaciones, Gobierno Vasco, Vitoria-Gasteiz, 220 pp.

Hanoq, E., Urarte, E., Ugarte, E., Arrese, F., Gabiña, D., Arranz, J., Oregui, L.M., Bravo, M.V. and Beltrán de Heredia, I. (1993). Situación y problemática del programa de mejora genética del ovino lechero en la Comunidad Autónoma Vasca. *ITEA*, 89A: 143-161.

Nafarrate, L., Marijuan, S., Elgarresta, M., Arrieta, I., Lete, J.M., Garmendia, K., Zuriarrain, I., Garro, J., Solaguren, F., Mtz de Albeniz, E., Bilbao, K., Santamaria, P. and Garrastazu, A. (2001). Evolución y análisis de los datos tecnico-económicos en las explotaciones de ovino de leche en la CAPV. *ITEA*, Vol. Extra 22: 227-229.

Oregui, L.M., Bravo, M.V. and Gabiña, D. (2001). Evolución de la condición corporal en ovino lechero explotado en régimen de transhumancia valle-monte, factores que lo afectan. *ITEA*, 97A(I): 29-46.

Oregui, L.M., Garro, J., Vicente, M.S. and Bravo, M.V. (1997). Estudio del sistema de alimentación en las razas ovinas Latxa y Carranzana: Utilización de los pastos comunales y suplementación en pesebre. *ITEA*, 93A(3): 173-182.

Oregui, L.M. and Ruiz, R. (2002). El papel del pastoreo en la explotación del ganado ovino lechero en zonas húmedas y de montaña. *Ovis*, 81 (in press).

Ruiz, R. (1992). Análisis de los factores de explotación que afectan a la producción lechera en los rebaños de raza Latxa de la CAPV. Servicio Central de Publicaciones del Gobierno Vasco, Serie Tesis Doctorales, No. 39, 328 pp.

Ruiz, R., Oregui, L.M. and Bravo, M.V. (1997). Productive characteristics of dairy ewe flocksin the Basque Country. In: *Livestock Farming Systems: More than Food Production,* Sorensen, J.T. (ed.). EAAP Publ. No. 89. Wageningen Pers, The Netherlands, pp 42-47.

Ruiz, R., Oregui, L.M. and Herrero, M. (2000). Comparison of models for describing the lactation curve of Latxa sheep and an analysis of factors affecting milk yield. *J. Dairy Sci*, 83: 2709-2719.

Ugarte, E., Ruiz, R. and Beltrán de Heredia, I. (2000). Impact and influence of foreing breeds in Spanish races of dairy sheep. In: *51st Annual Meeting EAAP*, Book of Abstracts No. 6. Wageningen Pers, p. 287

Urarte, E., Gabiña, D., Arranz, J., Arrese, F., Gorostiza, P. and Sierra, I. (1989). Las razas ovinas Latxa y Carranzana. I. Sistemas de producción. *ITEA*, 84: 7-25.