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Is cheese making and marketing by farmers determining sustainability in dairy sheep?

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Abstract. Since the beginning of the breeding programme for the Latxa and Carranzana dairy sheep in the middle 80s, significant changes have occurred in the production systems. A whole set of actors and advisory schemes have been implemented to increase productivity and efficiency, improving the standard of living of the farmers, food safety and quality of livestock products. However, whereas many flocks disappear without generational turnover, others decide to undertake new transformation and commercialisation strategies in an attempt to improve the economic turnover of the activity. Therefore cheese making and better access to the consumers are increasingly considered as key issues in the search for economic viability. An overview of the recent trends and current situation of the Latxa system in terms of its sustainability, with special emphasis on the role of cheese-making and marketing options will be presented in this paper.

Keywords. Profitability – Milk – Sheep – Added value – Commercialisation.

Est-ce que la fabrication du fromage et la commercialisation par les producteurs peut déterminer la viabilité des ovins laitiers?

Résumé. Depuis le début du programme de sélection de la race Latxa et Carranzana au milieu des années 80, des changements importants sont survenus dans les systèmes de production. Un ensemble d'acteurs et d'activités de conseil ont été mis en œuvre visant à augmenter la productivité et l'efficacité des troupeaux, l'amélioration des conditions de vie des producteurs, la sécurité alimentaire et la qualité des produits fermiers. Cependant, alors que de nombreux troupeaux disparaissent sans renouvellement, quelques autres éleveurs décident d'entreprendre la production fermière du fromage et de nouvelles stratégies de commercialisation dans le but d'améliorer le chiffre d'affaires économique de l'activité. C'est pourquoi la fabrication du fromage et l'accès aux consommateurs sont de plus en plus considérés comme les clés dans la recherche de la viabilité économique de l'activité. Une étude de la situation actuelle du système d'élevage de la race Latxa et des tendances récentes en termes de durabilité, avec un accent particulier sur le rôle de la fabrication du fromage et de la commercialisation, sera présentée dans ce document.

Mots-clés. Rentabilité – Lait – Ovins – Valeur ajoutée – Marketing.

I – Introduction

The production system of the Latxa sheep in the Autonomous Community of the Basque Country (BC, Spain) has been improved during the last 30 years due to the implementation of several programmes regarding health and sanitary issues, the breeding scheme for conservation and improvement of the local breeds, adoption of technology, as well as a process of structuration and organisation of the whole professional sector.

Regarding commercialisation, a Regulatory Council for the Protected Denomination of Origin (PDO) "Idiazabal" was sorted out in 1987 to certify and guarantee the outstanding quality of the cheese produced. As a result, there are prestigious farmers that enjoy certain social recognition and a suitable level of incomes for their activity.

However, there are certain issues that threaten the evolution and even the sustainability of the system, as well as opportunities and challenges to be faced.

The objective of this paper is to analyse the official statistics databases available and the sources of information arising from the existing programmes aimed to reflect about the main strategies carried out by farmers to target the sustainability of dairy sheep.

II – Material and methods

The following information sources were consulted to analyse the current situation of the dairy sheep sector in the BC:

(i) EUSTAT is the public body that collects, analyses and publishes statistical information about every aspect of the BC. In particular, the Agricultural Census carried out in 1999 and 2009 have been taken as a reference to check the overall trends regarding the population size of dairy sheep farmers and breeds.

(ii) The Statistics Official Service of the Department of the Environment, Regional Planning, Agriculture and Fisheries of the Basque Government (DERPAF) provided the data regarding: (i) annual production and destination; (ii) sanitary programs carried out every year; and (iii) data arisen from the technical and economical advisory services provided by the management centres (Abelur and Lurgintza in Gipuzkoa, Lorra in Bizkaia, and Sergal in Álava). These economical data, together with those coming from other sectors, make up the Basque Farm Accountancy Data Network (RICAV), which is later integrated within the Spanish and European Networks.

(iii) The Regulatory Council of the PDO Idiazabal provided data regarding the number of farms involved, as well as the volume of milk transformed and cheese labelled within the PDO.

(iv) The Confederation of Associations of Latxa and Carranzana sheep breeders (CONFELAC) provided their historical data about the population taking part in the breeding scheme implemented for the local dairy breeds.

III – Results and discussion

1. Sheep flocks in the Basque Country: general trends

According to the Agricultural Census of 2009, the number of livestock farms existing in the BC has experienced a significant decrease during the last decade. For instance, since 1999 the number of breeders has decreased in 69% for dairy cattle and 33% for beef cattle. Regarding sheep, there are nowadays 271,493 heads in 4596 flocks, which represent a slight decrease of 14 and 4% respectively in that period (EUSTAT, 2004; EUSTAT, 2010).

The data collected within the sanitary programs carried out every year, allows estimating in 86.5% the number of sheep belonging to local dairy breeds (Latxa and Carranzana), 1.5% are high-productive foreign dairy breeds (95% of them being Assaf), and 6.6% are reared for meat production.

In addition to the disappearance of certain flocks, there has been a significant change in the structure of the dairy sheep sector. Regarding the classification of flocks according to their size:

(i) Smaller flocks (with less than 99 sheep) represent nowadays 91.6% of the total number of flocks and 48% of the sheep population. The number of flocks within this category has increased in 29% since 1999.

(ii) Medium-sized flocks (with 100-199 sheep): their productive orientation would not be clear either, since that flock size can hardly provide the minimum economical yields required. After a

reduction of 11.6% of those existing in 1999, they are 4.6% of the flocks existing in the BC and gather 17.2% of the sheep population.

(iii) Large flocks (200-599 sheep) represent only 3.6% of the flocks, but they manage 21.9 % of the sheep population. Their size can be indicative of a sort of main activity, and their number has been reduced in 5.5%.

(iv) Very large flocks (over 600 sheep): they are just 14 flocks nowadays (0.2%), whereas during this last decade their number has ranged between 12 and 20. However, these flocks are responsible for 5.5% of the sheep population.

Even the number of flocks that take part of the breeding scheme for the Latxa and Carranzana breeds (CONFELAC, 2010) has decreased in 18% during the last 10 years (from 205 in 1999 to 169 in 2009).

So these figures can already device a first idea about the abandonment of professional activity, or the transition towards more diversified, multi-objective farming systems (i.e. for leisure activities or for managing small plots of land by means of grazing practices) or even part-time livestock farming.

2. Milk production: professional and market oriented flocks

Total milk production in the BC was estimated in 8.8 million litres in 2009 (Statistics Official Service of the DERPAF, 2010), being oriented basically for cheese making purposes. In this sense, 54% is transformed into cheese in the farms and later directly marketed to consumers, restaurants, shops, etc. and 40% is sold to the dairy industry (Fig. 1). In 1999, these percentages were 47 and 52%, respectively, so there has been a significant change in the main commercialisation paths followed by farmers for their production.

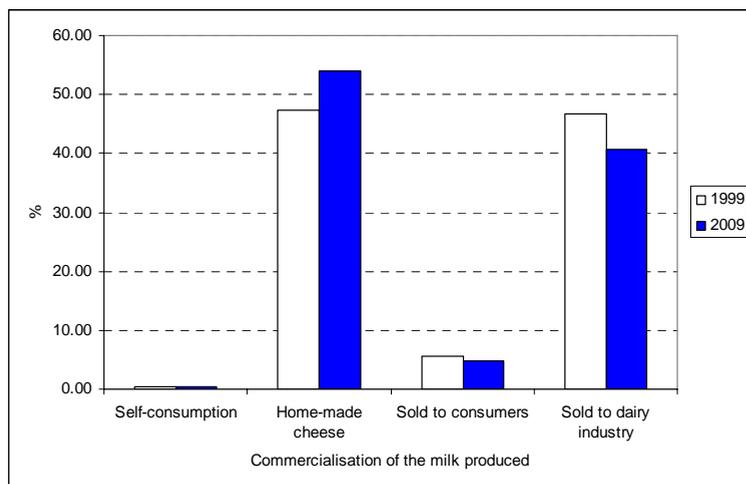


Fig. 1. Changes observed in the sheep's milk production classified by destination between 1999 and 2009 (Source: Statistics Official Service of the DERPAF).

The Regulatory Council of the Protected Denomination of Origin of Idiazabal Cheese was created in 1987 to defend the interests of the shepherds and the autochthonous Latxa and Carranzana sheep breeds, and to guarantee the origin and quality authenticity to the consumers. Although the number of flocks that allocate their milk to the Protected Denomination

of Origen Idiazabal has decreased in 27% (from 602 in 2001 to 506 in 2009), the number of cheese makers, either industrial or artisan, has grown in 63% since 1999 (from 72 to 117). The volume of milk involved and the cheese branded with the PDO have also increased during these last years up to the current 8.4 million litres and 1.4 million kg, although regarding these figures it has to be taken into account that they refer to both the BC and Navarre, the area comprised by the PDO. Such production is possible due to a sheep population of 81,710 heads in the Basque Country and 40,086 in Navarre.

According to these general data, it is evident that there is an increasing importance of transformation and commercialisation activities carried out at the farm in order to catch the potential added value that offers milk production.

3. Marketing and commercialisation strategies

In order to focus the scope onto the farmers more devoted to market oriented activities, the sources of information come from different programmes, being the advisory programmes analyzed by the Statistics Official Service of the DERPAF the most significant one.

Whereas in 1999 only 46 flocks were taking part within advisory programmes (Nafarrate *et al.*, 2001), ten years later they were 85 farms (+85%) demanding technical and economical support for decision making. This figure represents 39% of the flocks with more than 200 sheep existing in the BC. Therefore, they can be envisaged as representative of the most efficient and professional flocks existing within the production system of the Latxa sheep.

The number of farms that carry out added value activities in the form of home-made cheese-making nowadays represents 74% of the sample size (Table 1), whereas in 1999 they were 54%. Apparently this is the most evident strategy adopted by farmers in the search of economic sustainability. There is a main reason leading to that decision, which is the difference existing between the price paid by the dairy industry and the price achievable by making cheese.

Table 1. Comparison of the flocks taking part in advisory services in the Basque Country in 1999 and 2009: main features

	1999†	2009†		
	Average	Average	Milk	Cheese
N farms	46	85	22	63
Sheep (n)	382	261	245	267
Land (ha)	n.a.††	46.36	56	43
Total Labour (n Work Units)	n.a.††	1.80	1.5	1.9
Family Labour (n Work Units)	1.75	1.70	1.4	1.8
Total Milk Production (l)	28,673	35,523	34,134	36,008

†Data Sources: 1999: Nafarrate *et al.* 2001; 2009: Statistics Official Service of the DERPAF, 2010.

††n.a. = non available

The criteria used by the dairy industry to determine the price paid to each farmer have changed during the last decade within the framework of a programme to promote milk quality. Since the late 90's, the price was set on the basis of:

(i) Fat and protein content: Initially set in 0.0676 € per g of fat plus protein /100 g of milk, it remained nearly unchanged until 2008, when it was increased up to 0.075 € for farms delivering less than 8000 litres/year and to 0.085 € for the remaining ones. These figures have been decreased during 2010 to 0.069 € and 0.081 €, respectively. Moreover, whereas at the

beginning every fat and protein unit was rewarded, since 2002 a limit was established in 14%, above which additional fat or protein content is not considered for further payment.

(ii) Somatic cell count (SCC): Until 2001, there was a bonus of 0.018 €/l for the price of the bulk tank milk containing less than 400×10^3 SCC, but then the level of exigency increased when the reference decreased to 300×10^3 SCC. There is also a penalization of -0.012 €/l if there are over 750×10^3 SCC.

(iii) Monthly volume of milk delivered: Before 2007, flocks delivering between 3000 and 5000 l / month were given a bonus of +0.03 €/l; + 0.048 €/l between 5000 and 7000 l, and 0.078 €/l over 7000 l. But that year a penalisation of -0.15 €/l was applied whenever less than 1200 l was collected, and the bonus began to be applied only above 5000 l / month.

(iv) Bacteria: Penalizations have continuously been applied to milk containing above 500×10^3 bacteria, but no premium are established to promote good hygienic conditions.

(v) Irregular bonuses have been applied in certain moments under not fully clear requirements.

As a consequence, the price of the milk provided by a representative flock, assuming the same monthly average quality conditions, would have increased a total of 17%, which means an average annual rate of 1.9%. This figure is significantly under the average inter-annual increases registered in the Consumer Price Index during this decade (INE, 2010), which have ranged between 2.8 and 4.1% from 2002 to 2008 (in 2009 it was +0.3). Therefore, this tendency could apparently be leading to a decrease in the purchase capacity of this sort of farmers.

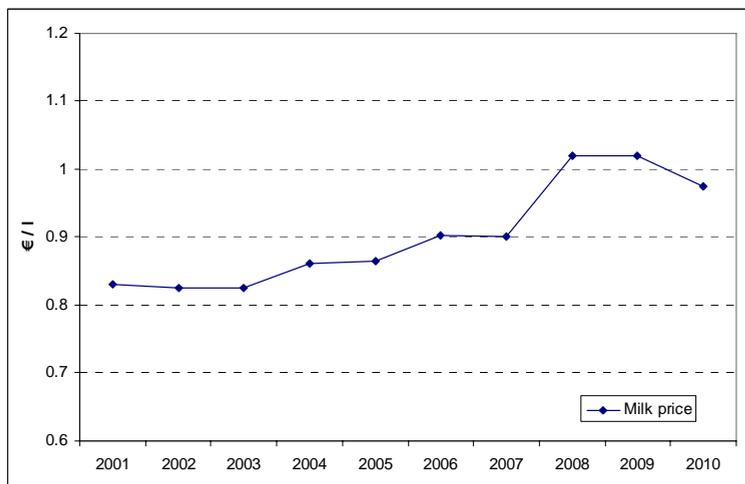


Fig. 2. Simulated milk price paid by dairy industry assuming the same monthly average quality features.

Regarding the price of home-made cheese, as most of it is directly sold to consumers, the farmer has the key to fix it depending on the particular demand existing for his product, which up to a point is a consequence of the prestige achieved within the local market, cheese liking and consumer willingness to pay (Cayot, 2007). As stated by Hansen (2005), the price exerts a positive effect on the expected eating quality for certain type of consumers, who also underlines the positive effect of experienced eating quality on pleasure-feeling. Nowadays, the average price obtained per milk litre by the farmers within the sample of flocks analysed is 2.2 €/l, 101% higher than the price achieved by raw-milk-oriented farmers (1.09 €/l). That average price is the result of different commercialisation options:

(i) Raw-milk directly sold to final consumers, usually in 1 l plastic bags or bottles: although it represents a small volume in some farms, it is an interesting option since the final price ranges between 2.2 and 3 €/l without further added value activities or too demanding requirements for instalments, storage, etc.

(ii) Cheese: There are several commercialisation channels between the farmer and the final consumer, the most common one being direct selling either at the farm or in the local markets regularly held in many places (on a weekly basis, events, etc.). A certain amount can be sold indirectly normally through just one intermediary (such as a restaurant, butchery, small shop, or even the Association of Artisan Cheese Makers). Therefore, the efforts required for the commercialisation of cheese depend on many factors, and the prices achieved can range from 12 to 18 €/kg.

The evolution of the price of milk processed into cheese, between 1999 (1.53 €/l) and 2009 (2.2 €/l) according to the data available (Table) shows an annual average increase of 4.4%, which is slightly over the average of the evolution previously mentioned for the Consumers Price Index in the BC. Making cheese do not only provides a better price, but also a direct contact with the final consumer and a more evident acknowledgment of the quality achieved, which is considered to contribute to the sense of self-esteem of farmers.

But the decision of starting transformation and commercialisation activities cannot be taken only on the expected price of milk. There are other issues such as the availability of family labour resources, the age of the farmer, the expectancy for generational turnover, the financial conditions and existence of subsidies to face investments, etc. So, there should be other strategies available for those farmers that definitely decide to remain producing milk, or even complementary practices for cheese-makers in the search of sustainability. Though, to have a more accurate comparison between milk-oriented or cheese-making farmers, in terms of the evolution followed during these last years, other technical and economical indicators were analysed.

A. Technical issues

Feeding involves the most important cost for dairy sheep production; in particular in 2009 they represented on average 80% of the variable costs and 54% of the total costs (Statistics Official Service of the DERPAF, 2010). This means a significant increase in comparison to 1999 when they were 70 and 35% respectively. In fact, the feed costs have multiplied by 1.5 per litre and nearly by 3 per sheep (Table). One of the reasons is the higher price of the feedstuff used for supplementation, basically during the lactation. Since 1999, the price of the concentrates has increased at an annual average rate of 3% up to the current 0.23 €/kg, and even they reached the top at 0.28 €/kg due to the global food and feed crises in 2008.

Table 2. Comparison of the flocks taking part in advisory services in the Basque Country in 1999 and 2009: Technical and economical data

	1999†	2009†		
	Average	Average	Milk	Cheese
Milk yield (l/sheep)	74.7	136.1	139.2	135.0
Milk yield (l/work unit)	16384.6	21137.2	24381.4	20004.3
Price of concentrates (€/kg)	0.18	0.23	0.23	0.23
Milk price (€/l)	0.94 milk vs 1.53 cheese	1.92	1.09	2.20
Feed cost (€/l)	0.46	0.69	0.66	0.70
Feed cost (€/sheep)	34.7	93.9	91.7	94.7

†Data Sources: 1999: Nafarrate *et al.*, 2001; 2009: DERPAF's Statistics Official Service, 2010.

But at the same time, there has been a huge enhance in the productivity of the farms, either in terms of milk yield per sheep or per work unit, and even a reduction in the flock size. This can be related to the improvements achieved by the breeding programme in terms of genetic features of the sheep population for milk production, but also to an advance in the efficiency of the activity regarding nutrition, reproduction management, milking practices, etc., which would be the result of succeeding advisory programmes.

As a result, the profitability of dairy sheep production and the economical sustainability has improved significantly during this last decade, although the differences existing per sheep and per work unit are still evident depending on the orientation of the farm. Generally speaking, cheese-oriented farms tend to be more profitable than raw-milk oriented farms selling to dairy industry.

B. Social issues and other components of sustainability

The objectives pursued by the farmers are not only related to technical and economical issues, but they are also affected by the particular features of the farm for a wide set of factors (García-Martínez *et al.*, 2007). The socio-economic conditions existing around dairy sheep in the BC interact together with family and individual factors in the decision making process. In particular the combination of three factors such as the age of the farmer, the availability of family labour resources and the chances for generational turnover, play a crucial role in the definition of farming objectives. In fact, the labour availability is significantly higher in cheese-making farms (Table 2).

Therefore, these social factors determine to a great extent the process of adopting new technologies and facing inversion in instalments to begin with cheese-making activities. In addition, the values that nowadays rule the behaviour of the society play a significant role in the acceptance of shepherding as a professional activity and determine the chances for generational turnover (Ramos, 2009).

In addition, the evident implications of livestock systems upon the environment (grazing, land management, biodiversity, nutrient cycling, etc.) and the growing concern for potential hazards (fire, erosion, water pollution, deforestation, climate change, etc.), require delivering more holistic approaches when targeting sustainable development.

C. Sustainability assessment in case-study flocks: milk vs cheese-making

To be able to cope with the complexity arising around the concept of sustainability, different approaches and methodologies have been proposed, such as MESMIS (López-Ridaura *et al.*, 2002), Lyfe Cycle Assessment (Haas *et al.*, 2001), SAFE (Van Cauwenbergh *et al.*, 2007), etc.

In particular the MESMIS framework allows measuring and monitoring sustainability indicators through an interdisciplinary participatory process. Then sustainability is assessed in comparative terms between two or more systems or between different stages of the same system once improvements have been implemented (López-Ridaura *et al.*, 2002). To do so, seven attributes are defined to assess sustainability: productivity, stability, reliability, resilience, adaptability or flexibility, equity and self-reliance or self-empowerment. The criteria used to measure each attribute and the indicators selected should be established after a critical analysis of the economic, social and environmental situation of the system. As an example, two flocks (milk oriented vs cheese-making) were monitored during a whole productive cycle. The data collected were analysed to assess the indicators agreed by a multi-disciplinal expert's panel. The results can be viewed in the Fig. 3.

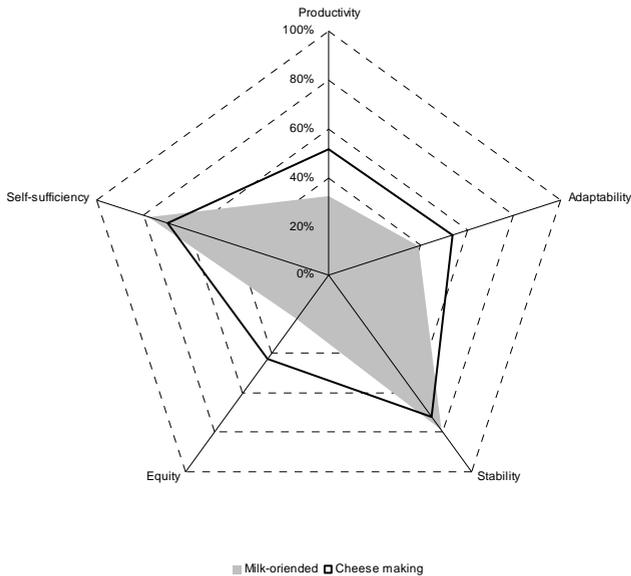


Fig. 3. Assessment of sustainability attributes in two case studies within the MESMIS framework: comparison of a milk oriented vs a cheese-making flock.

The cheese-making flock was more productive on the basis of higher yields and technical results per animal and per hectare. The impact of the higher price achieved due to the added value activities carried out was also evident.

The adaptability attribute included several indicators related with the level of extensification, the diversification of the economic activities and the access to land and markets. On the one hand, the milk oriented farm obtained better results because the flock grazes in mountain areas during summer. But on the other hand, the cheese oriented farm is more adaptable due to a higher level of diversification and to a better access to markets and land to rent.

Regarding stability both farms show similar high results according to the measured indicators, which are related with the long term continuity of the farm, the relevance of the off-farm incomes and the absence of conflicts with predators, a growing risk in the western part of the BC.

Equity was considered under two dimensions: (i) internal, related to the level of satisfaction that the farmer obtains with the activity, the salary and the leisure time; and (ii) external, more related to the externalities generated, as the number of hired labour or the utilization of pastures, either at mountain or valley areas. The milk-oriented farm achieved a lower salary level and enjoys less days of vacation per year, but both farmers rated a high level of satisfaction with the activity.

Self-sufficiency was assessed in terms of the level of endowment, the dependence on subsidies, the quantity of purchased food and the capacity of the farmer to fix the price of the products. The differences observed were basically due to the higher dependency on purchased food of the cheese making farm.

The analysis carried out allows an overall analysis of both farms focusing on the critical points that affect the three pillars of sustainability. In general terms, the cheese-making farm seemed to be more sustainable than the milk-oriented. The adoption of certain measures and practices aimed to improving the current situation could be suggested to each farm.

IV – Conclusion

The implementation of added value activities at the farm determines to a great extent the profitability, and in consequence the economic success and the sustainability of dairy sheep. The chances to undertake tasks regarding transformation and commercialisation are conditioned by a set of factors of social nature. Nevertheless, the approach to sustainability requires a holistic overview aiming to assess at the same time the economic, social, and environmental situation of the system.

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