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Recent evolution of suckler cow farming systems in the Spanish central Pyrenees

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SUMMARY – The evolution of suckler cow farming systems in Spanish mountain areas was studied (1989/91-2004). Results showed important structural adjustments (physical and economic size), change of productive orientation, extensification of grazing management, reduction of variable cost and large increase of labour productivity due to the impact of subsidies on economic indicators.

Keywords: Farm evolution, economics, suckler cow, mountain areas.

RESUME – *"Évolution récente des systèmes d'élevage de bovines allaitants dans les Pyrénées Centrales espagnoles". On analyse les évolutions des systèmes bovins en zone de montagne (1989/91-2004). Les résultats montrent une considérable adaptation structurelle des exploitations, un changement de l'orientation productive et une gestion technique plus extensive. Les résultats économiques ont fortement augmenté, mais en ce qui concerne la contribution des soutiens directs aux exploitations.*

Mots-clés : *Évolution des exploitations, économie, bovin allaitant, montagne.*

Introduction

Mountain areas in Europe have great relevance in environmental and social terms, holding great ecological, landscape and cultural diversity. Grazing livestock systems play a central role in the conservation on these areas and agricultural policies currently recognise their multiple functions, productive, environmental and societal, because of their contribution to economic and social cohesion and rural development (Laurent *et al*., 2003). However, there are a number of factors that threaten the continuity of agricultural households in Spanish mountain areas, specially those of smaller dimension (Baldock *et al*., 1996), and therefore the sustainability of large pastoral ecosystems is compromised (Bernués *et al*., 2005). The abandonment of farming activities has being a continuous process in many European areas, with diverse environmental consequences. In most cases a clear evidence of negative impacts of this abandonment has been described (McDonalds *et al*., 2000).

In general terms, the changes observed in extensive farming systems in the last few years can be interpreted as attempts to adapt to the changing socio-economic environment, predominantly influenced by agricultural policies, but local and farm-specific characteristics are also very important.

Within this context, the aim of this study was to analyse the evolution of suckler cow farming systems in mountain areas in the last 15 years. Current structural, management, economic and productivity variables were compared with those observed in 1990.

Material and methods

Data were collected through a direct questionnaire applied to farmers in 3 valleys of the Spainsh Central Spanish Pyrenees in 2004 (Broto, Baliera-Barrabés and Benasque). The survey gathered information on farm structure, family composition and labour, management and economic

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performance. The sample was designed according to previous studies in the same areas (Olaizola, 1991; Bernués, 1994), so that the information would be available in the same farms in two different dates. From the initial sample of 102 farms (years 1989 and 1991), 30 disappeared in this time interval, so the final size of the sample in 2004 was 72 farms. Representative variables were analysed with a Student's T test to compare differences between dates.

Results and discussion

In relation to the abandonment of farming activities (29.4% of the initial sample), the main causes were retirement of farmers (40%) and substitution with other economic activities (56.6%), from which the most important one was tourism (33.3%). Abandonment was more pronounced in Benasque Valley (36.4% of farms) (Table 1).

Table 1. Evolution of structure, productive orientation and management (1989/1991-2004)

	Broto			Baliera-Barrabés			Benasque			Total		
	1991	2004		1991	2004		1989	2004		89-91	2004	
No. farms	32	22		37	29		33	21		102	72	
LA (ha)	17.7	34.8	***	120.9	106.2	***	26.6	43.5	***	58.1	66.1	NS
%grazing area	95.6	98.1	NS	85.8	91.2	NS	97.8	99.9	***	92.8	95.8	NS
%forage crops/ grazing a.	2.5	0	*	17.1	6.9	***	4.3	0.6	***	8.4	2.9	***
LU	46.7	69.1	***	66.8	82.6	NS	31.3	54.0	***	49.0	70.1	***
WU	1.5	1.4	NS	2.0	1.6	***	1.7	1.1	***	1.8	1.4	***
LU/ WU	31.7	52.7	***	32.4	51.4	***	17.2	49.9	***	27.3	51.4	***
%LU cattle/ LU total	92.9	94.5	*	80.1	95.8	***	85.3	100.0	***	85.6	96.6	***
% dairy farms	87.5	0.0	***	89.2	0.0	***	93.9	4.8	***	90.2	1.4	***
% fattening farms	12.5	45.5	***	10.8	55.2	***	6.1	42.9	***	9.8	48.6	***
grazing period (d)	266	302	***	249	284	***	232	323	***	249	301.1	***
%LU in mountain past.	66.8	77.0	***	50.0	72.0	***	57.3	74.4	***	57.6	74.2	***
concentrates (kg/LU/year)	418	141	***	219	49	***	638	33	***	417	73	***

NS: no significant; *p < 0.5; **p < 0.01; ***p<0.001. LA: land area; LU: Livestock unit; WU: Working unit.

Evolution of structure, productive orientation and management

Land area (LA) increased notably en Broto and Benasque valleys in the period of study (97% and 64%, respectively), but decreased slightly in Baliera-Barrabés valley, where farms were initially bigger; changes in grazing management can also explain this reduction in size (see below). Grazing areas, which already were predominant in 1990, have increased even more in percentage of LA, therefore agricultural crops are negligible. Natural pastures constituted most grazing areas, as forage crops in the global sample decreased from 8.4% to 2.9% of the total grazing area. Similarly, herd size increased markedly in all areas, but less in Baliera-Barrabés that initially had more livestock units (LU) (Table 1).

All households had a familiar character with null or very little salaried labour. Labour input (WU) decreased notably in all areas, specially in Baliera-Barrabés and Benasque (22% and 35%, respectively). Together with the observed herd size enlargement, this reduction constitutes a structural improvement of farms in these mountain areas: the proportion LU/ WU increased by 24 LU in the global sample.

Orientation of production suffered a drastic change in this period. Milk and weaned calves were the main products of cattle farming systems in the Central Pyrenees in 1990 (Olaizola *et al*., 1995). These mixed beef-dairy farms, which constituted around 90% of the initial sample, have completely disappeared. The importance of sheep and goat decreased, so we can consider the beef farming

systems as fully specialized. At the same time, many farmers expanded their production cycle to produce young bulls and heifers (10-12 months old). On-farm fattening activities, either individually or in cooperative way, currently take place in nearly 50% of the farms. Similar evolution patterns were observed in other Spanish mountain areas (Serrano *et al*., 2002). These processes respond mainly to changes of the CAP, such as the milk abandonment programmes in the nineties and the slaughter and male premiums established after the Agenda 2000 reform.

Management also changed significantly in the period of study. One of the main factors of change was the duration of the grazing season, that increased in all areas, specially in Benasque (Fig. 1); generally speaking winter housing has decreased from 3 to 2 months in average. In Baliera-Barrabés the use of mountain (summer) pastures increased more than in other areas, and rented pastures (part of farm LA), used mainly in spring and autumn, decreased slightly. The proportion of animals that use mountain pastures increased in all areas up to 75% of total LU. Also, as consequence or change of orientation and extensification of grazing management, external inputs decreased in importance. The use of off-farm concentrates to feed suckler cows dropped by 344 kg/cow/year in average, whereas this fall has been proportionally larger in Baliera-Barrabés and Benasque.

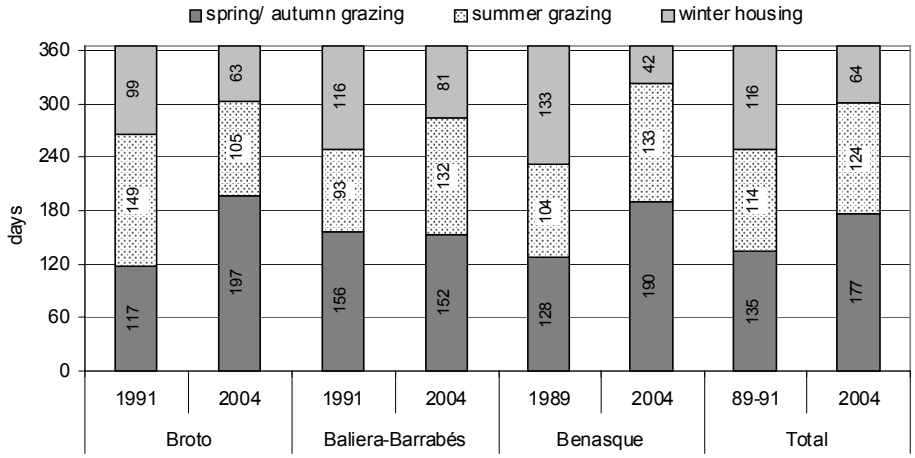

Fig. 1. Duration of the grazing seasons and the winter housing (1989/1991-2004).

Evolution of costs, economic results and productivity

Average Variable Costs (VC) increased due to the bigger size of farms (Table 2). Nevertheless, when expressed on a per-head basis, this indicator decreased, except in Baliera-Barrabés that faced an increase of VC/LU. In agreement with what was described above, feeding costs diminished in all areas. This was specially the case when only the costs assigned to suckler cows (excluding fattening feedstuffs) were considered (from 194 to 35 €/cow/year). Total feeding cost decreased to a less degree in Baliera-Barrabés because of the higher importance of fattening activities in this valley.

In relation to the structure of VC, off-farm feedstuffs continued to be the largest component, although in declining relative importance (around 60%), whereas sanitary costs increased very significantly in all areas (16%). When sanitary costs were calculated per LU, significant differences were found in all areas between dates, but while in Broto and Baliera-Barrabés this cost increased, in Benasque decreased.

As could be expected, average economic size increased (Table 3) and was partially related to the physical size (land and herd) of the farms. Both Total Output (livestock products sold) and Total Revenues (Total Output + subsidies + incomes from pension fattening[2]) increased, although differences were not significant for the first indicator that did not include subsidies. In a similar way,

[2] Fattening of calves that are owned by other farmers at a certain price. Only facilities and labour are accounted as costs.

Gross Margin (GM= Total Revenues – Variable Costs) increased significantly in the 3 areas: around 90% in Broto, 73% in Baliera-Barrabés and only 40% in Benasque. However, when subsidies were removed from the GM, no significant differences were found in Broto (small increase) and Baliera-Barrabés (small reduction), and a significant reduction was observed in Benasque valley. Subsidies clearly played a central role in the economic performance of the farms and in the differences observed between dates, as they represented 61% of GM in 2004 and only 17% in 1991 (Fig. 2).

Table 2. Evolution of unitary costs and structure of costs (1989/1991-2004)

	Broto			Baliera-Barrabés			Benasque			Total		
	1991	2004		1991	2004		1989	2004		89-91	2004	
Variable Costs (000€)	11.9	20.7	*	19.3	28.4	*	11.6	15.8	NS	14.5	22.3	***
Variable Costs/ LU	234	226	NS	276	362	**	362	231	***	291	281	NS
Total feeding costs/ LU	170	130	**	181	158	NS	258	135	***	202	142	***
Suckler cow f.c./ LU	167	46	***	173	29	***	243	30	***	194	35	***
Sanitary costs/ LU	27	33	***	30	37	***	37	25	***	31	32	NS
% feeding costs/ VC	67.4	60.5	*	60.1	57.5	NS	69.4	60.1	*	65.4	59.2	***
% sanitary costs/ VC	12.4	18.3	***	10.8	14.9	***	10.5	15.7	***	11.2	16.2	***

NS = no significant; *p < 0.5; **p < 0.01; ***p < 0.001. Figures in constant monetary value 2004 (€).

Table 3. Evolution of economic results and productivity (1989/1991-2004)

	Broto			Baliera-Barrabés			Benasque			Total		
	1991	2004		1991	2004		1991	2004		89-91	2004	
Total Output (sales) †	35.6	44.9	NS	46.2	49.0	NS	32.1	29.5	NS	38.3	41.9	NS
Total Revenue†	39.8	73.8	***	54.4	89.2	***	35.0	48.7	**	43.5	72.5	***
Gross Margin (GM) †	27.9	53.1	***	35.1	60.8	***	23.4	32.8	**	29.1	50.1	***
GM – subsidies†	23.6	24.2	NS	26.9	24.3	NS	20.5	13.6	***	23.8	21.1	NS
%subsidies/ GM	14.8	59.2	***	22.5	64.2	***	13.5	59.1	***	17.1	61.1	***
Total Revenue/ LU	853	913	NS	817	1093	***	1121	866	***	927	970	NS
GM/ LU	619	687	**	541	731	***	759	635	***	636	689	**
GM – subsidies/ LU	533	299	***	437	290	***	667	285	***	541	291	***
GM/ WU[1]	18.5	38.6	***	17.7	40.4	***	13.3	30.6	***	16.5	36.9	***
GM – subsidies/ WU†	15.6	17.1	NS	13.8	16.1	NS	11.7	12.6	NS	13.7	15.4	NS

NS: no significant; *p < 0.5; **p < 0.01; ***p < 0.001. Figures in constant monetary value 2004 (€).
† (000€).

Herd productivity (Total revenue/ LU and GM/ LU) increased in Broto and in particular in Baliera-Barrabés, but again Benasque showed an inverse behaviour as herd productivity decreased significantly (Fig. 3a). In 2004, for the total sample, the GM obtained per LU was very similar to the figure obtained by Veysset *et al*. (2005) in the Massif Central in France. Nevertheless, when subsidies were removed from the calculation, animal productivity decreased 46% in average for all areas (ranging from 33.6% in Baliera-Barrabés to 57.3% in Benasque).

Labour productivity (GM/ WU) improved substantially in all areas (123.6% in average) due to the increase in GM and the reduction of on-farm labour (Fig. 3b). Nevertheless, if calculated without subsidies, labour productivity only increased slightly, although differences between 1990 and 2004 were not significant in any valley or in the general sample.

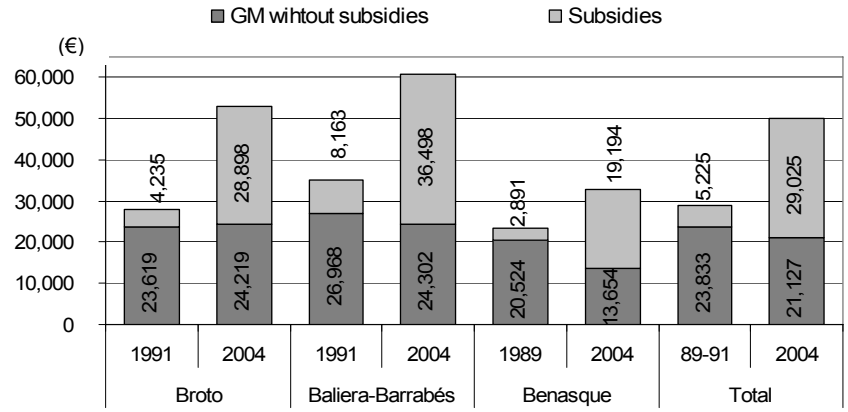

Fig. 2. Gross Margin composition and evolution (1989/1991-2004).

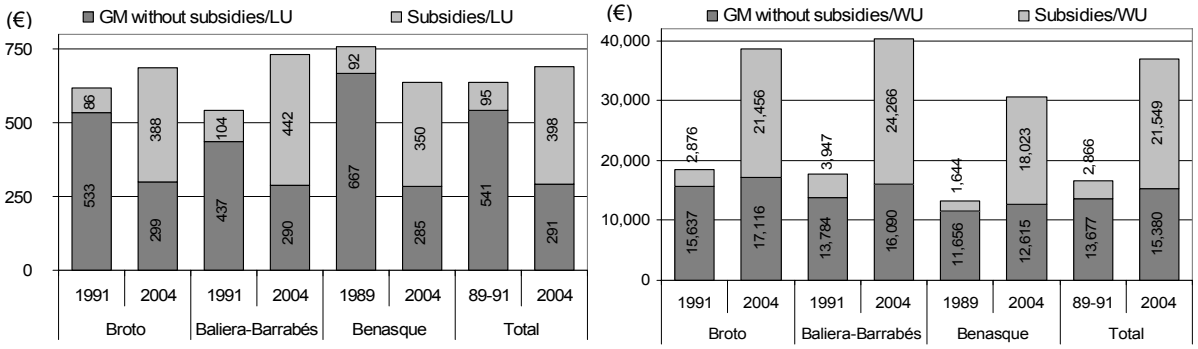

Fig. 3. Evolution of animal (a) and labour (b) productivity (1989/1991-2004).

To conclude, we can affirm that results showed a clear process of structural adjustment towards suckler cow farming systems in the areas of study, although there were differences between valleys. Also, a drastic change of productive orientation was observed: total abandonment of dairy and expansion towards fattening in a large proportion of farms. Those changes were directly influenced by specific measures and successive reforms of the CAP (milk abandonment programmes, 1992 reform and Agenda 2000). Also, a process of extensification was observed in management, with significant enlargement of grazing periods and utilization of mountain pastures, and in economics terms, as utilization of off-farm inputs decreased notably, especially feedstuffs. Extensification meant a reduction of unitary Variable Costs and also of animal productivity (without considering subsidies), although there was a process of capital intensification (higher ratio LU/WU). Labour productivity, which constitutes one of the central factors for the sustainability of these livestock systems (Veysset *et al.*, 2005) increased slightly in the period of study, but due to the great importance of subsidies the economic viability of the production system can be guaranteed.

In the future, we will deepen the analysis of relationships between internal farm factors, family and farmer objectives, socio-economic factors and the different adaptation strategies followed.

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