

Annex 2: Report from Work Package 2 – Pyrenean Breeds

Study of three Pyrenean dairy sheep breeds

SUMMARY

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1) Numbers and trends

a – A dynamic dairy sheep breeding

The department (the French basic administrative entity) of « Pyrénées-Atlantiques » includes all the breeding area of 3 dairy sheep breeds, the Manech Tête Rousse (MTR), the Basco-Béarnaise (BB) and the Manech Tête Noire (MTN).

Table 1 : Evolution of the number of ewes and herds for the 3 Pyrenean breeds

	1985	1995	2005
Number of dairy ewes	380 000	463 334	481 450
Number of breeders	3 300	2 648	2 223
Average number of ewes/herd	115	175	217

Source : CDEO Compte-rendu d'activités 2005-06

In this table, all the ewes of the dairy farms are taken into account even if they are of another breed such as the Lacaune, but it represents a small part of the total. In 20 years, the numbers of Pyrenean dairy sheep breeds have considerably increased: in 2005 there are 100,000 ewes more than in 1985. However, many dairy sheep farms disappeared during that time, following the general agriculture trend in France, and the average number of ewes/herds has almost doubled.

Despite a rather good situation, the three Pyrenean sheep breeds don't follow the same trends.

b –Different evolutions depending on the breed

Table 2 : Recent evolution by breed

	Basco-Béarnaise		Manech Tête Noire		Manech Tête Rousse	
	RA 2000	2006	RA 2000	2006	RA 2000	2006
Number of ewes/breed	79 000	82 876	114 000	100 837	263 000	285 484
Number of herds/breed	483	420	583	510	1 343	1 170

Sources : RGA 2000, CDEO

The Manech Tête Rousse (MTR) numbers are increasing for several years, while the Basco-Béarnaise (BB) is stable and the Manech Tête Noire (MTN) has more difficulties: it is the only breed with decreasing numbers.

On the other hand, the number of breeders is decreasing for the 3 breeds: on average there are 50 breeders less each year.

c – An increasing pressure of the Lacaune breed

This very successful dairy breed is in competition with the Pyrenean breeds. The number of ewes is increasing: the Lacaune was present in 66 farms (almost 17 000 ewes) in 2000 (source RGA 2000), and now the CDEO (a local organization in charge of the Pyrenean breeds) estimates that the Lacaune is raised in 150 to 200 farms. It is one of the principal threat for the Pyrenean breeds.

2) A strong link between breed and territory

a –Breeds less productive but more adapted to their environment

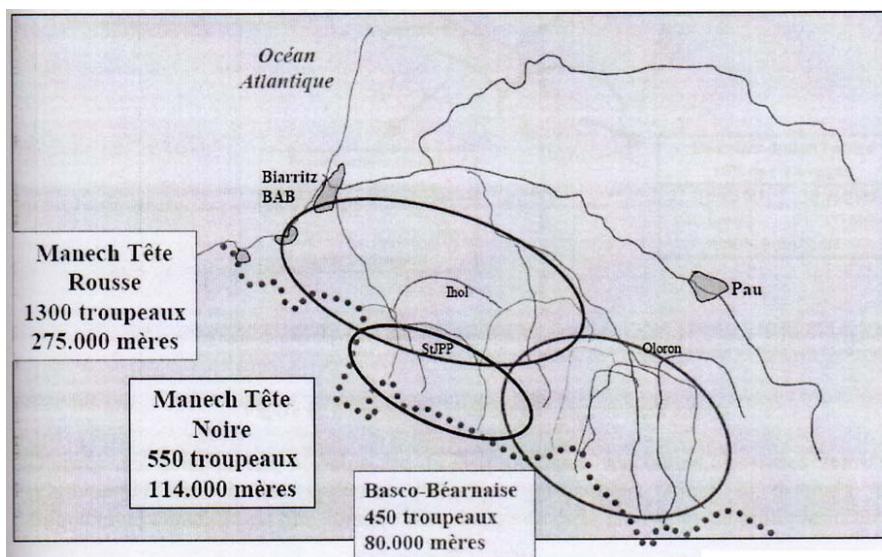
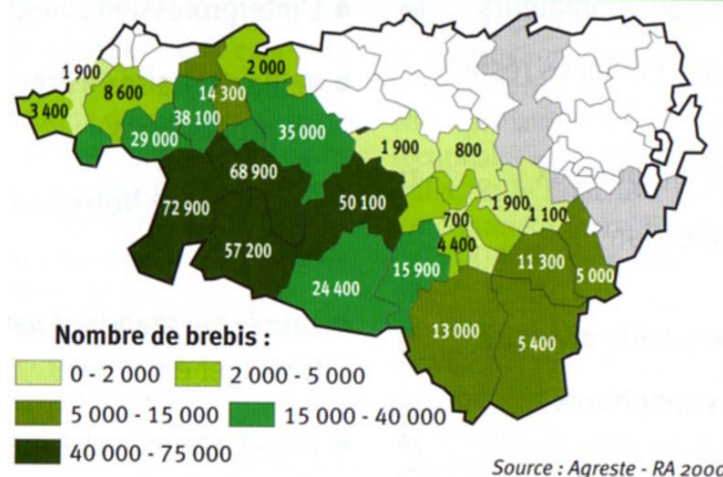
Pyrenean dairy sheep breeds have good aptitudes for milk production even if their performances stay below the Lacaune ones.

	BB	MTN	MTR	Lacaune
Average quantity of milk/breed (L)	144	126	166	276
Average lactation length (days)	141	134	150	162

Sources : CDEO service Contôle Laitier 2006, UPRa Lacaune

There is a significant difference of production between the Lacaune and the other breeds which can explain why the pressure of this breed is so important in the Pyrénées-Atlantiques.

However, the Lacaune is not more present in this region because the 3 local breeds are more adapted to their natural area: they are very hardy and resistant to harsh climatic conditions, particularly the Basco-Béarnaise and the Manech Tête Noire. These 3 breeds are raised in mountain or hill area with inclined pasture. Furthermore, the climate is very humid all the year long which allows a good grass growth and is favourable to a pastoral agriculture.



Source : RA2000, traitement CDEO

b – Different breeding systems

An analysis made in 2000 with the economic results of 637 farm raising local breeds in Pyrénées-Atlantiques permitted to distinguish 5 main farming system. We can underline an opposition between the regions of Béarn and Pays Basque.

Table 3 : Schematic representation of the 5 farming systems

	Pays Basque			Béarn	
	Traditional transhumant	Intermediate transhumant	No transhumance	Transhumant Pasture	Transhumant Stock
Ewes breed	MTN - MTR	MTR - MTN – BB	MTR	BB	BB
Forage intensification	-	+	++	-	+
Number of cattle units per forage surface (UGB/ ha SFP)	2,5	1,9	1,9	2,1	1,9
Seasonal move in mountains	3,9 months	3,7 months		3,3 months	2,9 months
reproduction of primipara	2 years	2 years to 1 year	1 year	1year	1year
fodder available/ewe (kg MS)	192	208	204	193	348
fodder bought/ewe (kg MS)	89	34	46	39	59

In most cases, farms are small with a low total cultivated area. The crops are used on majority for grazing because it is the only valorisation for these lands usually difficult to access. Transhumant breeders use moors and collectives pastures. Nevertheless, the number of animals /ha is important and it is going to be difficult to increase the herds size if the total cultivated land by farm do not increase. The small size of farms can be explained by a strong family tradition of patrimonial transmission. 85% of the farms have another breeding activity, which is generally beef cattle.

As stated previously, there is an opposition between the farming systems of Béarn and Pays Basque :

- 3 groups in Pays Basque are defined by the transhumant duration, the reproduction of the primipara and the grazing use.
- 2 groups in Béarn are defined by winter alimentation of animals, farms “stock” feeding animals (in sheep pen principally), and farms “Pasture” that leave their animals outside as early as possible.

We can also see a geographical repartition of 2 types of breeders: in Pays Basque, they deliver their milk to a dairy processing plant, whereas the cheese makers transforming their production directly at the farm are in majority in Béarn and the Pays Basque .Each breeding system actually corresponds to a breed (cf. previous map).

Several of the farming systems described are still strongly linked to their territory (mostly the transhumant). However a category of farms has changed to a more intensive system with less grazing. These farmers are not transhumant, sell their milk to dairies and live in the Pays Basque hills. They raise Manech Tête Rousse, their milk production is high and their lands are cultivated for fodder production. It has to be emphasized that the Lacaune breed is well adapted to such a

breeding system. The intensification of these structures could be a factor of decline of the Pyrenean breeds.

3) Three breeds anchored in tradition

Béarn and Pays Basque have a strong cultural identity and tradition has a great place in their activities, particularly in agriculture. As in other mountainous area, sheep breeding has been present for centuries in Pyrénées-Atlantiques and transhumance is an important tradition.

Most of the breeders are very attached to their local breed. In the seventies, when the dairy sheep breed industry was restructured (cf. § 4). , it was more than likely an important element of the development of these breeds.

On the other hand, it is hard to change the farmers group consciousness. Pyrenean farmers have the reputation to be individualists and very attached to their traditional breeding system. They have a reticence to use new tools such as AI.

Another important characteristic to point is the farmers participation to trade unions. There are two major farmers trade unions in France which don't share at all the same views on what agriculture should be¹, and in the Pyrenees both unions are well represented. Since farmers of both tendencies are sitting in the different local organizations (breeder association, AI centre, "interprofession" –cf. following), the debates can be quite stormy even more so when the question is about the collective management of the dairy industry. These discussions obviously slow down any tries to change the breeds development program, however, depending on the people interviewed, it is not quite sure if these debates are a threat or a chance for the breeds.

4) A favourable technical support

a – Tools to improve the breeding profitability

Many organizations are offering technical support to the farmers.

- The ex breeder association ("UPRA"), now called « Organisme de Sélection des Races Ovines Laitières des Pyrénées » (Selection Organism for the Pyrenean dairy sheep breeds). It is in charge of the herd-book of each breed. It defines the criteria for an animal to be acknowledged as "pure bred", the selection objectives (while taking into account the management of genetic diversity), and it ensures a coherence between the actions that contribute to the genetic improvement of the 3 breeds.

- The cooperatives in charge of selling live animals (lamb mostly), which are the main actors of the meat industry, offer a technical follow-up to all their members for herd management.

- The local Chambre d'agriculture (CA – Agriculture Board) does administrative accompaniment and specific follow-up on some topics such as the construction of new buildings according to the European norms. Furthermore, they participate to the economic observatory set up by the Interprofession.

- The CDEO is in charge of the genetic selection scheme and does research on pastoralism, fodders management, milk and cheese quality...

The CA and CDEO technical support is clearly in favour of the local breeds. It is centred on linking the farming system to its region through pastoralisme, and advocates the development of an

¹ The main union is the « FNSEA » which has a fairly intensive vision of what agriculture should be while the « Confédération Paysanne » - whose leader at one point was José Bové – defends the vision of a "human size" and environmental-friendly farming system.

industry sustaining the local breeds. For example, Lacaune breeders were helping into switching their herds to local breeds.

b – Impact of changes from the CAP

The 2nd pillar of the last reform of Common Agricultural Policy could have huge consequences. Indeed, some criteria are not adapted to the management system of several local breeds. For example, the pasture bonus to encourage to maintain meadows on extensive management by grazing or cutting. There is an organic fertilisation and a loading threshold, and above them it is not possible to have a bonus. But in Pyrénées-Atlantiques sheep breeding, surfaces are small and loading is important and then, they can not avoid having an important organic fertilisation.

5) A collective management of the main industry

a – A milk industry built thanks to the breeders will, based on a local “savoir-faire”

Dairy sheep breeding is traditional in Pyrénées-Atlantiques, but the origin of its development is actually coming from the Roquefort²'s influence.

In 1900, the Roquefort industry grew greatly. Because of its success, the milk sheep production in the traditional area of Roquefort was not sufficient so the regions allowed to produce milk for Roquefort was enlarged, and included Pyrénées-Atlantiques. Small dairy industries were built and produced milk and cheese which were afterward sent to Roquefort for cheese maturing in the Roquefort cellars. At its peak, 80 to 90% of the Pyrenean production was for Roquefort. Since prices were attractive, the number of herds and ewes of the 3 local breeds grew quickly.

Around 1965, Lacaune breeders in Massif Central began a selection scheme based on milk quantity. The scheme was very successful and production quickly increased. Eventually the “true” Roquefort region could provide all the milk needed for the Roquefort cheese. The withdrawal of the Roquefort industry from the Pyrenees in the 70's left the Pyrenean dairy sheep industry in a critical situation.

Since farmers in the Pyrénées-Atlantiques were used to transform part of their production in a cheese known as “Pyrenean pure ewe”, some dairies continued to product cheese, however they lowered greatly their milk demand. Since it was not enough to meet all the supply, some farmers tried to motivate the food industry to stay in the area by producing Pyrenean dairy sheep cheese. The company Bongrain, which was already making cow cheese, decided to start making sheep cheese.

The farmers that were already making their own cheese were more isolated than the ones delivering their milk to dairies, however they decided also to structure their production by creating collective organisations. As today 6 farmers cooperatives exist, and these structures allow cheese makers farmers to have a tremendous impact on the decisions about the future of the local dairy industry future. It is also a guarantee of products with a good quality, since the standard asked by the cooperatives are higher than the ones from the food industry.

In conclusion, since 1975 the Pyrenean sheep dairy industry is completely structured by and for the local farmers, and based on the milk production of the Pyrenean breeds.

b – A dynamic industry

The milk production has more than doubled between 1985 and 2005: it is estimated at 54 million litres in 2005. Deliveries represent 85% of the volume and farm transformation 15%. Meanwhile, cheese production doubled between 1997 and 2005 which proves its dynamism.

² The most famous French sheep cheese, made in the département of Aveyron with the Lacaune breed

The dairy sheep cheese market is very segmented: there is pure ewe cheese as AOC Ossau-Iraty (cf. later), or mixed with cow or goat etc. For the Interprofession (cf. below), it is a good point for the Pyrenean dairy industry because if a product is less popular, the other ones are a relay to maintain the milk production.

c – Development of a collective management tool of the dairy industry

The success of the Pyrenean sheep dairy industry can be linked to creation of a collective management tool: « L'Association Interprofessionnelle du Lait et des Produits Laitiers de Brebis des Pyrénées-Atlantiques » (interprofessional association of sheep milk and milk products in Pyrénées-Atlantiques). This association created in 1986 was officially recognized in 1992. It is a structure of dialogue and development of the local dairy industry. It is financed principally by its members subscriptions and its budget is of 700 000 €/year.

It is composed of 3 boards:

- The producers board, almost 2000 farmers, namely 95% of the milk industry,
- The cooperatives board (except for some farmers cooperatives who do not want to collaborate to this institution),
- The transformers board: 8 dairy companies are engaged, among them the main ones such as “Fromagerie des Chaumes” and “Pyrénéfrom” representing near 2/3 of the milk produced. They are committed to use all the milk produced in this region before importing any from other part of the country (or Spain) if needed.

The 3 boards have one vote each and decisions have to be taken at unanimity.

The Interprofession has for main objective to confront the actors wishes in order to reach compromises concerning the future of the local industry. As an example it is up to the Interprofession to decide the milk qualitative grids of payment.

d – A worrying differential between production and transformation

One of the Interprofession task is to regulate the whole industry, from the milk to the cheese production. To do so it collects statistics about the markets, stocks, production etc. Data are collected, then homogenised and processed by the technicians. This constant monitoring permits a good follow up of the local conjuncture and help to set up the supply/demand balance.

The Interprofession realises also a regional and national follow up of the cheese and dairy market by buying panels. With these information the local companies can evaluate their evolution compared to the rest of the industry. A close monitoring is done also at the European level, even more so for the countries which product important quantity of sheep milk such as Spain, Greece, Italy, Romania and Bulgaria. New producers countries are under a careful watch in order to anticipate their potential influence on the French market.

All these information should allow to regulate the local production by using tools such as prices. However since 1998, last year of equilibrium, there is a differential between collection and transformation. The milk supply was too low by 10 to 12 millions litres in 2003.

As for now, this differential represents an opportunity for the farmers. The lacking milk is supplied by external regions such as Roquefort, and the deficit is a safety valve for the Pyrenean who are rather safe from possible fluctuations of the milk market. However, this differential is judged too big by all the Pyrenean actors as it might become a threat for local breeding. Since the supply is too low, milk price is quite high in the Pyrénées-Atlantiques (cf. following table) and it

could become interesting for transformers to buy mainly external milk³. Therefore the immediate goal of the Interprofession is to reduce by half the deficit. To do so, the Interprofession encourages the farmers who still can increase their production to invest.

Table 4 : Average price of sheep milk in different regions

2004	Average price of milk/L (€)
Pyrénées	0,9401
Corse	1,14
Rayon de Roquefort	0,838
Spain (2005)	0,7911

Sources : DMA Interprofession, SEB, Ubifrance, Office de l'Elevage

e – A collective management of the products promotion

Around 50% of the subscriptions perceived by the Interprofession is used for a collective promotion of the Pyrenean ewe cheeses. The products diversity is taken into account: half the budget goes to the promotion of the AOC Ossau-Iraty (cf. § 5) and the rest to promote other ewe cheeses. This decision was taken recently to satisfy the industries of both productions, AOC and “generic”, besides it was important that the promotion was coherent for all the local production and not ending in a competition between products coming from the same region.

The promotion program was realized since a study showed that Pyrenean ewe cheeses were not known outside its own region. Promotion is done using press, web site, animation in shows (including cheese tasting). For the generic cheeses the promotion focuses on the geographical origin while it is more the local traditions that are highlighted in the AOC cheese.

The collective promotion doesn't put any emphasize on the local breeds since 200 herds are using the Lacaune breed to produce Pyrenean ewe cheese.

The promotion system seems to be efficient. Pyrenean cheeses were traditionally sold in specialised network, now the sales are developing through self-service (56% of the volume sold) which proves that the Pyrenean cheese are known by a wider public.

f – A useful and efficient tool in case of crisis : example of the scrapie

In case of sanitary crisis, it is important to present a coherent and unified image of the industry. This role was attributed to the interprofession during the scrapie crisis which affected mostly the Pyrénées-Atlantiques. Most of the scrapie cases in France were in this department and with the BSE crisis it was considered as a health hazard to create any food product from flocks that may have contaminated animals.

Since the food industry was pressured to present all the possible health guarantee on their cheese production, the Interprofession created a « food and sanitary safety » health watch committee. It was also in charge of managing the media. The breeder association was in charge of setting up the genetic aspect of the scrapie program, that is genotyping all the potential breeding males as well as the sire dams in some cases.

For the most traditional breeders, particularly in MTN, often reticent to an external intervention, it was difficult to make them understand the problem and cooperate to the systematic

³ As we will say later on, the AOC cheese is not by far the main production of the area, and it is the only one that requires the use of milk produced in Pyrénées-Atlantiques for the cheese production.

genotyping of the rams. However, it seems that, in the end, this event led to a better cohesion between the different actors of the industry.

Nowadays, the health watch committee is monitoring the watch against cheese pathogens such as listeria, salmonella etc.... This problem concerns particularly cheese maker farmers and they are offered by the Interprofession technical assistance and payment of cheese analyses. Once again, the success of this plan is compromised by some farmers that want to be independent in their work.

Both the setting up and the management of a tool such as the Interprofession is complicated, since, to work, the people in charge and the participants need to show goodwill and diplomacy. However since it was successful it helped considerably to consolidate the Pyrenean dairy sheep industry by structuring it, facilitating the negotiations between the different groups, managing collectively the production and orienting the strategy. Some decisions are difficult to make, however once it is agreed on, they have an undeniable legitimacy and power.

6) Impact of an Official Sign of Quality (OSQ) : the AOC Ossau-Iraty

a – An OSQ wanted by the farmers

The AOC⁴ Ossau-Iraty is a collective tool that was set up by the farmers to face a crisis. Since the local cheese products were very heterogeneous in type and quality, some farmers thought that it would be interesting to develop a flagship product representative of the Pyrénées-Atlantiques and its sheep breeding. They were also hoping to obtain the establishment of differential prices depending on the type of milk produced and to get better prices for the AOC milk.

In 1978 the « Syndicat de défense de l'AOC » was created in order to write the specifications of the Ossau-Iraty, then to obtain the agreement as an OSQ. In 1981, the AOC « Ossau-Iraty Brebis Pyrénées » or « Petit Ossau-Iraty Brebis Pyrénées » (it was simplified later on to « Ossau-Iraty ») was recognized by the INAO⁵.

The organisation of « syndicat AOC » is very similar to the Interprofession's one, with 3 same boards. This structure includes almost all the 1 800 farmers and 20 companies and cooperatives. It is particularly submitted to tensions between union-trades since the AOC specifications is not making unanimity in the industry.

b – A mixed success

The AOC Ossau-Iraty sales have more than doubled in 10 years. However, they represent only 32% of the Pyrenean cheese sales. In fact, the food-industries prefer to sell their production under their own brand, which are more known, and with their own communication plan.

On one hand this competition makes it harder to sell AOC cheese, however, in the long run, the food-industry mediatization of the Pyrenean cheeses actually help the AOC cheese to be known by a wider audience.

c - Specifications widely in favour of the local breeds

At its creation the AOC specifications were a little bit light weighted: the whole department was in the AOC area and the milk had to be produced from « traditional » breeds, which was quite vague.

⁴ Appellation d'Origine Contrôlée : an OSQ that certifies the geographical origin of a food-product.

⁵ The French institution in charge of all OSQ products

Quickly, the area was limited to south of department and the name of the 3 local breeds were explicitly mentioned to limit the establishment of “exotic” breeds as Lacaune.

The dairy industry encouraged also the use of local breed. As an example, when were negotiated the different milk prices, it was decided that prices were going to depend on if the milk was produced with the AOC specifications or not, and if the farmers use the Lacaune breed.

Table 5 : prices applied by a local dairy industry (Pyrénéfrom).

	price of milk/litre t (€)
Milk AOC	0,981
Milk non AOC	0,955
Breeders with Lacaune	0,884

Since the dairy industries had an interest in collecting milk only once in a region (since a specific collect is necessary for AOC milk), they encouraged the farmers to follow the AOC specifications which include the use of local breeds. As a result, 85% of the collect follow the AOC specifications and the farmers kept their local breeds.

d - A specifications reform which could have tremendous consequences

In 2000, started an important revision of the AOC specifications under the pressure of organisms managing official sign of quality (INAO mostly).

This revision comes with a politic idea to maintain farmers difficult areas. The suggestions were to incite farmers to maintain transhumance, to require a minimal number of days of grazing, to forbid zero-grazing, to limit the use of silage forage and the importation of alimentation from outside the region. They suggested also a valorisation of the specificities of the local breeds such as their hardiness by limiting the milk production (less than 300L/year/ewe on average for a herd).

Furthermore, several surveys ordered by the "syndicat AOC" showed that consumer had a good image of the Ossau-Iraty: “natural”, “authentic”, “grass”, “mountain” are the most associated words. This image is a good point but the farming system reality has to be coherent.

However, several observers think that the suggested reform is going too far for certain points and could have negative consequences on local breeding. The main conflicting subjects are:

- The limitation of external buying: some farms are very dependant on external supplies for their herd feeding especially the traditional transhumant (cf. *breeding systems diversity*).
- The limitation of mineral fertilisation. This measure is paradoxical for some farmers since there is also a wish to limit external buying, which is done to encourage grazing.
- The limitation of milk productivity. As for now the threshold (300 l) that was decided is high in comparison with what is the average production by ewe and by herd. However some people are afraid it will impact the genetic gain on milk quantity which may lead to negative consequences in a context of under production (cf. § 4d).

Also, several actors are in favour of a greater difference between the price of AOC and non AOC milk. This decision may have downside since if a farmer loses its AOC agreement, it might be tempted to increase its production with an exogenous breed such as Lacaune (even more so if the difference in production is too big because of the limitation of milk productivity). This threat is

actually bigger for the Manech Tête Rousse since its farming system is adapted to the Lacaune, and because its breeders are less attached to their breed than Manech Tête Noire or Basco-Béarnaise breeders.

7) A meat industry less structured and less developed

An industry of milk-lamb (agneau de lait) was also developed in Pyrénées-Atlantiques. This market is characterised by its important seasonality and it is near dependence to Spain. 400,000 lambs are produced each year. This industry provides a non negligible income to farmers, but it remains minor compared to milk products, particularly for the no transhumant deliverers.

The lambs sold are in majority an industrial crossing. In Manech Tête Rousse and Basco Béarnaise, primipara are mated with a meat breed male (such as Berrichon du Cher or Charolais). 80% lambs are exported to Spain for the end of the year festivities. The lamb production is available between November and May with a peak in December and January.

For milk lamb, a sign of quality (OSQ) was created : the « Label Rouge Agneau de Lait des Pyrénées ». It is not recognised yet at a European level but negotiations are done to obtain a certification. The Label specifications require that the lambs have to be of the breeds: MTN, MTR, BB, or crossbred with rams of meat breeds, which is the main case as explained before.

However, even with a profit of 30 cts€/kg compared to a non qualified lamb, the meat is actually more valorised when it is sold in Spain than in France with a Label Rouge. It does not contribute to the development of this sign of quality. In the end, only 10% of the 400,000 milk lambs produced are sold as Label Rouge.

The meat industry is not as structured as to milk industry. There are 4 cooperatives counting 1260 members which are in charge of the meat industry. 930 farmers are engaged in Label Rouge, but there is no Interprofession or other institution. A PGI (Protected Geographical Indication) such as an AOC could improve the situation of Pyrenean lamb for exportation, as this appellation is recognised at a European level.

8) A selection scheme in synergy with the industry

a- Farmers at the origin of a collective management tool

The idea of genetic selection appeared in Pyrénées-Atlantiques in the 60's and was set up with the creation of milk recording. At the same time, a mass selection was made among males of 43 farms on milk quantity. The efficiency of the selection scheme was clear rapidly, however it was never as efficient as the Lacaune's one.

With the technical contribution of several organisms, as INRA (research institute of agronomy) or FSO (Federation of the sheep trade unions), a male selection centre and artificial insemination cooperative (CIA) was created in 1975 for the 3 local breeds. The 43 same breeders particularly motivated contributed to the creation by financing the structures. This CIA was built in collaboration with the breeder association, the "UPRA des Races Ovines Laitières des Pyrénées". The UPRA received its state agreement in 1975 and, according to the breed law of 1966, it has the responsibility to orientate and promote the breeds.

Nowadays, breeders still have an important place in the collective management of breeds. They sit in the CIA and in the UPRA the breed commission.

b- A scheme based on the motivation of a group of breeders

For the 3 local breeds, selection is made on pure breed without any crossing. The Pyrenean selection scheme is based on the same management as for specialised breeds, and is also pyramidal.

- **Breeders and selection nucleus**

Breeders are under contracts and have to be very motivated by their breed and genetic since the constraints are quite high. They are under obligation to perform a minimum number of AI, and the male centre has the priority for the choice of the males issued of planned mating. Farmers have to be on official milk recording (quantity and quality of milk, protein and fat percentages, cell counts). Setting up contracts between breeders and the organisation in charge of the selection scheme (the CDEO) was necessary to improve the scheme efficiency, even if ended when it was set up in the loss of some of the breeders. Now, only really motivated breeders are involved.

- **Breed centre and AI Centre**

Lambs are selected on farm by the CDEO managers and the male centre manager. All males are genotyped at the PrP gene (scrapie resistance). After weaning, they are gathered in the male breed centre. When 3 or 4 months of age, a second selection is done by the breeders of the UPRA breed commissions. The best males are progeny tested at 1 or 2 year old. After progeny testing, 20% of them are used as improver rams and kept in the breed centre, the other are culled.

- **Genetic diffusion**

Diffusion is mostly done through natural service, less with AI, and also with sale of “intermediate” rams to breeders. This already existing practice was developed during the scrapie crisis in order to help the diffusion of R/R (resistant) rams. Diffusion is also done by selling young ewes from selection farms to farm with simplified milk recording or without milk recording.

Table 6 : Presentation of the selection scheme by breed

	BB	MTN	MTR
nb herds in selection	74	60	218
nb ewes in selection	19 652	17 041	71 666
nb herds of the breed *(>100 ewes)	367	395	1094
Nb ewes of the breed	82 876	100 837	285 484
% ewes in selection	24	17	25

Source: EDE 2006

The selection nucleus size is satisfactory in MTR, but too small in BB and even more so in MTN. For these 2 last breeds, it is difficult to apply all the selection criteria (cf. following §) with so few resources. At the present time 140 rams are progeny tested in MTR each year compared to 40 in BB and 30 in MTN. According to Xavier AGUERRE, the selection program geneticist, these numbers should be doubled to have an efficient selection scheme.

c – Selection criteria

Nowadays 5 factors are taking into account for the selection scheme. When deciding the future orientation of a breed, the breeders association (UPRA) is used to make the link between the industry and farmers. It is the UPRA which decides what are the main selection goals, however they are implemented in agreement with the breeders and the industry wishes.

❖ **Breed standard**

A mass selection is done on this criteria. It is particularly important in MTN where breeders are very demanding on this point and eliminate easily rams with an excellent breeding value if they don't have the right standard. This behaviour slow down the efficiency of the MTN selection scheme which is already less successful since the selection nucleus is already too small to be really efficient on milk quantity.

❖ Genetic variability

Both the breeding centre and the CDEO technicians want to maintain all the main families, in order to conserve the existing genetic diversity of the Pyrenean local breeds. However, if it is conceivable in MTR since the selection nucleus is big enough, it is more complicated to implement in the 2 other breeds.

❖ Milk quantity

Genetic improvement is measured mainly thanks to this criteria.

❖ Scrapie resistance

The selection centre put a lot of emphasize on this aspect since the 3 breeds were among the most sensitive to this disease in 2000, and the prevalence of the disease was quite high. The CDEO had all the rams genotyped and males that were carrier of two sensitive alleles could not enter the breeding centre (except for few ones with good breeding values and representative of a rare family). Within 2 to 3 years, depending on the breeds, considerable progress were made and the resistant allele has been spread in most flocks thanks to all the genetic improvement system.

❖ Quality of milk (fat and protein percentages, cells count)

Both the farmers and the local industries were wanting to improve the milk quality for cheese. Some work was made since 2000 but was delayed because of the scrapie crisis. The MTR benefits of a systematic implementation of these criteria since 2003. It is done by taking into account qualitative criteria (protein and fat percentages) during milk recording and creation of a synthetic breeding value which includes milk quantity and quality.

The selection schemes has been very efficient and actually answered the main demand of the local industry which was to fill in the milk deficit that was existing in the 80's.

Table 7 : Genetic progress in milk quantity for the three Pyrenean breeds

	BB	MTN	MTR
Average annual mean genetic progress on milk quantity for last 15 years (in litres)	2,6	2,5	3,9
Increase of milk production between 1990 and 2005	45 litres +44%	37 litres +42%	64 litres +61%

Milk richness was actually deteriorating slowly for the last 10 years, but since the last 2 or 3 rams generations the percentages are stabilizing and let hope good results for the years to come.

Since selection is done on farm, animals are expressing their superiority in usual breed conditions. It is an efficient way to conserve the genes for environment adaptation and rusticity. However, this point is actually debated by the MTN breeders who blame the selection scheme to be too focused on milk production and forgetting other breed characteristics, such as aptitude to transhume and to graze during winter.

d- Reticent breeders toward genetic improvement

Even if the MTR shows a functional scheme and a sufficient selection group, globally Pyrenean dairy sheep breeders are reticent towards selection schemes and AI. Only 17% of the Pyrenean ewes are inseminated versus 60 % in the Lacaune breed.

Table 8 : Efficiency of the genetic selection scheme

	BB	MTN	MTR	Total
nb herds/breed (estimation)	420	510	1170	2100
nb herds in selection (Official milk recording)	75	66	220	361
nb herds in simplified milk recording	23	6	127	156
nb herds without milk recording	322	438	823	1583
nb total AI	13775	9313	57423	80511
% inseminated ewes	16,6	9,2	20,1	17,1
% diffusion AI	36,8	23,4	37,7	35,9

The number of breeders using the official milk recording is very few, and AI diffusion rate is very low, particularly in MTN. The numbers for BB have slightly increased since the scrapie crisis.

The future of AI in the Pyrenean breeds is actually at a cross-road: with the recent restructuring of the State implication in animal genetics, the AI centre will lose a huge part of its national financial helps, and so is the organisation responsible of the milk recording. As a consequence both the milk recording and AI fares have been raised in order to compensate the state disengagement. However it won't be sustainable unless the number of AI and recorded ewes increase rapidly.

Nowadays, if the selection scheme is working quite well in MTR and is improving in BB, there are big interrogations for the future of the MTN selection scheme. Since its selection group is the smallest among the 3 Pyrenean breeds, and as less and less breeders are involved, the selection scheme is losing its efficiency. One of the reasons of failure is the breeders requirement concerning the breed standard: the farmers choose their rams mainly on phenotypic considerations instead of paying attention to its dairy breeding value. From a mid term perspective there is a possibility that the MTN will follow a conservation strategy .

Conclusion

Overall, the Pyrenean dairy breeds managed to implement a booming development plan. The reasons of success are mainly the attachment of the farmers to their local breeds which led them into inventing successful collective technical tools to improve their breeds. The creation of the Interprofession and the invention of the AOC Ossau-Iraty were decisive for the maintain of local breeds in Pyrénées-Atlantiques.

Farmers managed to overcome several serious crisis such as the withdrawal of Roquefort in the seventies, a lack of milk production in the eighties (which still exists), the scrapie crisis in 2000. However despite their success it seems that the Pyrenean breeds are again at a difficult cross-road.

The efficiency of the selection scheme depends obviously on the existing staff dedicated to its management at the AI centre and the CDEO. Both these structures were depending greatly on

national funding that have been declining greatly in the past couple years, and are meant to diminish even more in the coming years. At the same time, the prices of milk recording are increasing since the local organisation in charge was also partly dependant of state funds, which are also declining. All together, and in a global context where charges are growing drastically for farmers, it is not sure that the AI centre will be capable of developing AI enough to access self-sustainability.

Also the future of the three breeds might end differently. From a genetic point of view the MTR seems to be the most successful breed. However, its breeders are not that attached to their breed and their farming system is more and more disconnected from the local environment, and is actually well suited to the Lacaune. In case of a crisis on milk prices, it is more than likely that lot of farmers will switch to the Lacaune. On the other hand, the BB and mostly the MTN have difficulties in maintaining a nucleus selection of sufficient size. Selection breeders and geneticist are afraid that if their selection scheme collapse, these breeds will be doomed since they won't be productive enough in comparison with MTR (and Lacaune). However, since these breeds farmers are often cheese transformers, quite independent, their income doesn't rely as much on the milk industry as other farmers. Also the fact that they are very attached to their breed is an important point. As the global agriculture context is very unsteady at this very moment (prices of raw materials, farm products deficit, end of the state funding to genetic improvement, new CAP and so forth) it is actually quite difficult to forecast what the future of these breeds will be.

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