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Towards self-sustainable European Regional Cattle Breeds

Breed demonstration cases

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Abstract
This report describes the process to re-develop
the breed conservation and development
strategy in Belgium, France, Spain and the
Netherlands with involvement of multi-
stakeholders

Keywords
Local cattle breeds, SWOT, multi-stakeholder
analyses, self-sustainability

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Cattle Breeds-Breed demonstration cases

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Summary

The objective of this work package of the EURECA project was to support stakeholders in their process to re-develop the breed conservation and development strategy. These strategies aim to improve *in situ* and *ex situ* conservation strategies and to increase self-sustainability of the breed. Multiple stakeholders were involved in these processes which is strength in itself. Firstly because the different points of view and angles create a wider understanding of the breed and its strengths, weaknesses, opportunities and threats – two (or more) persons know always more than one person. Secondly because the chosen solutions and strategies will then be supported by many stakeholders of the breed and therefore communicated by and carried out on many different levels.

In this work package the multi-stakeholder approach was applied in four European countries; Belgium, France, Spain and The Netherlands. Each country had a specific aim and strategy that was addressed. The aim was defined based on the outcomes of the SWOT-analyses of the local cattle breeds carried out in work package 1. The chosen strategy to solve the problem was determined by the involved stakeholders.

In Belgium, the number of approved bulls is still low, and, in short term, inbreeding could become a problem. All stakeholders (the Walloon Breeding Association, the Belgian Blue Breed herd book, the universities and the federal and regional authorities) agreed on the necessity to increase the number of approved bulls and to manage the inbreeding. After the process, the Belgian and French breeders and stakeholders of the dual-purpose Blue breeds have now a common understanding of problems and opportunities of their breeds. A large consensus has been established and all breeders and stakeholders carry out joint actions aimed at the safeguarding of their breeds.

In France, a recent breed standard, supported with measurements, was lacking. A first step is made to collect data on measuring cow features of Ferrandaise cows, and they will have to be completed with data on the dairy and beef production of the breed in the near future. The recorded measurements show that the current Ferrandaise cow is very close to the original one that existed in 1928. When compared to the Villard de Lans' cows, the shape of these two breeds seems to be quite similar and it is confirmed with the data obtained that the measures are very close for all the criteria analysed.

In Spain, two strategies were followed to improve sustainability of the Avileña-Negra Ibérica breed; (1) by developing a sound program to support the use of the breed as a source of suckler cows to cross with non-local breeds, or (2) by developing a selection program to emphasize the quality of the porducts provided that there is a market that requires such products. Questionnaires were sent out as a first inventory to find out the relative importance of the cattle characteristics for both types of farmers and the criteria they are currently using for the genetic selection on their animals. The questionnaires showed that Avileña-Negra Ibérica breeders do not seem to have a high level of specialization. Any of the identified strategies could be incorporated into their system.

In the Netherlands, the SWOT analysis and multi-stakeholders process has led to a common understanding of problems and opportunities of the Groningen White Headed cattle. One of the weaknesses of the breed is the lack of coordinated breeding program and breeding goal. The followed strategy to overcome this weakness was to (re-)define the breeding goal and to strengthen and better coordinate the breeding programme and breeding structure. The process resulted in a number of concrete actions to increase the number of AI bulls that both add genetic diversity to the population because they are unrelated and perform good on the most important traits of the breeding goal.

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Summary

1 Introduction

The EURECA-project takes a step-wise and qualitative/semi-quantitative approach. Detailed breed case studies (15 cases) and a detailed assessment of cryopreservation programmes (4 cases) have been followed by a European-wide survey. Parallel to this an assessment of available tools and methodologies has been carried out to support the genetic management in conservation and selection programmes of small populations. An 'expert system', best practises and guidelines have been drafted based on the outcome of the work packages 1-4. Lately, these guidelines have been tested in a limited number of breed demonstration cases. For the chosen breeds, breed strategies will be (re)developed in close collaboration with interested stakeholders of the breed. A multi-stakeholder approach was often required to (re)develop strategies towards more self-sustainability of the breed. Eventually, four partners have been taken responsibility to carry out a demonstration breed case. This document describes their findings.

Aim of study

The objective of this work package within the EURECA project is to support (several) stakeholders in their process to re-develop the breed conservation and development strategy.

New strategies will aim to improve *in situ* and *ex situ* conservation strategies and to increase self-sustainability of the breed, e.g. to develop a milk product linked to the breed or to have recognised in the market the environmental/cultural value of a breed. Possible ways of doing it, organisation, responsibilities, constraints and costs will be discussed and evaluated.

(Original) Partners

The following partners will organise a breed demonstration case:
1. Partner 0 (CGN, the Netherlands)
2. Partner 1 (IE, France)
3. Partner 4 (ULg - GxABT, Belgium)
4. Partner 7 (ICBF, Ireland)
5. Partner 8 (INIA, Spain)

During the EURECA-project, the multi-stakeholder approach could not be carried out in Ireland, due to lack of collaboration of the Kerry Cattle Herdbook. Therefore, four (Belgium, France, Spain, the Netherlands) demonstration breed cases are described in this report.

2 Multi stakeholder approaches

Conservation of local cattle breeds is a complex problem. It integrates economic, social, environmental, and technical issues, and it involves many different stakeholders. Those stakeholders range from direct users, as farmers and consumers, to indirect users that benefit from local cattle breeds, like the inhabitants of the farming areas. Some stakeholders may be involved in several economic activities, of which some may compete with local cattle breeding.

The complexity of local cattle conservation also comes from the fact that the environment of local cattle production is dynamic. Agro-ecosystems, functions of cattle, products demanded by the society, technologies, etc., change all through time. To solve complex problems we first need to identify and analyse the key driving factors of the system, and to understand how they act and how they can be controlled. The identification process could also be seen as an exercise of simplification; the problem is dissected into its basic entities in order to understand it and to make decisions. We also need to be aware of the risk of over-simplification; all important factors have to be taken into account in order to avoid undesirable outcomes. For this, decision making tools can be used for the identification and selection of strategies and policies for the development and conservation of local cattle in the context of Europe departing from an analysis of single breeds.

Decision making tools, as part of strategic planning, originated from the business world, concretely in the American Business School in the 60's (Hill and Westbrook, 1997). These tools were developed to help in the process of making choices in complex systems. One of the most widely used tools is the SWOT (Strengths, Weaknesses, Opportunities and Threats) analysis. In this analysis, factors affecting a particular situation or problem of a local cattle breed are split into internal and external factors. Internal factors refer to the attributes of the breed that can be exploited (strengths) or should be minimized (weaknesses) to achieve a goal. External factors are features that are fostering (opportunities) or hampering (threats) the performance of the breed. The two groups of factors also differ by the degree of control that we have on them. External factors cannot be controlled or modified, while internal factors can be managed to alter the current situation.

Strategic decisions can be made based on the analysis of the current and expected future situations by using the SWOT matrix (Weihrich, 1982). The matrix settings help to identify interactions between internal and external factors. Strategies can be developed in four ways, as shown in Figure 2.1, (1) to maximize both opportunities and strengths, (2) to minimize weaknesses while maximizing opportunities, (3) to maximize strength while minimizing threats, and (4) to minimize both weaknesses and threats.

SWOT MATRIX		INTERNAL FACTORS	
		STRENGTHS	WEAKNESSES
EXTERNAL FACTORS	OPPORTUNITIES	**SO Strategy** Maximize both strength and opportunities	**WO Strategy** Minimize weaknesses and maximize opportunities
	THREATS	**ST Strategy** Maximize strengths while minimizing threats	**WT Strategy** Minimize both weaknesses and threats

Figure 2.1. The SWOT matrix: strategic decisions based on SWOT factors (Weihrich, 1982).

These four strategies can be defined in more specific terms as follows:
- SO strategy: To use strengths to take advantage of opportunities.
- ST strategy: To use strengths to reduce the likelihood and impact of threats.
- WO strategy: To overcome weaknesses that prevent to pursue opportunities, and to make use of the opportunities to overcome weaknesses.
- WT strategy: To be aware of limitations that emerge from the combination of weaknesses and threats.

Use of SWOT in EURECA

SWOT analysis has been implemented in the context of the EURECA project. We have adapted it into a specific decision making tool to assist policy makers, local, regional and national authorities, breeders associations or any other stakeholder, in the identification and selection of strategies for the development and conservation of European local cattle breeds. Both internal and external factors were identified for each breed considering the opinion of different stakeholders. The breeds analysed were dual-purpose Belgian Blue and in Belgium, Ferrandaise in France, Avileña-Negra Ibérica in Spain, and Groningen White Headed in The Netherlands.

3 Belgium - The dual purpose Belgian Blue breed (dp-BBB)

Survey of farmers and stakeholders and SWOT analysis

Under work package 1 of the EURECA project, the survey and the SWOT analysis showed that the dual purpose Belgian Blue breed (dp-BBB) is rooted in the tradition of the region. To date, the population size of dp-BBB is stable in Walloon Region and the registration in the dp-BBB herd-book is well done by the breeders (particularly due to that it is one of the conditions to get the Agri-Environmental Measures). Those animals have interesting features: good longevity, robustness, ease of calving (the incidence of caesarean section in dp-BBB cows is clearly lower than in meat type Belgian Blue cows) and, especially, it is a dual purpose breed (milk production, good conformation, and high carcass value of calves and cows) and a type of breed that is still adapted to local production circumstances. Furthermore, the Walloon Breeding Association plays a favourable role towards the dp-BBB cattle (e.g., a breed commission dedicated to the dp-BBB was created in 2003) and the dp-BBB are accepted as a different strain by the Belgian Blue Breed herd-book. Nevertheless, we had to highlight that the number of approved bulls is still low, and, in short term, inbreeding could become a problem. Moreover, there was no differentiated product related to dp-BBB.

Opportunities for the breed

Interest in the conservation and the development of the dp-BBB cattle is nowadays shared by the breeders themselves and all important stakeholders: the Walloon Breeding Association, the Belgian Blue Breed herd book, the universities and the federal and regional authorities. All of them agreed on the necessity to increase the number of approved bulls and to manage the inbreeding.

It must be noted that dp-BBB and the Bleue du Nord (in France) breeds are related because of their common ancestors in the former Mid and High Belgium cattle, but these two breeds diverged slightly under differentiated selection objectives. The dp-BBB and the Bleue du Nord cattle are mainly located on both sides of the border between France and Belgium. Currently, there is an exchange of bulls, cows and semen doses between both countries. The dp-BBB and the Bleue du Nord will be called dual-purpose Blue breeds in this report.

Strategic plan and first results

Bull dams and elite-matings
It was decided to set up a collaboration between breeders and stakeholders of dp-BBB and Bleue du Nord from Walloon Region of Belgium and France. The first aim of this collaboration is to create an across-border working group that will develop common guidelines for selection of bull dams and elite-matings for these dual-purpose Blue breeds. Because the dual-purpose Blue cattle are also spread in the Flanders Region of Belgium, it was proposed to extend this working group to the dual-purpose Blue breeders in Flanders Region.

Since 2009, the working group visited French, Walloon and Flemish farms for 5 days (about 30 farms) to examine the conformation of some cows that were screened based on their milk production. Then, the group is convened twice a year in order to select bull dams and to recommend matings. As a result, about 20 bull dams are selected each year. The matings are carried out in order to either improve production or conformation traits or to regenerate old lines of bulls which are poorly represented in the current pedigree. This group will also create and help to conserve a common pool of bulls that are available for breeding in both countries. The first male calves were born in late 2009 – early 2010. The first year of work on mating yielded 11 male calves.

Gene pool
The working group met twice at the Artificial Insemination Centers of Northern France, Walloon Region of Belgium and Flemish Region of Belgium in order to present the group and to negotiate the entry of bulls of dual-purpose Blue breeds in their centers. Two centers have agreed to enter 5 bulls per year. Each year, some of the calves from the recommended matings could enter in Artificial Insemination Centers; the other bulls will be sold as natural service bulls. The group is currently busy setting up a gene pool which in future will be supplemented with semen doses of the new bulls. Breeders participating in this working group and those who agree to have a bull dam are very motivated by this new initiative. Motivation is such that some use of embryo transfer in order to maximize the chances of new bulls from the recommended matings.

Pedigree analyses
Under this collaboration, the pedigrees of these Belgian and French dual-purpose Blue breeds are compared in order to find cross-references due to exchanges of animals and importation of semen doses. The three pedigrees (French, Walloon and Flemish) were analyzed (alone or as a combination of them) to study the inbreeding and the pedigree completeness indexes. This analysis highlighted the historical problems known in the dual-purpose Blue breeds. In particular, there is a high number of animals registered with an unknown sire or with both parents unknown. This was observed in French pedigree during the years 1983-1996 and in Belgian pedigree during the years 1983-1989 and between 1995-2004. Nowadays in Belgium, the rules for registration of dual-purpose Belgian Blue (dp-BBB) animals in the herd book are more severe. Based on this ongoing work a common pedigree was established maximising recognition of links between animals. This allows studying the relatedness between animals, and to manage inbreeding better. Even if we know the real inbreeding this could be higher than the calculated inbreeding based on pedigree due to the importance of unknown parents.

Joint genetic evaluation
In Belgium, registered dp-BBB cows are milk recorded. This is also due to that fact that it is one of the conditions for them to be registered as dp-BBB and therefore to get the Agri-Environmental Measures. In order to improve the use of available milk recording data provided by both countries and to allow a joint ranking of French and Belgian dual-purpose Blue bulls, a joint genetic evaluation for production traits is set up. This new system will be adapted better to the specificities of these breeds. In this context, we must manage differences in trait definition, especially for milk protein content which is determined as crude protein in Belgium and as true protein in France. Because of its dual purposed selection objective, harmonization of the collection of conformation data (same traits and common procedures to measure them) is also needed.

Double muscling
In dp-BBB cattle a deletion within the Myostatin gene causes the double muscling phenotype, the allele including this deletion is called mh (muscular hypertrophy) allele. Even if the mh allele frequency is close to 100% in the well known beef breed called Double-Muscled Belgian Blue cattle, this frequency is only about 61% in dp-BBB. A particularity in Walloon Region is that selection goals differ among dp-BBB breeders. Even if the milk production is always important and cows are milk recorded, some breeders put large emphasing on meat production relative to milk production. Therefore, they prefer and have more animals with the mh/mh genotype (due to their better conformation). Other breeders put less emphasis on beef and have therefore more mh/+ and especially +/+ animals. Given the importance of the effects of the mh allele on the conformation and the musculature, this allele could also have a potential indirect role in dairy production. Based on this hypothesis the effect of the mh allele on milk production traits was studied. This provided the scientific information that was missing and that is needed to take this gene effect into account when selecting bulls for the artificial insemination centers according to the impact of their genotype on milk production. Results provided more reliable estimates of the negative effects of mh allele on milk production traits. Indeed, the average estimated allelic substitutions of the mh allele are - 160 kg milk, - 9 kg fat and - 5 kg protein for the first three lactations.

Conformation traits
French and Walloon farmers and stakeholders have met several times to discuss the conformation traits. The two scoring grids were compared and each trait was discussed. The Walloon stakeholder conducted a survey of Walloon dual-purpose Belgian Blue breeders to get their views on the importance of the different traits. Based on these discussions and the results of the survey, a new scoring grid was established by agreement between breeders and stakeholders from Walloon Region

of Belgium and France. After three day of harmonization of scoring with those involved, the conformation of cows is appraised in the same way since August 2009. The scores will be incorporated into a common database and there are plans to use then in the future in a joint genetic evaluation system.

Many times, we continue to visit the dual-purpose Blue breeders to maintain and strengthen the contact. Indeed, some problems are not immediately noticeable; the discussion with breeders at several times allows us to improve our relationship and to perceive more easily some problems.

To date, the main stakeholders as well as the working groups (including breeders) continue to meet regularly to work on the thematic cited above.

Conclusions for the Belgian breed

At present, Belgian and French breeders and stakeholders of the dual-purpose Blue breeds have a common understanding of problems and opportunities of their breeds. A large consensus has been established and all of breeders and stakeholders are carrying out joint actions aimed at the safeguarding of their breeds.

4 France - Ferrandaise

Survey of farmers and stakeholders and SWOT analysis

Several actors are playing a key role for the maintenance and development of the breed Ferrandaise: there is an active breed society working in collaboration with the Institut de l'Elevage who keeps the herd book of the breed since 1980 and a regional park: "Parc naturel régional des Volcans d'Auvergne". All of them are working together since the beginning of the conservation program at the end of the 70's. Bulls of different origins have been found and collected since 1979. Today, 29 bulls are available for artificial insemination with a good genetic diversity which permits to avoid inbreeding (total inbreeding of females is 2 %). Every year all breeders are contacted or visited and the herd book of the breed is distributed to all breeders with a list of alive animals in each farm. But there is a lack of references on the breed and a product directly linked to the breed is missing.

Opportunities for the breed

One of the subjects that was interesting to study in our project was the implementation of specific products for this breed. However, the reflexion for such a product is just beginning and one year was really short to be able to have some interesting conclusion at the end. The second issue was the lack of references on the breed and particularly the lack of measurement to complete the breed standard. Indeed, measurements exist for the Ferrandaise but they were done in 1928 and in 1979 at the beginning of the conservation program. Therefore, it was interesting to have new current data. Furthermore this kind of measures were made two years ago for the breed Villard de Lans. It could be interesting to compare this two breeds.

Strategic plan and first results

1) Sampling of the cows to be measured

The aim was to choose at least 100 cows in about fifteen farms. Chosen cows should be of different ages and represent a large part of genetic diversity through a high number of sires.
First, we chose fifteen farms with a sufficient number of cows where animals are well-fed to be representative of the population. Then we chose between 4 and 15 cows per herd to be measured. The person doing the measurements in the farms was also authorised to add new cows when it was not possible with the ones we had selected.

In fact 107 cows were measured. They were between 34 months and 17 years old. They were daughters of 49 different sires.

2) Results of the measurements

Different measures were made on each cow with a height gauge and a tape measure.
Results are given in the Table 4.1.

Table 4.1: Results of the measures made on 107 Ferrandaises' cows

Measurements (cm)	Mean	Std dev	Minimum	Maximum
Withers height	135.1	4.5	126	150
Sacrum height	140.0	4.9	128	157
Chest circumference	198.4	9.3	176	224
Chest width	49.2	4.9	35	58
Chest depth	73.2	3.2	63	80
Pelvis length	56.2	3.8	43	78
Haunch width	59.2	3.4	51	70
Width at the trochanters	52.6	4.0	44	67
Pins width	35.5	3.0	30	47
Back length	79.5	6.7	68	113

Comparison with older data

The data from Pitiot were made in 1928 and were published in a book about Ferrandaise breed. But it was not indicated how many cows were measured to obtain these results. Nevertheless, it seems to be a good indication of how Ferrandaise cow was at the beginning of the 20th century, when it was a mainstream breed. The data from 1979 were collected at the beginning of the conservation program, after a census of the remaining animals of this breed was done. Almost the same number of cows were measured (102 cows).

Table 4.2 shows that the 3 measurements were quite similar, particularly the results obtained in 1928 and 2010. Then the current Ferrandaise cow is very close to the one existing in 1928.

Table 4.2: Comparison with older measures made

Measurements (cm)	Year of the measures		
	Pitiot, 1928	**1979 (102 cows)**	**2010 (107 cows)**
Withers height	138 – 150	134 +/- 4	135.1
Chest circumference	188 – 205	189 +/- 8	198.4
Chest width	45 – 58	42 +/- 4	49.2
Chest depth	70 – 85	72 +/- 3	73.2
Pelvis length		53 +/- 3	56.1
Haunch width	47 – 55	53 +/- 3	59.2
Width at the trochanters	48 – 65	53 +/- 3	52.6
Pins width		34 +/- 3	35.5

Comparison with data from Villard de Lans
Similar measures were scored in 2007 on 80 Villard de Lans' cows. The means obtained are presented in the Table 4.3 to be compared with the Ferrandaises' results.

Table 4.3: Results of the measurements in Villard de Lans (2008) and Ferrandaise (2010)

Measurements (cm)	Villard de Lans	Ferrandaise
Withers height	138.2	135.1
Sacrum height	143	140.0
Chest circumference	203.3	198.4
Chest width	47.9	49.2
Chest depth	74.6	73.2
Pelvis length	58.8	56.1
Haunch width	58	59.2
Width at the trochanters	55	52.6
Pins width	39.2	35.5

The shape of these two breeds seems to be quite similar and it is confirmed with the data obtained as the measures are very close for all the criteria analysed. Villard de Lans cows are only a little taller on average than the Ferrandaise.

Conclusions for the French breed

The measurements made are the first step to a larger collection of references on Ferrandaise cows. They have to be completed with data on the dairy and beef production of the breed. The problem is that only few cows are participating to the national performance recording. The breed society, the Institut de l'Elevage and the regional park are trying to see what is possible to encourage new farmers to join milk or beef recording but it is not on easy task, particularly in the difficult general agricultural context.

5 Spain - The Avileña-Negra Ibérica breed

Survey of farmers and stakeholders and SWOT analysis

Breed description
The survey of farmers and stakeholders implemented in this first work package was used to determine the SWOT factors (strengths, weaknesses, opportunities and threats) of the breeds. The outcomes of this analysis were used to have a clear and objective description of the environment of the breed. The Avileña-Negra Ibérica breed has always been exploited in the mountains of central Spain. It is known that it is well adapted to the harsh environmental conditions and extensive production system of this region. However, it is generally believed that productivity is low compare to the mainstream breeds, but the breed has functional features that could be enhanced to transform the breed into a competitive breed providing the environmental constraints. One of the main attributes of the Avileña-Negra Ibérica breed is the high quality of its products. Avileña- Negra Ibérica posses a "certified meat quality label" since 1988. Compared to other local Spanish breeds, Avileña-Negra Ibérica resulted to be the one that provided the best general acceptance in a trained panel (Sañudo 2009, personal communication). Survey of consumers pointed out that the best attribute of its meat is the flavor together with the tenderness. This is an important factor because tenderness can be improved by a great extent through the aging process. However, the flavor is an intrinsic property of the combination of the muscle attributes and the production system that is more difficult to be externally manipulated. In addition, the Avileña-Negra Ibérica breed has been linked to transhumance as a production system where animals are moved between the mountains of Castilla-León and the plains and "dehesa" forests of Extremadura to use the grass available in different seasons in the two regions. The internal (i.e. attributes of the breed that can be exploited (strengths) or should be minimized (weaknesses) to achieve a goal) and external (i.e. features that are fostering (opportunities) or hampering (threats) the performance of the breed) factors determined for the Avileña-Negra Ibérica breed are listed in Annex 5.1.

Multi stakeholder discussion
The relevance and completion of the strengths, weaknesses, opportunities and threats were discussed with the Breeders' Association. Based on this discussion, some conclusions can be drawn: First, the information of the internal and external factors relative to the breed corresponds with the perceptions of breeders. Second, it is not very clear how people understand productivity of a breed. It is our understanding that most farmers speak about the amount of output obtained from the production system instead of the profitability of the farm. And third, there are distinct groups of breeders differing in two aspects; (1) the relevance of profitability in their decision of using the breed and (2) the objective they pursue.

Thus, with regard to the first conclusion there are two major herdmen profiles. Firstly, farmers who remain breeding the Avileña-Negra Ibérica even though they believe that other breeds would be more profitable. Secondly, farmers who believe that their local breed is the most suitable option for their environmental constraints. These farmers could also be grouped according to their breeding objective; there are breeders that are focused on selling animals alive to other breeders as a source of replacement for sires and sucklers cows, and there are a number of farmers whose main objective is selling calves to feedlots or slaughterhouses.

Opportunities for the breed

Based on the idea that a good strategy should fit the internal characteristics with the external environment, potential strategies were derived from the SWOT analysis performed under work package 1 (see Annex 5.2). The strategic opportunities identified were discussed with the Breeders Association to evaluate its potential impact on the development of the breed.

Three out of 20 potential strategies were chosen by the Breeder Association as being the most feasible ones in the short term. It was decided to focus on (1) the development of a sound program to support the use of the breed as a source of suckler cows to cross with non-local breeds, (2) the development of a selection program to emphasize the quality of the products, provided that there is a market that requires such products, and (3) to elaborate selection objectives that allows the breeders to account for the environmental attributes of the breed. The implementation of these strategies and the role and changes that it implies for the Association were also discussed.

1 - The development of a sound program to support the use of the breed as a source of suckler cows to cross with non-local breeds (strategy 8 in annex 5.2).
Many farmers have been substituting Avileña-Negra Ibérica animals by mainstream animals in the last decades. They are now realizing that in order to achieve a higher level of production in such extensive systems, more labour and higher costs are need. More labour is required due to its worse functional attributes in mountain environment, and input costs are higher because of the higher food requirements and more veterinary costs. These farmers find a midway solution in using Avileña-Negra Ibérica cows as suckler cows to cross with mainstream bulls (mainly Limousin and Charolais). In this way they increase the productivity of the calves compared to pure Avileña-Negra Iberica calves, but they also make use of the good functional features of the cows that can be derived from its adaptation to the environment. The current situation now is:
a) There is an increasing demand of suckler Avileña-Negra Ibérica cows by farmers out of the Breeder Association to cross with mainstream bulls.
b) The Association is considering how to include F1 animals within the 'Breed label' to increase the profitability of the associated breeders.

This strategy was seen by the Breeders Association as one of the most promising to increase breed profitability in the short term. It implies a developed genetic program to improve the features that the Avileña-Negra Iberica cattle require for this new function. Therefore, in addition to the systematic recording of weaning weight, it is also necessary to implement a systematic recording of fertility traits and functional longevity. In addition, it is necessary as well to score maternal traits and to monitor the genetic status of the population. Setting up an organized structure among breeders that supply genetic material into the population is needed too.

2 - The development of a selection program to emphasize the quality of the products provided that there is a market that requires such products (strategy 1 in annex 5.2).
One of the main strengths of Avileña-Negra Iberica cattle is the high quality of its products. However, only a small number of programs in beef cattle populations include meat quality among their breeding objectives because of the high costs for recording and the difficulty of defining quality without a clear definition of the meat market. Currently there is a project aiming to identify genomic regions for the favourite traits of this specific breed. It has been decided by the Breeders Association that it is time to start working in that direction. In addition to the genetic aspects, there are some initiatives to study the weak points of the production chain trying to optimize the external condition (e.g. maximum period for an animal to stay in the abattoir previous to slaughter, aging period etc.) that can affect the quality of the final product.

3 - To elaborate selection objectives that allows the breeders to account for the environmental attributes of the breed (strategy 4 in annex 5.2).
Avileña-Negra Iberica fits into low input-low output breeds. The animals are subject to a fully extensive production system and to transhumance. Currently there is an increasing social demand of "environmental friendly" cattle systems. This may become an interesting option for the promotion and development of this breed. However, the key point is how to include the environmental value as part of the selection objective. Although this strategy has been considered by the Breeders Association as an interesting option to develop, it has been decided to work on it once the results of the previous two strategies are analyzed. Therefore, this item will not be worked out in the rest of the document.

Strategic plan and first results

As a common first step of the two selected strategies, an inventory was performed on the relative importance of the cattle characteristics for farmers and the criteria they are currently using for the genetic selection on their animals. The objectives of this inventory were firstly to be able to identify types of farmers, and secondly, to analyze if there were differences among those groups of farmers in terms of the attributes of the breed they pursue and how those are translating into selection criteria. The farmers can be assigned to two groups; (1) farmers that are focused on selling animals alive to other farmers as a source of replacement for sires and sucklers cows ("genetic" group), and (2) farmers whose main objective is selling calves to feedlots or slaughterhouses ("meat" group). This distinction is important because of the structure with nucleus herds, that is supposed to supply genetic material for the development of the population. The breeders of the nucleus ("genetic group") have to have selection criteria that include those aspects requested by farmers whose main objective is to produce meat ("meat group").

A questionnaire for farmers was designed for this inventory. Results presented in the following tables are based on 24 questionnaires; the number of interviews will increase to more than 70 when all the questionnaires are done.

Importance of cattle features
Analyzing the importance that breeders give to cattle features (Table 5.1) points out that in general breeders are searching to develop the functional traits of the breed. Both groups of breeders are also interested in the quality of the meat of the breed. It has to be highlighted as well that it seems that similar perception and relative importance are given to the features by the two groups of farmers ("genetic" and "meat").

Table 5.1: Relative importance of the cattle features for its breeding for the farmers of *Avileña-Negra Ibérica*								
GROUP			**Meat production**	**Fer-tility**	**Long-evity**	**Labour force demand.**	**Sanitary problems**	**Meat quality**	**Matern. ability**
FARM OBJECTIVE	**MEAT**	**Mean**	**0.12**	**0.19**	**0.07**	**0.06**	**0.21**	**0.16**	**0.19**
		Stand. deviation	0.08	0.06	0.04	0.05	0.06	0.06	0.07
		n	18						
	GENETIC	**Mean**	**0.10**	**0.19**	**0.03**	**0.08**	**0.23**	**0.17**	**0.22**
		Stand. deviation	0.05	0.06	0.01	0.06	0.03	0.05	0.07
		n	6						
ECONOMIC CRITERIA	**PRIORITY**	**Mean**	**0.13**	**0.19**	**0.06**	**0.08**	**0.20**	**0.17**	**0.17**
		Stand. deviation	0.08	0.06	0.04	0.05	0.06	0.06	0.07
		n	14						
	SECOND.	**Mean**	**0.09**	**0.19**	**0.06**	**0.05**	**0.24**	**0.16**	**0.22**
		Stand. deviation	0.06	0.05	0.04	0.05	0.04	0.06	0.07
		n	10						

Importance of selection criteria

The relative importance of the selection criteria for the different groups of farmers are presented in Table 5.2. One would expect that those features that are more important for the farmers would be those that have highest weights as selection criteria, but this is not what the results of the inventory show. Meat quality and sanitary problems are not included as selection criteria despite its importance as desirable features for the animals. We could argue that farmers are aware of the quality of their products and therefore they may be willing to pursue "meat quality as a selection objective". Now the challenge is to design how to incorporate such objective into the breeding program.

Productivity is poorly included in the selection criteria in the majority of the cases. It is mainly measured with morphological traits and only in half of the farms is measured with the weaning weight.

Table 5.2: Relative importance of the selection criteria of *Avileña-Negra Ibérica* suckler cows								
GROUP			Morphology	Birth weight	Weaning weight	Weight gain during fattening	Fertility	Maternal ability	Long-evity
FARM OBJECTIVE	MEAT	Mean	0.22		0.15	0.15	0.35	0.38	
		Stand. deviation	0.14		0.12	0.08	0.07	0.17	
		n	13	0	9	5	14	14	0
		Frequency	0.72	0	0.50	0.28	0.78	0.78	0
	GENETIC	Mean	0.28	0.04	0.06	0.15	0.39	0.29	
		Stand. deviation	0.16		0.05	0.0	0.08	0.13	
		n	5	1	4	2	4	5	0
		Frequency	0.83	0.17	0.67	0.33	0.67	0.83	0
ECONOMIC CRITERIA	PRIORITY	Mean	0.23	0.04	0.15	0.15	0.36	0.35	
		Stand. deviation	0.14		0.11	0.08	0.08	0.12	
		n	10	1	8	5	11	11	0
		Frequency	0.71	0.07	0.57	0.36	0.79	0.79	0
	SECOND.	Mean	0.25		0.09	0.15	0.35	0.35	
		Stand. deviation	0.15		0.13	0.0	0.05	0.17	
		n	8	0	5	2	7	8	0
		Frequency	0.80	0	0.50	0.20	0.70	0.80	0

One relevant aspect that can be observed in Table 5.2 is that the group of "genetic" breeders give more importance to the morphology (conformation traits) than the group of "meat" breeders. The group of "genetic" breeders give less weight to weaning weight and maternal ability criteria compared to the group of "meat" breeders. This incoherence has to be solved in the breeding program, because farmers of the "genetic" group are selling their animals to other farmers of the "meat" group. However, it turns out that the "genetic" breeders are selecting the animals according to criteria that are not important for "meat" breeders.

Conclusions for the Spanish breed

Avileña-Negra Ibérica breeders do not seem to have a high level of specialization. Any of the identified strategies could be incorporated into their system. Even though meat production is a objective for the breed, it is clear that the objective is to produce meat at low cost (fertility, maternal ability, healthy animals). It is not clear yet if the breeders that are more oriented towards meat production are aware of the need to fully implement a breeding program that incorporates meat quality in the breeding objective.

Annex 5.1. SWOT factors of *Avileña-Negra Ibérica* breed

	Avileña-Negra Ibérica SWOT analysis
Strengths	1. Better functional traits than mainstream breed: robustness, health, high fertility rates, longevity, low rates of calving difficulties, good use of low nutritional value pastures (local pastures) 2. High quality of breed products (meat) 3. Lower cost of inputs than intensive cattle farming 4. Lower investment requirements than intensive cattle farming 5. Ecological sustainability of extensive exploitation system 6. Historical link breed-territory 7. High traditional prestige of breed products 8. High farmers interest on breed conservation 9. High efficiency of Breed Association: common fatten, common marketing, presence of breeding programs 10. Presence of Breed Label (IGP) 11. Good market competition capacity against other quality/local breed products
Weaknesses	1. Lower productivity & carcass value than mainstream breeds (Charolais, Limousine) 2. Lower profitability than mainstream breeds 3. High farmers' age 4. High dependency on subsidies
Opportunities	A. Increase of quality products demand B. Increase of traditional local products conservation awareness C. Increase of demand of sustainable/environmental friendly cattle farming at European and National levels D. Increase of demand of socio-cultural activities for tourism E. Demand of landscape and vegetation management of extensive cattle farming F. Considerable demand of suckler cows to cross with non-local breeds G. Local breed subsidies maintenance H. Rural population fixation I. Proximity to Madrid as an important market (6 mill. of consumers)

Threats	A. Rural depopulation B. Unattractive job for young people C. Competition against national and European quantity products D. Competition against international products with different legal requirements (sanitary, labor rights) E. Competition against other economic activities more attractive for young people (tourism, construction) F. Increase of inputs costs G. Political obstacles to transhumance through too demanding sanitary policies and lack of paths maintenance H. Increase of bureaucratic procedures

Annex 5.2. SWOT matrix of *Avileña-Negra Ibérica* breed

SWOT matrix. Strategic alternatives for Avileña-Negra Ibérica.		
	Internal (breed, breeders)	
	Opportunities	**Threats**
External / **Strengths**	1. Continue developing the **"quality"** of ANi products as a **marketing strategy** in all the directions; research, products development, promotion, etc. 2. Insert cultural, traditional and environmental elements in the **marketing** of ANi products 3. Develop **tourism activities** related with cultural and environmental aspects of ANi breed 4. Study and develop potential **environmental economic alternatives/new functions** for extensive local cattle farming 5. **Use the traditional prestige of Avila meat**, in the promotion of ANi products 6. Promotion of ANI breed as a **low investment economic alternative** in the area 7. Fasten the good competition capacity of ANi meat developing new products, distribution channels, production systems, etc. 8. Develop and promote the **use** of the breed **as suckler cows to cross** with non-local breeds	9. Promotion of ANi breed as a **low investment economic alternative for young people** 10. **Explore management alternatives** to interest young people 11. Implement **economic studies** to evaluate the real competitiveness of ANi products 12. Boost the **use of local resources** to face the increase of inputs costs 13. Explore and **develop** new **marketing strategies** 14. Look for local and national **authorities support to transhumance** 15. Create **social awareness on obstacles to transhumance** through it promotion as an environmentally friendly cultural tradition to be maintained
Weaknesses	16. Study and develop potential **economic alternatives/new functions** for extensive local cattle farming 17. Focus AS products **promotion on social demanded aspects** 18. Explore and exploit the **distribution of products on Madrid** to optimize its potential consume of ANi products	19. Explore and promote **attractive aspects** of AS breed **for young people** 20. Study the **potential impact of inputs costs** increase in the coming years **on farms profitability** to suggest and evaluate economic strategies

6 The Netherlands – Groningen White Headed Cattle

Survey of farmers and stakeholders and SWOT analysis

The Groningen White Headed is a native Dutch breed. First descriptions of this breed go back to the 14th century. Already in the Middle Ages portraits of red and black White Headed cows were painted. At the start of the 20th century, 90% of all cattle in the Province Groningen existed of White Headed cattle. Also, in the Province Zuid-Holland, around Leiden, and along the Rhine in Utrecht, White Headed cattle were bred. In 1975, the population of purebred White Headed cattle was around 20,000 cows. In 1999, there were only approximately 830 purebred (87.5 - 100%) White Headed cows left and 15 AI-bulls. In 2004, 1321 purebred White Headed cows were registered and currently the trend in the population size is stable, but the population size itself is small.

The strategy development process for the Groningen White Headed cattle started with the definition of the strengths and weaknesses of the breed. The main factors were determined by the Dutch EURECA experts based on farmer interviews and consultation of stakeholders, in particular the people involved in the Groningen White Headed breed interest group. The strengths of the breed are related to the following features of the animals: good fertility and strong feet and legs. The weaknesses are partly related to the features of the animals (low milk production), but also to the population (small population size), and to the breeding structure (lack of coordinated breeding program and breeding goal).

Opportunities for the breed

The potential strategies to overcome the weaknesses were discusses and two main strategic opportunities were pointed out as (1) to (re-)define the breeding goal and to strengthen and better coordinate the breeding programme and breeding structure, (2) to develop niche markets for breed related products, in particular related to certain production systems (e.g. organic farming or regional specificities) or farm management styles. After further discussion with the main stakeholders (Blaarkopstichting) it was agreed that - in the context of the EURECA project- first focus should be on improving the breeding structure and breeding programme.

Strategic plan and first results

To improve the breeding structure and breeding programme of the Groningen White Headed cattle in the Netherlands, the first step was to explore individual farmers' production goals, followed by a study of the genetic structure of the current population.

Breeding goal
A questionnaire was sent to 291 farmers, getting response from 111. Most of them were dairy herds with mixed breeds (69%). A minority of the farmers has the main focus on beef production (only for 4% of farmers), therefore a separate breeding program for beef production does not seem to be relevant. The most important traits for the farmers in order of importance were: (1) fertility, (2) calving ease, (3) durability, (4) protein content and (5) somatic cell count. Those are the traits that should be incorporated in a selection index, according to the farmers

Population analysis
A pedigree analysis was carried out. It showed that the number of calves born per year has decreased sharply since 1980 being nowadays approximately 1000 purebred calves per year (Figure 6.1).
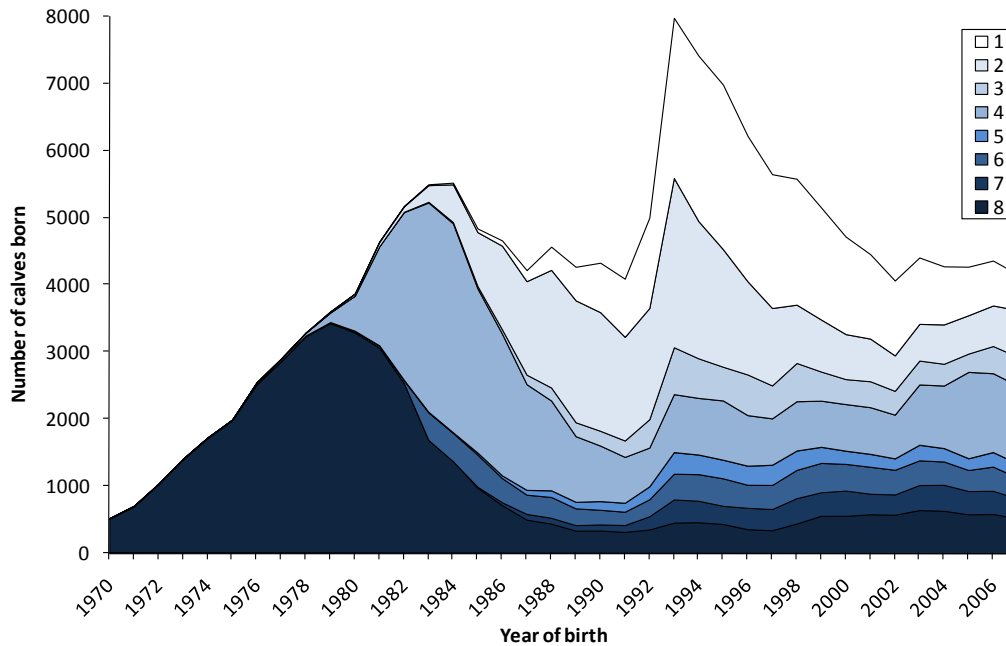

Figure 6.1: The number of calves born each year between 1970 and 2007 per class of Groningen White Headed genes (1=12.5%, 2=25%, 3=37.5%, 4=50%, 5=62.5%, 6=75%, 7=87.5% and 8=100%).

The inbreeding and coancestry has increased steadily since 1970. The current rate of inbreeding is 0.48% per generation that is almost the top limit for a healthy population according to FAO guidelines. An increasing awareness about the limited genetic variation in the current Groningen Whiteheaded population resulted in a collaboration plan between de Gene bank and the Groningen White Headed breeders. A number of breeders is using "old" semen from the gene bank in order to increase genetic diversity on their farm and in the national population.

Based on the results of the farmer survey and genetic analysis of the population, the breed organization (Blaarkopstichting) decided to continue selection of a sufficient number of bulls and putting more value to the five selected traits and minimizing the genetic relationships with the current White Headed population. They also initiated a programme to attract 'donor funding' for a revolving fund, in order to be able to increase the number of pure bred AI-bulls available for farmers.

Conclusions for the Dutch breed

The EURECA SWOT analysis and multi-stakeholders process has led the Dutch breeders and stakeholders of Groningen White Headed cattle to a common understanding of problems and opportunities of their breeds. The process resulted in a number of concrete actions to increase the number of AI bulls that both add genetic diversity to the population because they are unrelated and perform good on the most important traits of the breeding goal.

7 Overall conclusions and implementations

The objective of this work package was to support stakeholders in their process to re-develop the breed conservation and development strategy. These strategies aim to improve *in situ* and *ex situ* conservation strategies and to increase self-sustainability of the breed. The multi-stakeholder approach worked out very good for the analysed breeds. Firstly because the different points of view and angles created a wider understanding of the breed and its strengths, weaknesses, opportunities and threats. Secondly because the chosen solutions and strategies were supported by many stakeholders of the breed and therefore carried out on different levels.

In Belgium, the Belgian and French breeders and stakeholders of the dual-purpose Blue breeds have now a common understanding of problems and opportunities of their breeds. A large consensus has been established and all breeders and stakeholders carry out joint actions aimed at the safeguarding of their breeds.

In France, a recent breed standard, supported with measurements, was lacking. A first step is made to collect data on measuring cow features of Ferrandaise cows, and they will have to be completed with data on the dairy and beef production of the breed in the near future. The recorded measurements show that the current Ferrandaise cow is very close to the original one that existed in 1928. When compared to the Villard de Lans' cows, the shape of these two breeds seems to be quite similar and it is confirmed with the data obtained that the measures are very close for all the criteria analysed.

In Spain, the questionnaires showed that Avileña-Negra Ibérica breeders do not seem to have a high level of specialization. Any of the identified strategies could be incorporated into their system. Even though meat production is a objective for the breed, it is clear that the objective is to produce meat, but at low costs. It is not clear if the breeders that are more oriented towards meat are aware of the need to fully implement a program to incorporate the meat quality in the breeding objective.

In the Netherlands, the SWOT analysis and multi-stakeholders process has led to a common understanding of problems and opportunities of the Groningen White Headed cattle. The process resulted in a number of concrete actions to increase the number of AI bulls that both add genetic diversity to the population because they are unrelated and perform good on the most important traits of the breeding goal.

8 References

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