



# Breeding Profitable Sheep in Ireland

## Recommendations to the Interim Sheep Board from the Strategy Project Team

A Report prepared for the Interim Sheep Board

by

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**FINAL REPORT SUBMITTED TO THE INTERIM SHEEP BOARD**

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# Breeding Profitable Sheep in Ireland – Recommendations to the Interim Sheep Board from the Strategy Project Team

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## Executive Summary

There is a strong political will within Ireland to drive progress across all sectors of the sheep industry. The Malone Report on the sheep industry indicated the need for a major new initiative in the area of breeding. The recommendation that the Irish Cattle Breeding Federation be involved in a new sheep breeding initiative was actioned by the Implementation Group late in 2007. Subsequent developments have resulted in the formation of an Interim Sheep Board.

At the direction of the Interim Sheep Board, a project team has been formed to consult with key stakeholders in Irish sheep breeding and farming, with a view to forming a clear set of recommendations on how genetic improvement of sheep in Ireland could be enhanced. This Report outlines a pathway forward for the development of sheep breeding in Ireland.

Four key areas were identified for the project team to address:

1. animal identification,
2. data recording including trait data,
3. genetic evaluation - breeding objectives and selection criteria,
4. breeding (and demonstration) schemes.

The Project Team defined the vision as

***a long-term highly-profitable Irish sheep industry.***

In order to deliver on this vision, the focus must be on achieving an outcome of

***sustainable profitability for all sectors of the Irish sheep industry,***

where sustainable profitability is defined as a sheep industry that is competitive with other enterprises. The Project Team was particularly concerned with the development and application of a genetic improvement programme.

## Issues and Recommendations

### **Recommendation 1: Animal identification - the system**

The current animal identification system (NSIS) does not provide a unique lifetime identifier for every animal because; new tags with a different number are used to replace lost tags, and animals must be tagged, with a tag associated with the new flock, after movement (thus the animal will have two identifiers (one in each ear) after movement). Breed society identifiers are not unique across breeds or over time and in some cases across sexes. There is a need for double tagging to prevent the loss of identification, and the re-issue of unique lifetime identifiers in the event of a tag being lost. The sheep database will need to play a role in tracking animal location.

#### ***The Project Team recommends that:***

the current NSIS sheep identification system be modified to include double tagging, the issue of an identical replacement for lost tags and no tagging on movement between flocks, to closely reflect the current successful cattle model; however this would only be a requirement for performance-recording breeders and producers, and not a mandated requirement across the industry.

### **Recommendation 2: Animal identification - Establishment of a Sheep Database**

To deliver such a system will necessitate the establishment of a central database so that the NSIS requirements can be met; this is particularly important given that the proposed genetic ID system will not allow re-tagging with a different number on movement. The sheep database will therefore need to play a role in tracking animal location.

**The Project Team recommends that:**

a central database (the Sheep Database) is established.

**Recommendation 3: Data recording - Electronic Identification (EID)**

Electronic ID systems are available with further improvements likely. These systems are likely to facilitate lower cost, more frequent, and more accurate data recording in the future.

**The Project Team recommends that:**

performance-recorded flocks move as quickly as possible to use of EID animal identification subject to cost and practicality.

**Recommendation 4: Data recording - Trait recording**

The current recording protocol and data capture are limited, both with respect to the time that traits are recorded, and in the lack of breadth of recording across the full range of economically-important traits.

**The Project Team recommends that:**

performance recording protocols be adjusted to accommodate earlier, later, and more regular recording of lamb live weights, recording of lamb mortality, lambing difficulty, feet problems, faecal egg counts, dag scores, and mature ewe weights.

**Recommendation 5: Data recording - Minimum recording of criteria**

Users of the new sheep database evaluation systems will need to be aware that provision of minimal and/or poor quality data will result in subsequent predictors of genetic merit being of very low quality. However it is important to get the scheme operating.

**The Project Team recommends that:**

the genetic evaluation system makes use of all recorded data that helps improve the accuracy of the evaluations.

**Recommendation 6: Data recording - Recording systems**

Widespread adoption of data recording systems by breeders and producers is dependent on systems that are relatively cheap to implement, and are minimally-disruptive of normal management. However given the importance of ensuring that users of the genetic evaluation scheme are committed to the programme, it is important that the costs of performance recording are borne by the owners of the animals being recorded.

**The Project Team recommends that:**

that data recording systems be developed to minimise costs and minimise disruption to normal management, and the costs of all performance recording should move to a user-pays basis in a way that maintains and enhances participation in performance recording in response to demand for trait improvements by commercial producers.

**Recommendation 7: Data recording - Data capture**

There are benefits in terms of data integrity and savings in costs that could arise from better practices for data capture and transfer to the Sheep Database. Options currently available are mainly paper-based systems, albeit often with electronic data transfer. Developments in electronic data capture systems will soon deliver relatively cheap technology that can be integrated with high-performance EID systems.

**The Project Team recommends that:**

a range of data capture options be provided to performance recording flocks, with a view that over time these will migrate to widespread use of EID systems for performance recording.

**Recommendation 8: Data recording - Provision for new genomics technologies**

In the future, there is scope for DNA tests that would improve the accuracy of prediction of economically- important traits, particularly for young animals. High quality DNA samples will be required.

***The Project Team recommends that:***

blood samples be taken from selected animals (all sires of lambs recorded in the central progeny test and all lambs born in the central progeny test) and high-quality DNA extracted and stored.

**Recommendation 9: Genetic evaluation - Timing of evaluations**

A modern genetic evaluation system with web-based reporting should be capable of delivering breeding values with a rapid turn-around. With the additional recording capability proposed above, there is likely to be new data entered onto the database at many different times of the year, and it is well-recognised that rapid feedback encourages good practice.

***The Project Team recommends that:***

evaluations be conducted on at least a weekly basis all year round.

**Recommendation 10: Genetic evaluation - Reporting of results**

There will be a need to report a wide range of results. There is also a need to develop breeding objectives that encompass a broader range of traits than at present, and which recognise that buyers are likely to place different emphasis on different traits due to differences in their personal and farming circumstances.

***The Project Team recommends that:***

a draft version of the breeding objective be prepared as soon as possible for further industry consultation and that the breeding objective be used to report sub-indexes for trait groups, along with overall indexes such as a Flock Replacement Index and a Terminal Index.

**Recommendation 11: Breeding (and demonstration) schemes – the Central Progeny Test**

The success of the genetic evaluation scheme will depend on acceptance by breeders and producers that the predictions of the genetic merit of individual animals are accurate and are of sufficient magnitude to make a real difference in a breeding or production situation. Therefore the implementation of a system to generate the data that will enable comparison of large numbers of rams from a range of sources, and a demonstration component become pivotal. This is the rationale behind the proposed Central Progeny Test (CPT) and the Maternal Lamb Producer group (MALP) scheme.

The primary function of each of the CPT is to provide the genetic linkage across flocks so that the genetic merit of individual rams including those in the PSBIP can be assessed accurately.

***The Project Team recommends that:***

the CPT is established as outlined in this report to start with mating in 2009.

**Recommendation 12: Breeding (and demonstration) schemes – the Maternal Lamb Producer group (MALP) scheme**

The Irish sheep industry requires an innovative new approach to show the real value of genetics in real farm situations. Thus the rationale behind the Maternal Lamb Producer group (MALP) scheme is to provide a convincing demonstration, across a range of commercial flocks, of the range in genetic merit among a group of rams in terms of the financial and management

impacts of using rams with the appropriate traits to improve income and reduce costs. Thus the primary function of the MALP is to provide a demonstration.

***The Project Team recommends that:***

the MALP is established to start with mating in 2008.

***Recommendation 13: Breeding (and demonstration) schemes – CPT & MALP - emphasis on traits***

Central to this proposal is the emphasis on traits, not breed. This emphasis on traits, rather than breed, will encourage the vital co-operation of the breed societies whose members will service the commercial producer's demand with the appropriate genetics into the future.

***The Project Team recommends that:***

that the emphasis within both the CPT and the MALP is on traits, not breed.

***Recommendation 14: Breeding (and demonstration) schemes – CPT location***

As outlined above, there is a need for the breeding scheme to be integrated across a wide range of participating flocks so that producers can see the effects demonstrated in normal farm situations relevant to their own. The proposed breeding scheme facilitates inclusion of sire referencing schemes, research flocks, TET (technology evaluation and transfer flocks) and performance recording flocks that are part of producer groups.

***The Project Team recommends that:***

the CPT is spread over geographically diverse locations wherever possible.

***Recommendation 15: Breeding (and demonstration) schemes – operations of the MALP***

The MALP provides an opportunity to incorporate interests from all levels of the industry from the pedigree breeder to the lamb producer to the processor. The scheme also incorporates a focus on practical and producer-driven recording. That is, the MALP is designed to generate valuable information with minimal disruption of normal farm management.

***The Project Team recommends that:***

the Interim Sheep Board urgently commits to the MALP scheme recognising that the investment reflects its critical role in the dissemination of knowledge and understanding of the value of genetic improvement to breeders and producers.

***Recommendation 16: Potential impact of the proposed genetic evaluation scheme***

A successful genetic evaluation scheme will lead to ongoing genetic improvement of the Irish sheep flock.

***The Project Team recommends that:***

the Interim Sheep Board commissions a cost-benefit analysis of the proposed genetic evaluation scheme.

***Recommendation 17: Structure - The need for a collective support structure***

There is a need for a guiding support structure with co-ordinated input from a number of key sectors including processors, performance recording commercial producers, performance recording pedigree breeders, pedigree breed societies and non-performance-recording breeders as well as commercial producers not currently performance recording.

***The Project Team recommends that:***

the Interim Sheep Board move towards the development of a permanent structure that pulls together and represents the interests of sheep processors, sheep producers and sheep breeders, including those sheep breeders and producers that do not currently performance record.

***Recommendation 18: Structure - Participation by processors***

The processing sector needs to be actively engaged in the process of developing the sheep database and the permanent structure that oversees it.

***The Project Team recommends that:***

the sheep breeding objective be developed to reflect future industry benefits from improved carcase characteristics under close consultation with the sheep processing sector.

***Recommendation 19: Structure - Participation by performance recording pedigree breeders***

The performance records held by pedigree breeders are a key resource. The data of the current PSBIP breeders needs to be migrated across to a new sheep database as a priority, and existing, improved and expanded services delivered to these breeders as soon as possible.

***The Project Team recommends that:***

the data of current PSBIP breeders needs to be migrated across to a new sheep database as a priority, and existing, improved and expanded services delivered to these breeders as soon as possible.

***Recommendation 20: Structure - Participation by breed societies***

There are huge opportunities for cost efficient delivery of breed society services through integration with a central database. Over time, new systems and capability to service the needs of breed societies need to be incorporated as part of the Sheep Database. Initially, one or two breed societies should be the focus of development, and over time, this should be rolled out to become generally available to all breeds.

***The Project Team recommends that:***

over time the Sheep Database should offer new systems and capability to facilitate highly cost effective delivery of services offered by breed societies to their members.

***Status of the Report***

This is a final version of the report submitted for distribution to the Interim Sheep Board on September 11<sup>th</sup> 2008.

## Summary of Recommendations

No.	Title	The project team recommends that:
1	<i>Animal identification - The system</i>	the current NSIS sheep identification system be modified to include double tagging, the issue of an identical replacement for lost tags and no tagging on movement between flocks, to closely reflect the current successful cattle model; however this would only be a requirement for performance-recording breeders and producers, and not a mandated requirement across the industry.
2	<i>Animal identification - Establishment of a Sheep Database</i>	a central database (the Sheep Database) is established.
3	<i>Data recording - Electronic Identification (EID)</i>	performance-recorded flocks move as quickly as possible to use of EID animal identification subject to cost and practicality.
4	<i>Data recording - Trait recording</i>	performance recording protocols be adjusted to accommodate earlier, later, and more regular recording of lamb live weights, recording of lamb mortality, lambing difficulty, feet problems, faecal egg counts, dag scores, and mature ewe weights.
5	<i>Data recording - Minimum recording of criteria</i>	the genetic evaluation system makes use of all recorded data that helps improve the accuracy of the evaluations.
6	<i>Data recording - Recording systems</i>	that data recording systems be developed to minimise costs and minimise disruption to normal management, and the costs of all performance recording should move to a user-pays basis in a way that maintains and enhances participation in performance recording in response to demand for trait improvements by commercial producers.
7	<i>Data recording - Data capture</i>	a range of data capture options be provided to performance recording flocks, with a view that over time these will migrate to widespread use of EID systems for performance recording.
8	<i>Data recording - Provision for new genomics technologies</i>	blood samples be taken from selected animals (all sires of lambs recorded in the central progeny test and all lambs born in the central progeny test) and high-quality DNA extracted and stored.
9	<i>Genetic evaluation - Timing of evaluations</i>	evaluations be conducted on at least a weekly basis all year round.
10	<i>Genetic evaluation - Reporting of results</i>	a draft version of the breeding objective be prepared as soon as possible for further industry consultation and that the breeding objective be used to report sub-indexes for trait groups, along with overall indexes such as a Flock Replacement Index and a Terminal Index.
11	<i>Breeding (and demonstration) schemes - the Central Progeny Test</i>	the Central Progeny Test (CPT) is established as outlined in this report to start with mating in 2009.

No.	Title	The project team recommends that:
12	<i>Breeding (and demonstration) schemes</i> – the Maternal Lamb Producer group (MALP) scheme	the MALP is established to start with mating in 2008.
13	<i>Breeding (and demonstration) schemes</i> - CPT& MALP - emphasis on traits	that the emphasis within both the CPT and the MALP is on traits, not breed
14	<i>Breeding (and demonstration) schemes</i> - CPT location	the CPT is spread over geographically diverse locations wherever possible.
15	<i>Breeding (and demonstration) schemes</i> - operations of the MALP	the Interim Sheep Board urgently commits to the MALP scheme recognising that the investment reflects its critical role in the dissemination of knowledge and understanding of the value of genetic improvement to breeders and producers.
16	<i>Potential impact of the proposed genetic evaluation scheme</i>	the Interim Sheep Board commissions a cost-benefit analysis of the proposed genetic evaluation scheme.
17	<i>Structure</i> - The need for a collective support structure	the Interim Sheep Board move towards the development of a permanent structure that pulls together and represents the interests of sheep processors, sheep producers and sheep breeders, including those sheep breeders and producers that do not currently performance record.
18	<i>Structure</i> - Participation by processors	the sheep breeding objective be developed to reflect future industry benefits from improved carcase characteristics under close consultation with the sheep processing sector.
19	<i>Structure</i> - Participation by performance recording pedigree breeders	the data of current PSBIP breeders needs to be migrated across to a new sheep database as a priority, and existing, improved and expanded services delivered to these breeders as soon as possible.
20	<i>Structure</i> - Participation by breed societies	over time the Sheep Database should offer new systems and capability to facilitate highly cost effective delivery of services offered by breed societies to their members.

## Overview and Terms of Reference

### Overview

There is a strong political will within Ireland to drive forward progress in profitability across all sectors of the sheep industry. The Malone Report on the sheep industry indicated the need for a major new initiative in the area of breeding. The recommendation that the Irish Cattle Breeding Federation be involved in a new sheep breeding initiative was actioned by the Implementation Group late in 2007. Subsequent developments have resulted in the formation of an Interim Sheep Board.

### Terms of reference

At the direction of the Interim Sheep Board, a project team has been formed to consult with key stakeholders in Irish sheep breeding and farming, with a view to forming a clear set of recommendations on how genetic improvement of sheep in Ireland could be enhanced. Four key areas were identified for the project team to address including:

1. animal identification,
2. data recording,
3. trait data, breeding objectives and selection criteria,
4. breeding schemes.

The processes and activities leading to this report were as follows:

1. An industry consultation workshop (held at Tullamore Court Hotel, Monday 25<sup>th</sup> of August) within which break-out groups were formed to discuss each of the four issues above followed by reporting and collective discussion (summarised Appendix 1);
2. Preparation of a preliminary vision, strategy, and recommendations (Powerpoint presentation in Appendix 1).
3. Presentation of preliminary findings to a review group for further input and assessment (held at Tullamore Court Hotel, Wednesday 27<sup>th</sup> of August). This group included representatives from the meat processors, the Interim Sheep Board, the Irish Farmers Journal as well representatives from the UK sheep research and breeding communities.

## Strategic Overview

The Project Team defined the vision as

***a long-term highly-profitable Irish sheep industry.***

In order to deliver on this vision, the focus must be on achieving an outcome of

***sustainable profitability for all sectors of the Irish sheep industry,***

where sustainable profitability is defined as a sheep industry that is competitive with other enterprises. The Project Team is particularly concerned with the development and application of a genetic improvement programme.

### ***Findings from industry consultation***

Industry consultation provided the basis for definition of requirements in four key areas that are important in the delivery of a genetic improvement programme for the Irish sheep industry. They are the requirements in terms of:

1. an individual animal identification (ID) system;
2. a data recording system;
3. trait information to be recorded;
4. a breeding scheme and extension programme to present the real value of genetic improvement.

The key findings under each of these themes are presented below with more extensive summaries of the feedback questionnaires relating to each of these areas are presented in Appendix 1.

### **The requirements of an individual animal ID system**

The consultation groups defined the following as the most important aspects of an ID system:

- simple to use and cost-effective;
- one lifetime number for breeding sheep (as with the cattle scheme);
- the current NSIS provides the basis;
- provision for double tagging for both back-up and for management purposes (ideally there should be the facility to incorporate *year of birth* (YOB) and a *visual management number* on the tag). For reasons of practicality, management information may need to be added to pre-printed unique identifier tags via manual marking by the producer.

To deliver such a system will necessitate the establishment of a central database so that the NSIS requirements can be met; this is particularly important given that the proposed genetic ID system will not allow re-tagging with a different number on movement. The groups also noted the following issues:

- an individual ID scheme is essential for ram breeding flocks and would be useful for flocks breeding ewe replacements;
- the buy-in of the pedigree breeders through their breed societies is very important; and that
- the ideal would be an electronic ID (EID) system.

### **The requirements of a data recording system**

The consultation groups defined the following as the most important aspects of a data recording system:

- data integrity is dependent on an accurate and robust ID system;
- farmer recording is the priority (easy, low cost with minimal errors) except where the recording is more technical (eg. ultrasonics);
- the system will be paper-based initially but the preference is to migrate quickly to electronic systems with PDAs;
- good training is critical for farmer uptake;
- the system must be linked into industry systems, especially the meat processors.

### **The requirement in terms of the trait information to be recorded**

While it was agreed that the target is **profitability**, there was recognition that labour issues are a key factor impacting on the viability of the sheep industry, especially given the large numbers of small holdings where the sheep producer is a part-time farmer. The issue of viability of the processing sector was emphasised in discussions among the consultation groups and it was noted that adequate supply is fundamental to ensure viability. The groups then defined the following as the most important considerations when defining the traits and developing the methodologies around the traits to be recorded:

- maternal traits - productivity and health;
- terminal traits - productivity (and quality – if it is paid for or if it is likely to be paid for in the future) and health;
- presentation of information - breeders need Estimated Breeding Values (EBV) for traits while buyers need economic indexes;
- education for both breeders & buyers.

### **The requirements of a breeding scheme**

Two key aspects must be recognised in considering the outcomes of a successful industry-wide breeding scheme. They are the need to develop a scheme that will deliver faster genetic gain, and a system that will show the real value of genetic improvement to producers. The groups also noted the importance of recognising that there is potential value in all breeds, and that any scheme will need to recognise this. Therefore in considering these aspects, the consultation groups defined the following as the most important features to be incorporated into the design of an effective breeding scheme.

*In order to accelerate genetic gain, the following are required:*

- performance-recording across many ram breeding flocks;
- a Central Progeny Test (CPT) together with a Sire Referencing Scheme (SRS);
- a system that cost-effectively utilises new technology that can deliver benefits to users (eg. Artificial Insemination (AI) and DNA-based systems for parentage and ultimately for marker-assisted genetic improvement).

*In order to show the value of genetic improvement, the following are required:*

- the establishment of the CPT based on commercial flocks;
- the development of a robust demonstration and extension programme through involvement of leading producers, through working with Producer Groups, with the Teagasc TET farms, and with individual producers;
- publicity that shows the value of genetic improvement through live examples through field days and the national farming press.

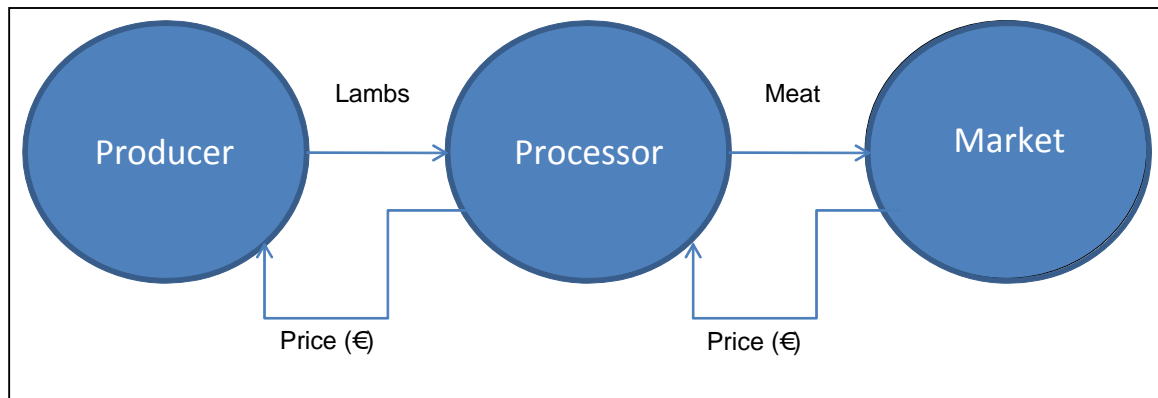
## The supply chain in the Irish sheep (meat) industry

The over-riding outcome required is **sustainable profitability for all sectors of the Irish sheep industry**. Therefore ensuring that each component of the supply chain from the producer to the processor to the market is viable in the context of the overall sheep industry is critical. In this respect, sustainable profitability means that the sheep industry is competitive with other enterprises.

### The current situation

The supply chain within the Irish sheep(meat) industry is outlined in Figure 1, which also displays the flow of information between the sectors. Product moves from producer to processor to market, with the primary information feedback to each sector being price only. At present, the price signals either do not provide sufficient incentive for producers to better match supply with demand, or do not provide sufficient information on quality for producers to respond to what the processors state as their requirements. Given the issues around supply and the competition among processors (within market constraints for price), it is not surprising that there is an element of competition for product.

**Figure 1.** Current information feedback through the supply chain in the Irish sheep industry



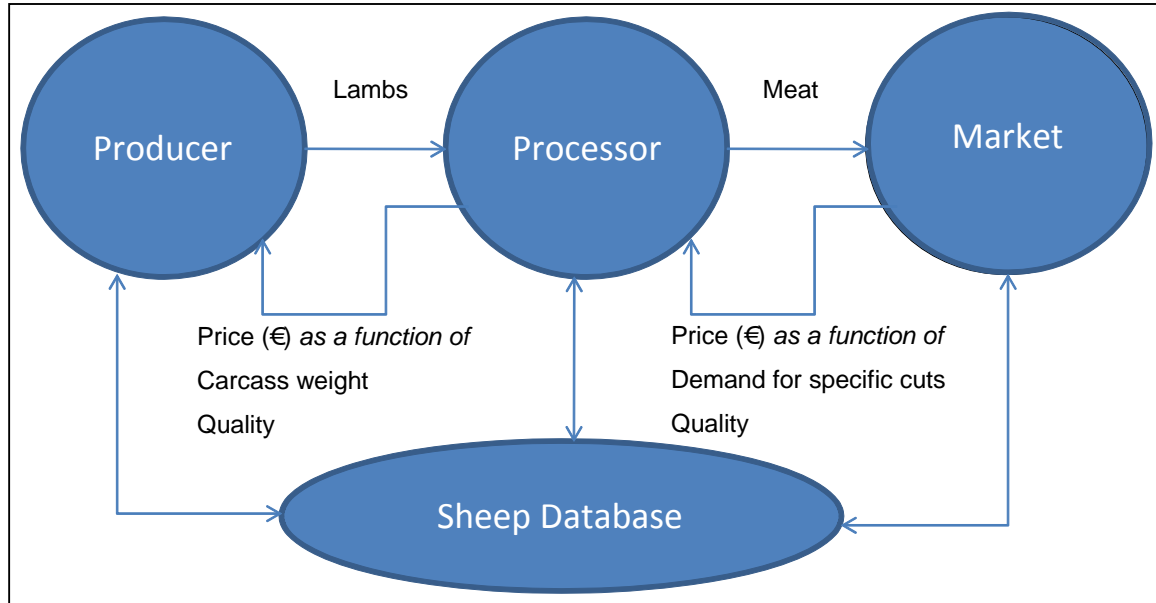
### The opportunity for an enhanced information system

The objective of the Project Team's deliberations has been to ensure a focus on those aspects within the supply chain where a Genetic Improvement Programme can contribute benefits and where the specific industry sector involved actually has sufficient control to capitalise on any investment. Therefore in the first instance, the focus is on one of these industry sectors, the producer, and what the participants within this sector, can control themselves.

A viable sheep industry requires a much-improved flow of information that is relevant to producers, through each of the sectors. Therefore Figure 2 represents some of the future opportunities for information feedback through the supply chain in the Irish sheep industry. This industry structure presents a vision of collaborative information sharing via an interconnected **sheep database**. The concept aims to provide price signals to the producer as a function of quality, quantity, and value driven by market demand with that flow of information facilitated by the use of information from the sheep database. This will enable the producer to utilize technologies and management practices that assist in the delivery of a product that better meets the requirements of the market.

For the major producers, the primary focus should be on profitability. For the producer to achieve increased profitability we need to develop schemes to deliver improved genetics and, in addition to this, deliver information to help producers improve their management. The primary focus on profitability is not to neglect the importance of labour issues in the sheep industry.

**Figure 2.** Future opportunities for information feedback through the supply chain in the Irish sheep industry incorporating the sheep database



## ***The genetic improvement scheme***

### **Key drivers for success**

The driver for the development of a genetic evaluation (and improvement) scheme must be the delivery of genetically superior rams to Irish sheep producers, with information expressed in terms that are meaningful to producers. Thus, genetic merit of rams will be expressed in terms of the expected gain in profitability per offspring when the ram is used in the producer's own flock, and which also incorporates an assessment of the impact on the management input required (such as in terms of foot care, parasite control, lambing assistance).

There are several key aspects that will have an influence on the success of a genetic evaluation scheme. Therefore the elements that need to be in place include:

1. a means to ensure that the information being provided is relevant to the needs of producers;
2. an effective ID system for individual animals;
3. high-quality data recording systems;
4. relevant traits that will deliver improved profitability to producers (including reduced labour requirement);
5. well-designed Breeding Schemes.

The focus is on breeding rams that are relevant to the needs of the producer sector of the industry. Therefore the genetic evaluation scheme will be required to rank rams for their ability to enhance the returns to producers through gains in productivity and efficiency for maternal sires and through gains in productivity, efficiency and meat quality for terminal sires. In addition, there is a need to incorporate a focus on reducing costs through improved health and survival.

## Sustainable profitability

The following equation incorporates the key components that influence profitability:

$$\text{Income} = \text{Output (revenue)} - \text{Inputs (costs)}$$

Thus, it is these components that must be considered in the development of a genetic improvement programme. In a sheep production system, key outputs can be defined as number of lambs sold and the value of lambs sold. These components of output can be further broken down as below.

The number of lambs sold is a function of:

- lambs born, and lamb deaths;
- ewe replacement requirements (a function of ewe survival).

The value of lambs sold is a function of:

- carcass weight
- the timing of lamb sales;
- carcass quality (weight, leanness, cleanliness of the animal presented for slaughter and the value of cuts).

In a sheep production system, the key inputs can be defined as being the costs of feed, labour and mating, plus those associated with health management (which includes the cost of replacements). These can be further defined as below.

Feed costs (expressed as the cost of feed per kg of meat sold) are a function of:

- the feed requirements for the growth, maintenance, pregnancy and lactation of the breeding ewe;
- the number and weight of lambs sold;
- the rate of growth and the slaughter weight of the lamb (faster growth means less feed to slaughter);
- the annual pattern of feed requirements, given that the cost of feed differs across the year.

Labour costs are a function of the labour inputs required to maintain flock productivity, which in turn are a function of:

- the need for high input animal care (foot care, lambing assistance, crutching, health treatments).

Ram costs per lamb sold are a function of the:

- ram to ewe ratio,
- the survival of rams,
- the number of lambs sold per ewe.

Health costs are a function of:

- ewe survival;
- animal health treatments, especially foot health and parasite control.

## Proposed Genetic Improvement Programme

The proposed features of the genetic improvement programme for the Irish sheep industry and the associated Recommendations are presented under the following headings:

1. an **individual animal identification** (ID) system;
2. a **data recording** system (including the trait data to be recorded);
3. **genetic evaluation** (breeding objectives and selection criteria);
4. a **breeding and demonstration scheme**, with an associated **extension programme** to present breeders and producers with evidence for the real value of genetic improvement to their businesses.

### ***Individual animal identification***

The project team is very firmly of the opinion that an animal identification system featuring unique lifetime identifiers is critical to underpin all new developments in sheep breeding in Ireland.

The current animal identification system (NSIS) does not provide a unique lifetime identifier for every animal because; new tags with a different number are used to replace lost tags, and animals must be tagged, with a tag associated with the new flock, after movement (thus the animal will have two identifiers (one in each ear) after movement). There is a need for double tagging to prevent the loss of identification, and the re-issue of unique lifetime identifiers in the event of a tag being lost. The sheep database will need to play a role in tracking animal location.

Breed Society identifiers are not unique across breeds, over time or in some cases across sexes. We are of the opinion that a suitably modified NSIS system would satisfy the identification requirements of the breed societies.

The identification requirements for flocks involved in sheep breeding are significantly greater than for other flocks. We cannot envisage sufficient benefit accruing in the short term in other flocks to justify extending the modified NSIS system to them. However, it is likely to be necessary for all adult sheep to be tagged in this way on a property where performance recording is carried out on at least some sheep within the defined property boundary. This will be required for avoidance of mix ups, and to facilitate robustness of the identification systems.

Therefore for performance recording purposes, the following is recommended.

#### ***Recommendation 1:***

that the current NSIS sheep identification system be modified to include double tagging, the issue of identical replacement for lost tags and no tagging on movement between flocks, to closely reflect the current successful cattle model; however this would only be a requirement for breeders and producers who have performance recorded animals on their properties, and not a mandated requirement across the industry.

To deliver such a system will necessitate the establishment of a central database so that the NSIS traceability requirements can be met; this is particularly important given that the proposed genetic ID system will not allow re-tagging with a different number on movement. Therefore it is recommended that a central database (the Sheep Database) is established; this database will need to play a role in tracking animal location.

#### ***Recommendation 2:***

that a central database (the Sheep Database) is established.

In addition, several key changes to the NSIS identification system are required to meet the requirements for an appropriate identification system. They are:

1. the ability to re-issue lost tags with the same identifier where the identity of the individual is preserved through the second tag;
2. recognition that the Sheep Database has a key role in tracking animal location for animals on the performance-recording database; this would replace the current system which requires that a new tag is inserted (in the right ear) when an animal is moved to a new flock; hence a further requirement of performance recording flocks will be that all animal movements are notified to the Sheep Database.
3. double tagging, with identical tags in each ear, the unique ID should occupy a small area of the tag with the numerical portion presented in a clear and easy to read way and/or space for the producer to manually mark their own information for management purposes;
4. one of the tags as above can be replaced by, or incorporate, an EID tag, provided that the national ID of the animal can be identified either directly by reading the EID, or alternatively by matching the EID identifier with the national unique identifier via the sheep database. When EID identifiers are lost and/or replaced, it is important that the new EID be added to the sheep database.

The project team sees the above systems being implemented for performance-recording flocks in the first instance; assuming that this is successful, it will demonstrate future opportunities for value capture from the application of this system at a wider level.

## **Data recording**

Efficient (rapid and accurate) data recording systems are fundamental to the success of any genetic evaluation scheme. Electronic ID systems are available and further improvements can be expected in the next few years. These systems are likely to facilitate lower cost, more frequent, and more accurate data recording in the future. Therefore the following is recommended.

### **Recommendation 3:**

that performance-recorded flocks move as quickly as possible to use of EID animal identification subject to cost and practicality.

## **Current recording protocols**

A summary of flock sizes and numbers of animals currently recorded within the PSBIP by breed and year of birth is presented in Appendix 2. In addition, there is a recording scheme operated for the Galway breed by Teagasc under the direction of the Department of Agriculture. Numbers of flocks and recorded ewes are summarised in Appendix 3.

The current recording protocols need to be supported, and in addition, the project team sees a need for substantial expansion of recording. The current protocol includes:

- Sire identifier
- Dam identifier
- Date of birth
- Sex
- Birth weight
- Date of scanning
- 120 day weight

- 120 day fat depth
- 120 day muscle depth
- Number of lambs born alive
- Number of lambs born dead
- Rearing rank

It was noted that birth weight is not included in the existing genetic evaluation process, but rather the record is used to help verify the integrity of birth date records.

Based on observation from genetic parameters observed in other countries whereby trait heritabilities increase following weaning, the project team has some concerns that the current recording protocol does suffer from loss of accuracy due to the time of scanning being at quite a young age. It is proposed that recording of scanning and live weights at a later date be implemented to improve accuracy of evaluations.

### **Proposed new data protocols**

The project team recommends that capability be developed for recording, storing and incorporating in the genetic evaluation process, a number of additional traits. These are outlined as follows:

- An early weight (around 40 days of age)
- Weights taken at any age up to 180 days of age
- Lambing difficulty
- Lamb mortality date and reason for mortality
- Feet score
- Dag score
- Faecal egg count
- Adult ewe live weight (taken at mating)

Detailed performance recording protocols need to be developed for these traits. Such protocols should be available from other countries, but it is likely that these protocols will need to be modified to suit the practicalities of sheep production in Ireland.

In summary, the current recording protocol and data storage is limited, both with respect to the time that traits are recorded, and in the lack of breadth of recording across the full range of economically-important traits. Therefore the following is recommended.

#### **Recommendation 4:**

that performance recording protocols be adjusted to accommodate earlier, later, and more regular recording of lamb live weights, recording of lamb mortality, lambing difficulty, foot problems, dag scores, faecal egg counts, and mature ewe weights.

### **Minimum recording of criteria**

Users of the new sheep database evaluation systems will need to be aware that provision of minimal and/or poor quality data will result in subsequent predictors of genetic merit being of very low quality. Users will need to be advised of **best practice** recording protocols that, if followed, should ensure a reasonable quality of results for particular circumstances. In general

1. Every effort should be made to include all recorded data in genetic evaluations. Where not all animals have been recorded, contemporary groups are too small, there are insufficient links to other flocks or traits have not been recorded, it is extremely unlikely that useful genetic evaluations can be provided.

2. Flock owners should be able to participate in performance recording to a level that they find cost beneficial.

The costs of providing the recording services to flock owners should be accurately reflected in the charges made for the recording services. Therefore the following is recommended.

**Recommendation 5:**

that the genetic evaluation system makes use of all recorded data that helps improve the accuracy of the evaluations.

**Methods of recording data**

**Parentage recording**

The project team envisages three levels of parentage identification as outlined below.

1. **Conventional:** This requires single sire mating to groups of ewes, and then lambs are matched to their dam within 24 hours of birth. Thus, the parentage recording process involves two steps that occur over a considerable time span (5 months). The first step involves capturing a list of which ewes are mated to which sire, while the second step involves capturing a list of which lambs belong to each ewe. Full parentage is subsequently established by cross referencing these two information sources in the database.
2. **DNA:** This requires collection of DNA samples (blood vial, wool follicles, FTA card from a blood spot) from all possible sires, all possible dams and all lambs. The DNA sample does not need to be taken from lambs at birth; however, there is considerable importance in pregnancy scanning ewes whose lambs are to be matched using this method because:
  - a. if DNA samples are not taken from dead lambs, there is no way to determine litter size of ewes; and
  - b. if recording of birth date and birth rank is not practical, then foetal aging (with ultrasound) is required (early-born, mid-born versus late-born) as a proxy for date of birth in order to correct for the environmental advantage accruing to lambs born earlier in the season and consequently having a higher age at measurement. Number of lambs present at pregnancy scanning should also be recorded.
3. **Dam only:** This involves matching lambs to their dams within 24 hours of birth. Sire parentage is left as unknown. The information would be useful for a commercial producer where there is multiple sire joining but it is still practical to match lambs to their dams. In this situation, performance recording can be used to identify ewe lambs within the flock that have come from ewes that have good records themselves, and whose previous lambs have also performed well. The information would also assist with culling of ewes based on the performance of their lambs as well as their own performance.

**Recording systems for trait data**

Widespread adoption of data recording systems by breeders and producers is dependent on systems that are relatively cheap to implement, and are minimally-disruptive of normal management. The project team recommends that the majority of traits are recorded by the sheep producer themselves (exceptions are discussed below). The primary motivation for this recommendation is based on costs of technician visits, and our proposal for more frequent recording of data. However, it is recognised that some specialist service providers will be required to record data for the following traits:

- muscle and fat depth scanning;
- faecal egg count;

- scrapie genotyping;
- other DNA testing systems.

Therefore it is important that such specialist recording capability is readily available.

As noted above, producer-based recording will need to be the integral part of the performance recording process. In principle, the project team believes that the cost of all performance recording services should be met by the breeders and producers who require them. This is important to help ensure that users of the genetic evaluation scheme are committed to the programme. However, during a transition period, it may be necessary for these to be subsidised. Furthermore, where recording activities are part of wider sheep industry breeding programmes and research activities, it is also likely that additional financial support will be required. Therefore the following is recommended.

#### **Recommendation 6:**

that data recording systems be developed to minimise costs and minimise disruption to normal management, and the costs of all performance recording should move to a user-pays basis in a way that maintains and enhances participation in performance recording in response to demand for trait improvements by commercial producers.

#### **Data capture systems**

Options currently available are based on paper-based systems, albeit often with electronic data transfer. Developments in electronic data capture systems (i.e. via handheld devices that synchronise data to the central database using mobile phone and or internet technology) will soon deliver relatively cheap data recording devices that can be integrated with high-speed EID systems. Therefore the following is recommended.

#### **Recommendation 7:**

that a range of data capture options be provided to performance recording flocks, with a view that over time these will migrate to widespread use of EID systems for performance recording.

In order to progress the development of the genetic evaluation scheme, the project team recommends that paper-based systems be developed whereby performance recording producers enter trait data onto pre-printed sheets. Hand-written data would then be loaded onto the Sheep Database and the recording producer will have to meet the data entry costs. Alternatively, producers may enter data via their farm management software, or directly via a web interface and realise cost savings.

Electronic hand-held systems should also be developed for data recording which synchronise with the Sheep Database. It is anticipated that these systems would cost €800 to €1000 per unit, with little extra costs to upload data to the database. It would be desirable that these hand-held devices be developed with the future option to interact with electronic ID readers. In the medium term (but as soon as possible), the project team considers that it would be highly desirable to move to electronic identification of animals, and to data capture systems that exploit this.

In summary, there are benefits in terms of data integrity and savings in costs that could arise from better practices for data capture and transfer to the Sheep Database.

#### **Auditing and quality control**

Historically, quality control has been maintained by having a technician visit the farms for scanning, and the use of birth weights to verify birth dates. However with more frequent recording, and the eventual use of electronic ID systems, it is anticipated that improved data capture methods will help detect errors at the data capture point, and minimise errors associated with data handling.

It might be possible to have blood samples recorded on all *conventional parentage* recorded lambs, with a small proportion of these tested using DNA to audit the quality of parentage. However, to do this, all sires and dams would need to be genotyped, and so the auditing process is likely to be very costly unless a substantial reduction in DNA parentage testing costs was to occur.

The project team does not believe that a formal data auditing process could be cost-effective in increasing the quality of data. Instead, improved breeding programme structures, performance recording, and genetic evaluation systems are likely to identify flocks where recording errors are common.

### **Provision for new genomics technologies**

In the future, there is scope for DNA tests that would improve the accuracy of prediction of economically- important traits, particularly for young animals. The predictions will need to be informed by analysis of allele-trait relationships across large numbers of performance-recorded animals, or by analysing such allele-trait relationships for the average progeny performance of sires with large numbers of progeny records. High quality DNA samples are required for this sort of approach utilising large numbers of single nucleotide polymorphisms (SNPs). Therefore the following is recommended.

#### **Recommendation 8:**

that blood samples be taken from selected animals (all sires of lambs recorded in the central progeny test and all lambs born in the central progeny test) and high-quality DNA extracted and stored.

### **Genetic evaluation**

#### **Timing of evaluations**

A single genetic evaluation per year and delays in the provision of such evaluations create constraints on the timing of recording (i.e. records are taken at less than optimal age), and may also result in selection decisions being made on raw data, rather than on breeding values. The proposed new Sheep Database coupled with a modern genetic evaluation system and with web-based reporting should easily be capable of delivering breeding values with a rapid turn-around.

With the recording capability proposed above, there is likely to be new data entered onto the database at many different times of the year. For enthusiastic performance-recorders, it will be beneficial for them to see the change in estimated breeding values soon after any new data have been loaded. This will also provide opportunities for culling decisions to be made based on breeding values at convenient times of the year. Therefore the following is recommended.

#### **Recommendation 9:**

that evaluations be conducted on at least a weekly basis all year round.

### **Reporting of results**

There will be a need to report a wide range of results. Individual breeding values are important for pedigree breeders, whereas commercial ram buyers often find economic indexes more useful in guiding their purchase decisions.

There is a need to develop breeding objectives that encompass a broader range of traits than currently incorporated in the current Lean Meat Index (LMI). The project team recommends that a draft version of the breeding objective be prepared as soon as possible for further industry consultation.

Because ram buyers are likely to place different emphasis on different traits due to differences in their personal and farming circumstances, the project team recommends that the breeding

objective be used to report sub-indexes for trait groups; examples include growth, carcass, reproduction and functionality.

There will also be a need for overall indexes. Therefore the project team recommends the formulation of sub-indexes into a Ewe Replacement Index and a Terminal Index. The project team also recommends a star system be developed along the lines of the beef cattle system. Therefore the following is recommended.

**Recommendation 10:**

that a draft version of the breeding objective be prepared as soon as possible for further industry consultation and that the breeding objective be used to report sub-indexes for trait groups, along with overall indexes such as a Ewe Replacement Index and a Terminal Index.

**Breeding and demonstration schemes**

The success of the genetic evaluation scheme will depend on acceptance by breeders and producers that the predictions of the genetic merit of individual animals are accurate and variations are of sufficient magnitude to make a real difference in a breeding or production situation; that is, that the evidence for the value of genetic improvement will be relevant to real farms and real producers. Therefore the implementation of a system to generate the data that will enable comparison of large numbers of rams from a range of sources, and the design, servicing and funding of a demonstration component becomes pivotal. This is the rationale behind the proposed Central Progeny Test (CPT) and the Maternal Lamb Producer group (MALP) scheme.

**Integrating the schemes**

The structure and the integration of the proposed Central Progeny Test and the Maternal Lamb Producer group are presented in Figure 3. The primary function of each of the two schemes is to provide:

- CPT (from 2009): the genetic linkage across flocks so that the genetic merit of individual rams including those in the PSBIP can be assessed accurately;
- MALP (from 2008): a demonstration of the range of genetic merit among rams within the industry.

Overall, the two schemes are designed to incorporate performance assessment of a number of recorded rams from different breeds and existing performance recording schemes with a demonstration of the real benefits of genetics for producers.

Where practical, it would be beneficial to recruit flocks for the CPT as soon as possible so that good recording systems can be implemented and experience gained with them.

Indicative costs for the schemes are presented in Appendix 4. Therefore the following are recommended.

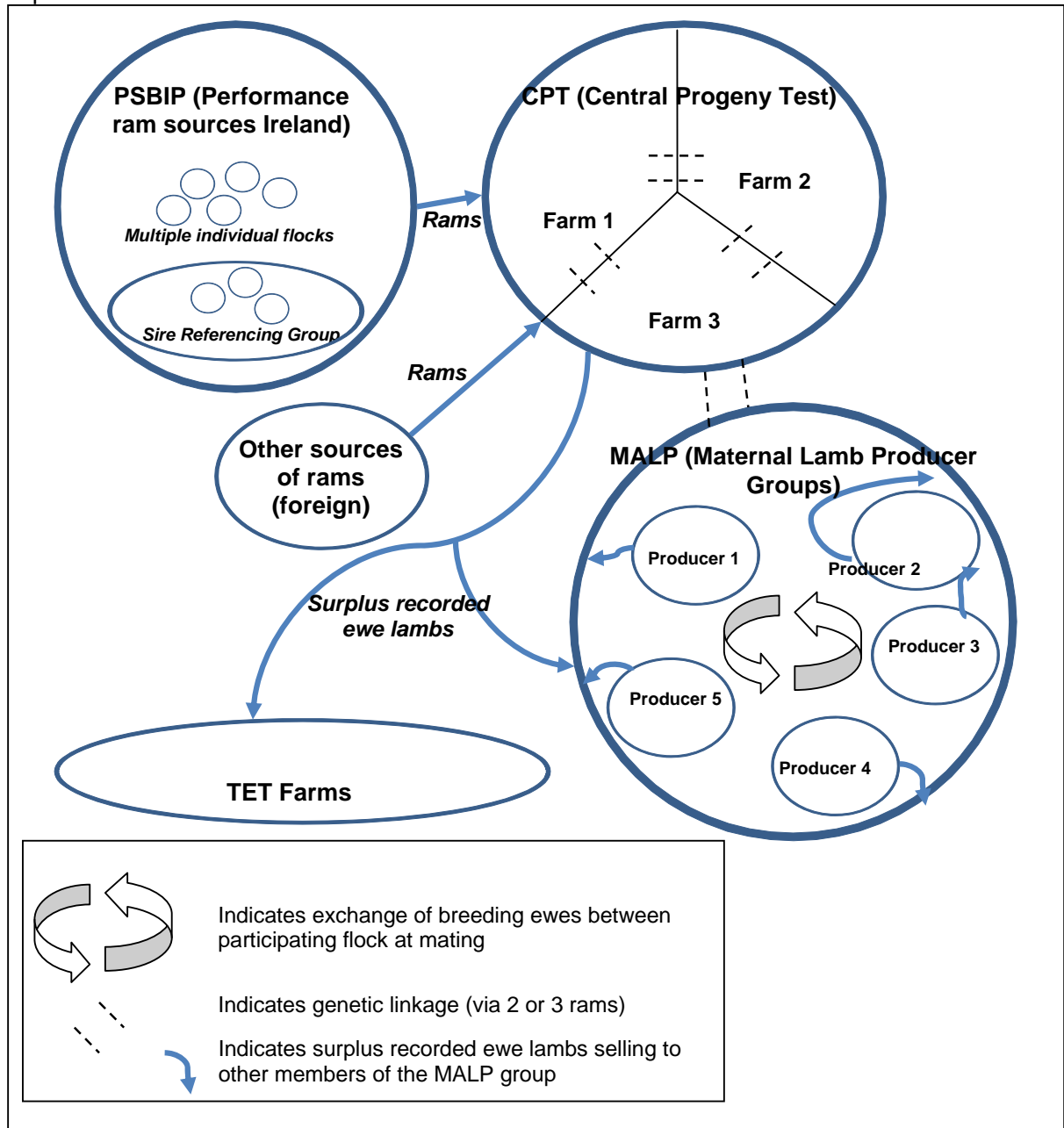
**Recommendation 11:**

that the CPT is established to start with mating in 2009.

**Recommendation 12:**

that the MALP is established to start with mating in 2008.

**Figure 3.** Proposed structure of the Irish sheep industry CPT and MALP, for the performance assessment of genetically-linked rams and the demonstration of the real benefits of genetic improvement



### The Central Progeny Test

The CPT will provide the basis for assessing a large number of rams, and linking this information to an even wider number of animals throughout the linked pedigree system (as per Figure 3). The proposed structure of the CPT incorporates approximately 2100 ewes, with the capability of assessing approximately 38 rams per year at a mating ratio of one ram to around 50 ewes. Two or three rams will be used as genetic links between the proposed three-flock system. To ensure that the system is both practical and will generate sufficiently accurate data, flock sizes need to be at least in the range of 600 to 800 ewes. The important components of this system are outlined below.

1. It is proposed that the CPT will start with mating next season in 2009.

2. Rams, with existing progeny records, will be sourced from existing performance-recorded flocks and sire referencing groups within Ireland and from performance-recorded flocks and sire referencing groups internationally. It is proposed that rams from all of the important breeds are included to ensure that the results will be relevant to a wide range of breeders and producers.
3. A single sire mating structure requiring multiple mating groups across a number of farms is proposed, although DNA parentage is a potential, albeit expensive, alternative should single-sire mating with such a large number of rams not be considered practical.
4. All rams, ewes, and progeny will be electronically-tagged for identification purposes, to simplify data collection and animal management. Electronic identification will facilitate an intensive performance recording system, incorporating maternal and terminal traits.
5. All male progeny of recorded rams will be slaughtered with individual identification monitored to point of processing, to provide terminal sire information.
6. Approximately 10 % of the ewe lamb progeny will be culled (slaughtered), while a further 30% of ewe lambs will be retained as replacements for CPT flocks, with the remaining ewe lambs being available for placement in either TET farms and/or MALP group properties for further recording. Any recorded ewe lambs that cannot be placed will be slaughtered to provide additional terminal sire information.

### **The Maternal Lamb Producer Groups**

The Irish sheep industry requires an innovative new approach to show the real value of genetics in real farm situations. Thus the rationale behind the MALP scheme is to provide a convincing demonstration of the range in genetic merit among a group of rams in terms of the financial and management impacts of using rams with the appropriate traits to improve income and decrease costs.

The MALP will provide the starting point for the demonstration of the range of genetic merit and the benefits of utilising genetically superior rams in a commercial producer situation. A focus on practical and producer-driven recording will be taken. It is envisaged that in the first year, the number of ewes involved would be 1000 (over 3 or 4 flocks), at a mating ratio of 1 ram to 50 ewes (multi-sire mated). This would enable 20 rams to be assessed per year. A minimum flock size requirement of 250 ewes would ensure both an appropriate level of accuracy while still being practical. There are a number of elements of the MALP that are essential to its function; these are outlined below.

1. It is proposed that the MALP will start with mating in 2008.
2. A very important aspect of this system is that it would require ewes to be transferred between participating flocks at mating, to assess the rams accurately. A recommendation is that each involved farmer transfer 20% of his/her ewes to other participating flocks for 3 weeks over mating (see Figure 3). This is an alternative to transferring rams which is not practical in a small flock situation. Ewes should be moved from each flock, normally to one other flock. However, if there are large differences in flock size, it may be necessary in some cases for ewes from one big flock to go to two smaller flocks and/or vice versa.
3. It is important to note that the transfer of ewes between properties does pose a bio-security risk, and so it is critical to ensure that this element is managed by following best practice guidelines. A derogation will also be required so that ewes can be transferred without having to be tagged in the recipient flock.
4. DNA parentage will be used to allow multi-sire mating, ensure accuracy, and reduce the work load required at lambing. Participants should be provided with the option of recording lambs at birth (data of birth and litter size), or detailed pregnancy scanning to determine litter size at scanning and foetal age.

5. All progeny will be electronically-tagged for identification purposes, to simplify data collection, and to simplify animal management. The ewes may also be electronically identified.
6. All male progeny would be slaughtered and data collected from the point of processing for terminal sire analysis.
7. It is anticipated that approximately 10% of ewe lambs would be culled (slaughtered), a further 30% would also be slaughtered to provide terminal information on the sires, and a further 30% would be retained as replacements. The remaining ewe lambs would be sold within the group and further recorded (larger producer group). This will help provide a genetic link between flocks.
8. A focus on practical and producer-driven recording is taken. The recording required on the female progeny retained (by the MALP producer member) or transferred (sold to other participating group members) would be growth rate, mature weight, fertility and fecundity, foot health, crutching requirements and lambing ease. The development of protocols and the means to gather this information is required. The recording system for intervention traits (feet, lambing assistance, crutching, etc) is based on incidence rather than on whole flock routine assessment.
9. A very important aspect of this system is that the MALP scheme would assess the commercial producers' own rams. It is important that all of these rams are from a pedigree flock (i.e. have a pedigree identity). In addition, it is proposed that at least one ram from each of the major recorded breeds (Suffolk, Texel, Charollais, Belclare and Vendeen) is selected from existing performance-recording flocks for inclusion in order to help link the MALP and CPT.

## Demonstrating benefits

The success of the genetic evaluation scheme will depend on acceptance by breeders and producers that the evidence for the value of genetic improvement will be applicable to real farms and real producers. Therefore the demonstration component is pivotal.

A positive change in producer acceptance of the impact of the difference in genetic merit among a group of rams will impact back into the pedigree breeding sector through market forces, thereby encouraging breeders to supply appropriate genetics to the producer sector.

Performance recording and sire referencing in Ireland has largely been unsuccessful in stimulating the overall Irish sheep industry, because it has lacked commercial producer buy-in. Breeders have consequently considered that these technologies represent a cost and an imposition on their business. Historically much of the investment by technology providers in their attempts to encourage breeder uptake, and also those breeders who have taken up the technology, has been wasted, as the sector which would benefit most has remained naive. This situation has occurred because of:

- inadequate or ill-informed market signals;
- diversion of focus from sheep enterprise profitability due to direct support structures; and
- the predominance of part-time sheep farmers who derive much of their income from elsewhere, and hence have other priorities as they see sheep farming as a difficult venture by which to manage land use.

All of these factors have led to a lack of interest leading to a lack of demand for genetic improvement by commercial producers.

The Irish sheep industry therefore requires an innovative new approach to show the real value of genetics in real farm situations. Therefore the project team has recommended a comprehensive demonstration (the MALP) to act as a catalyst for increased awareness of the financial and management impacts of using rams with the appropriate traits to improve income and decrease costs.

Central to this proposal is the emphasis on traits, not breed. It must be made clear to both full time and part time producers, be they in hill country or on lowland, that the value of specific traits will be peculiar to each situation. The emphasis on traits, rather than breed, will encourage the vital co-operation of the breed societies whose members will service the commercial producer's demand with the appropriate genetics into the future. Therefore the following is recommended.

**Recommendation 13:**

that the emphasis within both the CPT and the MALP is on traits, not breed.

The credibility of the information presented to the commercial sector must withstand challenge to ensure buy-in. It must encourage as many commercial producers as possible to feel included. This can be achieved by integrating the CPT with the MALP and other extension activities (TET farms and other producer groups) thereby spreading their locations widely. In this way, producers will see the effects demonstrated in normal farm situations relevant to their own.

The proposed CPT scheme allows the flexibility to incorporate the collection of novel traits needed to further develop genetic opportunities for the future, and to demonstrate other technologies as they emerge. An example would be the value which can be created from EID-facilitated data collection for improved business decisions and ease of management.

The proposed scheme also gives the processor/marketing sectors an avenue for involvement by providing a conduit for the flow of information back to the Sheep Database to ensure relevant market signals are reflected in the indexes presented to ram purchasers, be they in the pedigree sector to enable them to be visionary, or in the producer sector to be relevant to their immediate needs.

Unless a fundamental change in the approach to ram breeding/purchasing occurs, the Irish sheep industry is unlikely to fulfil its future potential. For this industry to be sustainable, profitable and a competitive land use, it must be market-driven. The value of a high impact demonstration in this context should be very evident.

As outlined above, there is a need for the breeding scheme to be integrated with a wide range of participating flocks so that producers see the effects demonstrated in normal farm situations relevant to their own. The proposed breeding scheme facilitates inclusion of sire referencing schemes, research flocks, TET (technology evaluation and transfer) flocks, and performance recording flocks, and producer groups. Therefore the following is recommended.

**Recommendation 14:**

that the CPT be spread over geographically diverse locations wherever possible.

The MALP provides an opportunity to incorporate interests from all levels of the industry from the pedigree breeder to the lamb producer to the processors. The scheme also incorporates a focus on practical and producer-driven recording. That is, the MALP is designed to generate valuable information with minimal disruption of normal farm management. Therefore the following is recommended.

**Recommendation 15:**

that the Interim Sheep Board urgently commits to the MALP scheme recognising that the investment reflects its critical role in the dissemination of knowledge and understanding of the value of genetic improvement to breeders and producers.

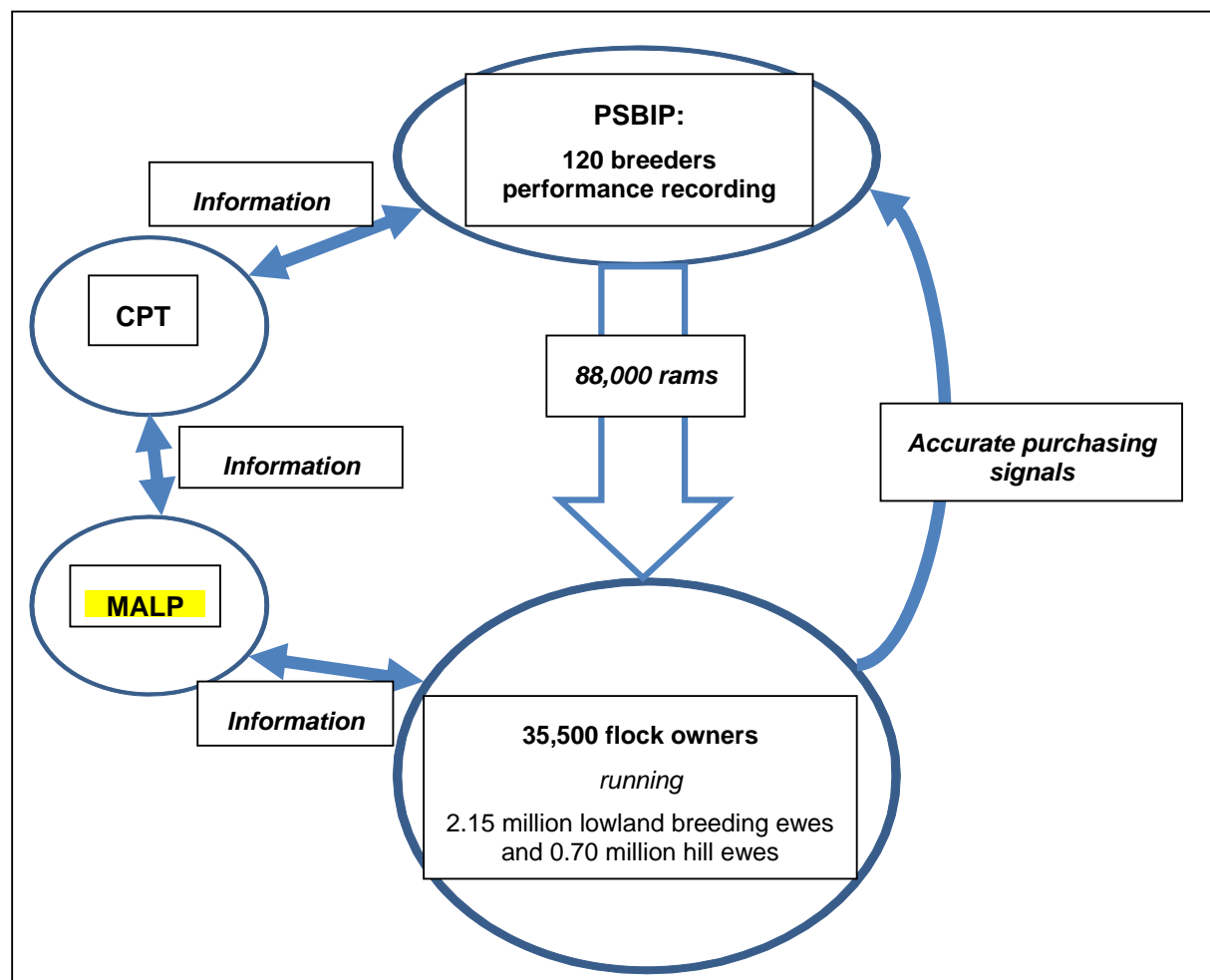
### Potential impact of the proposed genetic improvement scheme

A successful genetic improvement scheme will lead to ongoing genetic improvement of the Irish sheep flock. Therefore Figure 4 provides a diagrammatic summary of the current breeder and producer structure of the Irish industry, and incorporates the CPT and MALP to indicate the novel information flows that will be possible. This outline provides the basis for any future analysis of the potential cost-benefit of the development of a genetic improvement scheme. Therefore the following is recommended.

**Recommendation 16:**

that the Interim Sheep Board commissions a cost-benefit analysis of the proposed genetic improvement scheme.

**Figure 4.** Sheep breeder and producer sector structure (source Bord Bia, Meat & Livestock Review 2007) with inclusion of recommended breeding and demonstration schemes.



## Support Structure

The strategic overview provided at the beginning of this report outlined the critical role of a data information system encompassing all sectors of the sheep industry. While the focus of many recommendations within this report has been on short term implementation of recording, genetic improvement programmes and genetic evaluations systems, there is much to be gained from a future shift to a wider information system. Both the initial genetic improvement strategies, and this wider sheep industry information system will need a guiding support structure with co-ordinated input from a number of key sectors. These key sectors include:

1. The processors – who ultimately need to provide feedback to producers and ram breeders as to what the sheep meat market requires, and who can benefit from an industry information system through appropriate genetic improvements.
2. Performance recording commercial producers – who can contribute to the identification of elite rams and help demonstrate the benefits of using them
3. Performance recording pedigree breeders – who will be needed to continue to provide the engine room for genetic improvement for economic traits, and dissemination of the genetic improvements.
4. Pedigree breed societies and non-performance-recording breeders – who have recorded valuable ancestry information required to facilitate accurate genetic evaluation of rams on an industry wide basis.
5. Commercial producers not currently performance recording – who stand to benefit from genetic improvement and improved adoption of performance recording and industry information systems.

Therefore the following is recommended.

### **Recommendation 17:**

that the Interim Sheep Board move towards the development of a permanent structure that pulls together and represents the interests of sheep processors, sheep producers and sheep breeders, including those sheep breeders and producers that do not currently performance record.

While an obvious initial focus for the new sheep organisation will be on implementing systems for genetic improvement, it should also be a key priority to engage constructively with each of the key sectors listed above. Opportunities for engagement (in addition to those already mentioned above) include;

### **Processors**

The processing sector needs to be engaged in the process of establishment of breeding objectives, including encouragement to persevere with the development of a grade based system that sends appropriate price signals to commercial producers supplying lambs for slaughter.

Therefore the following is recommended.

### **Recommendation 18:**

that the sheep breeding objective be developed to reflect future industry benefits from improved carcase characteristics under close consultation with the sheep processing sector.

## **Performance recording breeders**

The performance records held by pedigree breeders are a key resource. The data of the current PSBIP breeders needs to be migrated across to a new sheep database as a priority, and existing, improved and expanded services delivered to these breeders as soon as possible.

Therefore the following is recommended.

### **Recommendation 19:**

that the data of current PSBIP breeders needs to be migrated across to a new sheep database as a priority, and existing, improved and expanded services delivered to these breeders as soon as possible.

## **Pedigree breed societies**

Existing ancestry databases held by the sheep breed societies are a valuable resource. Furthermore, pedigree breed societies offer a potential source of enthusiastic performance recording breeders who can potentially make a massive contribution to the sheep industry through improvement and dissemination of elite breeding animals. There are huge opportunities for cost efficient delivery of breed society services through integration with a central database. Over time, new systems and capability to service the needs of breed societies need to be incorporated as part of the Sheep Database. Initially, one or two breed societies should be the focus of development, and over time, this should be rolled out to become generally available to all breeds.

### **Recommendation 20:**

that over time the Sheep Database should offer new systems and capability to facilitate highly cost effective delivery of services offered by breed societies to their members.

## Appendix 1: Summary from Industry Consultation Workshop

Industry consultation provided the basis for definition of requirements in four key areas that are important in the delivery of a genetic improvement programme for the Irish sheep industry. They are the requirements in terms of:

1. an individual animal identification (ID) system;
2. a data recording system;
3. trait information to be recorded;
4. a breeding scheme and extension programme to present the real value of genetic improvement.

While the key findings under each of these themes are presented in the main body of the Report, here we present the actually summary slides generated from the meeting.

### Summary for Session 1 – What do we need from an ID system?

- Simple & cost-effective
- One lifetime number for breeding sheep - *use the cattle model*
  - NSIS provides the basis
  - One tag for lifetime
  - Double tag for back-up & management purposes (YOB & Number)  
*which requires a well-managed central database*
- Essential for ram breeding flocks & useful for flocks breeding maternal replacements
- Can we get flock-books to “buy-in”?
- The ideal would be an EID system

1

## More thoughts about the value of data

- Data ..... not cost but value
- Think of EID in this context:
  - Value for sheep farmers
  - Value for processors
  - Value for breeders
- Value from EID is not only in traceability but in how it is used to:
  - deliver benefits to the farmer through enhanced productivity, reduced costs & greater returns

2

## Summary for Session 2 – What do we need from Data Recording?

- Data integrity needs an accurate ID system
- Farmer recording is priority (easy, low cost & minimal errors) except where there are technical issues
- Paper based initially but quickly moving to electronic (& PDAs)
- Good training is critical for farmer uptake
- Must link into industry systems, especially abattoirs

3

## Summary for Session 3 – What traits do we need to include?

PROFITABILITY is the target

- Maternal traits - productivity & health
- Terminal traits - productivity (& quality – if paid for!) & health
- Presentation of information - Breeders need EBV's & buyers need economic indexes
- Education for both breeders & buyers

*Noting that*

- Supply is fundamental for processor viability

4

### ***Feedback from the groups***

At the end of the industry consultation meeting, all participants were asked to complete a feedback form, the answers from which are listed in Table 1 (together with some comments offered up by people attending the meeting).

**Appendix Table 1.1. Summary of responses from participants at the workshop.**

Please let us have your feedback on the workshop by completing the following:					
	Totally disagree (1)	(2)	Neither agree or disagree (3)	(4)	Totally Agree (5)
The workshop was well organized.	0%	0%	2.9%	26.5%	70.6%
There was too much time spent on issues not relevant to me.	44.1%	14.7%	23.5%	11.8%	5.9%
I had enough opportunities to express my point of view.	0%	5.9%	8.8%	14.7%	70.6%
I feel that my thoughts and views were taken on board during the course of the day.	0%	0%	14.7%	38.2%	47.1%
The workshop was too technical	50%	17.6%	20.6%	11.8%	0%
I was very happy with the key pointers coming from the workshop.	0%	2.9%	11.8%	47.1%	38.2%
Irish sheep breeding is heading in a very desirable direction.	5.9%	5.9%	32.4%	32.4%	23.5%
Sheep breeding has a lot to contribute to the future of the Irish sheep industry.	0%	0%	2.9%	14.7%	82.4%

General comments

- *The sheep breeding programme has to be supported by all stakeholders and must continue to take on board the views of all involved. The education of all involved is important. The bottom line is cost versus profit. Good luck with the programme. Can we have a meeting of this group before any programme is rolled out?*
- *A very useful day, some parts were a bit technical. Overall a very good day.*
- *Excellent workshop, good to get farmers, researchers together and listen to the different opinions.*
- *Sheep industry is dead unless action is done now, not soon but now!!! Today was a great start, but it must continue.*
- *We need a meaningful benchmark for selecting terminal sires to improve the national flock, to get the results to farmers in a format they can easily understand and use.*
- *Key points would need to be worked on by all people in sheep. Don't let the work shop be a talking shop.*
- *I wish ICBF the very best in this programme and hope that it continues at full speed. Regular updates on progress would be useful and motivational.*

Review Meeting

The second meeting took place on Wednesday 27<sup>th</sup> August (also in Tullamore Court Hotel), and involved a review process, between members of the project team and an additional 10 people from the Irish and UK sheep industries, including 3 members from the interim sheep board. At this meeting, key thoughts & recommendations were presented by the project team and critical feed-back invited from all participants. The iterative process followed (i.e., recommendations, comments, discussion & feedback) was a major success in helping the project team further develop its key thoughts & ideas into a final set of recommendations for the Irish sheep industry.

## Appendix 2: Summary of Historic Data

**Appendix Table 2.1.** Summary of flock size, birth date and recording date in the 2008 birth year for currently performance recording flocks

Birth year	Belclare (see note)	Charollais	Ile de France	Suffolk	Texel	Vendéen	Total
Flocks	1	11	1	24	69	13	119
Average progeny per flock	36 (45) <sup>§</sup>	48	40	77	52	31	54
Average age at scanning (days)	116	121	101	111	115	123	115
Average date of birth	30 Dec	15 Jan	11 Mar	12 Jan	13 Feb	27 Dec	30 Jan

<sup>§</sup> Average for all 25 flocks in 2008

<sup>¶</sup> The median birth date for recorded Belclare flocks is usually in either the first or second week of January

**Appendix Table 2.2.** Summary of performance records by breed and year of birth for performance recording flocks

Birth year	Belclare	Charollais	Ile de France	Suffolk	Texel	Vendéen	Total
1995	(505) <sup>§</sup>				934		934
1996	(502)	592			967		1559
1997	(677)	888		2409	1196		4493
1998	131(802)	1182	36	2811	2786	280	7226
1999	86(1006)	1006	28	2875	2520	321	6836
2000	71(903)	1219	75	2488	2197	241	6291
2002	(852)	996	56	2706	2666	298	6764
2003	42(924)	727	49	1352	2608	263	5030
2004	31(974)	877	81	1618	2866	447	5929
2005	40(1138)	1058	47	1958	3615	438	7145
2006	29(1336)	548	36	1689	3558	505	6336
2007	(1393)	574	27	1430	3921	500	6452
2008	(1451)	419	34	1386	3017	300	5184
<b>Totals</b>	<b>28(1114)</b>	<b>10086</b>	<b>469</b>	<b>22722</b>	<b>32851</b>	<b>3593</b>	<b>70179</b>

<sup>§</sup> The numbers in brackets are for all lambs recorded by Belclare breeders and submitted to Teagasc for processing – the PSBIP numbers are a subset of the total. Over the period 1999 to 2008 the number of flocks providing performance records varied from 20 (in 2001) to 28 (2006); was 24 or 25 in most of the other years.

## Appendix 3: Galway Sheep Breed Improvement Programme

The Galway Sheep Breed Improvement Programme is operated by DAFF but all data processing and reporting has been done by Teagasc.

The objectives of the programme are:

1. *To record the lambing performance of all pedigree ewes in registered Galway flocks and to classify the ewes and their progeny into genetic merit classes for prolificacy*
2. *To encourage the use of this information in selection of breeding stock, i.e. that breeders select replacement stock from high merit classes and also retain in their flocks those breeding ewes with a high prolificacy background, and thus bring about genetic improvement for prolificacy in registered pedigree Galway flocks*

The following table shows the number of ewes submitted on the annual autumn mating/culling list for the recording programme. The upturn in numbers since 1994 in response to conservation effort is evident. In practice the number of lambing records returned is of the order of 80% of those ewes on the mating plan.

Year	No. of ewes	No. of flocks
1994	169	9
1995	280	15
1996	342	21
1997	555	28
1998	664	32
1999	821	39
2000	926	44
2001	718	34
2002	777	33
2003	743	32
2004	711	31
2005	807	39
2006	884	48
2007	851	40

## Appendix 4: Estimates of Costs

**Appendix Table 3.1.** Preliminary estimates of the costs associated with the proposed breeding and demonstration schemes (CPT and MALP)

Year	Number of ewes (& properties)	Minimum number of rams	Recording		Indicative costs	
			Lambs	New ewes <sup>1</sup>	Producer Fees	Services (including DNA)
<b>Central Progeny Test (CPT)</b>						
2009	2100 (3)	38 + 2 links	2900		€95K	€9K
2010	2100 (3)		2900	(1150 lambs)	€(95 + 4)K	€9K
2011	2100 (3)		2900	1150 + 1150 lambs	€(99 + 4)K	€9K
2012	2100 (3)		2900	2300 + 1150 lambs	€(103 + 4)K	€9K
2013	2100 (3)		2900	2300 + 1150 lambs	€(107 + 4)K	€9K
<b>Maternal Lamb Producer Group (MALP)</b>						
2008	1000 (3 to 4)	20	1400		€8K	€(4 + 48)K
2009	1000 (3 to 4)	17 + 3 links	1400	(230 lambs)	€(8 + 1)K	€(4 + 28)K
2010	1000 (3 to 4)	17 + 3 links	1400	230 + 230 lambs	€(8 + 1)K	€(4 + 28)K
2011	1000 (3 to 4)	17 + 3 links	1400	460 + 230 lambs	€(8 + 1)K	€(4 + 28)K
2012	1000 (3 to 4)	17 + 3 links	1400	460 + 230 lambs	€(8 + 1)K	€(4 + 28)K
2013	1000 (3 to 4)	17 + 3 links	1400	460 + 230 lambs	€(8 + 1)K	€(4 + 28)K

<sup>1</sup>New ewes are those new ewe replacements that are immediate descendants of rams being evaluated and which become part of the ewe breeding flock.