



# **Proposal for Increasing the Profitability of Sheep Farming – Information System & Breeding**

*Irish Cattle Breeding Federation*

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## Table of Contents

<b>1</b>	<b>BACKGROUND.....</b>	<b>1</b>
<b>2</b>	<b>STRUCTURE .....</b>	<b>3</b>
2.1	POLICY DECISION MAKING.....	3
2.2	ADMINISTRATION .....	3
2.3	RESEARCH, DEVELOPMENT & ADVISORY .....	4
2.4	OPERATIONS .....	4
2.5	FUNDING .....	4
<b>3</b>	<b>GENETIC EVALUATIONS .....</b>	<b>4</b>
3.1	BREEDING OBJECTIVES.....	4
3.2	TRAITS.....	5
3.3	GENETIC EVALUATIONS .....	5
<b>4</b>	<b>DATA.....</b>	<b>5</b>
4.1	IDENTIFICATION.....	6
4.2	HEALTH, MOVEMENTS & SLAUGHTER .....	6
4.3	ANCESTRY .....	6
4.4	PERFORMANCE RECORDS .....	6
4.5	DATABASE.....	7
4.6	ON-FARM RECORDING .....	7
4.7	HISTORICAL DATA.....	7
<b>5</b>	<b>BREEDING SCHEME DESIGN.....</b>	<b>8</b>
5.1	PEDIGREE RAM FLOCKS .....	8
5.1.1	<i>Ram selection</i> .....	8
5.1.2	<i>Ewe selection</i> .....	8
5.1.3	<i>Linkage between flocks</i> .....	8
5.1.4	<i>Ram marketing</i> .....	9
5.2	COMMERCIAL FLOCKS .....	9
5.3	IMPORTS .....	9
5.4	EXPORTS.....	9
<b>6</b>	<b>SUMMARY.....</b>	<b>9</b>

## 1 Background

This paper has been prepared in response to a request from the Sheep industry for ICBF to develop a proposal for the future organisation and operation of the sheep breeding sector<sup>1</sup>. The key recommendations from the sheep industry include:

1. The industry should agree a **specification as regards the ideal lamb for our best market outlets**. Appropriate bonus and penalties should centre on that specification as part of a price structure in order to give proper market signals on a consistent basis. As a result producers should deliver a better specification of product over a wider period. Discussions should be held between producers and processors to agree an appropriate framework.

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4. Priority should be given to achieving an **improvement in sheep production through better breeding**. A robust breeding programme should be put in place with **clear objectives and based on market signals**. There is a need for better **commitment by breeders than is presently the case and greater use of performance data by commercial producers**.

5. The focus should be on **breeding for growth rate and prolificacy**. **Targets should be set in regard to output per ewe and per hectare**. An output of 1.5 lambs sold/ewe to the ram compared with the current figure of 1.3 is a reasonable objective. Consideration should be given to the inclusion of **other traits in the breeding programme e.g. foot rot and parasite resistance**. The service should be **extended to non-registered flocks interested in genetic improvement**.

6. **ICBF should be involved** in the development of **breeding programmes, data capture and genetic evaluation** and should take over the Sheep Breed Improvement Programme with immediate effect. The **data currently available under the existing programme** as well as initiatives being undertaken by certain breed societies in regard to data capture **should be the starting point**. It is accepted that **adequate funding and resources should be provided to ICBF to undertake this task and all stakeholders should be involved**. The additional work should complement and not undermine its existing role.

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12. Formulating an effective and appropriate policy on sheep scrapie has proved difficult. However the industry must remain vigilant and have the necessary programmes in place to ensure consumer confidence. **Therefore the voluntary programme on genotyping against scrapie should be supported**.

13. A programme should be put in place to assist hill sheep production, which is essential to sustaining the mountain environment. This should involve pilot projects to develop better and new outlets for light lamb, as well as **breeding programmes to protect the future of the mountain flock**.

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<sup>1</sup> BLUEPRINT ON THE IRISH SHEEPMEAT INDUSTRY (2006). Group Chaired by John Malone. Recommendations 6, 16, 17 and 24.

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16. *In the modern economic environment and given the profile of the national flock, full-time and part-time farmers must be catered for in this context. **Specialist advisory programmes should have strong linkages with ICBF.***

17. *The role of monitor farms should be reviewed and a cadre of **progressive producers should be identified who will act as catalysts for best practice** with a strong focus on growth rates, farm productivity and grassland management. Such monitor farms should be adequately supported. The lessons of the New Zealand experience in using monitor farms should be taken into account. There should be **strong linkages with Teagasc and ICBF.***

18. ***Development in regard to breeding resistance and resilience to conditions like foot-rot should be examined in regard to their application in this country.** Links with research institutes internationally should be intensified. **Parasite resistance also fits into this category.***

19. *A proactive policy in regard to **using latest developments in genotyping should be encouraged.***

In preparing this proposal we have attempted to address all of these recommendations with a view to creating an infrastructure which has the genetic improvement of the profitability of sheep production at its centre and is closely integrated with meeting the needs of commercial sheep producers and providing the information needed by ram breeders so they can supply the rams required by the industry. Our proposal envisages the establishment of a special and new relationship between sheep breeding and the research and advisory services of TEAGASC.

The sheep production sector of Irish Agriculture is relatively small (ca €400 million turnover) thus making it essential that it operates as a tightly knit group involving a relatively small number of specialists in all aspects of sheep breeding and production. Our proposal envisages full use being made of available international expertise in order to ensure the industry has access to world best practice without the need to carry large R&D overheads.

The key elements of our proposal are:

- Structure
- Data
- Genetic Evaluations
- Breeding Scheme

In the following sections these are elaborated in some detail.

In the discussions that have led to the development of this proposal it has become clear that the sheep industry has a need for an information system which extends beyond satisfying just the requirements of the sheep breeding sector. Under our proposal a **sheep industry database will be established** to meet the needs of breeding and of the other aspects of the industry.

## 2 Structure

In order for the sheep breeding sector to deliver a population of ever more profitable animals for commercial producers it is imperative that a very efficient and innovative decision making and operational structure be established. Our proposal is that the establishment of this structure proceed in two steps. Firstly, an “**interim**” structure which has as a prime responsibility the establishment of a “**permanent**” structure and as a secondary responsibility to co-ordinate an “interim” operational structure which will be absorbed into the “permanent” operational structure when it is established.

The remainder of this section deals with the “**interim**” structure.

### 2.1 Policy Decision Making

It is proposed, that an interim structure be established forthwith. This will be done by creating the Irish Sheep Breeding Company (**ISBC**) as a fully owned operating unit of ICBF with the following mission:

*To achieve the greatest possible improvement, from genetic and other factors, in the profitability of the national sheep flock for the benefit of Irish farmers and the sheep industry, by:*

- a. Establishing an “interim” operational structure for collecting, collating and distributing information and data of practical and scientific interest, and by facilitating the exchange of all such information and data amongst sheep producers in Ireland and the wider sheep industry.*
- b. Establishing a “permanent” structure which best serves the interests of sheep producers and the sheep industry.*

### 2.2 Administration

ICBF will provide the administration for the ISBC. This will include:

A Board appointed from the key stakeholders in the sheep industry.

Members of the ISBC Interim Board will cover the interests of:

- ram breeders,
- commercial sheep producers,
- sheep meat processors,
- sheep product marketers (Board Bia),
- DAF, and
- TEAGASC.

The ISBC Board will operate as a Sub-Committee in accordance with ICBF’s rules. The ISBC Board will be responsible for setting policy relevant to achieving the mission of the ISBC.

**General Management.** The CE of ICBF will report to the ISBC Board on all matters relevant to its mission and be accountable for carrying out its policy.

**Secretarial and Office Administration** will be provided from ICBF's offices at Highfield House, Bandon, Co. Cork.

**Financial Management & Accounting** will be provided by ICBF through budgets, management accounts and annual accounts independent from those of ICBF and which clearly account for all resources used by the ISBC.

### 2.3 Research, Development & Advisory

In order to facilitate the rapid development of an operational sheep breeding scheme ICBF will appoint a **sheep breeding specialist** to become part of its animal evaluation and breeding scheme unit headed by Dr Andrew Cromie. This specialist will be devoted to the **development of the sheep breeding operational infrastructure for Ireland**. Specialist support will also be provided by other members of ICBF's genetics team, TEAGASC and **external contractors**.

It is envisaged that TEAGASC will maintain its commitment to sheep breeding research and that future research plans will be developed in close association with ISBC.

It is envisaged the TEAGASC will maintain its commitment to providing advisory services to sheep farmers and that advisors will be closely involved during the development and roll-out of the new sheep breeding infrastructure.

### 2.4 Operations

The operational elements of sheep breeding will be supported by a combination of ICBF's, geneticists, database operations and help centre. A web based data collection and information reporting infrastructure will be put in place by ICBF for the ISBC. This operational infrastructure will enable ram breeders and ram buyers to readily access (by internet or post) up-to-date information on the genetic characteristics of relevant animals for the full range of traits for which genetic evaluations are available. This same infrastructure will be available to TEAGASC advisors.

### 2.5 Funding

A draft budget for the first three years of the ISBC is contained in table 1. The key elements of the budget include are associated with capital development. Further work is required to deal with operations and service provision activities.

## 3 Genetic Evaluations

It is proposed that the genetic evaluation system for sheep focus on providing ram breeders and commercial flocks with information that enables animals to be ranked according to the breeding objective for sheep in Ireland. We will follow a process involving all key industry sectors to establish an agreed breeding objective for Irish sheep and this will then drive the sheep breeding programme for the future. We envisage the breeding objective for the Irish sheep industry being **focused on profitability** taking account of **markets** for sheep derived products and **costs of production**.

### 3.1 Breeding Objectives

To establish breeding objectives for Irish sheep we will undertake a review which makes full use of available international expertise. It is anticipated that the objective will be an economic one

focused on the profitability of sheep production in the economic and physical environment of Ireland. The bulk of the work will be focused on the economic considerations associated with establishing the relationship between farm profit and trait variations.

### 3.2 Traits

The traits that will be considered include:

<b>Production</b>	<b>Maternal</b>	<b>Health &amp; Welfare</b>
Growth Rate	Lambing ease	Foot Rot Worm Resistance Scrapie Genotype
Muscle Depth	Milking Ability	
Fat Depth	Mastitis Resistance	
Carcass Conformation	Birth weight	
Carcass Weight	Litter size	
Meat Tenderness	Survivability or Lamb vigour	

This list of traits will be reviewed as part of the research to establish breeding objectives for sheep production in Ireland (refer to 3.1).

### 3.3 Genetic Evaluations

Genetic evaluation systems will be developed as part of the breeding objectives review and updated as new and improved data is collected. A flexible system which uses standard software will form the basis of the genetic evaluation computations.

The genetic evaluation system proposed will operate as frequently as is required to provide information needed by breeders for timely decision making. With current computer technology and volumes of data expected for Ireland it is anticipated that evaluations for all relevant traits, for all animals, will be computed according to a timetable that is aligned with the timing of key breeding decisions and with the collection of relevant data. Consideration will be given to providing overnight processing and updating of genetic evaluations for flocks when they submit significant amounts of additional performance data.

It is envisaged that there will be sufficient links between flocks for the genetic evaluation system to operate across flocks and potentially across breeds.

## 4 Data

Our proposal centres on the establishment of a shared sheep production database that will be used for breeding and a range of other purposes. The database will be shared with Ram Breeders, Commercial Flocks, Flock Books, DAF, TEAGASC Research, TEAGASC Advisory and others (eg. Factories, Marketers). The database will be the source of data for genetic evaluations and the repository of genetic evaluation results. It will be readily accessible over the internet to a range of users and it will support systems for gathering relevant identification, ancestry and performance data on farms. The database will be loaded with all available historical data from DAF, Flock

Books, TEAGASC and other sources of relevant animal and flock details. The historical data will be linked with current data where-ever possible and practical. In creating the database we envisage a number of issues arising that will need to be addressed by ISBC and its Board.

Some of the issues for which clarification is currently being sought are discussed below.

#### **4.1 Identification**

The key to any breeding program is a national and international identification system that provides unique identification of animals over long time periods. We are not currently fully familiar with the identification systems used in the files held by DAF or the Flock Books. It is proposed that the unique tag numbering system introduced by the EU for sheep (NSIS) will become the standard form of identification used for all sheep breeding purposes. The establishment and widespread use of unique identification across all flocks involved in breed improvement from birth to slaughter is a prerequisite to a world-class sheep breeding scheme for Ireland.

It is envisaged that electronic identification will be used on a number of key flocks to facilitate data collection. We understand that where electronic ID is used the system will return the NSIS identification for the animal.

#### **4.2 Health, Movements & Slaughter**

It is proposed that the database established for sheep breeding purposes will also satisfy the needs for official purposes including disease control, quality assurance, and price reporting. While this may take some time to implement fully it is imperative that the initial database design and operation be capable of meeting all known and likely future requirements.

It is anticipated that initially a relatively small number of flocks and processing facilities will be linked to the database. For movements between these the database will be continually updated and similarly for slaughter information.

However, within the relatively short time period (two to three years) we envisage all flocks participating actively in the industry will be part of the database and will be obtaining a range of information relevant to their breeding and management decisions.

#### **4.3 Ancestry**

Effective breeding programs require sire and dam identification for large numbers of performance recorded sheep. We will, as part of this proposal, be offering a service, in association with the Flock Books, to all flocks interested and capable of keeping such records. The key for sheep is single sire mating groups. While there are DNA based tools for resolving paternity between multiple sire mating groups we understand the cost is currently too high for them to be a practical proposition for many Irish sheep breeders.

#### **4.4 Performance Records**

Our strategy is to encourage and reward those breeders who provide useful performance records from animals with known parents and for which valid contemporary groups exist.

The performance records we will be seeking in the first instance are those associated with the list of traits for genetic evaluations (refer to section 3.2 Traits). We will review current performance recording systems and implement a system that takes full advantage of recent developments in

identification (electronic and non-electronic), handheld computers, web interfaces and databases. We envisage a system that avoids duplication and is particularly easy to use in the field. However, a detailed study will be required before a fully priced solution can be proposed.

We envisage that TEAGASC will also make full use of the database and performance recording system for recording all breeding trials for research and demonstration purposes.

#### **4.5 Database**

The sheep database will be closely integrated with the cattle breeding database. Files for farms and farmers will be shared. ICBF's computer system infrastructure and software development infrastructure will be used to facilitate rapid deployment of the sheep database. Given the relatively small numbers of animals involved for the immediate future we do not expect to require any major additional investment in the central database hardware, operating systems and database management software. However, there will need to be a major investment in the specification and development of software required to support the data collection and information reporting systems unique to the Irish sheep breeding, producing and processing industry. There will also be a substantial need for investment in devices and facilities to enable low cost and low effort data collection on sheep farms participating in breeding programs.

The database will be fully web-enabled thus ensuring Flock Book, Farmer and Advisor access using existing systems with a suitable low cost web browser.

#### **4.6 On-farm recording**

We see the ease with which identification, ancestry and performance data is recorded at farm level as one of the keys to a successful sheep breeding scheme for Irish farmers. To this end we plan a substantial investment to evaluate and develop systems for farmer use. The key elements of our plan include:

- Validation at point of data capture
- Removal of all duplication of effort by farmers
- Electronic data capture as close to point of data collection as possible
- Loading to database as fast as possible
- Ease of use by farmer
- Feedback information to farmer from database as soon as possible (same day)
- Low total cost after accounting for farmers time and cost of all technology

Consideration will be given to establishing an all electronic recording vs a mixed electronic and manual (paper based) data recording system.

#### **4.7 Historical Data**

We will load all historical data that has the potential to be of some value in the future. In loading the historical data we will remove as many errors as possible and establish linkages with current data wherever possible.

Historical data files to be loaded include:

- Flock books

- DAF performance recording
- DAF scrapie testing results
- TEAGASC files for sheep
- Tag allocation to flocks

## **5 Breeding Scheme Design**

In order to ensure the optimum rate of genetic progress in the commercial Irish sheep population we will commission an expert in breeding scheme design to review the literature and conduct a study to identify the design which will give the greatest long term profits to Irish sheep farmers. We will use the results of this research to develop a breeding scheme for use in Ireland that will produce the greatest achievable long term profits for Irish sheep farmers.

We expect this work to take some time and that it will not commence until the breeding objective for Irish sheep breeding has been established.

### **5.1 Pedigree Ram Flocks**

In ensuring the highest possible rates of genetic gain it is essential that the flocks providing the rams for use in commercial flocks are following an optimal design. While we have not yet established the optimum there are a few important principles that should be followed. These include:

#### **5.1.1 Ram selection**

The selection of rams for use in ram breeding flocks should be of the highest possible merit as their genes will be propagated widely through the use of their sons in commercial flocks. The optimal breeding scheme design work will determine if these rams should first be progeny tested in commercial flocks (greater accuracy but longer generation interval) or if they should be carefully selected from performance recorded hogget rams bred out of elite ewes and rams from the previous generation.

Imported rams can also be considered for use providing they have genetic characteristics which are known to be valued according to the Irish breeding objective. For the industry to get best use of imports there is a strong case for continually importing and evaluating the best genetics available from other countries (refer to section 5.3 Imports).

#### **5.1.2 Ewe selection**

The replacement females in ram breeding flocks can be selected from ewe lambs born within the flock. Consideration should also be given to selecting high performing ewe lambs, or even older ewes, from well recorded commercial flocks. This open nucleus concept is potentially a valuable path for ensuring the ram breeding flocks have access to the best genetics found in commercial flocks.

#### **5.1.3 Linkage between flocks**

We understand that these flocks tend to be relatively small and thus rely on the use of bought-in rams which will be sufficient to generate adequate links between the flocks for genetic evaluation purposes.

#### 5.1.4 Ram marketing

The database will be used to provide comprehensive information for rams during their marketing.

### 5.2 Commercial Flocks

Initially it is envisaged that a number of commercial flocks will participate in an intensive performance recording service as well as following a rigorous single sire mating policy. These flocks will provide the bulk of the data required to assess the ultimate value of selective breeding.

These flocks will be facilitated through the provision of assistance required to:

- Use rams from recorded ram breeding flocks,
- use single-sire mating groups,
- tag, weigh and record parentage at birth,
- weight lambs during growth,
- collect data on footrot and other diseases, and
- collect relevant carcass data (subject to establishment of a suitable factory grading systems).

It is also envisaged that the database will be used as a repository of data on all flocks that are active participants in the industry. The details of how this might operate need to be given further thought.

### 5.3 Imports

It is anticipated that participating ram breeders and commercial flocks will purchase rams from other countries. These imported animals will be genetically evaluated based on their progeny performance under Irish conditions.

### 5.4 Exports

While the volume of exports of breeding stock is currently low it is envisaged that the breeding program that will be put in place by the ISBC will result in animals a considerable interest to breeders in other countries. For this reason the volume of exports is expected to grow over time.

## 6 Summary

ICBF proposes:

- To immediately establish a policy making Board, containing representation of sheep farmers and key sectors with the responsibility of establishing a more permanent structure and putting in place operational systems for sheep breeding.
- That the interim structure will involve close collaboration between key industry players to establish a shared database which will meet the information needs of the industry.
- That the breeding objectives for sheep in Ireland will be established from market returns, and production costs by using the best available skills.
- The breeding program for sheep in Ireland will be optimised to deliver more profit to commercial sheep producers.

Reference: \\Icbf-server1a\data\Shared\Company\RISI\ICBF Proposal Draft 3 28th November 2006.doc

**Table 1. Cost Estimation for Establishing Sheep Breeding Infrastructure and Operations. First three years.**

Cost Item	Year 1	Year 2	Year 3	Total Cost
	cost for year	cost for year	cost for year	
Administration & secretarial support	€15,000	€15,000	€15,000	€45,000
Financial & accounting support	€10,000	€10,000	€10,000	€30,000
Geneticist - data collection design	€75,000	€75,000	€75,000	€225,000
Geneticist - breeding objectives	€25,000	€25,000	€50,000	€100,000
Geneticist - genetic evaluations	€25,000	€25,000	€25,000	€75,000
Database analyst - design	€75,000	€75,000	€75,000	€225,000
Database analyst - build	€75,000	€75,000	€75,000	€225,000
Field Recording - supervisor	€25,000	€100,000	€100,000	€225,000
<b>Totals</b>	<b>€325,000</b>	<b>€400,000</b>	<b>€425,000</b>	<b>€1,150,000</b>
Commercial flock - setup	€30,000	€225,000	€450,000	€705,000
Ram breeding flock - setup	€20,000	€150,000	€750,000	€920,000
<b>Totals</b>	<b>€50,000</b>	<b>€375,000</b>	<b>€1,200,000</b>	<b>€1,625,000</b>
<b>Total overall</b>	<b>€375,000</b>	<b>€775,000</b>	<b>€1,625,000</b>	<b>€2,775,000</b>