Is the role of the BREED SOCIETY

STILL RELEVANT?

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INTRODUCTION

Breed Societies have had a place in New Zealand agriculture since the late 1800's.

Breeding groups of all species of livestock began incorporating Breed Societies particularly in the early 1900's and this practice has continued for the last 100 years.

The information gathered in this report refers to Sheep and Beef Breeds predominantly, however does reference the Dairy Breeds and the impact dairying has had on pastoral sheep and beef farming.

The purpose of this report is to examine the Breed Society role, its culture, and impact over the last 100 years, how this has changed, and the relevance of the role in New Zealand agriculture going forward.

Definition - What is a Breed Society?

"Breed" refers to specific characteristics also known as breed type and traits that are inherited and passed on from generation to generation.

Breed Type is expressed through the Phenotype and Genotype of an Animal

Phenotype refers to the physical makeup of an animal (what it looks like)

Genotype refers to what cannot be seen (DNA genetic makeup)

"Society" is the totality of the social relationship amongst humans. A group of humans broadly distinguished from other groups by mutual interest, participation in characteristic relationships, shared institutions, and of common culture.

Society in this context is the Membership of the Society

A BRIEF HISTORY

The Traditions

The Sheep and Beef Breeds of New Zealand were almost exclusively of British and Channel Island origin and early importations of both species occurred in the early to mid 1800's

But with the advent of refrigerated shipping many things changed. New Zealand became more dependent on the export of Meat and Dairy products to the UK and our sheep, beef, and dairy farmers sought maximum production from as much available land as possible.

Because of the country's largely warm temperate climate there was little need for farmers to change their existing breeds. Romney Marsh, Lincoln, Border Leicester, English Leicester, Shropshire Down, Merino, and Southdown being the most prevalent sheep breeds whilst Hereford and Aberdeen-Angus became the prime beef producers, and first the Shorthorn and then Jersey the principal dairy breeds

As in other parts of the World, the popularity of different breeds has varied over the years. The most significant change is the rise of the Holstein-Friesian, and in the 70s Continental Beef Breeds such as Simmental, Charolais, and Limousin becoming well established.

Numerous sheep breeds have been introduced right through to current day, Dorset, Suffolk, Perendale, Coopworth, Drysdale, Texel, Finnish X, East Friesian and others.

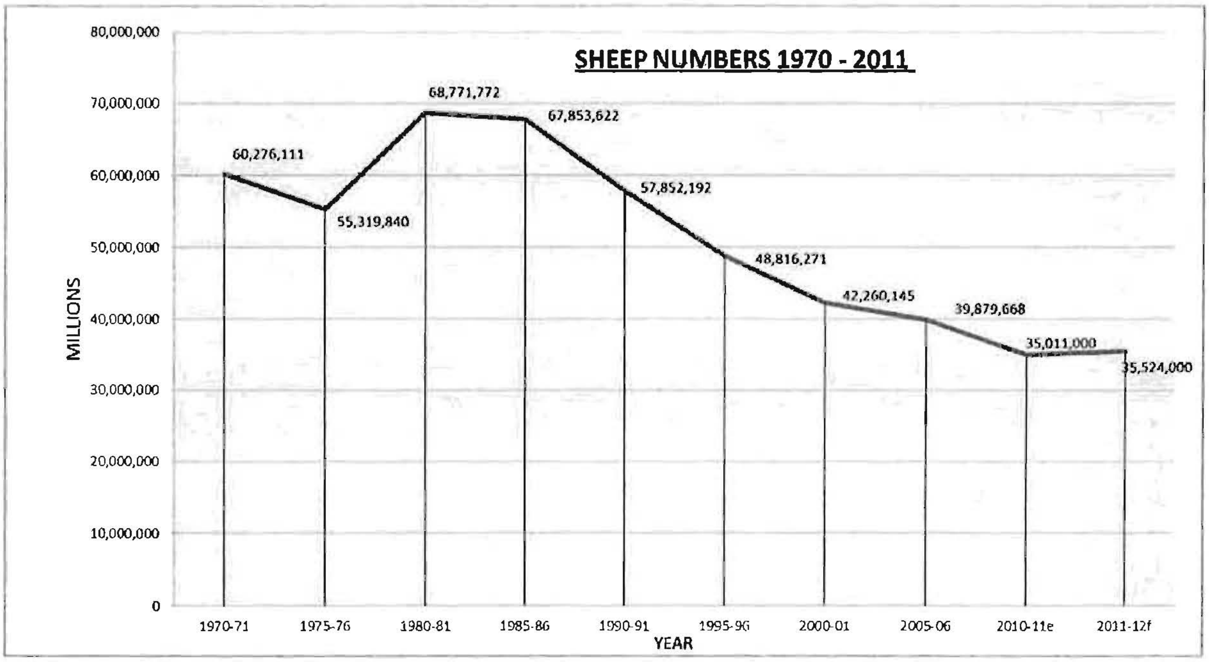
The Objectives

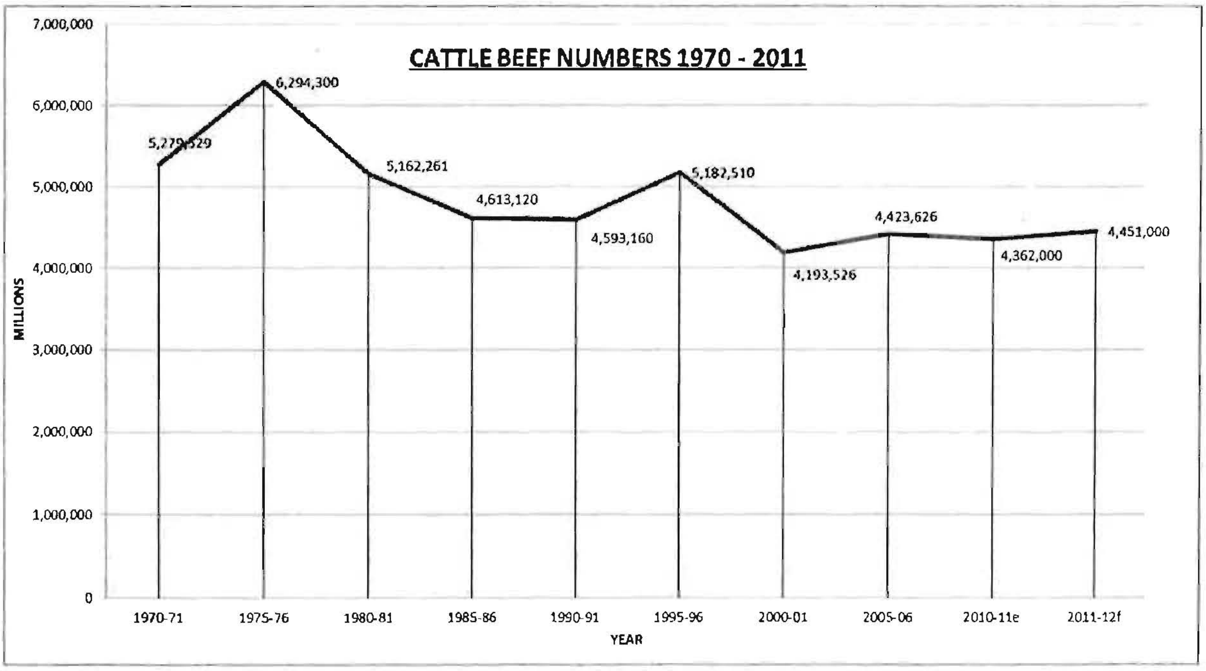
The aims and objectives can be found in any Breed Association Constitution

- To foster the improvement of all breeds and provides a unified body whose collective voice has a beneficial effect on the total NZ industry.
- To maintain the purity of breed within the jurisdiction of the association and to appoint breed inspectors and show judges to safeguard breed standards and encourage breed field days and trials.
- To collect, verify and store pedigree information for the registration of purebred livestock and to publish a herd/flock book annually.
- To encourage stud breeders to performance record, thereby allowing a comparison of individual animals to be made within a stud flock/herd and identify the top performance sires within a breed and encourage their use.
- To educate members and the general public regarding the use of registered animals in the production of meat and/or wool and their overall effect on the New Zealand economy.

SHEEP AND BEEF POPULATION TRENDS

Over the past 30 years sires required for both sheep and beef production systems have fluctuated. The national sheep flock has steadily declined nearly halving over the same period. The beef herd dropping some 30% in 25 years. This has had an effect on the financial viability of Breed Societies as membership and registrations have declined in some breeds.





Influence of Dairy & Dairy Support
The significant growth in the Dairy Industry and new conversions of land to Dairy farming has placed far more competition on sheep and beef finishing production systems. The same class of land whilst not converted is required for Dairy Support for the Dairy Industry

Change in Land Use
Contributing factors have been a change in land use of hill country breeding properties which were predominantly sheep and beef.

In the early to mid 90's hill country was retired from pastoral farming and pine trees were planted resulting in a drop in the breeding sheep flock and beef herds. This also having an effect on the number of sheep and beef sires required to service the breeding operations.

Farm Gate Returns for Sheep & Beef
The returns for sheep and beef production systems and in particular hill country sheep and beef have been low for the last 3 decades and these production systems have struggled to keep pace with competing systems for return per hectare.

THE RISE OF PERFORMANCE DATA

In the early years Breed Societies were concerned with purity of pedigree and the Association Rules and Regulations governed entry to the herd/flock book based on known ancestry and blood percentage purity.

The introduction of modern genetic evaluation systems over the last 20 years in beef (BREEDPLAN) and 10 years in sheep (SIL) has sped up the genetic gain in both production systems.

Both modern genetic evaluation systems offer breeders the potential to accelerate genetic progress in their flocks/herds and to provide objective information on stock they sell to commercial breeders.

Both BREEDPLAN and SIL use the world's most advanced genetic evaluation system (based on Best Linear Unbiased Prediction [BLUP] technology) to produce Estimated Breeding Values (EBVs or BVs) of recorded sheep and cattle for a range of important production traits.

In cattle production systems 17 traits are produced with the emphasis being on weight, carcase and fertility.

In sheep production systems 6 traits are produced focussing on growth, meat, wool, reproduction, survival and host resistance to internal parasites.

Included in the calculation of Breeding Values are the animal's own performance of known relatives, the heritability of each trait and the relationship between the different traits.

Genetic database technologies are used the world over and many of these have been merged since the late 90's to conduct international genetic evaluations (cattle specific). The rational for this is simple – the larger the population of cattle being evaluated the higher the chance of finding elite genetic material which can be rapidly disseminated using modern artificial breeding techniques.
This will improve the competitiveness of beef production in all co-operating countries.

See Appendix I

Outlines the Annual Economic benefit of BREEDPLAN to New Zealand's beef industry in 2010. In the beef industry this is estimated at $49M annually

DNA TECHNOLOGIES

Widely available from New Zealand DNA Testing laboratories are tests for Parentage, Inherited Diseases, and Production traits.

Parentage and recessive disease testing have been available for 15 years

The majority of testing is still carried out on micro satellite panels but the technology is advancing quickly and high-density SNP chips are being used for predicting economically important traits.

ParentageVerification/Analysis Testing

The integrity and accuracy of breed society databases are being tested with most breed societies moving to compulsory society registration verification.
This test is also used for multiple sire mating analysis, and is widely used stud sheep industry for lamb registration.

Testing for Inherited Disorder and Disease

All animals (and humans) carry potentially harmful mutations. Those that are deleterious are generally autosomal recessives so only cause a problem when the animal carries two copies of the mutation. Most if not all breeds have one or more genetic disorders.

An example of this is The New Zealand Angus Association having recently had to manage three genetic disorders. Breed Societies have moved proactively to manage and eradicate the disorder by making testing compulsory.

Arthrogryposis Multiplex AM (Curly Calf)
Neuropathic Hydrocephalus (Hydro Head)
Contractual Arachnodactyly (Fawn Calf)

The tests for these and similar disorders are often developed overseas and licenced to NZ laboratories.

A range of genetic condition testing is also available in the Sheep Industry
Eg parasite resistance and facial eczema.

Testing for Production Traits

Large DNA companies like Pfizer and Merial (Igenity) have invested heavily in the commercialisation of Molecular Value Predictions (MVPs) DNA samples are used to validate prediction equations based on 50k SNP genotypes for a range of production traits in breeds

TECHNOLOGY – The Information Age

The computer age and the development and use of the world wide web as a global information medium from the mid to late 90's has had quite an impact on the activities of the Breed Society.

Breed Societies have had the capability of receiving data electronically for 20 years. Over that time farmers have been slow to uptake technologies available to them for faster more efficient flow of "animal data" to their Breed Society bureaus.

A contributing factor has also been that Internet access in rural areas has been poor and farmers require Broadband or equivalent to communicate with any speed and efficiency.

However, change is being driven by market access requirements demanding trusted product and with the introduction of NAIT (National Animal Identification & Tracing) there has been a recent upsurge in the purchase of "on-farm" data management software that will record all pedigree and performance data as well as complete the mandatory compliance for NAIT.

EID (Electronic Identification) tagging of all cattle mandatory from July 2012 will be the enabler for faster more efficient information sharing.

Whilst this is only being implemented for cattle and deer, indications are that whilst also ideal in sheep production systems that the cost of compliance prohibits the foreseeable implementation.

<u>Information Technology and the Value Chain</u>

To help all parties in the value chain Breed Societies are launching multifaceted programmes that will deliver certainty and value to breeders and finishers of a particular breed of cattle for branded product options. An example of this is Angus cattle for the AngusPure and McDonald's Angus Burger options.

To enter these programmes all cattle must carry an EID branded tag and meet minimum Angus blood % requirements.

The electronic tagging will allow easy and accurate capture of weights and treatments to provide traceability of animals for such programmes.

Breeders and finishers will have access to relatively inexpensive software to record this information and complete NAIT compliance.

Ultimately the real information recorded on cattle, and information provided back from the Meat Processing companies, if they are linked to sires will be able to be used to improve the reliability of breeding values.

This diagram shows the information loop between all parties in the value chain, and the role that the breed society database will play in helping to identify those genetics that consistently tick the box.

Diagram courtesy of Saltbush Software, Armidale, NSW

THE FUTURE - STRATEGICALLY – WHERE IS THE MODERN DAY BREED SOCIETY HEADING.

Governance
To evolve a responsible and sustainable governance body that is positioned to steer societies confidently towards future opportunities.

Farm
To lift productivity and profitability of Breed Society members farming systems, and increase the rate of genetic progress to their targeted breeding objectives.

Leadership
To develop and equip individuals from within the membership with the necessary skills to administer the breed society and lead the sheep and beef industry forward. The association needs to look at investing in people to drive the breed in the right direction.

Market
Assist association breeders to develop a market orientated approach – aligning breeding programs with target market specifications demands.

Information
To effectively deliver quality information which the membership can utilise to improve their farming business, the genetics produced and relationships with customers and other relevant industry members.

Growth & Development
The association fosters an environment that supports growth and development through the successful implementation of a Strategic Plan with on-going reviews and development.

CONCLUSION

What of the future of the New Zealand Breed Society?

- The financial viability of a Breed Society is membership and animal registration dependent. This is the primary source of income for an association to operate.
- Although in *some* Breeds both membership and animal registrations have dropped this is less than the level of reduction in sheep and beef breed breeding operations.
- Breed administrations have embraced developing technologies to push superior genetics to the forefront in both production systems.
- The industry *smarts* that are coming as result of pieces of work such as the Red Meat Sector Strategy will drive farmers to be more focused on their end market – the consumer.
- Leading Breed Societies are becoming more consumer focussed and are driving branded product development for the benefit of their customers (the membership) and in turn their customers (commercial farmers who are the end users of the genetics)
- New and exciting technologies, like the rapidly developing science of genomics will continue to change the way we breed sires for both production systems. The breed society role will be to communicate and show leadership down through the industry at all levels.
- Many Breed Societies (in particular Sheep & Beef) have collaborated on a number of fronts to leverage opportunity for funding in areas of Research and Development. This will be a pivotal role for these organisations going forward as central government withdraws funding support in this area.
- Rising costs inside the farm gate encourages every supplier to look at the value-add opportunities. Breed Societies are not immune to this, and the commercial reality is that they too have to drive efficiencies to stay competitive and survive.
- Sadly, there are some Breed Societies that will not survive. Members will not see the value of being part of these organisations for a variety of reasons. The governance providers to these organisations *may* make political or self-serving decisions that do not have the best interests of the industry at heart.

The NZ Hereford Association very recently revisited their Vision and Mission Statements and I quote

<u>Vision</u> "To provide New Zealand's beef producers with the genetics, expertise in quality beef production and industry leadership, which is required to add value and increase market opportunities."

<u>Mission</u> "The NZHA will provide the leadership to collaborate and innovate with industry stakeholders, co-ordinate marketing, and communicate breed strengths in order to create value for our members, their customers and the consumers of Hereford derived beef."

Breed Societies in New Zealand that are able to adopt this level of vision and value are in good hands.

Acknowledgements & References

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- Peter Parnell, Angus Australia
- AngusPure, NZ Angus Association
- NZ Sheepbreeders
- PBBNZ
- The Red Meat Sector Strategy

APPENDIX 1

ESTIMATE OF BENEFIT: COST OF BREEDPLAN TO NEW ZEALAND BEEF INDUSTRY

1. Introduction

In 1989, the then Australian Meat and Livestock Research and Development Corporation engaged ACIL Australia Pty Ltd (a highly respected group of economic consultants) to undertake an independent benefit: cost analysis of the National Beef Recording Scheme and BREEDPLAN in Australia. This study estimated the benefit: cost of BREEDPLAN in Australia to be 10:1 at that time. This took into consideration the high level of investment made by various Australian organisations in the research and development of BREEDPLAN technology. For New Zealand a much higher benefit: cost could be expected because the New Zealand beef industry has not contributed to the huge cost of on-going research and development of BREEDPLAN. It has paid favourable operating fees for use of the technology.

2. Quantification of current benefits and costs

- A +1kg Estimated Breeding Value (EBV) gain in sires is estimated to be worth $85 (2010 dollars). This is based on a +1kg EBV in a bull producing 0.5kg of extra weight in 30 progeny per annum, realised over four years. The additional live weight gain is valued at $1.60 per kg live weight and future calves have had their gain discounted at 8 per cent. The crop of NZ bulls produced in 2010 have EBVs +57.5kg higher than the seedstock population base in 1990. Therefore the economic contribution of the current generation of BREEDPLAN bulls to the NZ beef industry over the pre-BREEDPLAN situation is around 57.5 x $85 = $4887.5 per bull.

- The economic contribution of selected heifers is calculated to be 1/25th of their bull herd mates. This assumes they produce 5 calves before being culled. This gives them an economic contribution of $4887.5/25 = $195.50 compared with the pre-BREEDPLAN situation in 1990.

- An allowance of $4 per head is made for the additional on-farm costs of running a performance program.

- The costs of NZ breed societies in actually processing BREEDPLAN records and despatching reports to breeders is assumed to be $4 per calf exclusive of ABRI royalties and GROUP BREEDPLAN costs.

- The annual cost to the New Zealand industry of ABRI's royalties and GROUP BREEDPLAN analyses is estimated to be NZ$160,000.

- Around 37,000 calves of both sexes will be recorded on BREEDPLAN in 2010. Of these, it is estimated that 52% of bull calves will be sold as herd sires and 80% of heifers born will be used in breeding.

The calculation of benefits and costs of BREEDPLAN for the beef industry in New Zealand in 2010 are as follows:

Benefits		Value $M
a)	9,620 selected bulls at 2010 value increment of $4887.50	47.018
b)	14,800 selected females in 2010 value increment of $195.50	2.893
	Total benefit	**$49.911M**

Costs

c)	additional on-farm recording costs	0.148
d)	costs of NZ Societies in processing data	0.148
e)	ABRI charges for BREEDPLAN technology	0.160
f)	Funding for BREEDPLAN extension, at present through NZBT, say	0.050
	Total Cost	**$0.506M**

In summary, the annual economic benefit of BREEDPLAN to New Zealand's beef industry is estimated to be $49.911M per annum in 2010 dollars. This is conservative because:

i) it makes no allowance for improvements in carcase and fertility traits. There has been a strong focus by NZ beef breeders on improving carcase traits with ultrasound scanning increasing by 73% between 2001/02 and 2008/09,

ii) it makes no allowance for the substantial on-farm benefits of calves reaching sale weight up to 12 months earlier, allowing more breeders to be run on the same land,

iii) no allowance is made for sales of semen and embryos in New Zealand and to overseas countries.

The costs for running BREEDPLAN in New Zealand in 2010, including the current conservative funding of beef breeding extension, is estimated to be around $0.506M.

The benefit: cost of the overall BREEDPLAN initiative in New Zealand is therefore estimated to be extraordinarily high at 98.6:1 ($49.911/.506).

However, it is not realistic or sustainable to run a national genetic improvement program with such low inputs.

Benefits & Costs with new software & a national extension service

Assume benefits increase by 10%.

	Estimated benefit	**$54.902M**

Revised costs

i)	additional on-farm recording costs	0.148
ii)	cost of NZ Societies in processing data	0.148
iii)	ABRI charges for BREEDPLAN	0.160
iv)	funding of BREEDPLAN extension	0.160
v)	annualised cost of new software	0.029
	Total Costs	**$0.645M**

Sustainable benefit:cost ratio **85.1:1.**

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