B+LNZ Genetics + ICAR

Agenda

- B+LNZ Genetics Background
- New Zealand Livestock Farming
- B+LNZ Genetics & Beef
- B+LNZ Genetics & Sheep
- Why B+LNZ Genetics + ICAR?

Partnership >

Government
+
Sheep & Beef Farmers

MINISTRY OF BUSINESS, INNOVATION & EMPLOYMENT
HIKINA WHAKATUTUKI

beef+lamb new zealand

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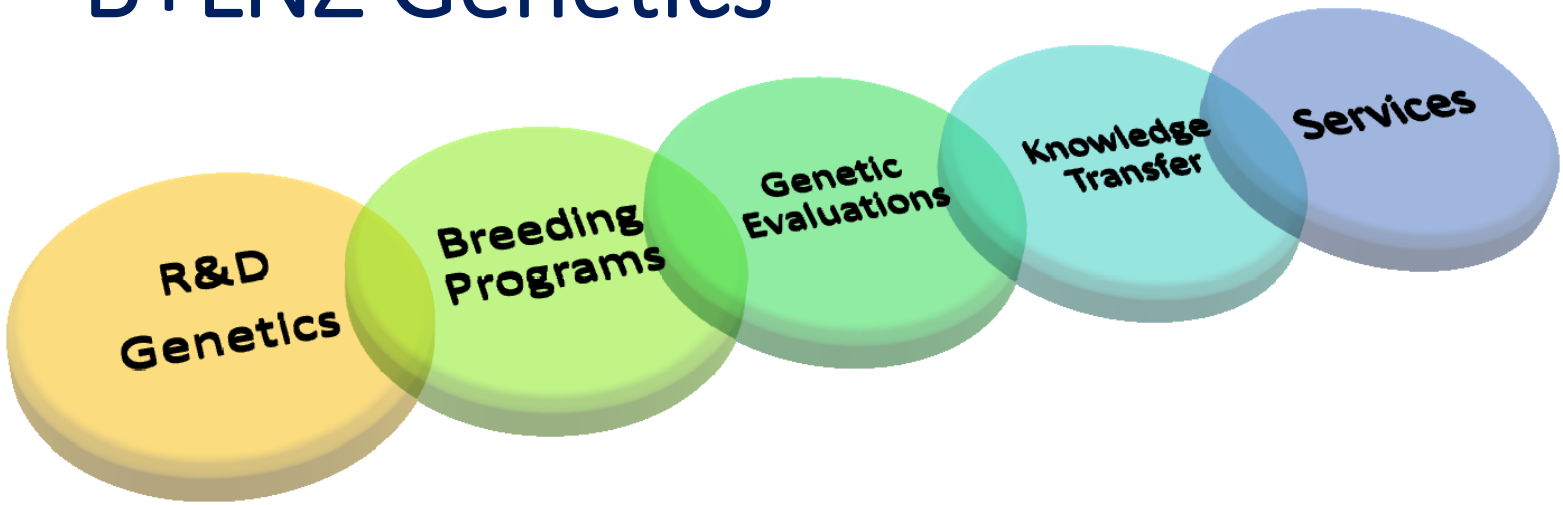
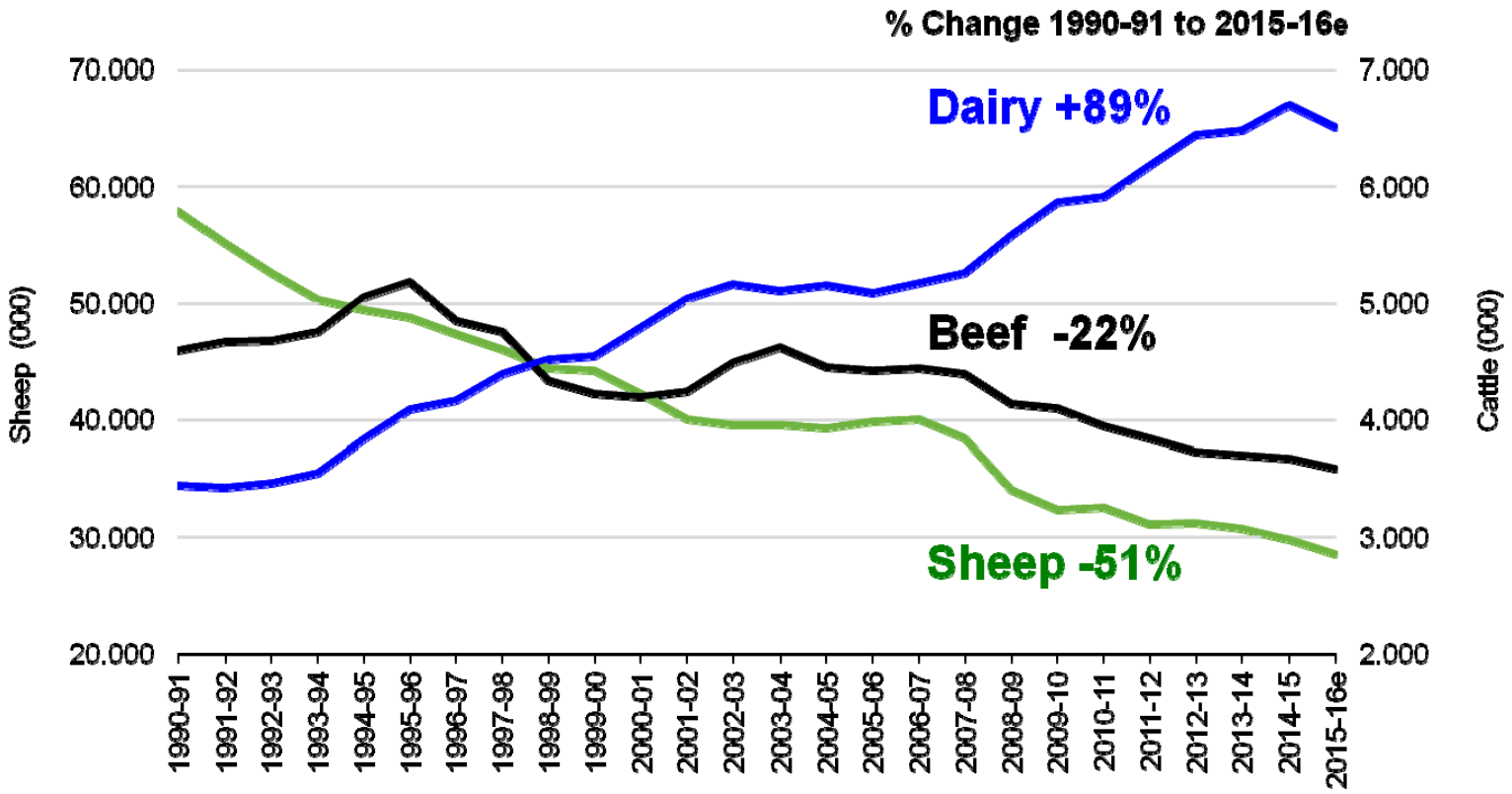
B+LNZ Genetics



PURPOSE

Provide the Information Infrastructure for Breeders, Farmers and Industry to make profitable breeding choices

NZ Sheep, Beef & Dairy Numbers



Source: Beef + Lamb New Zealand Economic Service
Statistics New Zealand

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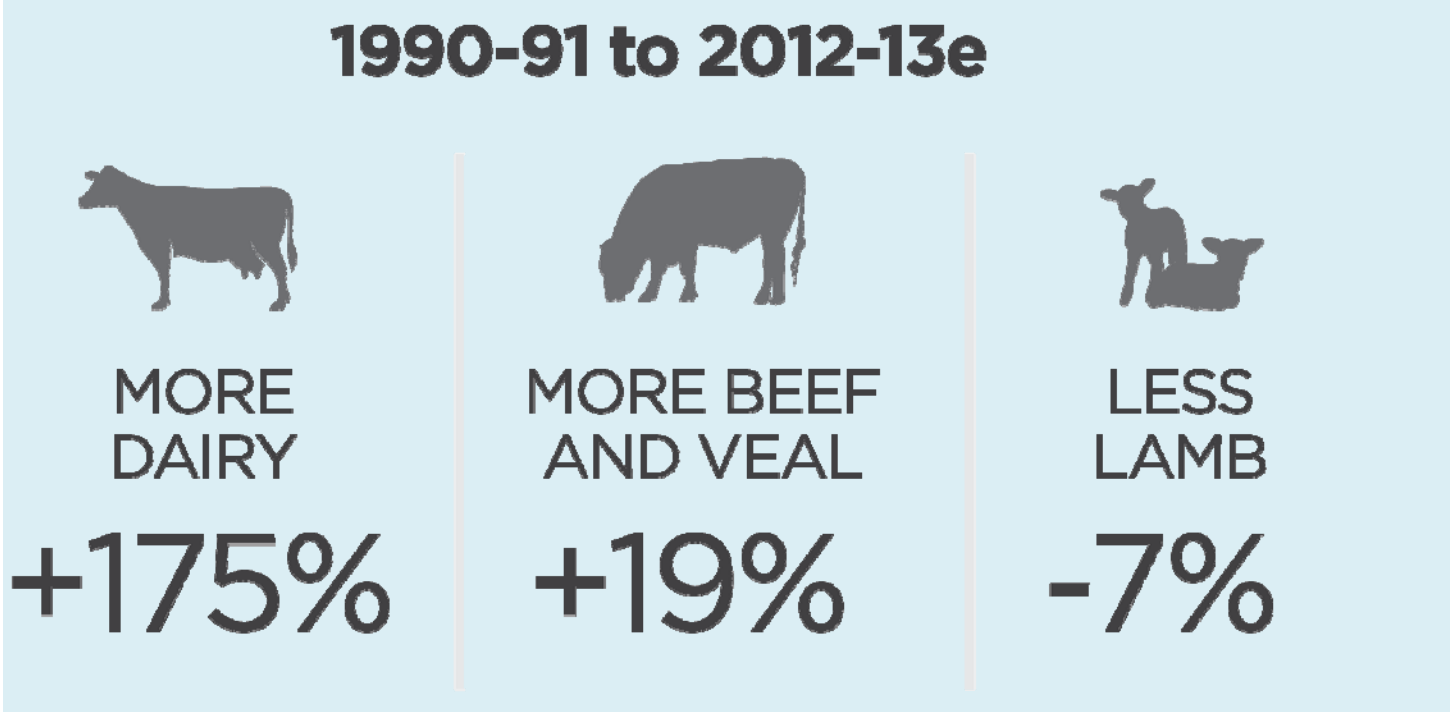
NZ Production Changes



But -51% fewer Sheep

B+LNZ Genetics: Beef

Challenges & Opportunities

- Sheep & Beef Farming System
  - ➢Beef provide more value than a lawn mower?
  - ➢Describe & Select Genotypes specifically for NZ?

Challenges & Opportunities

- NZ Dairy Farming No 1 source of NZ Beef
  - Describe specific Genotypes for Dairy-Beef versus traditional Beef System?

NZ Beef Genetic Evaluations > Australia

B+LNZ Genetics: Sheep

NZ Genetic Evaluation: Scale

	Within-Flock	Across-Flock
Unique animals	14 million	8.3 million
All flocks	1,135	
Current active flocks‡	564	
2015 born (NAI*)	330,649	
eBV's stored	22 billion	416 million

**NAI = new animal indicators*

‡Flocks selling rams

- Base Year 1995

Figures from Aug 2016

2016: Genetic Engine Upgrade (SIL)

Analysis	Flocks	Animals	ASREMEL	MIX99
Perendale	57	653,826	33 hours	**1½ hours**
Texel	79	491,988	15 hours	**0.5 hours**
Coopworth	101	1,612,649	48 hours	**4 hours**
Multi-Breed Across flock	456	5,348,205	>1 week •multiple computers •simplified models	**26 hours**
NZGE (Weekly)	1,135	**14,387,346**	Not Possible	31.5 hours

GE System Upgrade : Pre – 2016

Collect data manually

Transcribe to forms

Bureau Data Entry

Validation and Storage

JADE Core Database

Genetic Engine

Email out PDFs

Printed reports to breeders

GE System Upgrade : 2016 -2017

Breeders / Farmers

Web site/App
-Validation
-Review
-Reporting

Integration APIs**

Ped & Perf SQL DB

BV's SQL Database

Genotype SQL Database

- In-field data capture
- Decision support tools
- Integration with other farm systems & industry via API's

2017 New SSBLUP Genetic Engine (BLUPF90 Cloud)

**Application programming interface (API)

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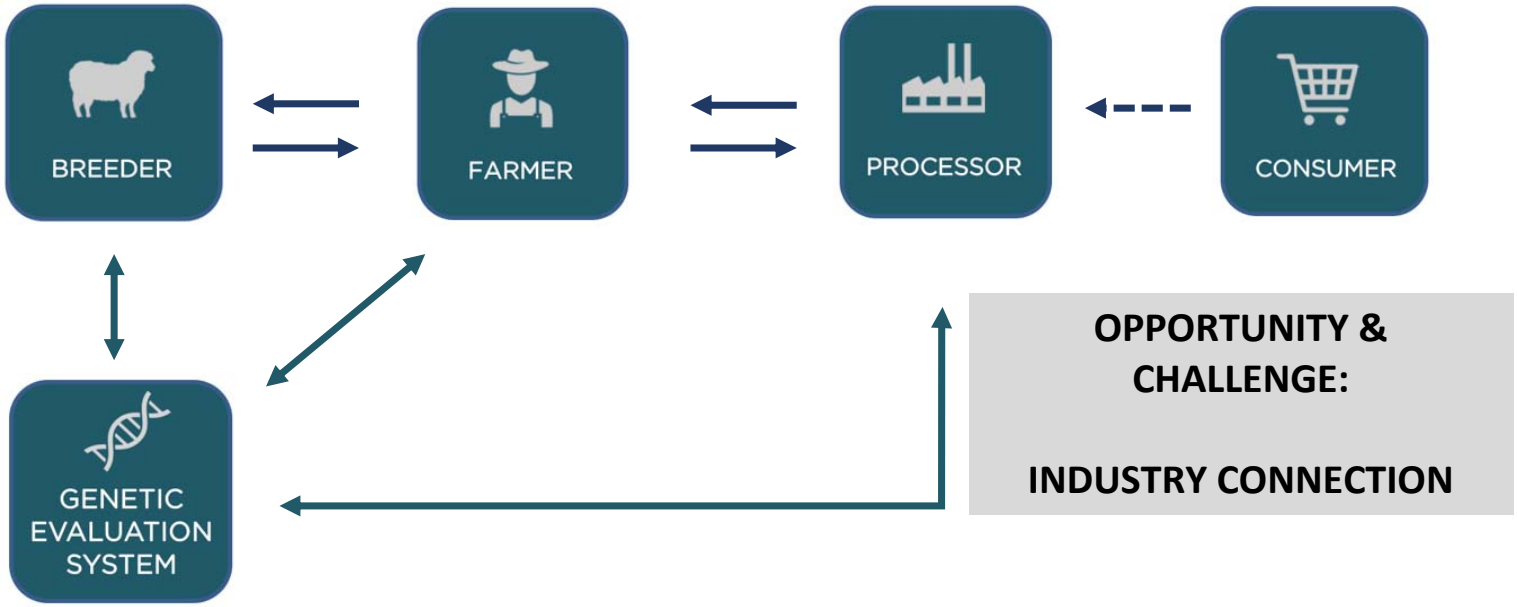
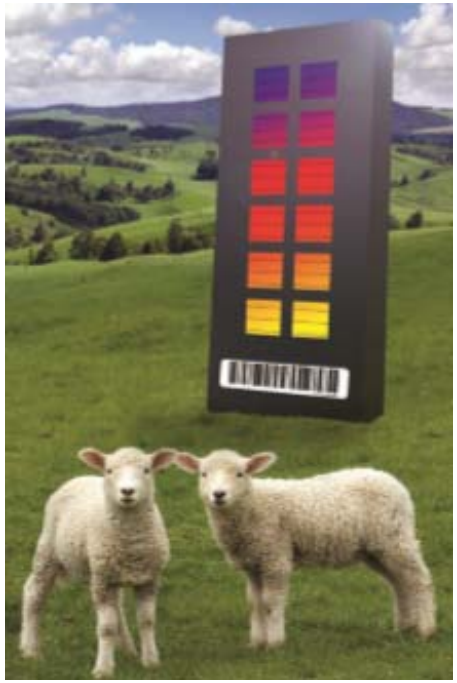
Genetic Evaluation Data Flow

CURRENT FLOW OF INFORMATION



Sheep Genotyping & Genomics

- SNP Parentage
  - Current 80,000 animals / year & growing
  - € 13.00 Euro
- Genomics
  - 36,170 in training: (50k & HD) & 10,000 p.a. genotyped LD
  - € 40.00 Euro



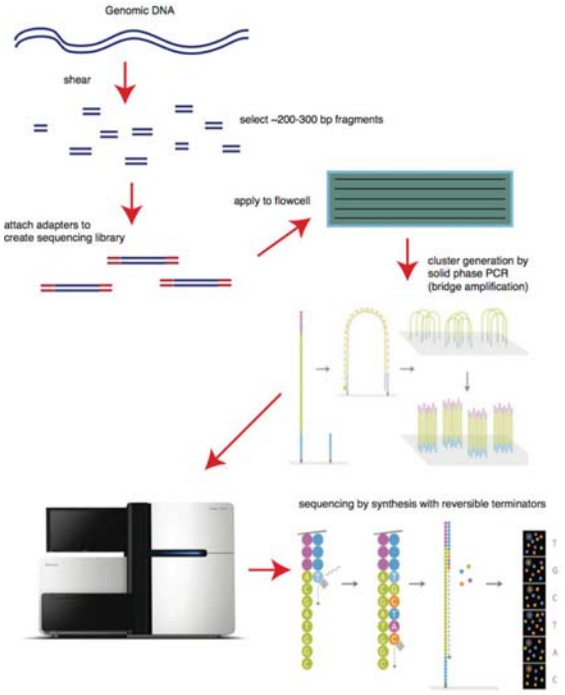
- **Challenge & Opportunities**
  - **Parentage: < € 5.00 Euro**
  - **Genomics: < € 15.00 Euro**
  - **Transition from totally Parentage > Genomics**

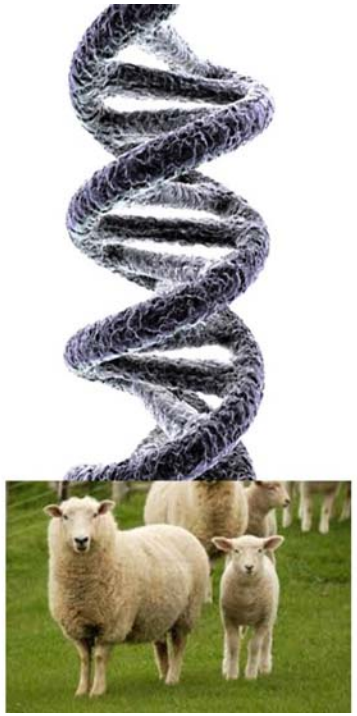
Sheep Genomic Predictions

Trait		Trait	Romney 2016	Coopworth	Perendale	Composite
Production	Number of Lambs Born	NLB	64%	54%	43%	47%
	Lamb Weaning Weight	WWT	63%	67%	60%	45%
	Weaning Weight Maternal	WWTM	47%	46%	41%	40%
	Live Weight 8 months	LW8	61%	61%	53%	45%
	Live Weight 12 months	LW12	58%	53%	51%	49%
	Carcase Weight	CW	58%	60%	46%	43%
	Ewe Live Weight	EWT	51%	55%	42%	45%
	Eye Muscle Area	EMAc	57%	59%	49%	39%
Meat Yield	Fat Yield	FATY	47%	67%	40%	43%
	Hind Qtr Yield	HQLY	45%	62%	42%	50%
	Loin Lean Yield	LNLY	44%	62%	42%	49%
	Shoulder Lean Yield	SHLY	50%	62%	41%	47%
	Lean Yield	LEANY	47%	62%	42%	49%
Health	Facial Eczema	GGT21	63%		46%	
	Lamb Dag Score	LDAG	48%	62%		59%
	Adult Dag Score	ADAG	52%	58%		53%
	Feacal Egg Count	FEC1	61%	68%	53%	61%
	Feacal Egg Count	FEC2	52%	50%	41%	44%
	Adult Ewe Faecal Egg Count	AFEC	46%	45%	34%	39%
Wool	Fleece Weight 12m	FW12	51%	69%	50%	54%
	Lamb Fleece Weight	LFW	34%	31%	28%	31%
	Ewe Fleece Weight	EFW	42%	26%	25%	27%

BLG Sheep Genomic Pipeline

1. HD Genotype key Sires with good phenotypes
2. Impute to Sequence
3. GWAS: Causative Mutations & QTL
4. Add SNPs to Panel to improve accuracy for Genomic Selection



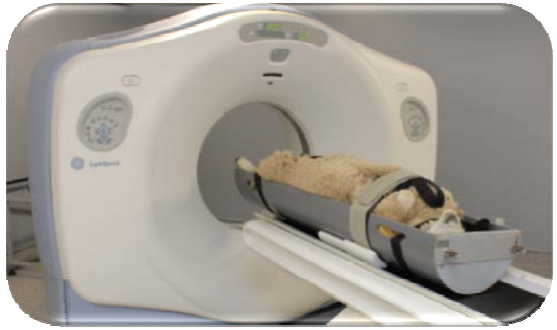


Challenge: ROI on GWAS vs. Phenotypes & Genotypes

Main Areas Sheep Research

Feed Efficacy (RFI)

Meat Yield & Shape



BCS

Maternal Ewe

Meat /Eating Quality

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Challenge> Knowledge Transfer (KT)

1. KT of R&D outcomes onto Farms
2. Assist Seed Stock producers to increase Genetic Merit of flock/herd

B+LNZ Genetics + ICAR > Sheep

Why BLG + ICAR?

- Identifying /implementing key traits of economic value across countries
- Dialog on standardisation / guidelines /codes of practice for the recording of these traits
- The standardisation between countries of nomenclature (IDs, names, units and abbreviations)

Why BLG + ICAR?

- Sharing/access to hard/expensive to record phenotypes (e.g. RFI)
- Opportunities stimulate across country evaluations/progeny tests and exchange of germplasm
- Exchange and use of data including genomic data for gene discovery and evaluations


ICAR
THE GLOBAL STANDARD
FOR LIVESTOCK DATA
Via Savoia 78, 00198, Rome, Italy
CERTIFICATE OF QUALITY
Beef+Lamb New Zealand Genetics
for Identification and production recording in dairy cattle; Laboratory analysis
(milk samples); Data processing
Hans Wilmink
President
Rome, 10 October 2016
Certificate number: 2016/10
Valid up-to: April 2018


The End