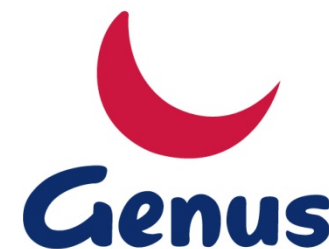


“The impact genetics and biotechnology will have on future livestock farming systems.”

2017 IFMA Congress

Andrew Thompson

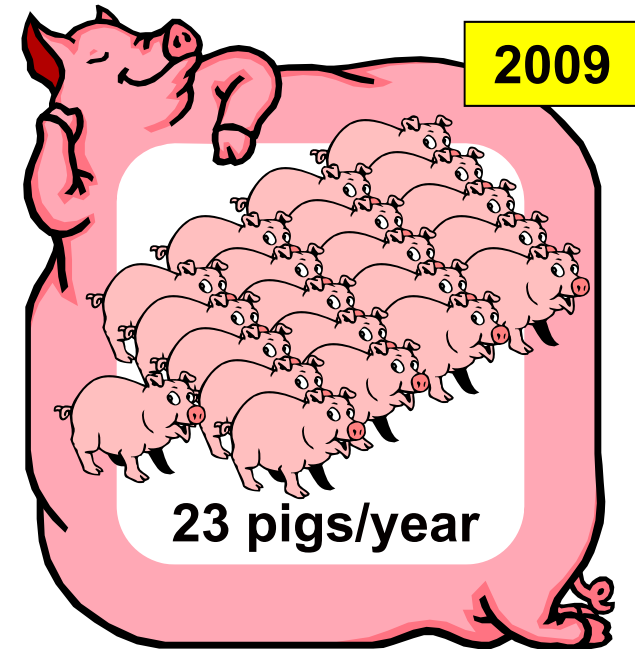
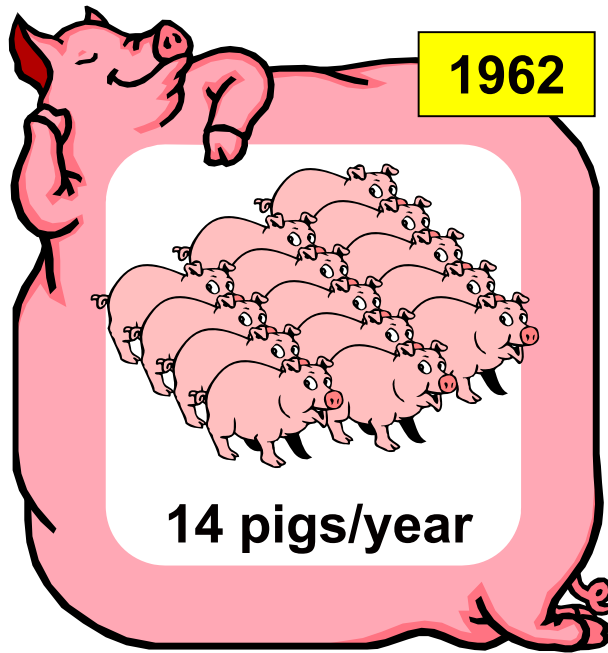
Regional Director - EMEA



Outline

- The impact genetics has made historically
- What have been the challenges?
- Why is this important?
- What are the opportunities in the future and does this really create value?
- Summary

UK pig performance



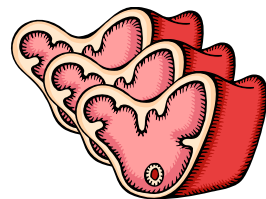
71% more pigs

38% less feed

39% more lean



**410 kg of
feed each
pig**

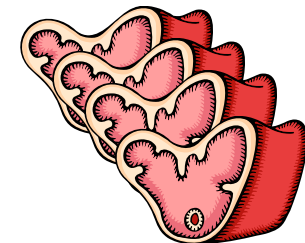


**34 kg of lean
each pig**

**50% less
manure per kg
of lean**



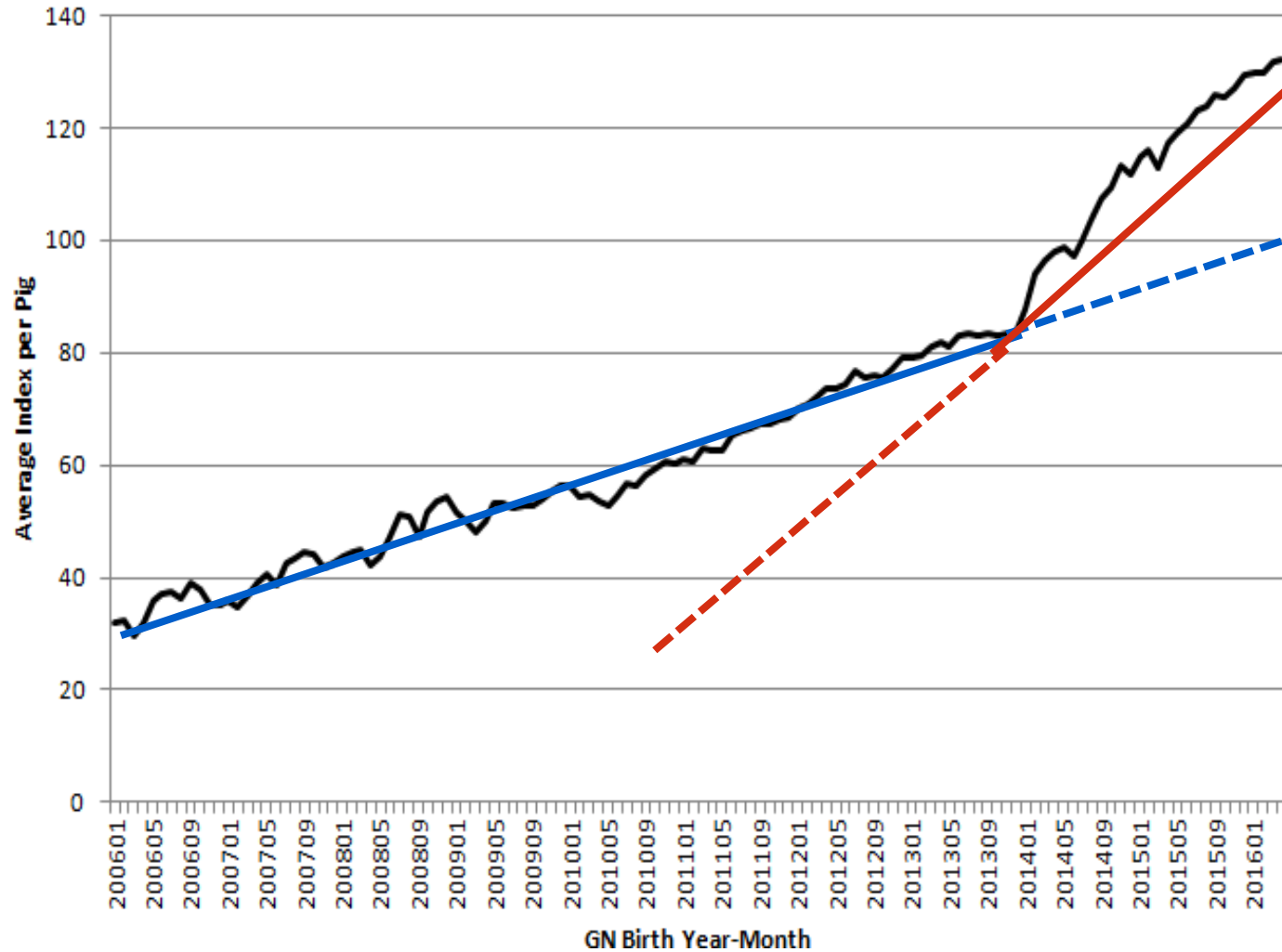
**273 kg of
feed each
pig**

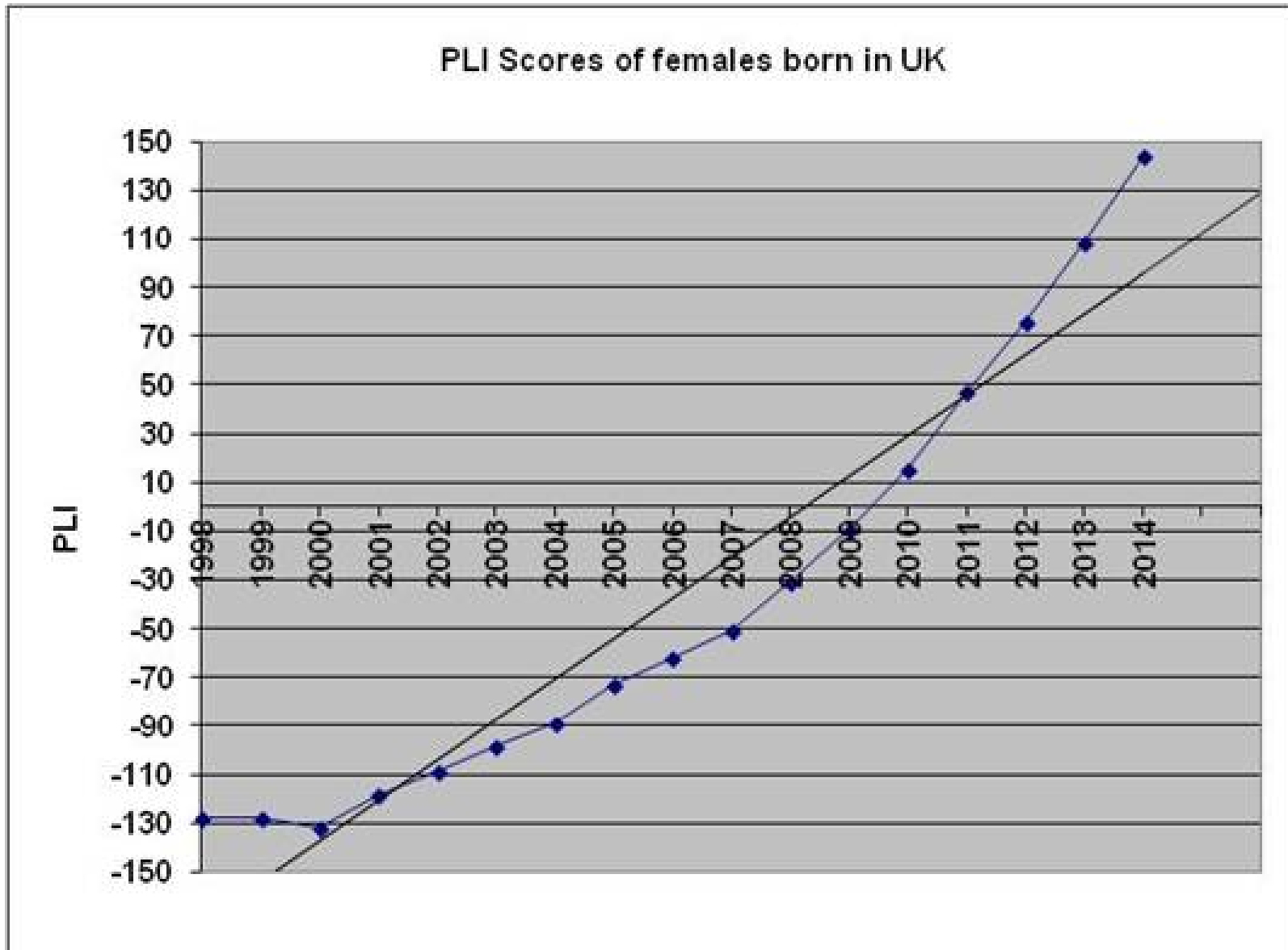


**45 kg of lean
each pig**

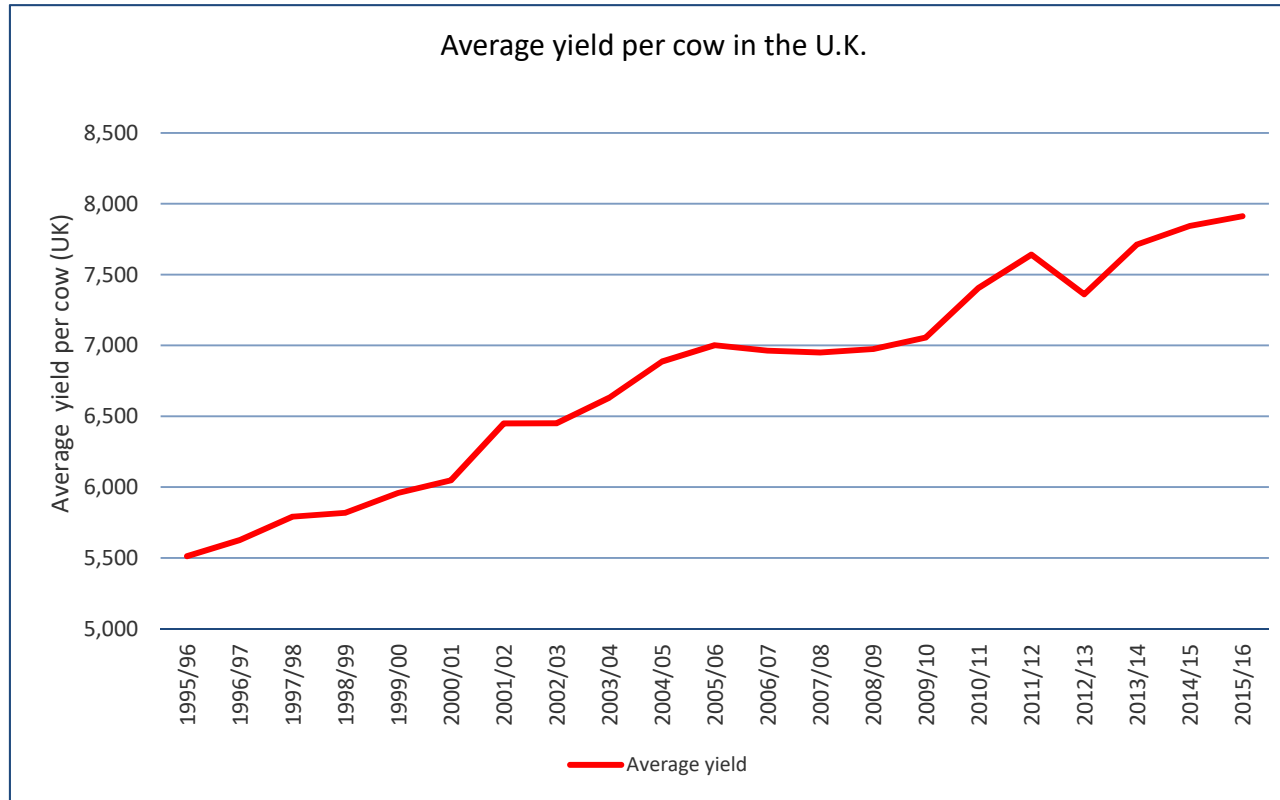
Approximately 60% of
improvement has come
from genetic
improvement

Onset of genomic testing in porcine

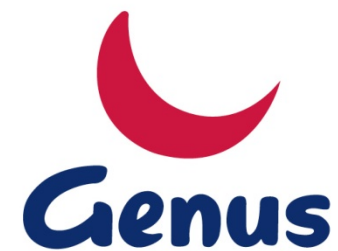




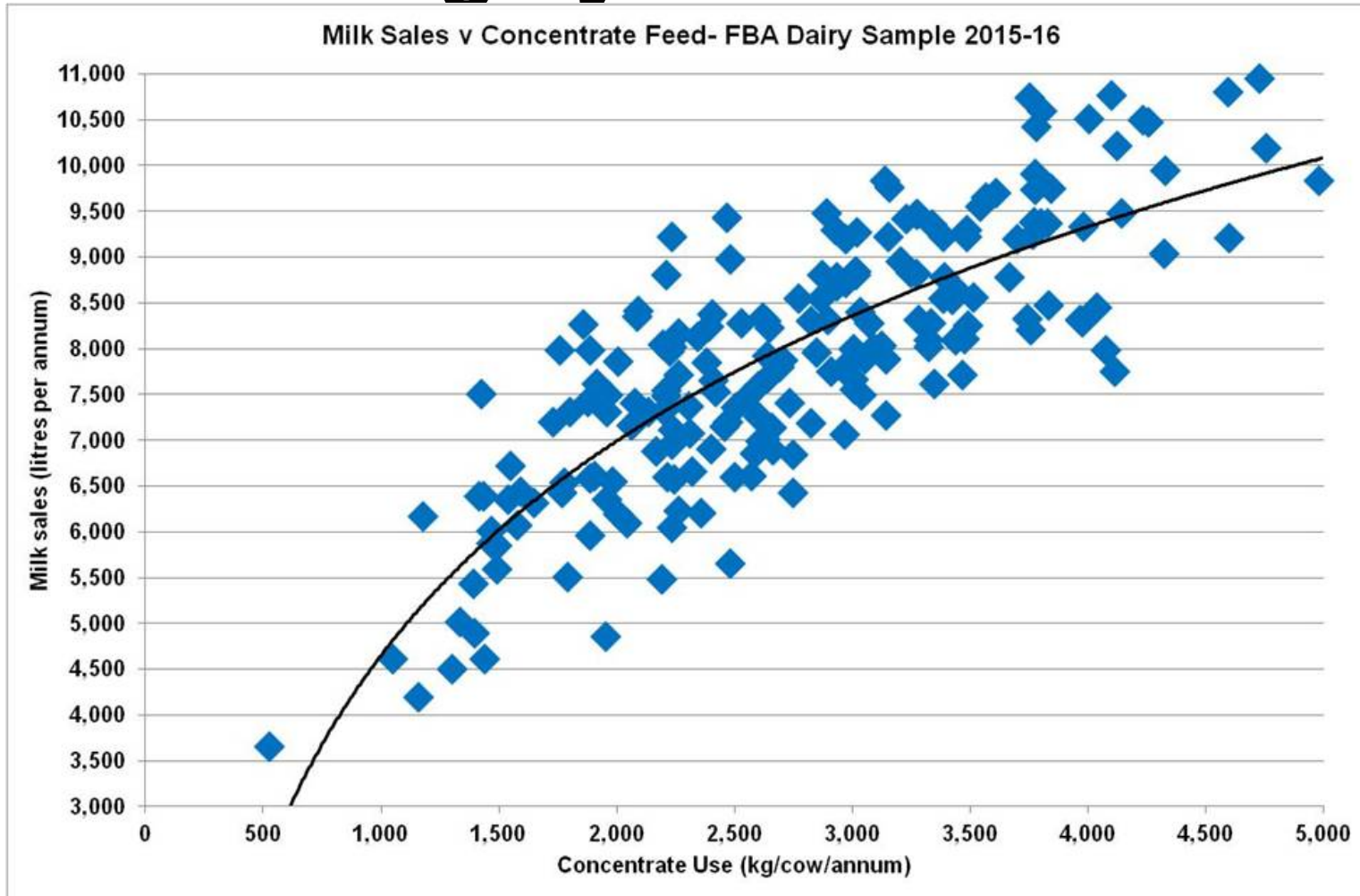
Which can be validated phenotypically!



This all sounds very easy?



The animal environment remains hugely influential!



Fragmented supply compounds this

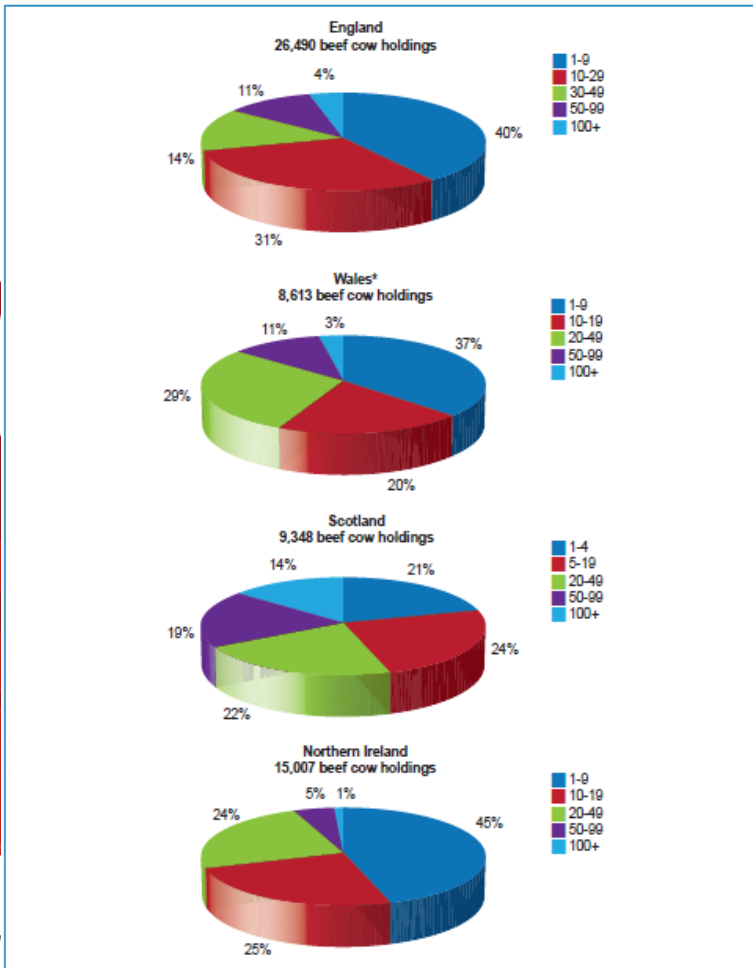
3.1 Density of beef breeding cows, UK, June 2013

3.4 Cattle holdings and average herd size by region, UK, June 2011–2014

3.5 Beef cow holdings by herd size and region, UK, June 2014



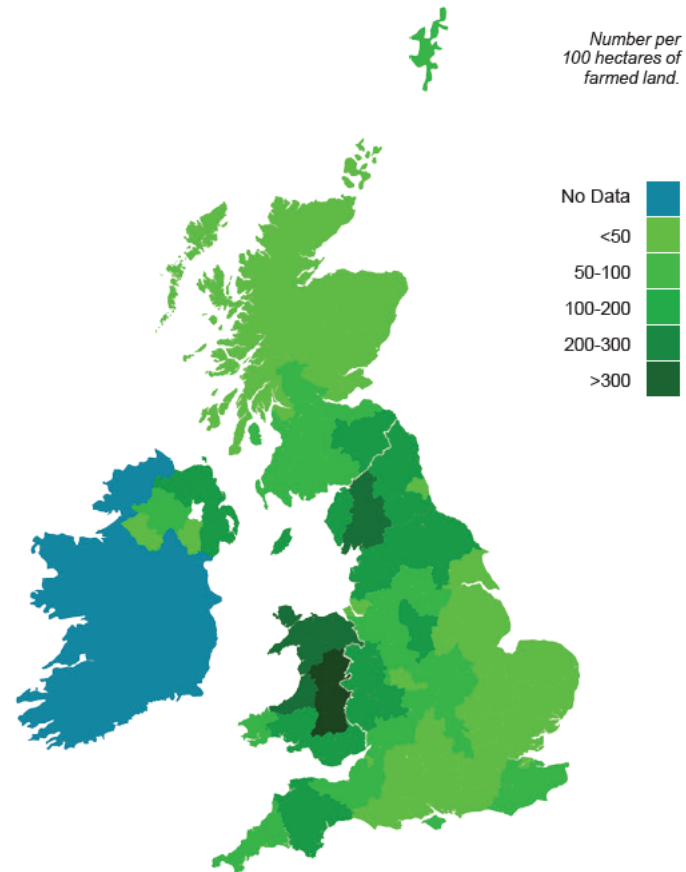
Source: Defra, Dardni, Scottish Government, Welsh Gov



Average airy herd size	No. of beef cow holdings	Average beef herd size	Total cattle holdings
79	27,459	28	41,527
82	26,514	28	40,209
84	26,990	27	40,961
89	26,490	27	40,601
N/A	9,395	N/A	11,635
N/A	9,114	N/A	11,348
N/A	8,910	N/A	11,104
N/A	8,613	N/A	10,906
76	9,825	48	12,580
82	9,660	48	12,380
87	9,843	47	12,097
92	9,348	47	11,969
80	15,389	18	20,461
81	15,665	18	20,434
82	15,356	18	20,201
86	15,007	17	20,044

Sheep spread very thinly!

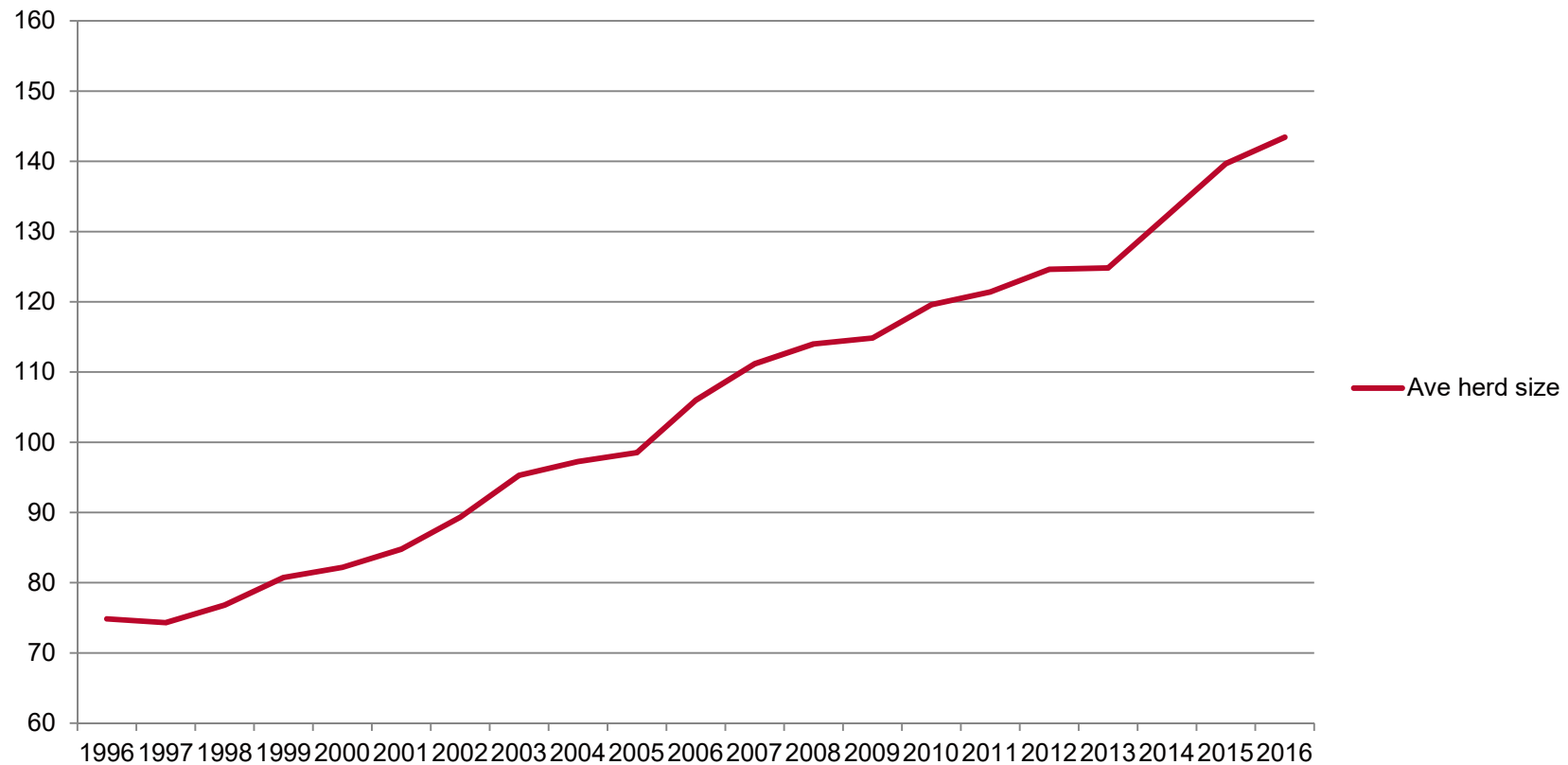
3.1 Density of breeding ewes, UK, June 2013



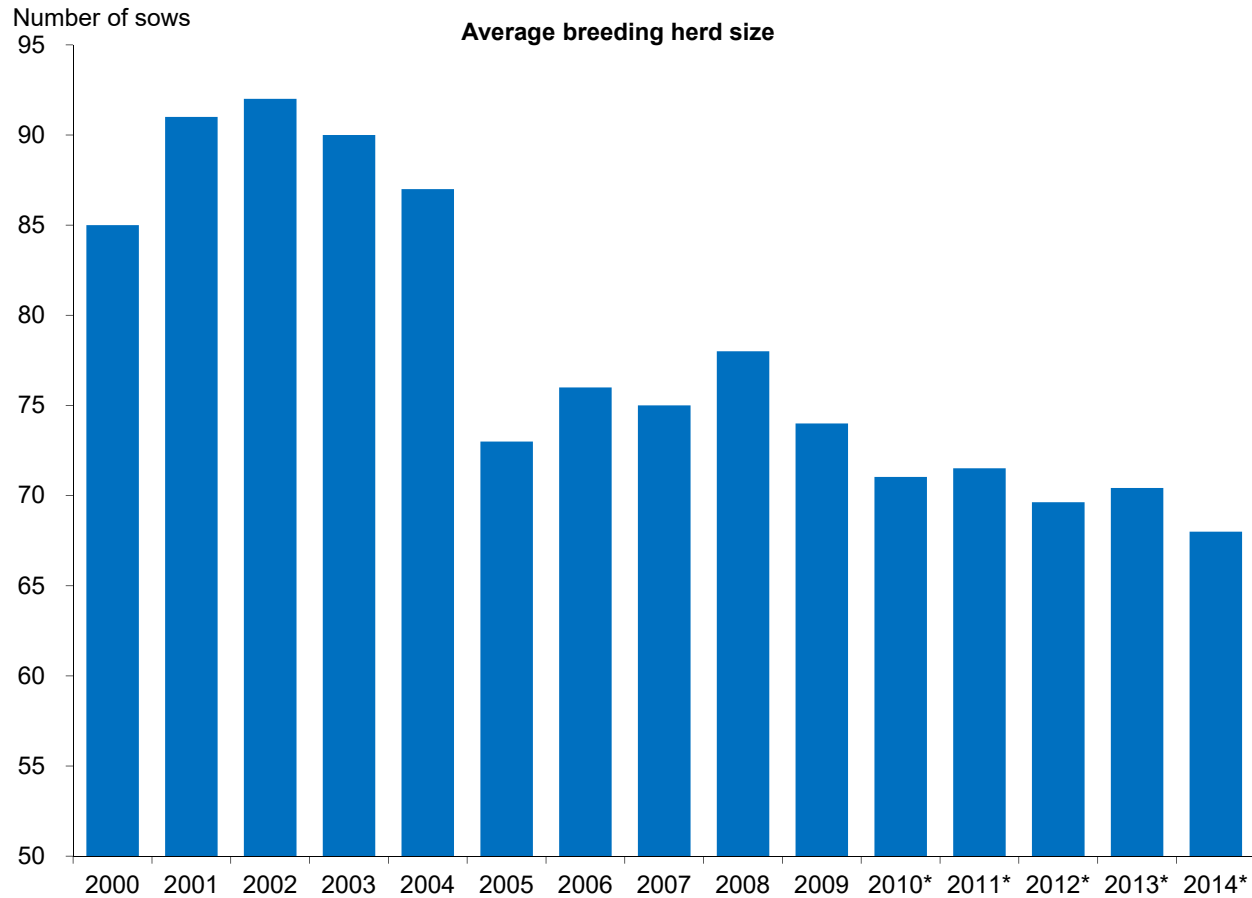
Source: Defra, Dardni, Scottish Government, Welsh Government

Consolidation in Dairy

UK Ave Dairy herd size



UK Pig world the opposite!



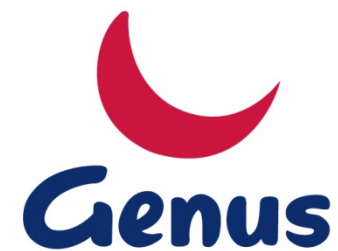
Moving from emotion to science



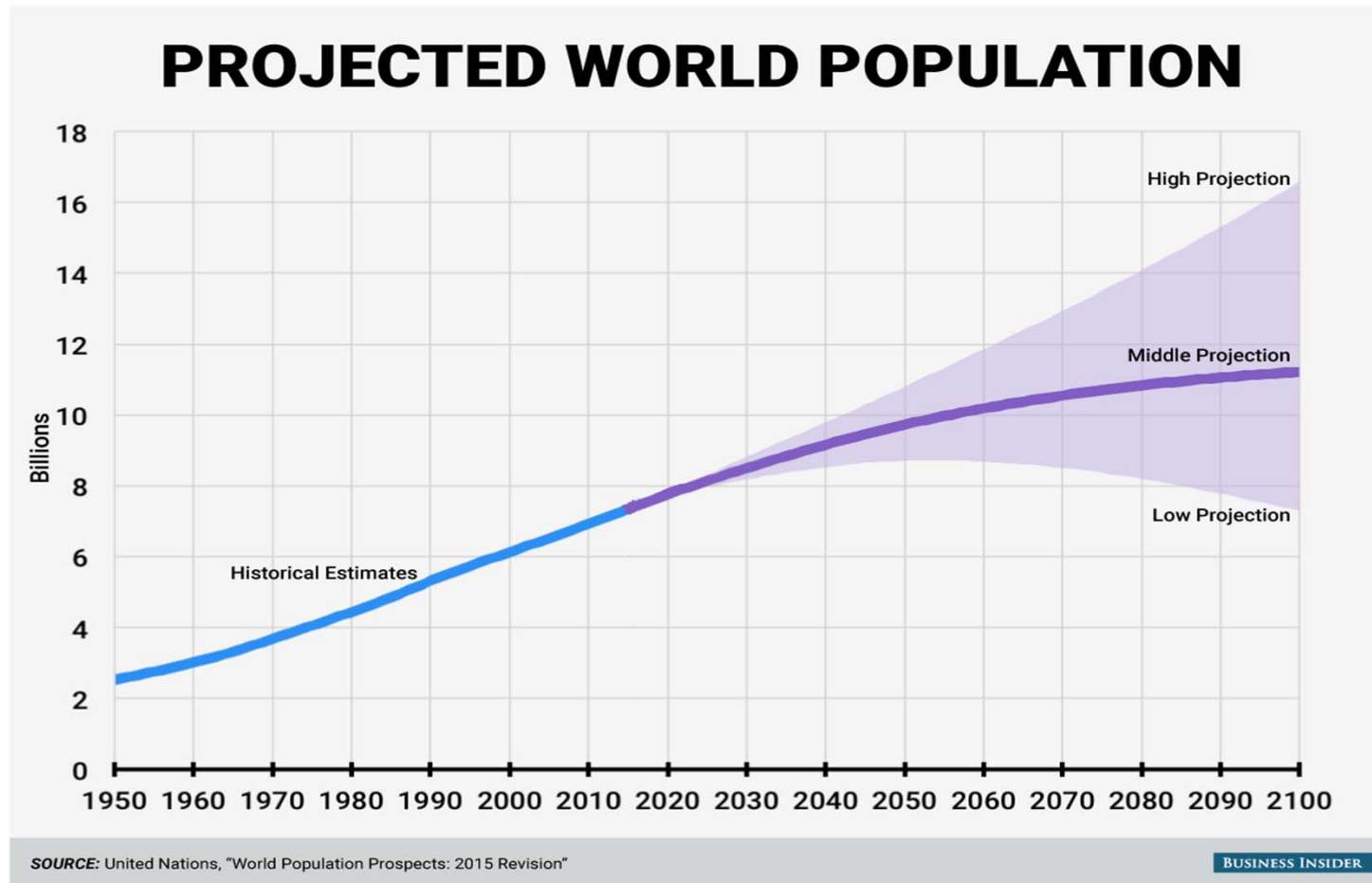
SIX SIGMA PHILOSOPHY

“If you don’t measure it, you can’t know it. If you don’t know it, you can’t control it. If you can’t control it, you are at the mercy of chance!”

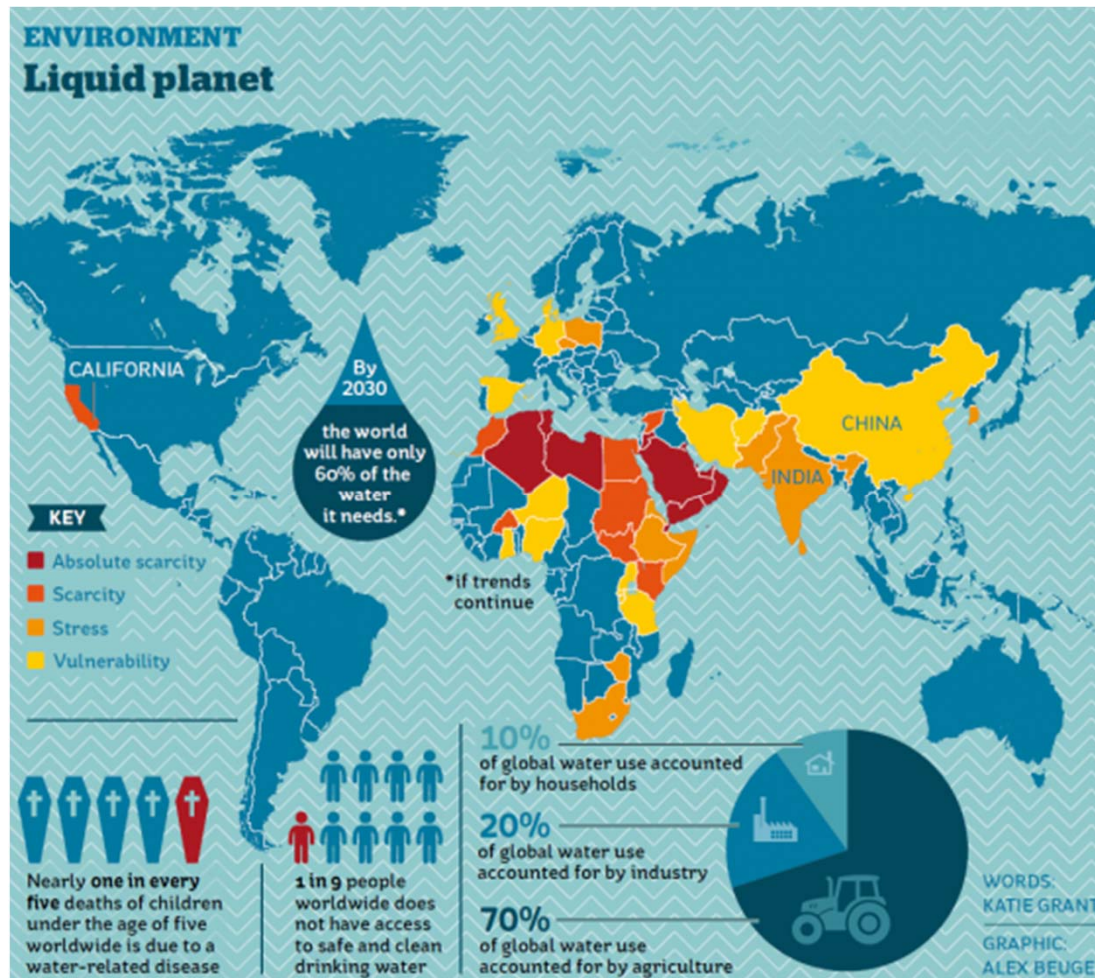
Why is this important?



Feeding the world



With water becoming equally scarce



Whilst retaining engagement with the consumer!



What are the opportunities in the future and does this really create value?



Milk is the main source of protein in India

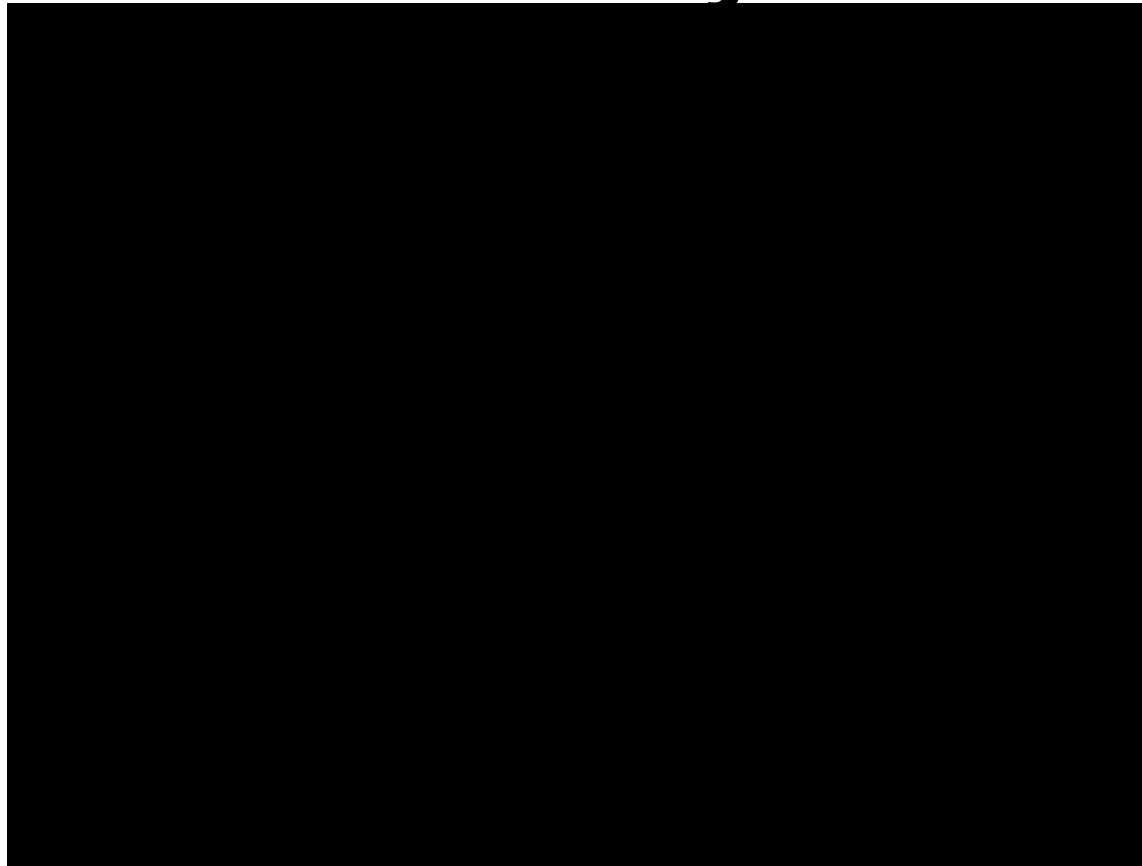


Milk production and per capita availability of milk in India

Year	Production (Million tonnes)	Per Capita Availability (gms/day)
1950-51	17.0	130
1960-61	20.0	126
1968-69	21.2	112
1973-74	23.2	110
1980-81	31.6	128
1990-91	53.9	176
1991-92	55.7	178
1992-93	58.0	182
1993-94	60.6	186
1994-95	63.8	192
1995-96	66.2	195
1996-97	69.1	200
1997-98	72.1	205
1998-99	75.4	210
1999-2K	78.3	214
2000-01	80.6	217
2001-02	84.4	222
2002-03	86.2	224
2003-04	88.1	225
2004-05	92.5	233
2005-06	97.1	241
2006-07	102.6	251
2007-08	107.9	260
2008-09	112.2	266
2009-10	116.4	273
2010-11	121.8	281
2011-12	127.9	290
2012-13	132.4	299
2013-14	137.7	307
2014-15	146.3	322
2015-16	155.5	337

Source: Department of Animal Husbandry, Dairying & Fisheries, Ministry of Agriculture & Farmers' welfare, GoI

But what could we achieve if we could double milk output over the next 5 years?



Human health and the link to antibiotic use in Livestock

- Recent reduction from 62mg/kg to 56mg/kg in antibiotic sales to food producing animals 2014 to 2015.
- Target reduction of 50mg/kg by 2018.
- Use of 30 million cow records now allows us to genetically select animals for disease resistance and resilience - **DATA**

Reduction in transition cow issues

“Antibiotic resistance is the biggest threat to modern medicine and we must act now to help keep antibiotics effective for future generations. This report shows the hard work of our vets and farmers is already making a real impact” (Defra)

Economic Index (per cow, per lactation)			
Holstein TransitionRight Genetics		Jersey TransitionRight Genetics	
★★★★★	\$100 Lactation Savings	★★★★★	\$50 Lactation Savings
★★★★	\$50 Lactation Savings	★★★★	\$25 Lactation Savings
★★★	\$0 Lactation Savings	★★★	\$0 Lactation Savings
★★	-\$50 Lactation Savings	★★	-\$25 Lactation Savings
★	-\$100 Lactation Savings	★	-\$50 Lactation Savings

Disease Reduction in 5-Star Daughter Group Compared to 1-Star Daughter Group			
Holstein TransitionRight Genetics		Jersey TransitionRight Genetics	
Disease Trait	Difference in Incidence Rates	Disease Trait	Difference in Incidence Rates
Mastitis	7%	Mastitis	10%
Metritis	6%	Metritis	3%
Ketosis	4%		

“Those who work with animals have a key role to play in the global fight against antibiotic resistance to monitor use and reduce it wherever we can. Clearly, we must not ease up in our efforts, but it is great to see that we are on track.” (CVO)



Gene editing

“Genome-editing offers opportunities to boost food security by reducing waste and losses from infectious diseases, as well as improving animal welfare by reducing the burden of disease. Our results take us closer to realising these benefits and specifically address the most important infectious disease problem for the pig industry worldwide.”

Professor Alan Archibald, of The Roslin Institute,

PRRSv resistance

- PRRS is endemic in most pig producing countries worldwide.
- Vaccines have mostly failed to stop the spread of the virus, which continues to evolve rapidly.
- Consequently, it is one of the greatest challenges facing pig producers today.
- In Europe alone, the disease is estimated to cost the pig industry more than €1.5 billion each year.
- In the latest study, only the section of CD163 that interacts with PRRSv is removed and the molecule appears to retain its other functions.
- The research team at the University of Edinburgh's Roslin Institute, in collaboration with Genus, used a gene-editing tool called CRISPR/Cas9 to cut out a small section of the CD163 gene in the pigs' DNA code.
- The next stage in the study will be to test whether the pigs are resistant to infection when exposed to the virus.
- Previous studies by another Genus-supported team have shown that pigs lacking the entire CD163 molecule do not become ill when exposed to PRRSv.

But what about beef?

- Understand what the consumer wants from a meat quality perspective.
- Understand the cost of production, especially growth rates, to create an animal which is more efficient.
- Combine the two to create an index to select sires and females by.
- Accelerate with partner farms.

Beef Advantage



Calving Ease



The cost of a difficult calving and the knock on effects to cow production and subsequent fertility.



Gestation Length



The cost of an extra day pregnant and the loss of days in milk production.



Calf Quality



The conformation of the calf and the extra value achieved from better calf conformation.



Calf Survivability



The cost of losing a live calf within 48 hours of birth.

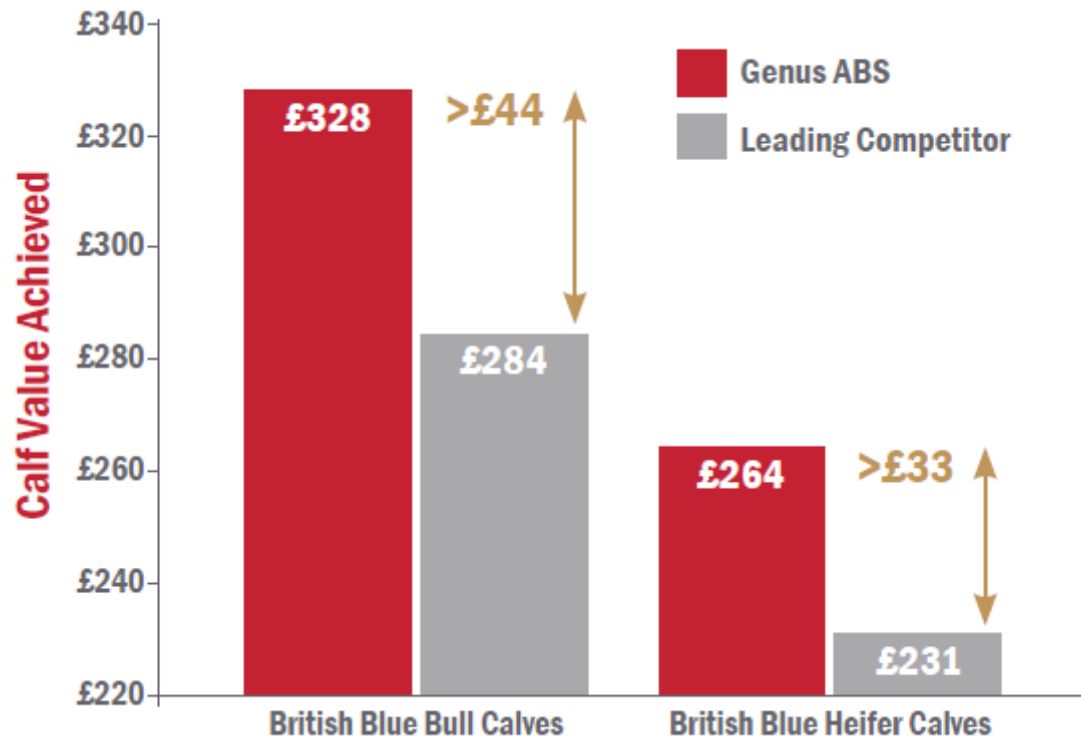


Calf Value



Calf prices realised from auction markets and leading calf buying companies.

Genus ABS & leading competitor



- Updated data set contains price from November 16 through March 17 for sire ID calves
- Price difference remain **£42** for Bull calves and **£33** for heifer calves
- Calf numbers now over **800** calves
- Average age **32** days
- Average weight
 - 68 kg for heifers (+1kg over Cogent)
 - 73 Kg for Bulls (+3Kg over Cogent)

Summary

We must:

- Be responsible in everything that we do
- Engage with the consumer and educate
- Encourage free trade and industry consolidation which will make influencing the environment easier.
- Training remains key to optimise the farmed environment
- Embrace that the world changes
- Learn from the past, but look forwards to the future!

Questions?

