



**ANIMAL GENETICS  
AND BREEDING UNIT**

*A joint unit of NSW DPI and UNE*

# **Opportunities through genetic improvement to 2020 and beyond**

Robert Banks

AGBU

# What is genetic improvement?

- ***Finding animals (or plants) with the best genes for our purpose***
- ***Using them as parents***
  - ***Current generation***
  - ***Future generations***

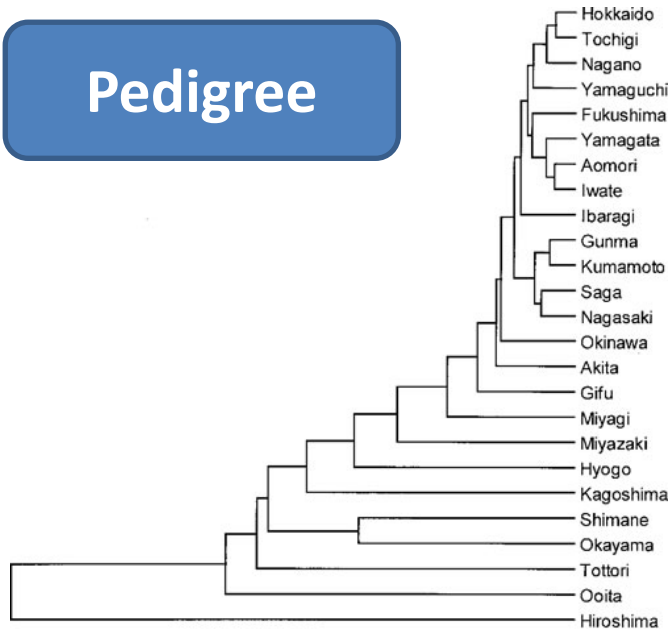
# The Challenge



- ***Which bull has the best genes?***

# Genetic evaluation

Pedigree



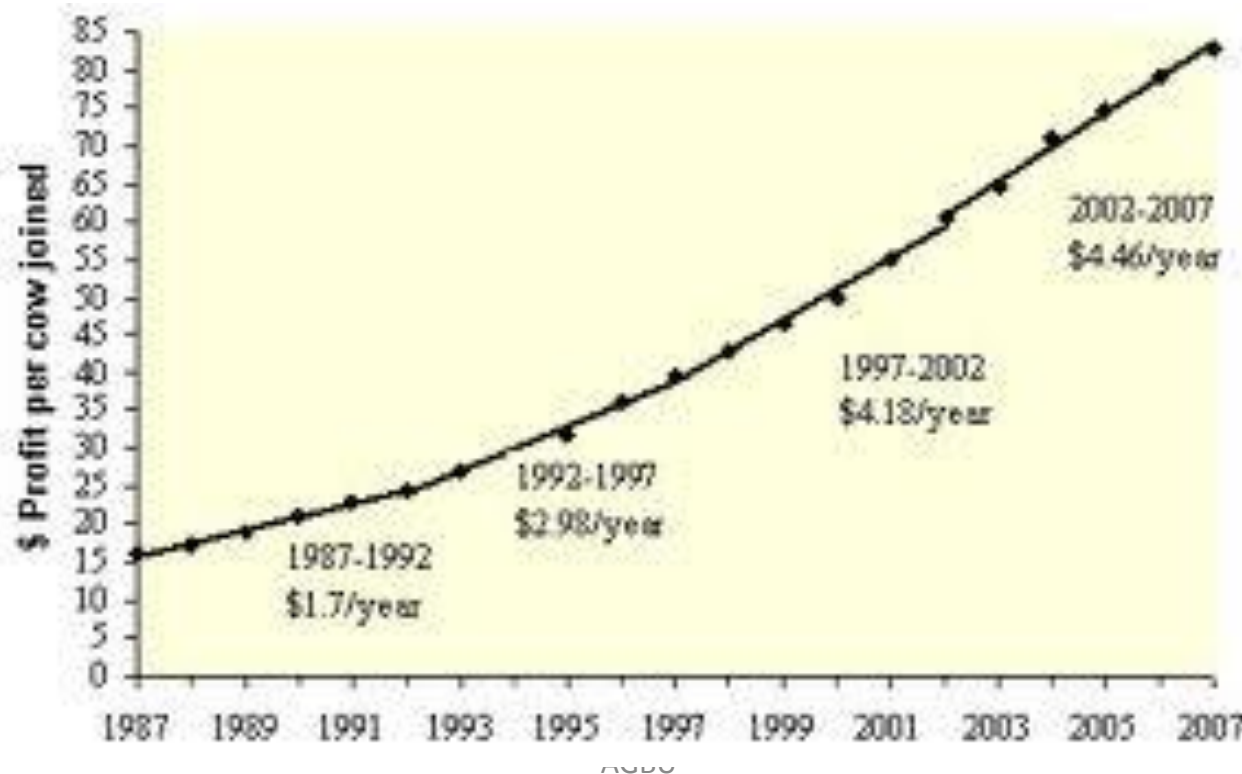
Performance records

EID ear tag	VID	Read Date	Birth Date	Pen	Weight	W. Date	Cow ID	Treatment	Treat. Date
124000252097231	231	4-Feb-2009	10-Oct-2008	4	500	4-Feb-2009	46R	Protocol 1	13-Feb-2009
124000252097233	233	4-Feb-2009	22-Oct-2008	4			2944U	Protocol 1	13-Feb-2009
124000261594152	4152	11-Feb-2009	8-Nov-2008	4			BESSIE	Protocol 1	13-Feb-2009
124000261594153	4153	4-Feb-2009	22-Oct-2008	4	555	4-Feb-2009	RED		
124000261594154	154	11-Feb-2009	11-Nov-2008	4				Predef	11-Feb-2009
124000261594154	154	11-Feb-2009	11-Nov-2008	4				Protocol 1	13-Feb-2009
124000261594157	4157	11-Feb-2009	2-Oct-2008	4	590	4-Feb-2009			
124000261594158		11-Feb-2009	2-Nov-2008	4	380	4-Feb-2009			
124000261594160	160	4-Feb-2009	12-Nov-2008	4	480	4-Feb-2009	26U		
124000261594161	161	4-Feb-2009	13-Nov-2008	4	453	4-Feb-2009		Excenel	15-Feb-2009
124000261594162	594162	11-Feb-2009	24-Oct-2008	5	385	4-Feb-2009			
124000261594163	4163	11-Feb-2009	26-Oct-2008	4				BovShield	21-Feb-2009
124000261594164	K	11-Feb-2009	10-Nov-2008	4	666	4-Feb-2009	KAY		
124000261594165	4165	4-Feb-2009	22-Oct-2008	4			56Y		
124000261594166	4166	4-Feb-2009	1-Oct-2008	5	600	4-Feb-2009		BovShield	21-Feb-2009
124000261594173	173	11-Feb-2009	2-Nov-2008	4					
124000261594174	4174	11-Feb-2009	1-Oct-2008	5			2342U	Returned	9-Feb-2009
124000261594174	4174	11-Feb-2009	1-Oct-2008	5				Excenel	9-Feb-2009
124000263638605	605Y	4-Feb-2009	1-Oct-2008	888M	499	4-Feb-2009	56T		
124000263638623		4-Feb-2009	1-Oct-2008	888M					
	BETTY	11-Feb-2009	19-Nov-2008					BovShield	11-Feb-2009
	J04	11-Feb-2009	18-Oct-2008	1			J03	Predef	11-Feb-2009

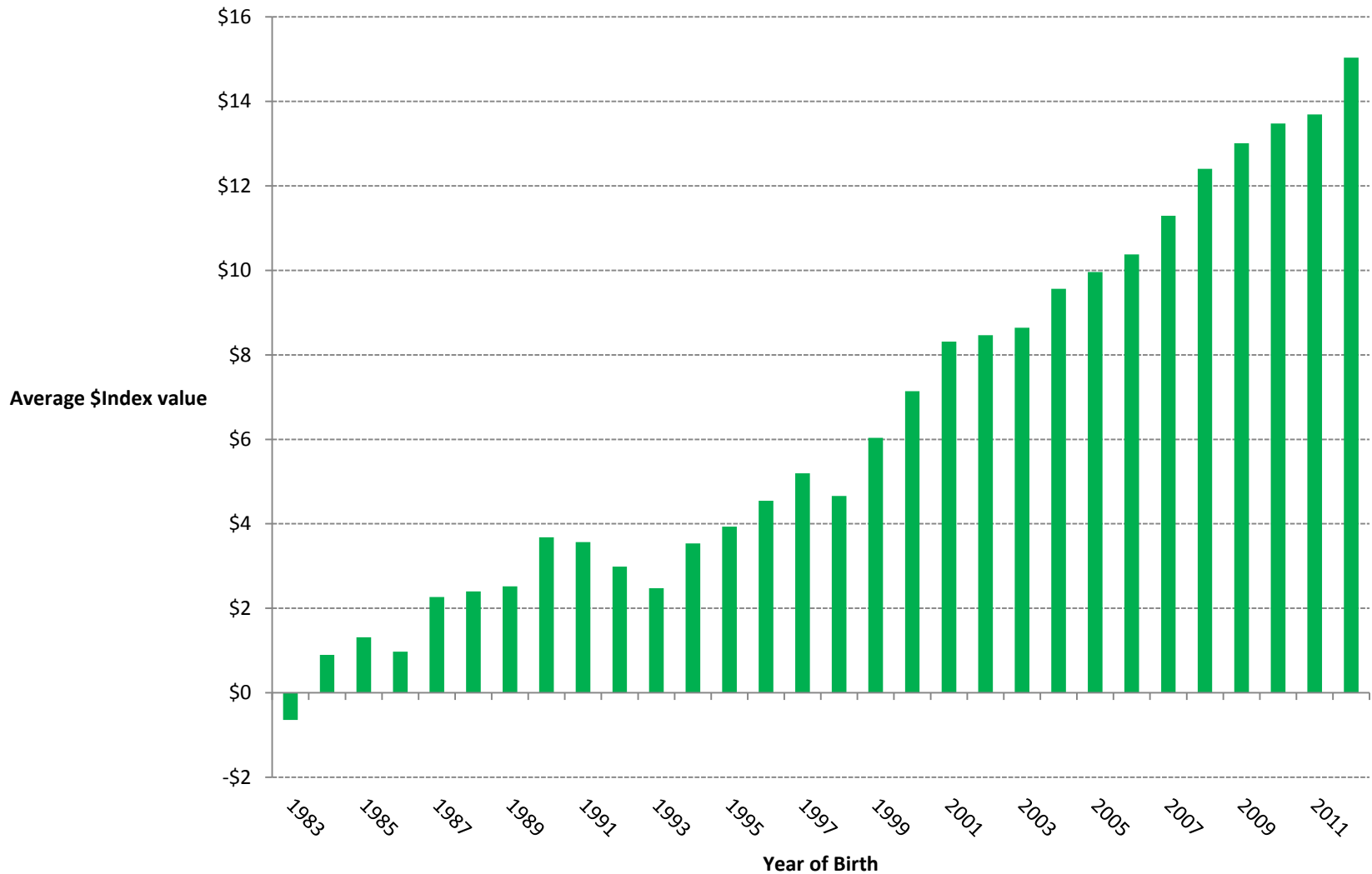
- Estimated Breeding Values (EBVs)
- *Value of each animal's genes for recorded traits*

# Improving future generations

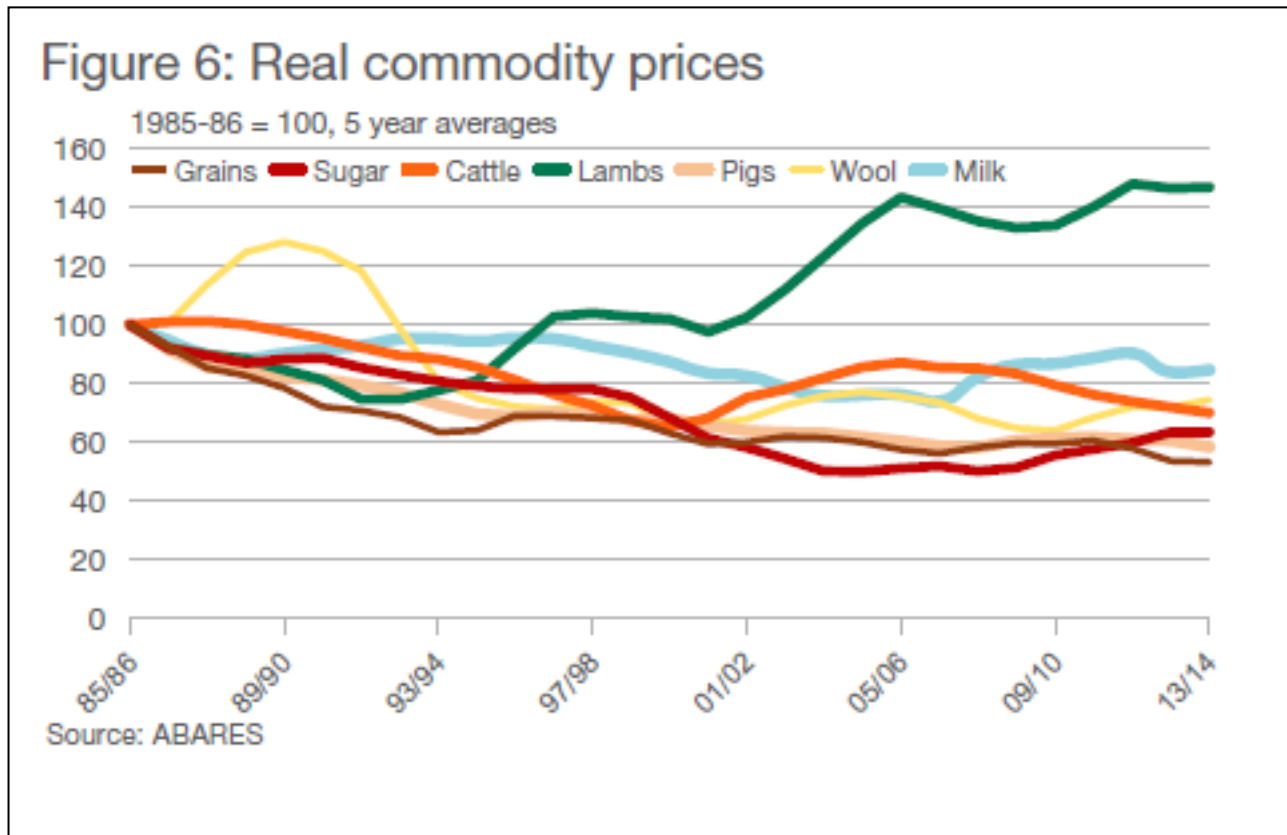
- *Identify the best animals to use as parents – breed better and better animals*



# \$Index Trend in Australian Brahmans



# Does it make a difference?



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Figure 6: Real commodity prices

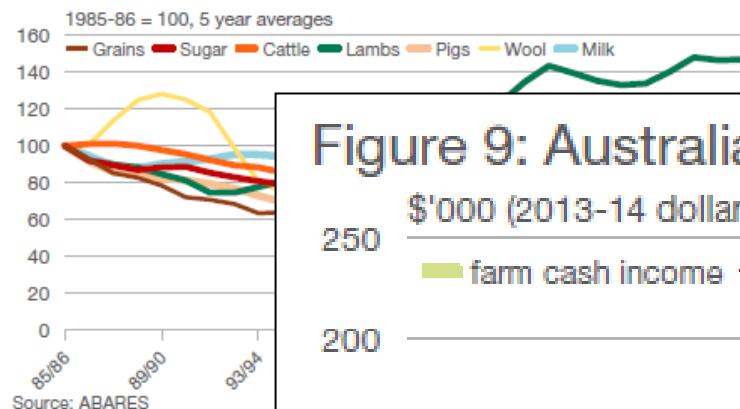


Figure 9: Australian slaughter lamb farm income

\$'000 (2013-14 dollars)

farm cash income trend

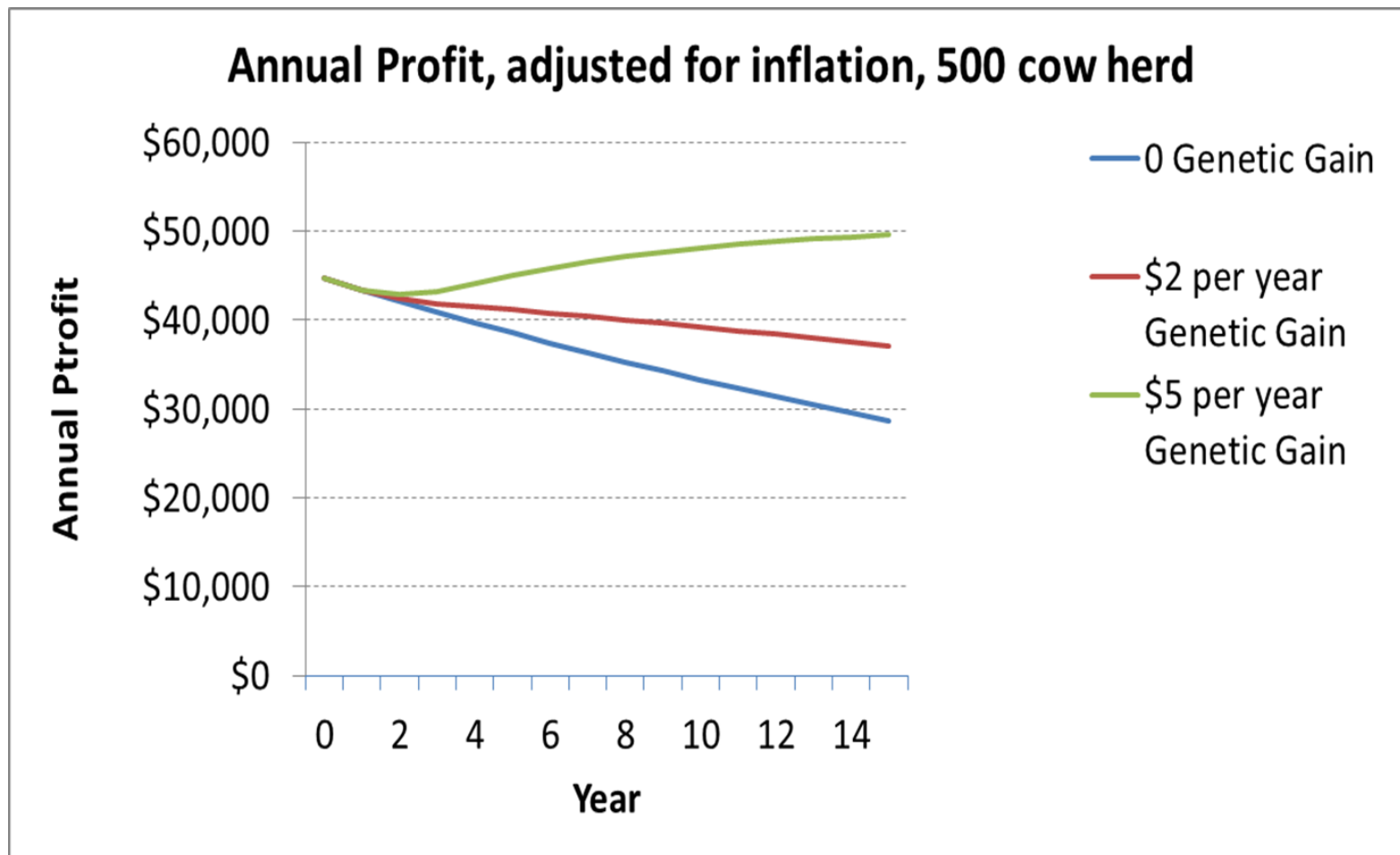


Source: ABARES

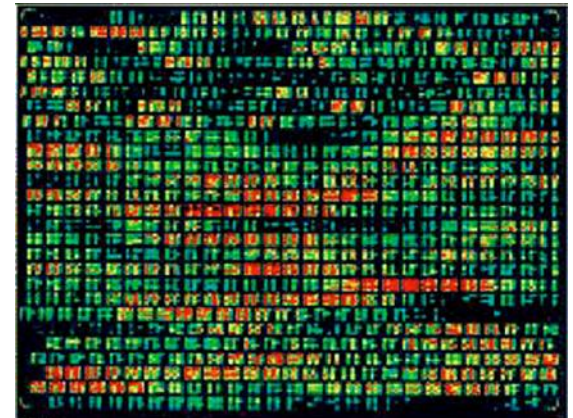
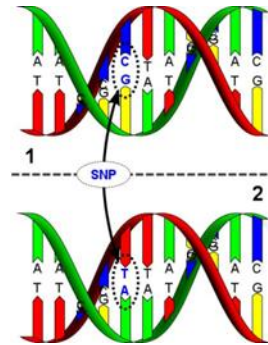
e = estimate



# Does it make a difference?



# Opportunities – new tools:



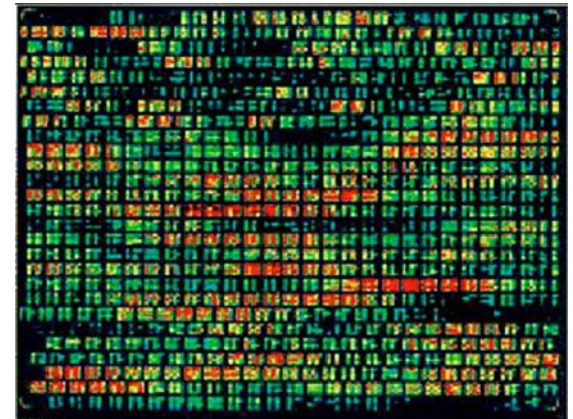
# Opportunities – new tools:



Record important traits

Read DNA

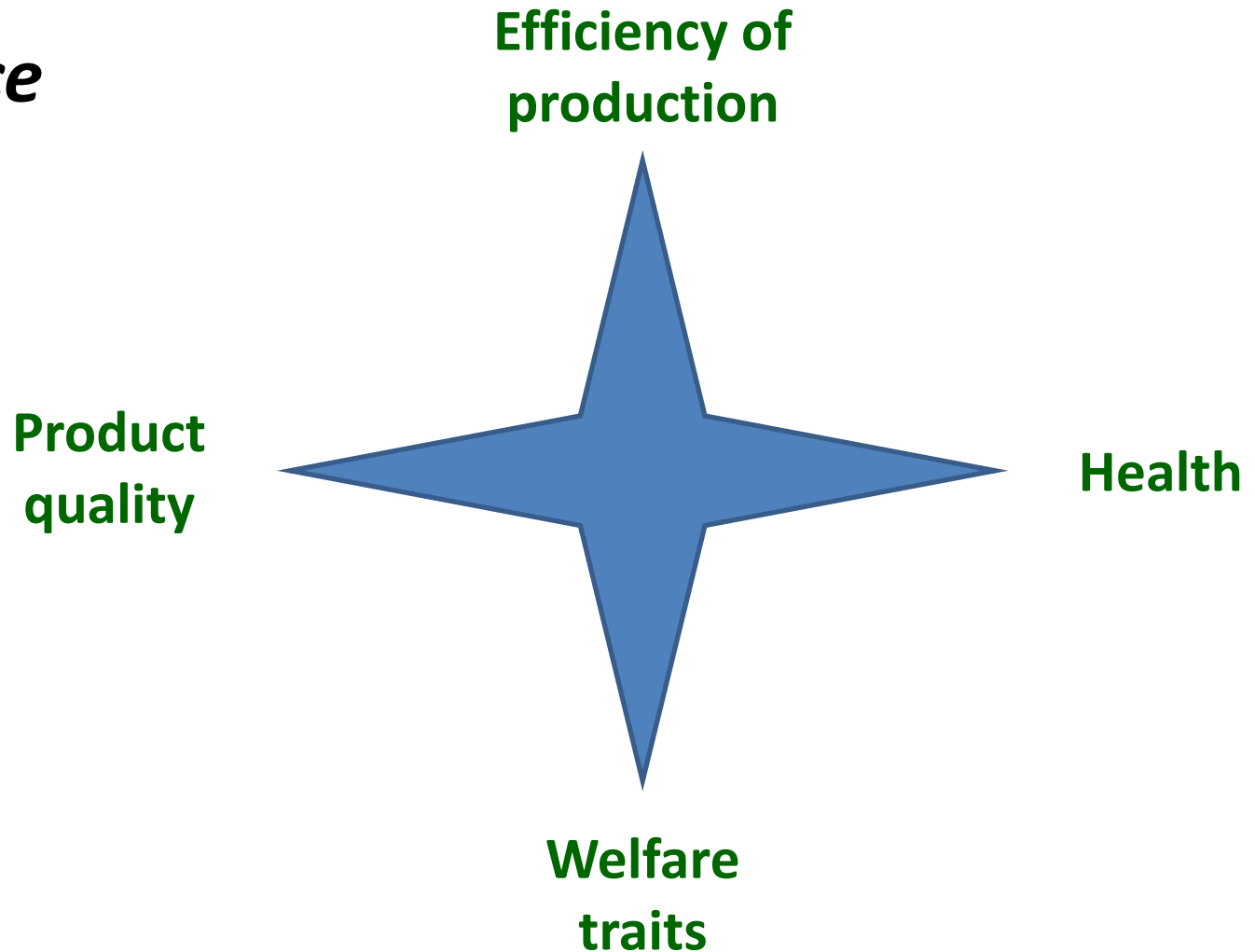
Relate DNA patterns to traits



# What does genomics offer?

- ***Balance***

- speed



# What does genomics offer?

- *Balance*
- *Speed*



# Opportunities for talented people:

- ***R&D***
  - *Maths and biology skills*
- ***Business support and development***
  - *communications skills, economics*
- ***Breeding and production businesses***
  - *Vision, relationships*

# Policy challenges:

- ***R&D***
  - *Maintenance of capacity*
  - *Balance of local and international*
- ***Implementation***
  - *Market failures inhibiting investment in recording – guarantee reduced breed portfolio*
  - *Role of RDCs and state agencies evolving but essential*
  - *Long-term commitments required*

# Looking ahead:

- *2 waves of enormous change since 1980 – BLUP and genomics*
- *Risk now largely packaged and manageable*
- *Transforms livestock production – genetics beats the cost-price squeeze*
- *Calls for vision and responsibility in designing the animals of the future*