Broiler Breeding Toward 2050:
Feeding the World

Oxford Farming Conference, Jan 2014

Agenda

- How does broiler breeding work?
- Where (& how) will we be in the future?
- Who will benefit?

HOW?


Pedigree Breeding Program:
Each Chick is Identified with a
Unique Wing Band
Cobb R

Family Hatch

Accenting Selection Technologies

400,000 birds measured per year

Phenotype Selection

Feed conversion

Gait scoring

Lixiscope

Accenting Selection Technologies

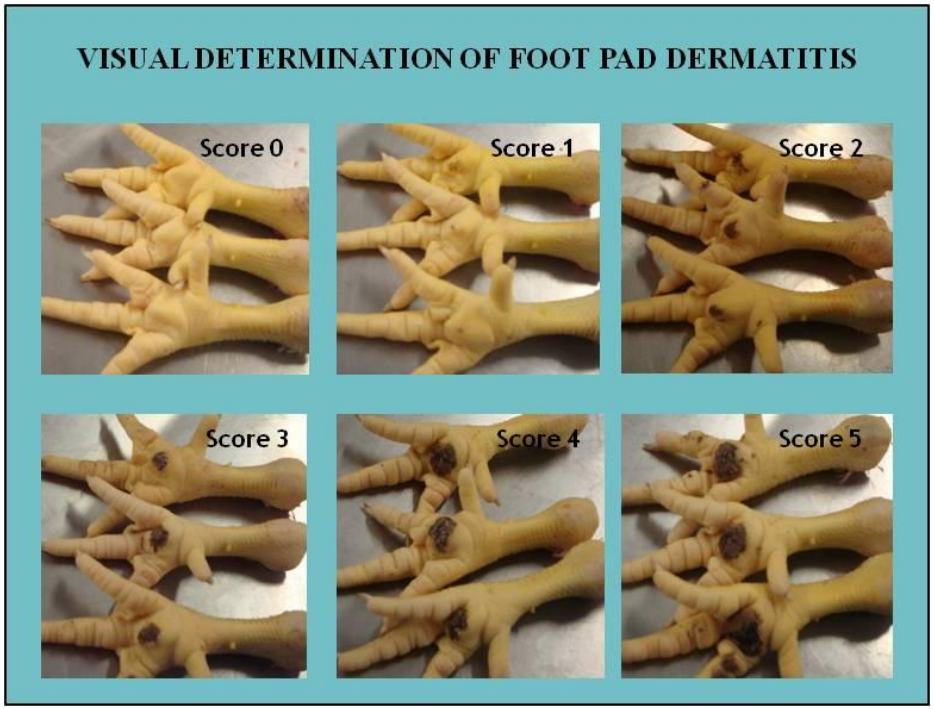
Filet Shape

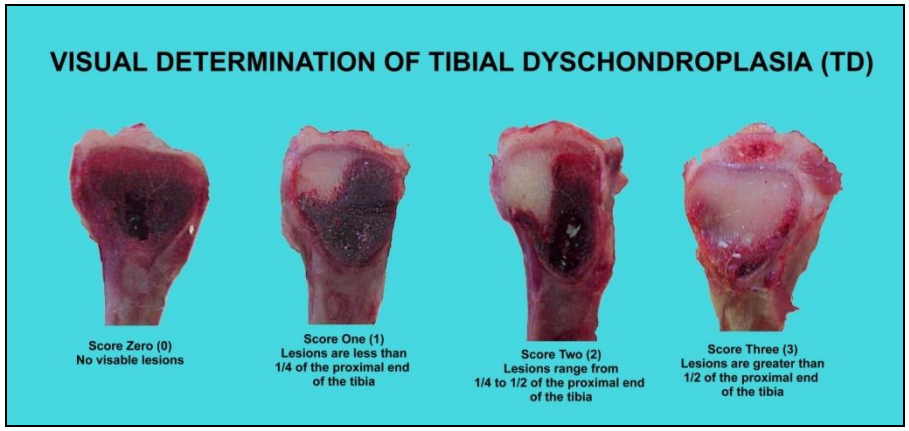
FCR Group Testing

Ultrasound

Blood O2 Testing

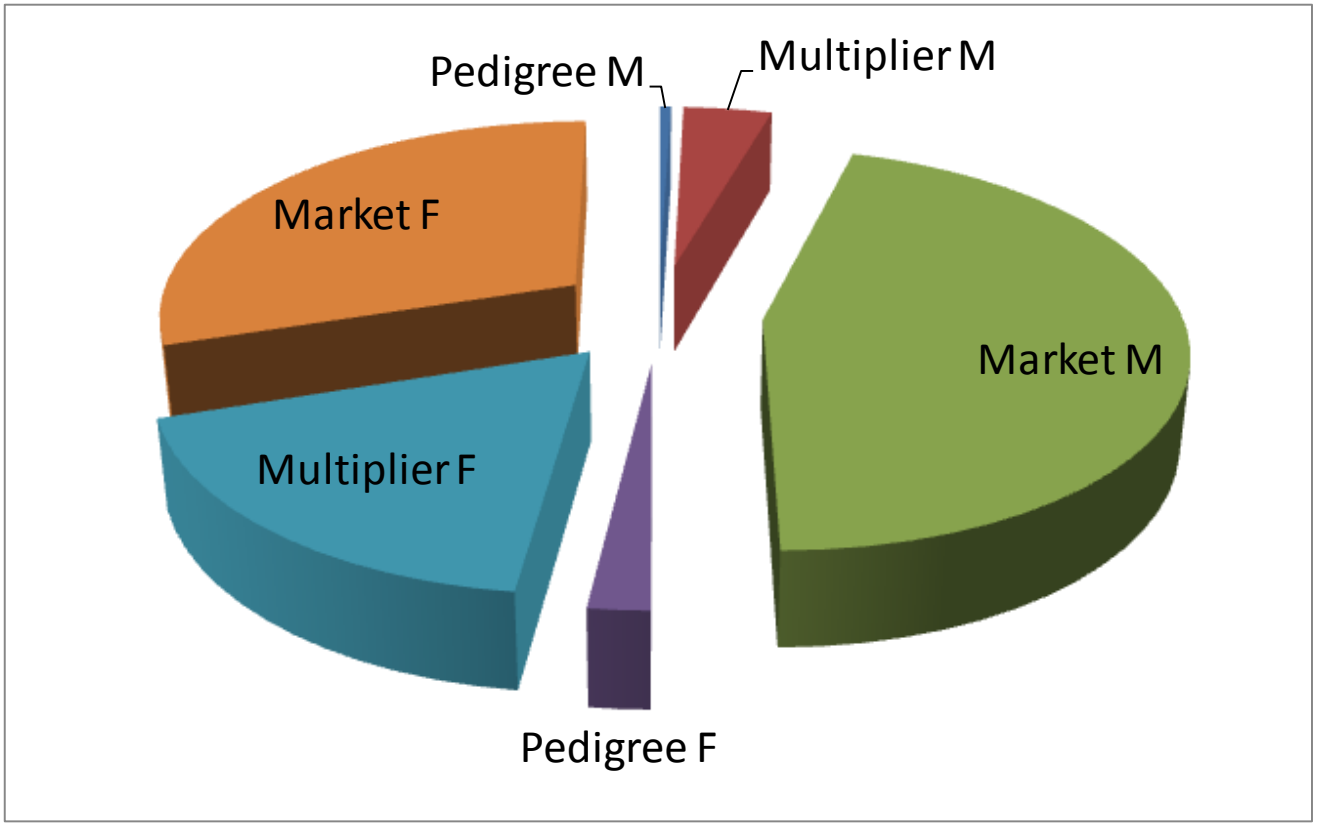
Bird Welfare Selection Scoring





Pedigree Selection System

Less than 1% of males kept for pedigree



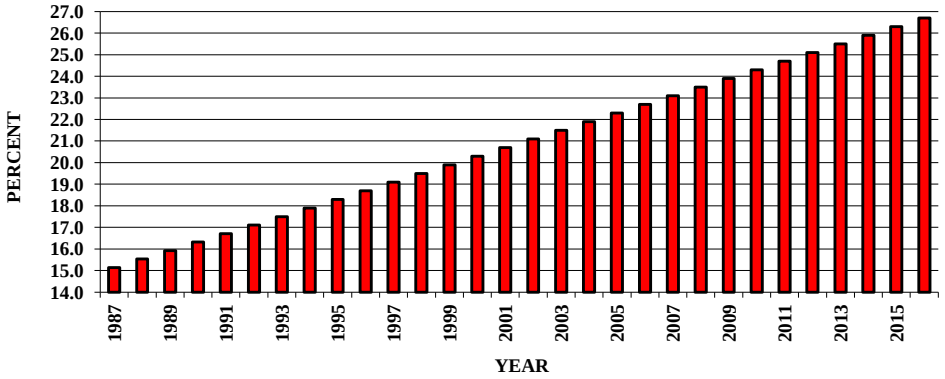
Less than 5% of females kept for pedigree

WHERE ARE WE?

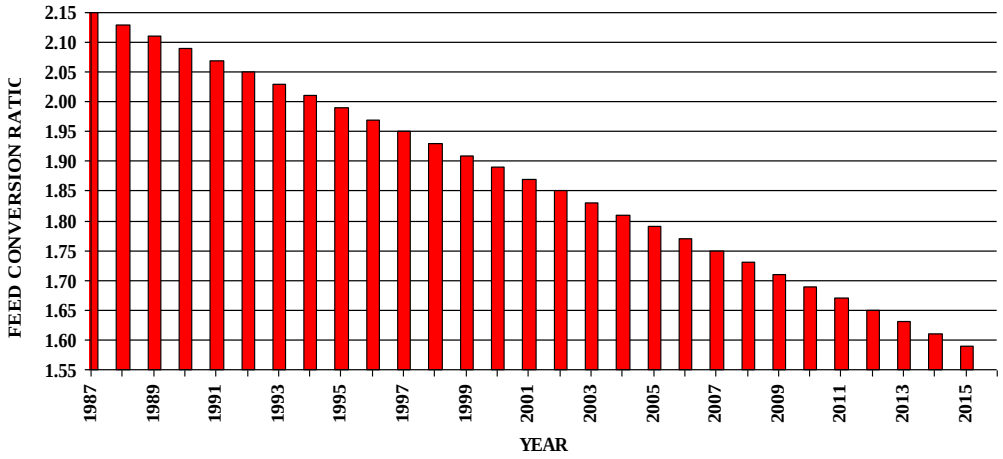
Cobb 500 Improvement Trends

2.3 kg Weight

Breast Yield



Feed Conversion



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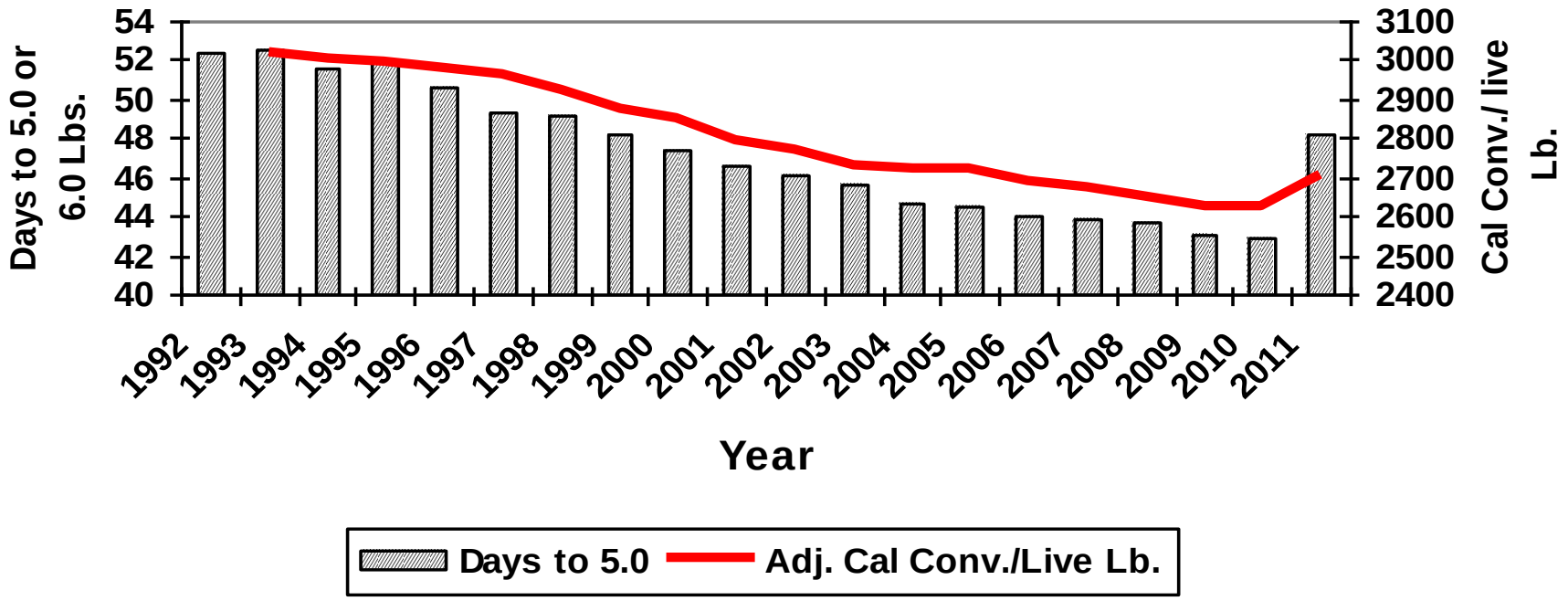
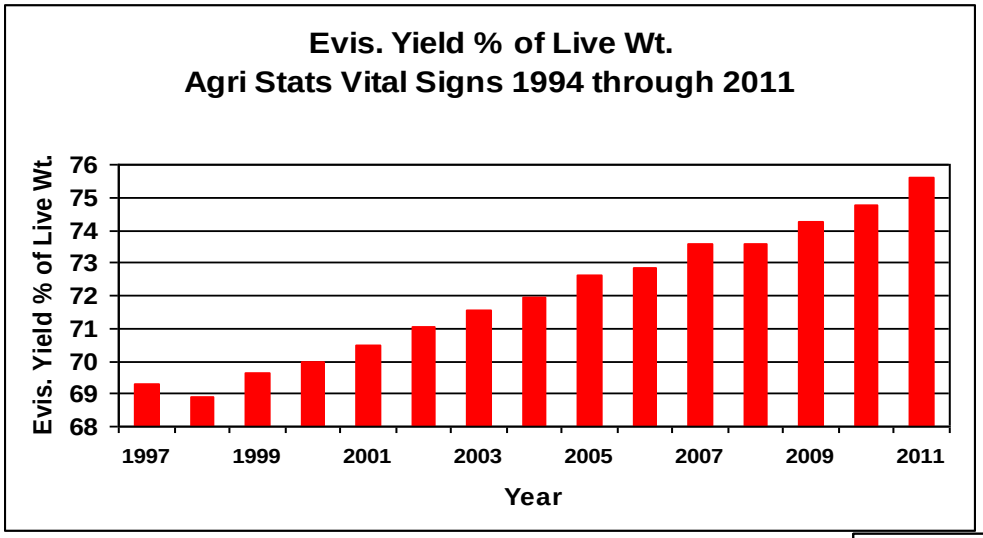
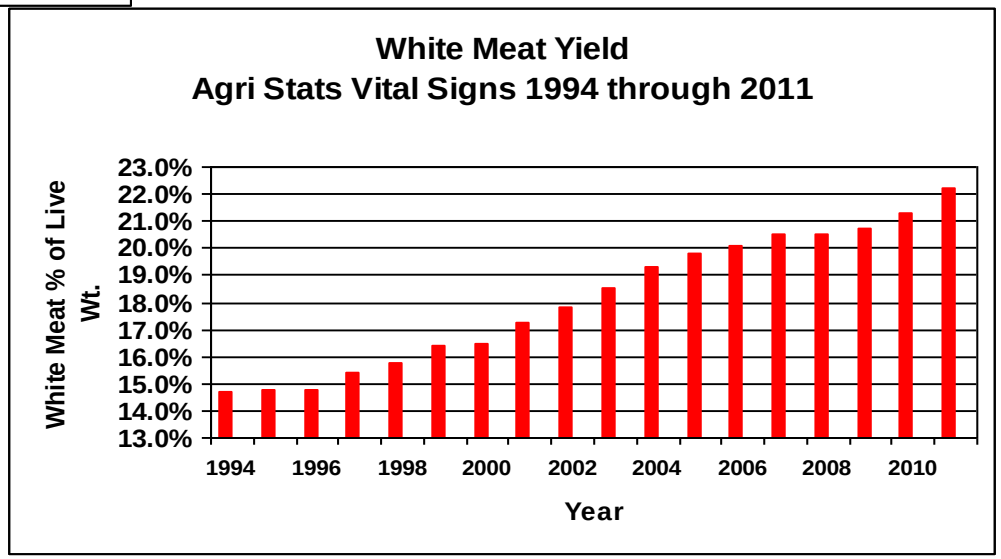
Days and Calories Conversion
(to 5.0 lbs to 2010,now to 6.0 Lbs.)
Agri Stats Vital Signs 1992 through 2011

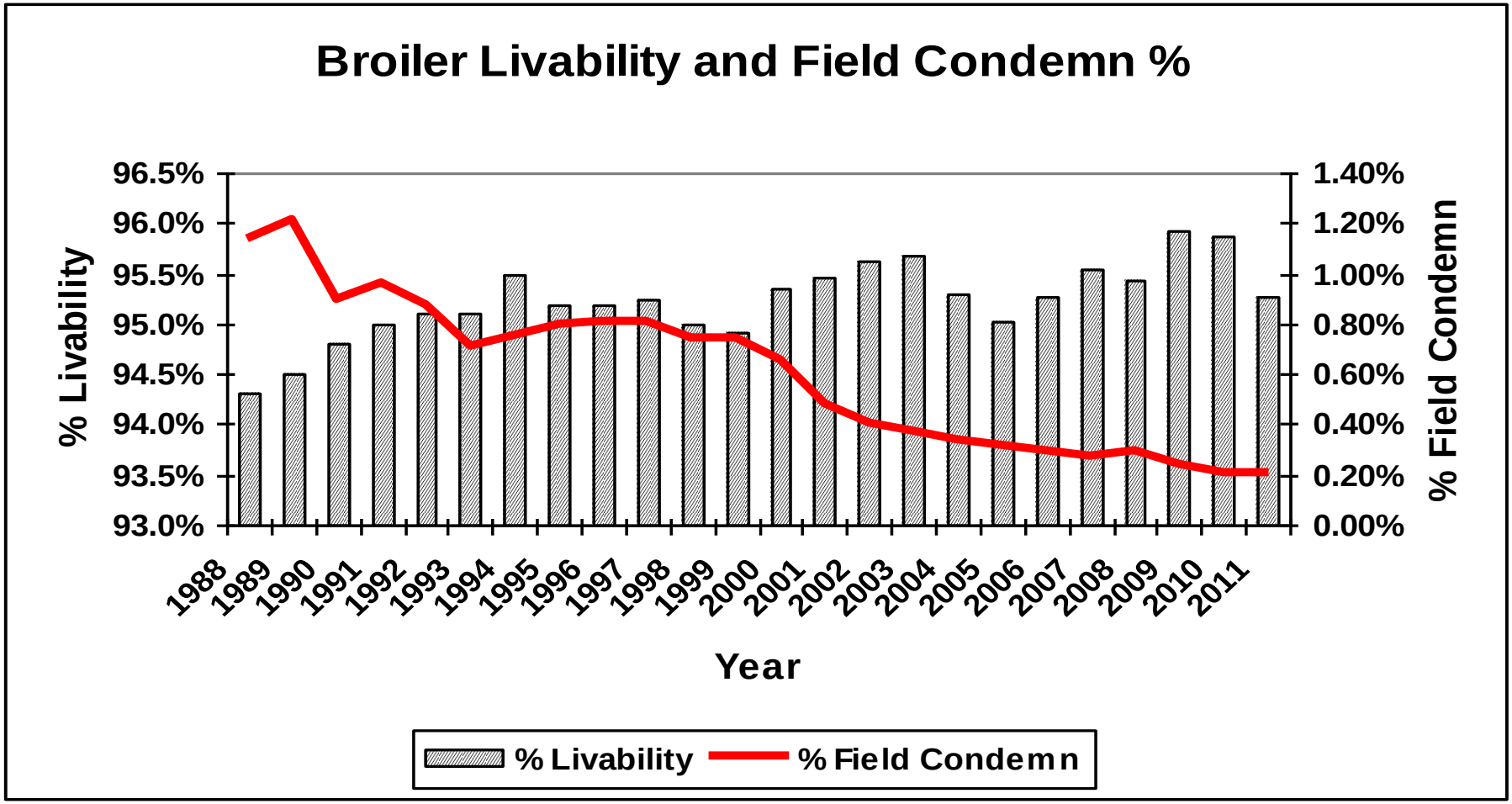


US Industry Plant Yield Trends





Source: Agristats


Broiler Livability and Field Condemn %
% Livability
96.5%
96.0%
95.5%
95.0%
94.5%
94.0%
93.5%
93.0%
% Field Condemn
1.40%
1.20%
1.00%
0.80%
0.60%
0.40%
0.20%
0.00%
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
Year
% Livability
% Field Condemn

Cobb*500*™ *improvements in SR broilers @ 42 days of age*

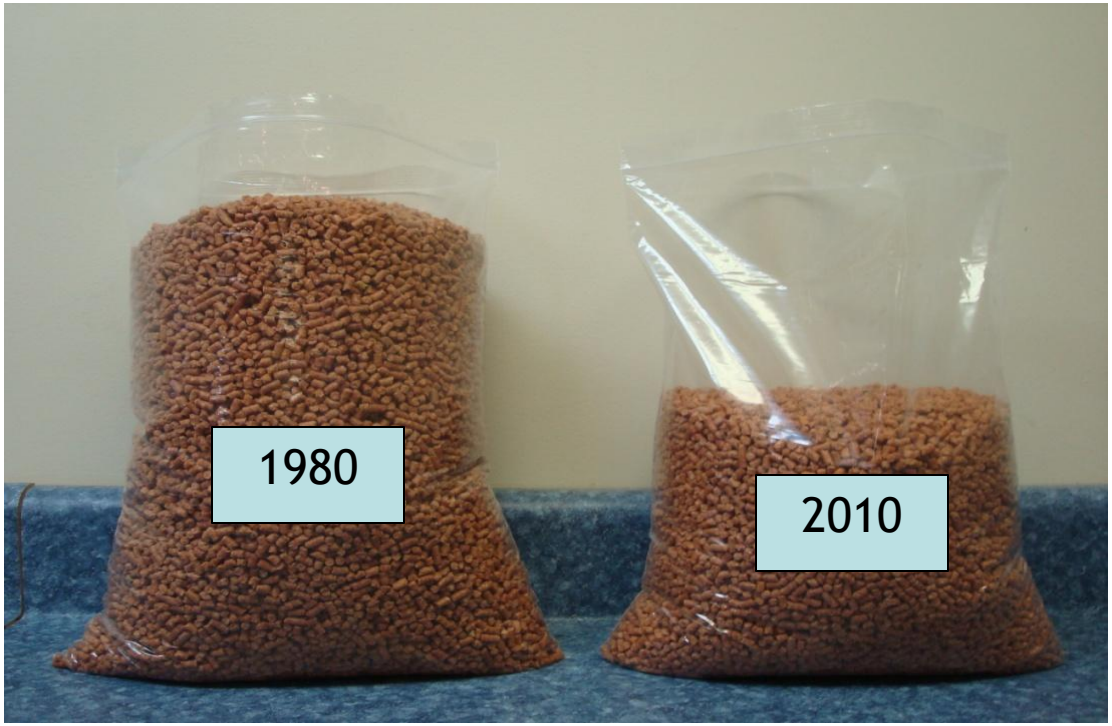
Trait	1990	2000	2010	2020 (TARGET?)
Wgt (lb)	3.5	4.5	5.5	6.5
Wgt (g)	1588	2041	2495	2948
Fcr	2.22	2.02	1.82	1.62
Fat %	1.90	1.70	1.50	1.30
Yield %	67.0	70.0	74.0	78.0
Breast%	15.2	19.2	23.2	27.2

Broiler Evolution

42 Days (2.5kg)

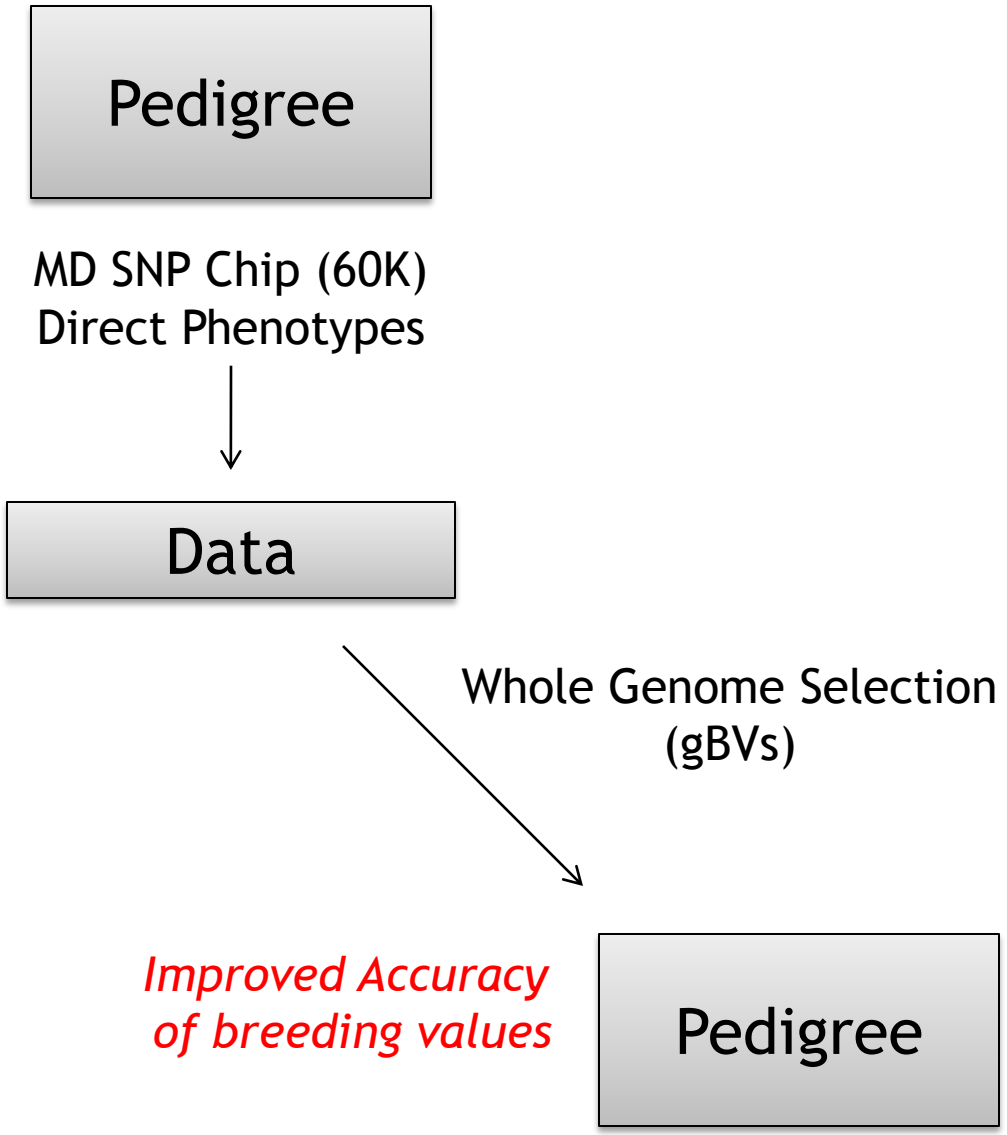
More Meat

Less Feed



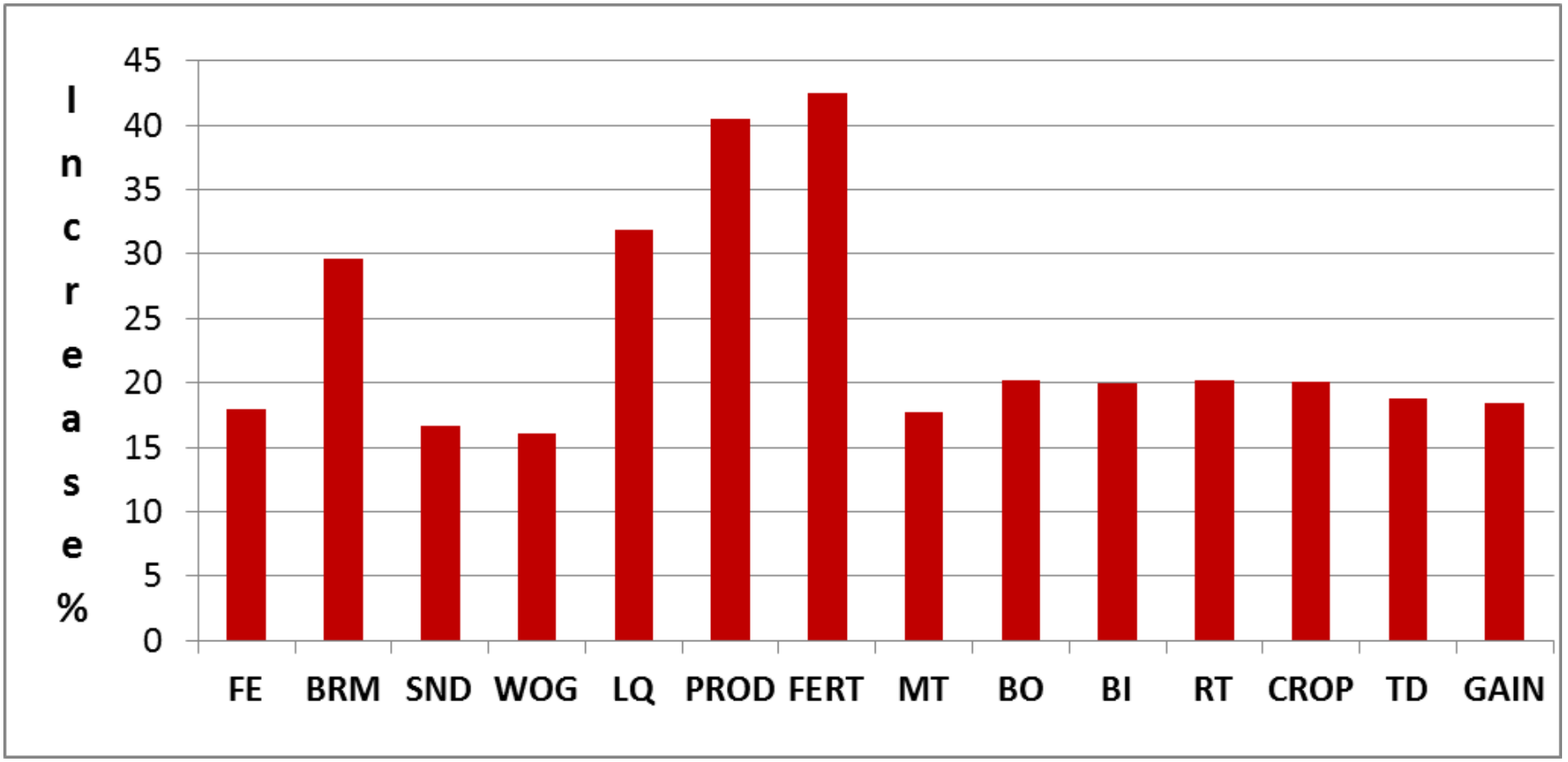
WHERE ARE WE GOING?

Genomic Strategy- Pedigree

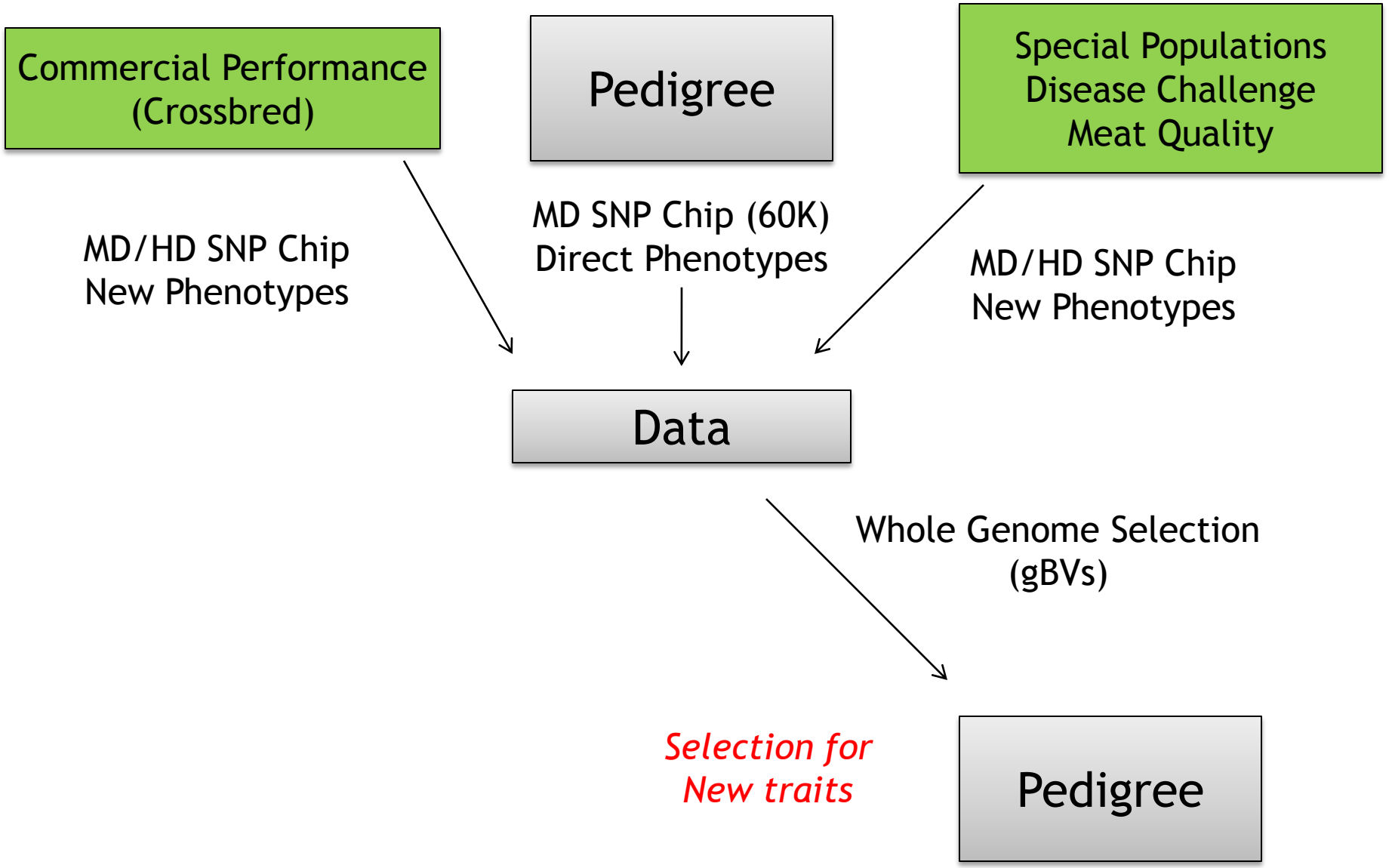


Potential for Improved Accuracy:
Traditional vs genomic selection

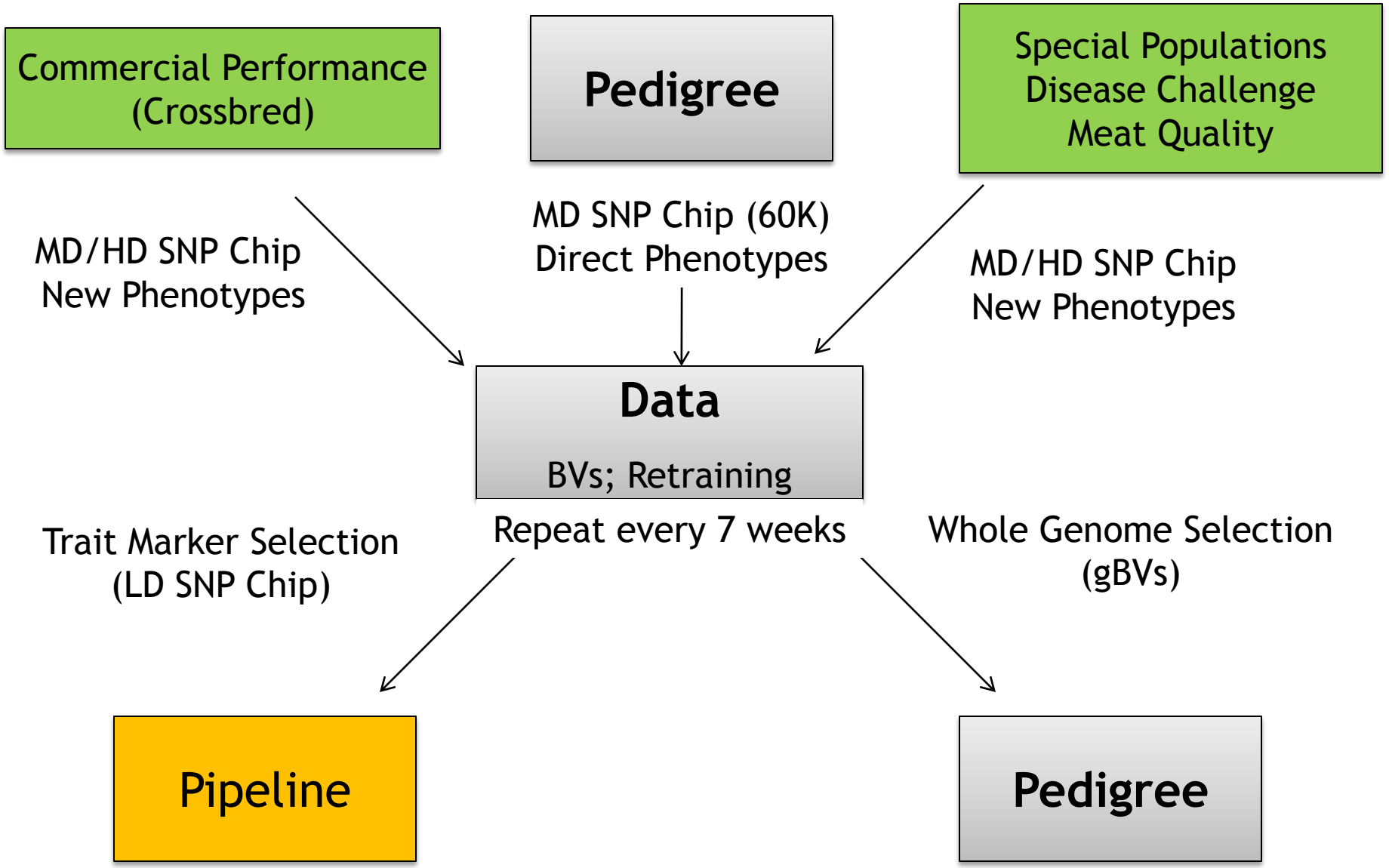
Based on prediction error variance of BVs



Genomic Strategy- Pedigree



Genomic Strategy- Pedigree & Pipeline



Prediction?

At the Egg & Poultry Industry Conference, one speaker predicted the following:

<u>By 2050</u>

Broiler Genetics

- 2 kg broiler ---------- 19 days
- FCR ---------- ~1.0

Gentleman was NOT in the breeding business!

WHO SHOULD BROILER GENETICS BENEFIT?

Egg & Poultry Industry Conference

Theme

"Embracing the Demands of Consumers and Society"

Sustainable Intensification

"…to increase food production from existing farmland while minimizing pressure on the environment."

Source: Oxford Martin Programme for the Future of Food

Cobb Purpose

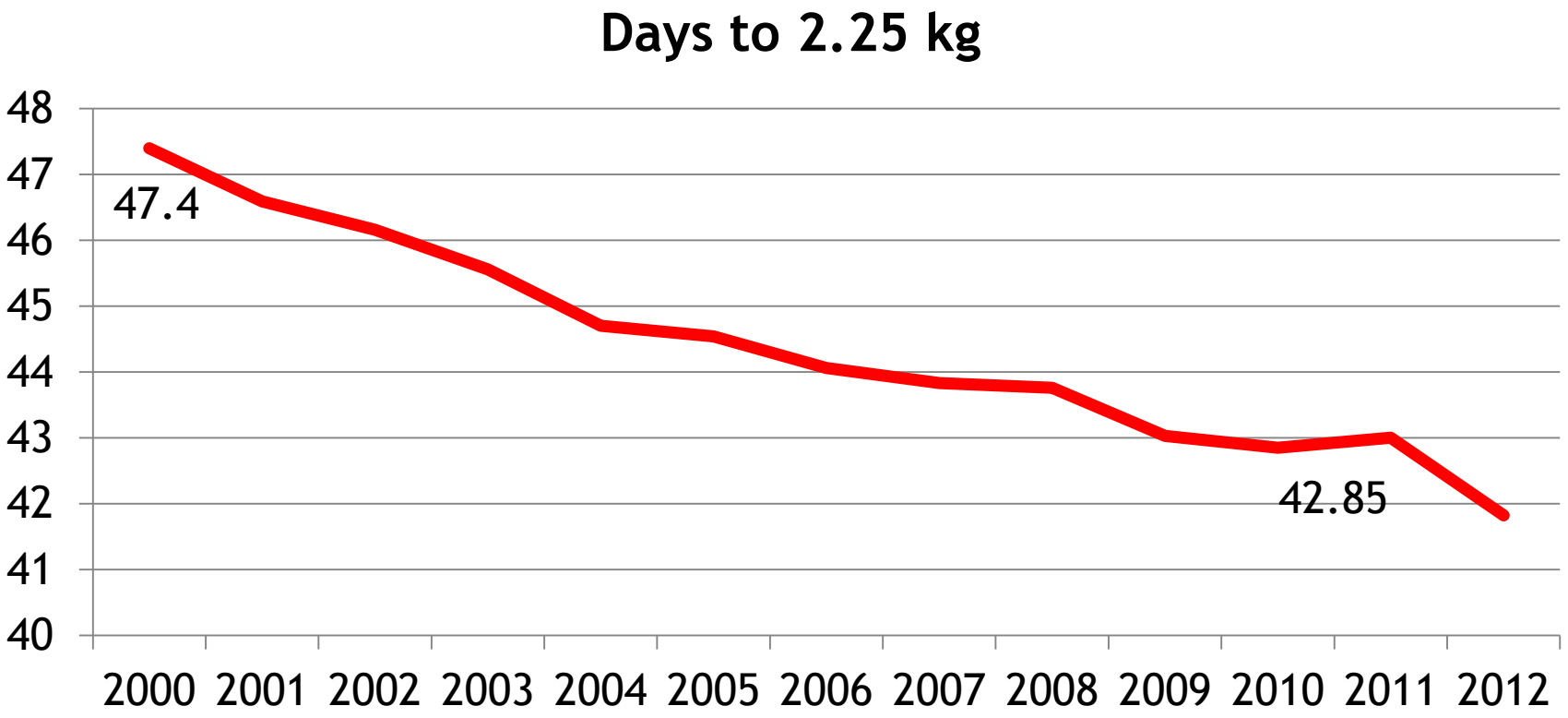
Serve our customer through the use of innovative research and technology to make protein healthy and affordable for everyone.

Consumer “Expectations”

Comments from a leading NL poultry processor regarding his retail customer’s demands for Chicken of Tomorrow.

“Genetic improvements will not be accepted”

Change in US Industry Growth Rate

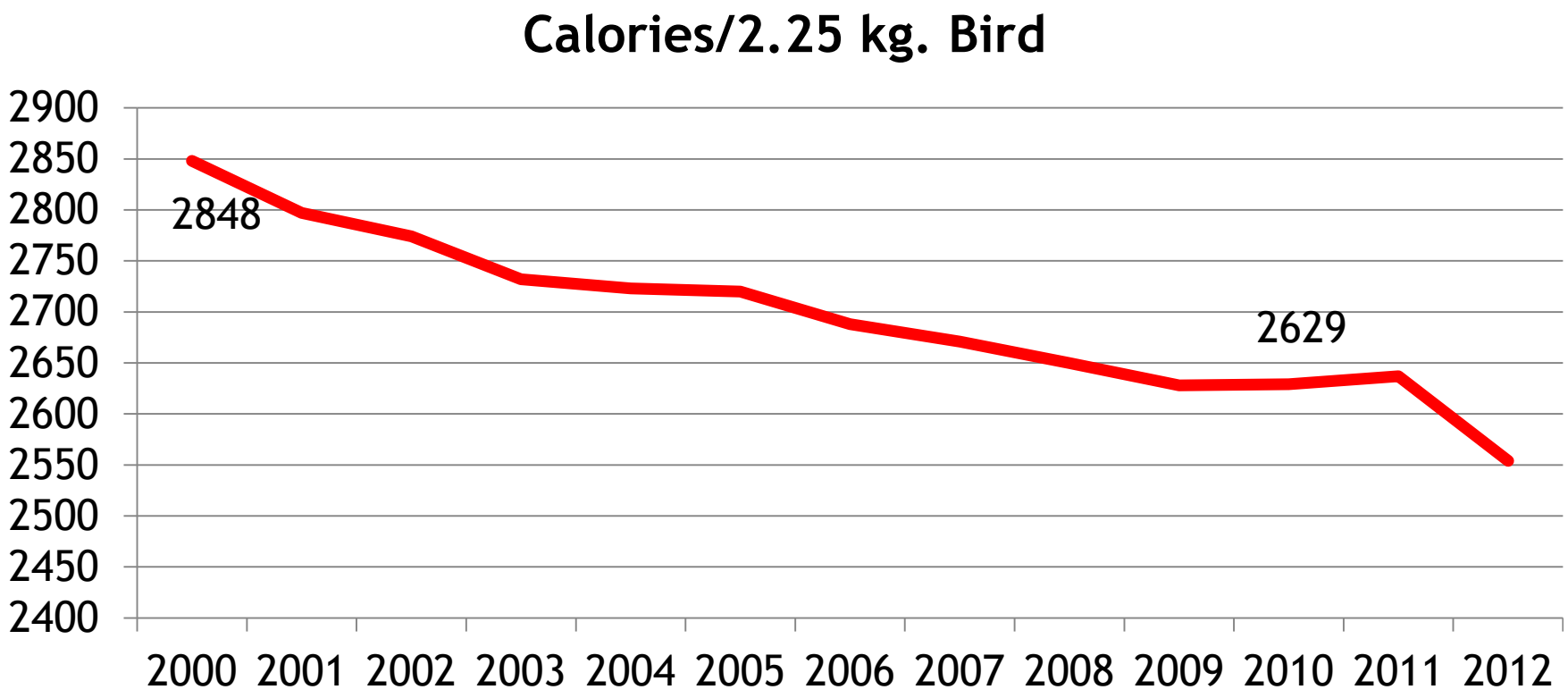


Sustainability Impact

- Investment Impact of Improved Growth Rate

  - US industry Sq. Feet of Housing needed @ .85 sq. Ft/Bird and 6 flocks per year : 1,652,745,098
  - Annual houses needed at house size 50’ by 500’ : 66,110
  - Annual houses needed at 2000 growth rate : 74,605
  - Difference : 8,496 poultry houses (11%)

Change in US Industry FCR



Note: 219 cal/lb change is ~.145 FCR

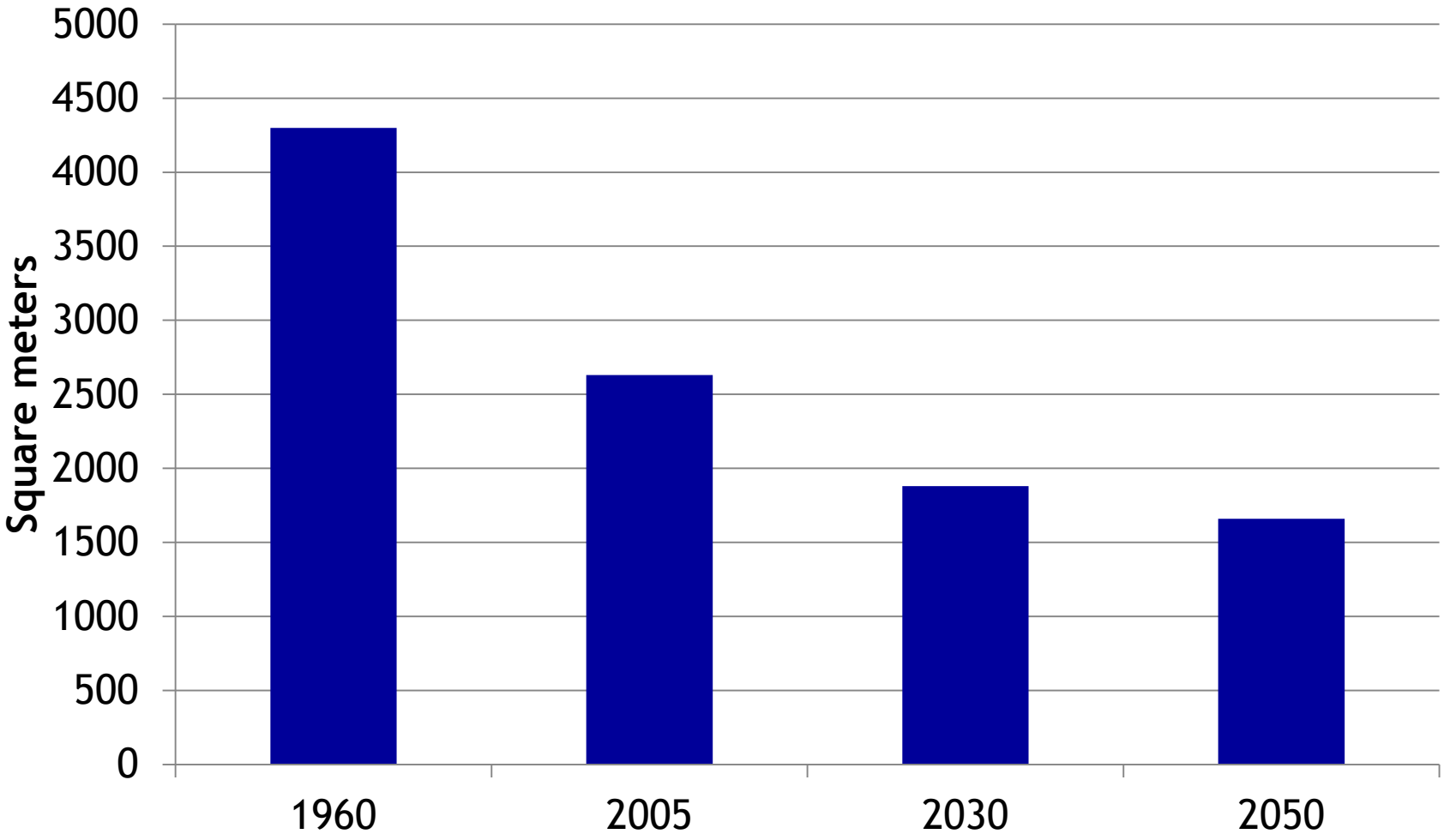
Sustainability Impact

World annual broiler production:	60,000,000,000
Ave. Broiler weight (kg):	2
Annual broiler kgs:	120,000,000,000
2000-2010 FCR savings:	0.145
Feed saved/year (kg/yr post 2010):	17,400,000,000
	1000
Tons feed saved/yr:	17,400,000

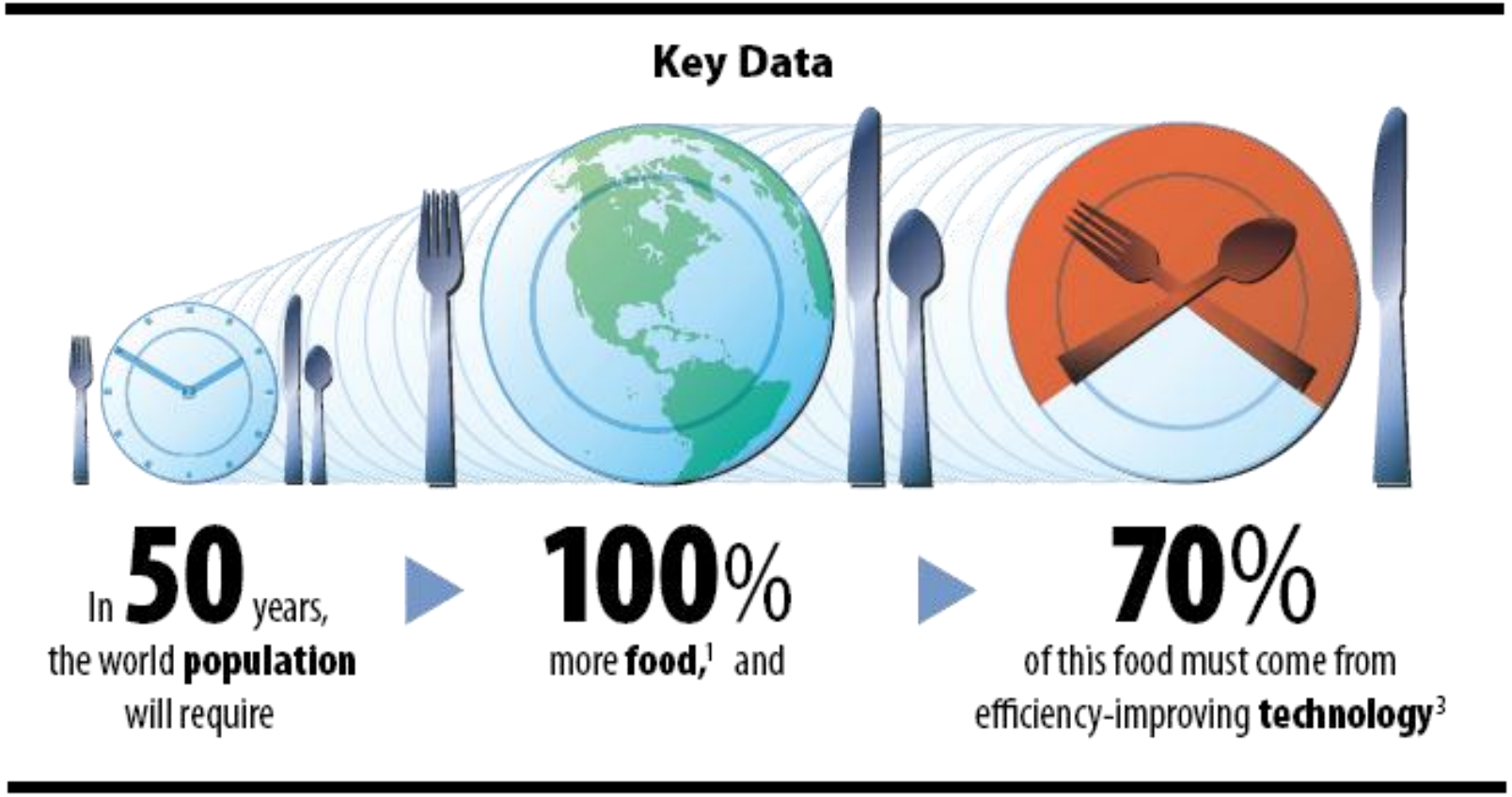
Tons feed saved/yr:	17,400,000
Corn in diet:	55%
Tons corn saved/yr:	9,570,000
US tons corn yield/farm acre:	3.6
Less acres of corn required:	**2,658,333**

Equivalent of 4,100 square miles

Arable Land per Capita



Meeting Food Demand



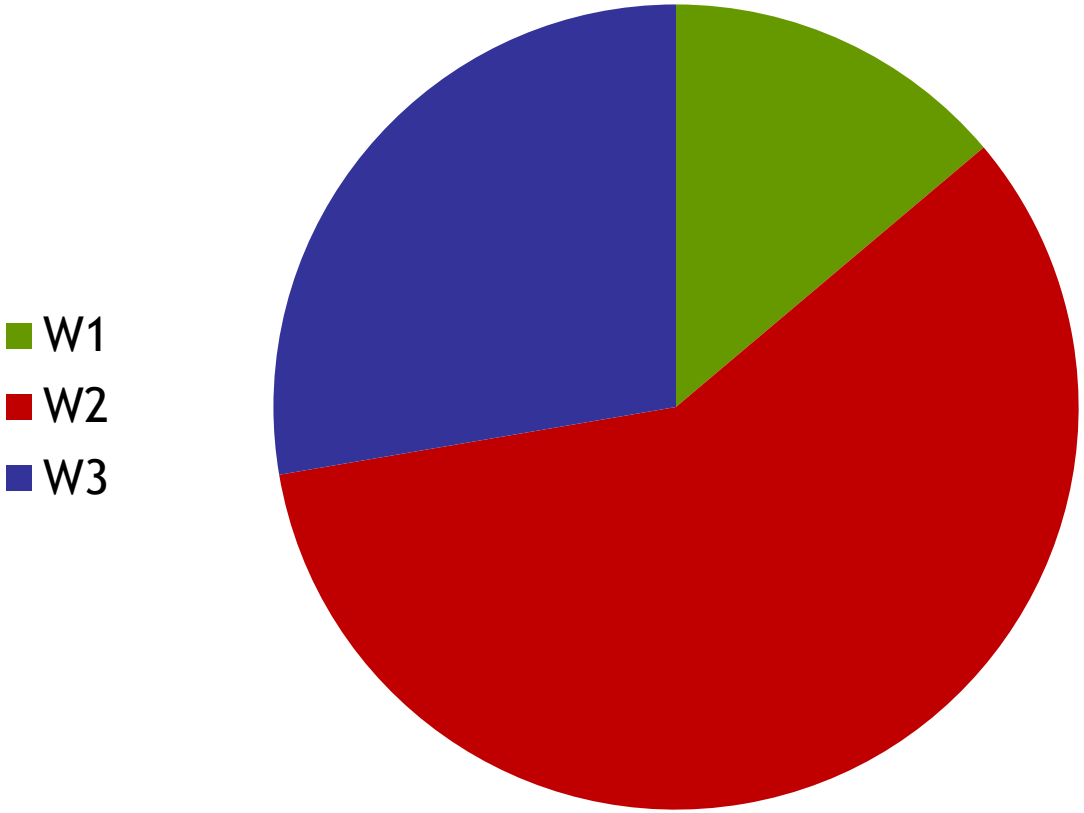
Source: Food Economics and Consumer Choice, Jeff Simmons, Elanco Animal Health, 2009

Meeting Food Demand

- By 2050, 100% more food will be required
- Additional farmland (1%) will contribute 20%
- Increased cropping will add another 10%
- Efficient technology must contribute 70%

Source: Food Economics and Consumer Choice, Jeff Simmons, Elanco Animal Health, 2009

Population Breakdown

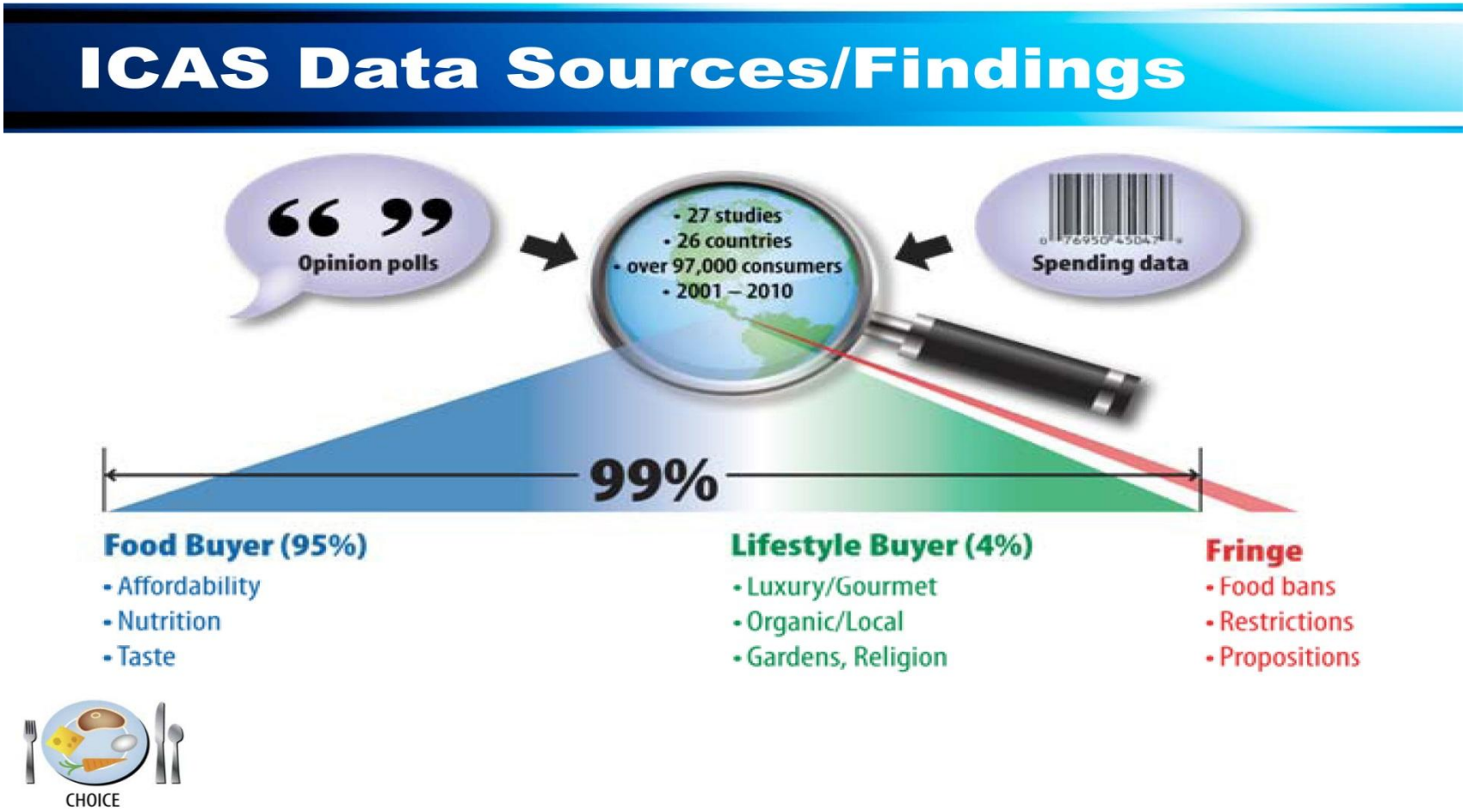


W1
Affluent/industrial

W2
Emerging (BRIC)

W3
Impoverished

International Consumer Attitudes Survey (ICAS)



Source: R Aukerman, Elanco Animal Health

Conclusion

- Broiler genetics have made great strides and still have huge potential for improvement
- Everyone in agriculture has a responsibility to produce safe food
- Animal breeding must develop animals that are fit for use in agriculture
- Genetics and agriculture must develop products that meet the needs of ALL consumers
- Consumer interest movements should be broadminded enough to understand their potential impact outside of their respective marketplaces

Thank You!