UNIVERSITY of WYOMING EXTENSION

Adding Value to Beef Production through the use of Livestock Technology

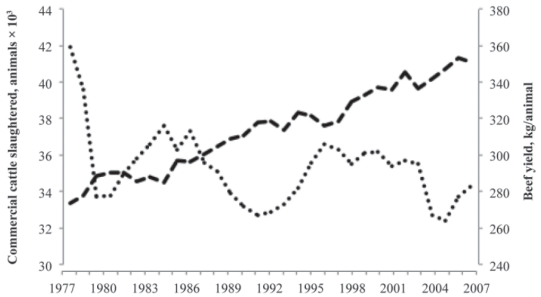
Dr. Steve Paisley
Extension Beef Cattle Specialist
University of Wyoming, SAREC

Importance of Agriculture

- World population of 9.5 billion people by the year 2050
  - (U.S. Census Bureau, 2008)
- Food production will have to increase by 70% to meet global demand
  - (Food and Agriculture Organization (FAO) 2009)

Challenge to Agriculture

- Continue to adapt/change and improve

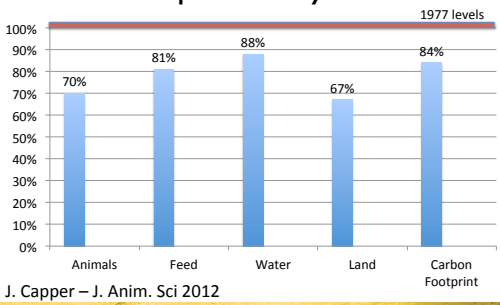


Capper, J. Anim. Sci Dec. 2011

Dairy Industry

- Capper et al., (2009) 2007 vs. 1944
  - Produced 59% more milk
  - 64% fewer milk cows
  - 41% reduction in GHG

Reduction in environmental impact due to increased productivity 1977 - 2007



J. Capper – J. Anim. Sci 2012

Profound "windshield therapy" challenge:

How do I get this guy to join the discussion and help our industry meet these new challenges?

Conflicting Agendas

- Continued environmental pressure
  - Water usage, greenhouse gasses, etc.
- Decrease in available land/resources.
- Growing demand for Natural, natural grass-fed and Organic beef production
  - Despite increased production costs and resource requirements

Changes in beef industry

a. Changes in the number of U.S. beef operations and average herd size, 1992–2007:

Year	Number of Operations	Percent Previous Year	Percent of 1992	Percent of 1996	Average Herd Size* (Cows)
1992	901,870	99.0	100.0	NA	37.0
		-15%			
2007	766,350	100.5	85.0	86.5	42.3

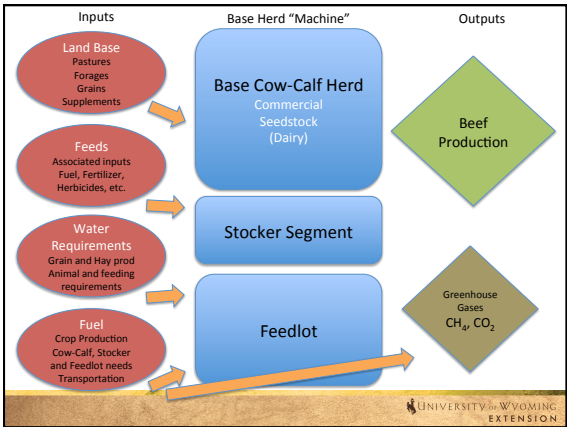
Source: NASS.
*Number of beef cows on January 1 divided by number of operations with one or more beef cows from previous year.

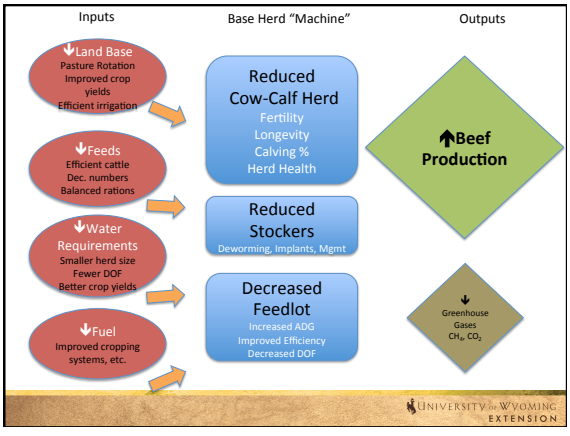
Challenge to the beef industry

- Quantify improvements in production
- Characterize those improvements in production efficiency and reduction in resource requirements.
- Show that our beef is produced in an ethical, sustainable and humane way.

Important Concept

- "Dilution of Maintenance" effect
  - (Capper et al., 2008, 2009)
- Production Efficiency is improved because:
  - (resources required per lb of beef produced)
  - Faster weight gain
  - Better reproductive efficiency
  - Heaver final weights
  - Fewer days on feed
  - SMALLER BASE COW HERD REQUIRED





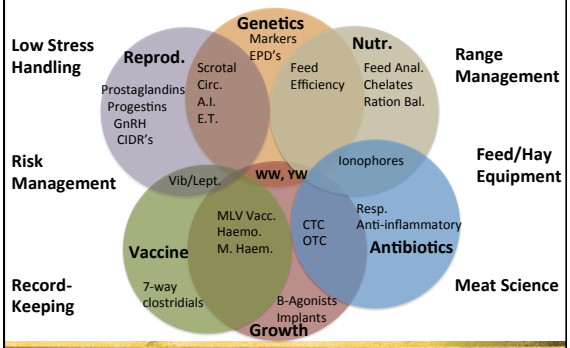
Technology Issues/Discussions:

- Global:
  - Increasing population, demand for protein
  - Decreasing agricultural land base
- National:
  - Demand for "Natural" and "Organic"
  - Environmental and carbon "footprint"
  - Animal welfare
- Local
  - Increasing input and fixed costs (profit).
  - Decreasing labor/agricultural work force

Technology discussion

- Environmental component
  - What is long-term environmentally sustainable
- Consumer acceptability component
  - Are consumers correctly informed? What can we do as producers to improve relationship
- Sustainability/profitability component
  - If production systems are proven safe, why can't we use them to improve profitability

Technologies we use:



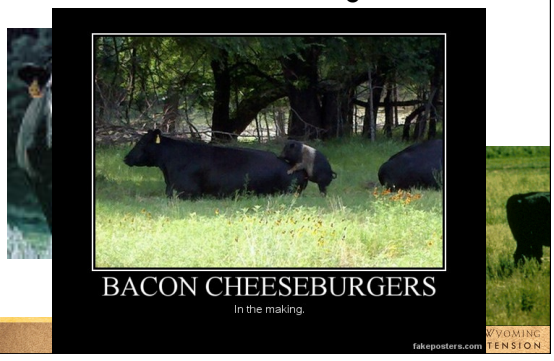
Where do we go from here?

- How do we continue to maintain ranching sustainability:
  - Webster's Dict. : able to last or continue for a long time
- Sustainable Agriculture:
  - **Profit over the long term**
  - **Stewardship of our nation's land, air and water**
  - **Quality of life for farmers, ranchers and their communities**

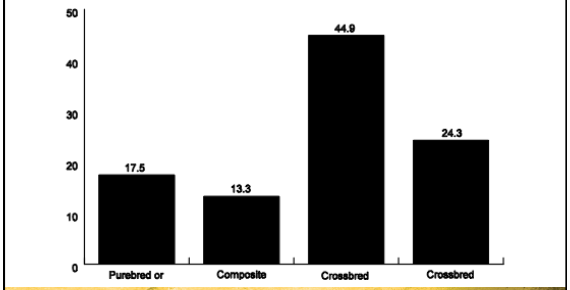
Technologies that Cow-Calf producers have not maximized

- Crossbreeding systems
  - Fertility, longevity, etc.

Crossbreeding



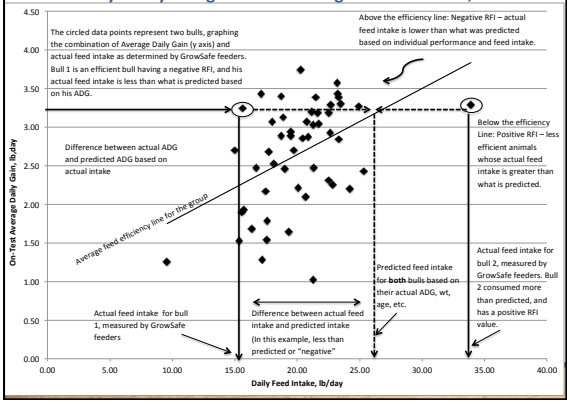
Percentage of purebred vs. crossbred beef cows
2007-08 NAHMS



Technologies that Cow-Calf producers have not maximized

- Crossbreeding systems
  - –Fertility, longevity, etc.
- Genetic information
  - –EPD's, Multi-trait, Profitability, etc.

University of Wyoming GrowSafe Forage-Based RFI test, 2011



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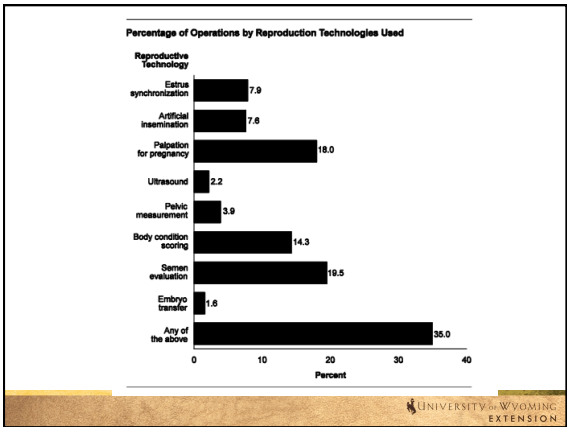
- A.I.
  - –Remains at approximately 5 to 10% of cattle
  - –Technology continues to improve dramatically



Reasons for NOT using reproductive technologies

Reason Not Used

Reproduction Technology	Does Not Work Pct.	Std. Error	Labor/ Time Pct.	Std. Error	Cost Pct.	Std. Error	Lack of Facilities Pct.	Std. Error	Too Difficult/ Compli-cated Pct.	Std. Error	Other Pct.	Std. Error	Total
Estrus synchronization	2.3	(0.4)	39.1	(1.4)	16.8	(1.1)	10.5	(1.0)	17.2	(1.2)	14.1	(1.0)	100.0
Artificial insemination	1.6	(0.3)	37.7	(1.4)	21.1	(1.2)	10.6	(1.0)	16.0	(1.1)	13.0	(1.0)	100.0
Palpation for pregnancy	1.3	(0.3)	38.4	(1.6)	19.6	(1.3)	10.6	(1.0)	16.4	(1.2)	13.7	(1.1)	100.0
Ultrasound	1.0	(0.3)	31.8	(1.3)	29.1	(1.3)	10.3	(0.9)	14.7	(1.1)	13.1	(1.0)	100.0
Pelvic measurement	1.9	(0.3)	38.2	(1.4)	18.1	(1.2)	10.1	(0.9)	17.7	(1.2)	14.0	(1.0)	100.0
Body condition scoring	1.7	(0.4)	40.1	(1.5)	17.0	(1.2)	8.3	(0.9)	18.5	(1.2)	14.4	(1.1)	100.0
Semen evaluation	1.3	(0.3)	34.4	(1.5)	25.2	(1.4)	9.4	(1.0)	16.1	(1.2)	13.6	(1.1)	100.0

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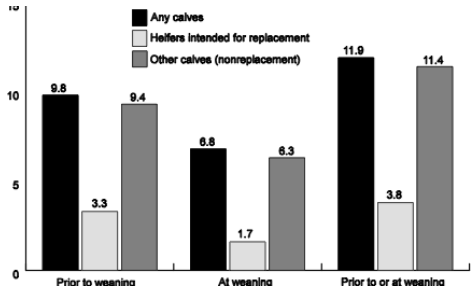
  - Technology continues to improve dramatically
- Implants
  - Selk (1997) Increase ADG 0.10 to 0.13 lb/d
  - Capper et al., (2012) didn't include pre-weaning implants because of lack of use.

Percent of calves implanted prior to weaning

2007-08 NAHMS



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- Record-Keeping

Record-keeping, 2007-08 NAHMS

Percent Operations

Herd Size (Number of Beef Cows)

Record-keeping System	1-49 Pct.	1-49 Std. Error	50-99 Pct.	50-99 Std. Error	100-199 Pct.	100-199 Std. Error	200 or More Pct.	200 or More Std. Error	All Operations Pct.	All Operations Std. Error
Hand-written records (e.g., ledger, notebook, pocket diary)	76.2	(1.6)	80.8	(2.4)	89.1	(1.7)	88.5	(1.7)	78.6	(1.2)
Computer on operation	13.3	(1.3)	24.5	(2.6)	21.8	(2.3)	37.4	(2.5)	17.0	(1.0)
Computer off operation	2.0	(0.5)	4.2	(1.2)	3.7	(1.0)	10.8	(1.4)	2.9	(0.4)
Any of above	80.5	(1.5)	87.0	(2.0)	93.6	(1.2)	95.0	(1.2)	83.3	(1.1)

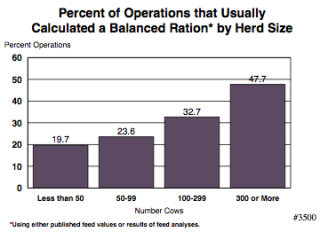
Individual animal identification

2007-08 NAHMS

Individual ID Type	Percent Operations	Standard Error	Percent Calves	Standard Error
Hot-iron brand	5.4	(0.6)	11.8	(1.1)
Freeze brand	0.7	(0.2)	1.1	(0.4)
Ear notch	5.6	(0.6)	11.2	(1.0)
Electronic ID or microchip responder	0.7	(0.2)	2.9	(0.7)
Brucellosis vaccination ear tag (Bang's tag)	8.5	(0.7)	12.3	(1.0)
Other metal ear tag	1.1	(0.3)	2.0	(0.5)
Plastic ear tag	37.7	(1.3)	50.2	(1.4)
Ear tattoo (other than for brucellosis vaccination)	5.2	(0.6)	5.6	(0.7)
Other method	0.3	(0.2)	0.3	(0.1)
Any ID	46.7	(1.4)	64.8	(1.3)

Under-utilized technologies

- Forage analysis and ration balancing



Under-Utilized technologies

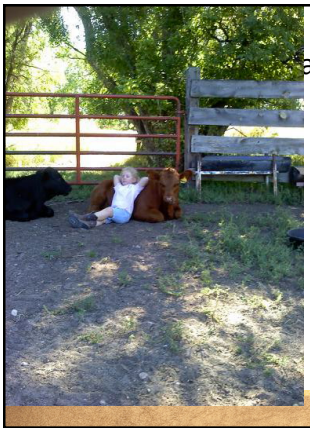
- MANAGING RISK:
  - Weather
  - Market
  - Performance
  - Health
  - Feed/Pasture prices
- USDA RMA Risk Management opportunities

Additional opportunities

- Forage resources
  - Water development,
  - Rotational grazing
  - Crop aftermath
  - By-product utilization

Improved efficiencies

- Reduction in labor force
- Average age of labor force
- Ease of production
  - Facilities
  - Genetics
  - Temperament and animal handling



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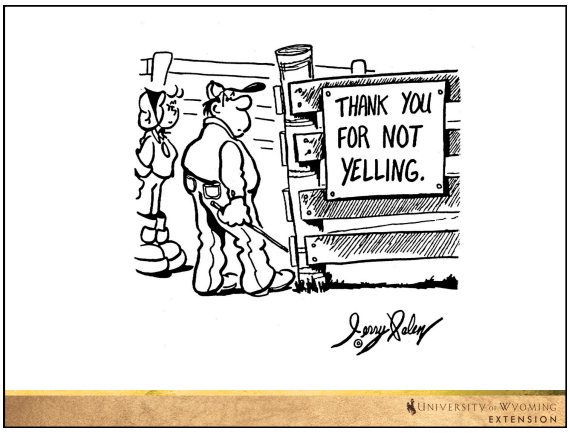
Summary

- Challenge to meet global demand
- Challenge is compounded by resource limitations and public perceptions
- Opportunities remain for continued improvements


THANK YOU FOR NOT YELLING.
Jerry Raley
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