

***Sustainable Livestock Development:  
Closing the  
Efficiency Gap***

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***U.S. Beef  
Production  
Practices***

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# ● **Overview of U.S. Beef Industry**

- Largest food and fiber sector
- Own/manage 670 million acres of land in US
- \$73 billion in U.S. consumer spending on beef annually
- 742,000 beef herds (90% < 100 head); 67,000 dairy herds
- 30.9M beef cows; 9.3M dairy cows; 26.7M feeder calves
- 2,140 feedyards with at least 1000 head capacity

## ● **With formidable impact, great responsibility**

- Industry acceptance through history
  - Enhance environmental stewardship/food safety
  - Improve efficiencies throughout
  - Rely on fewer inputs to produce more beef
  - Increase economic contributions to Rural America
  - Preserve open spaces
  - Contribute time, talent, treasure to communities

## ● **Cattle/beef industry segments largely independent of each other**

- Equity, management, financial



# Calving



6-8 mo.

# Weaning



30-35% of heifers kept as replacement breeding stock

20% of steers

150-210 days on feed

# Stockers

80% of steers + 65% of heifers



3-9 mos.

# Feedyard



100-150 days on feed

Harvest 13-18 mo.

# Harvest - Fabrication



# Retail Sales



# Food Service





# What Do Cattle Eat?

The U.S. beef cattle herd consumes approximately 80% of its nutrients in the form of forages and 20% in the form of concentrates.

Forages – grasses, herbs, browse, hay

Concentrates – corn, corn milling by-product, ethanol production by-product, silage, cotton by-product, food manufacturing by-product such as broken cookies, potato slurry, citrus pulp, etc.



# Typical U.S. Beef Cattle Production Systems

## Weaned Calves

180 days old  $\pm$  30 days

450 – 600 lbs.

### Dry Lot Program

ADG: 1.0; +175 lbs

175 days



### Wheat Pasture

ADG: 2.0; +240 lbs

120 days



### Background Yard

ADG: 2.25; +325 lbs

144 days



### Background Yard

ADG: 2.5; +300 lbs

120 days



### Grass

ADG: 1.5; = 240 lbs

160 days

### Grass

ADG: 1.35; + 175 lbs

129 days

### Feedlot

ADG: 3.2; + 385 lbs

120 days

### Slaughter

Age 21 Months,  $\pm$  1

1250 – 1400 lbs.

### Feedlot

ADG: 3.2; + 360 lbs

112 days

### Slaughter

Age 19 Months,  $\pm$  1

1225 – 1375 lbs.

### Feedlot

ADG: 3.1; +435 lbs

140 days

### Slaughter

Age 16 Months  $\pm$  1

1125 – 1275 lbs.

### Feedlot

ADG: 3.0; + 400 lbs

133 days

### Slaughter

Age 15 Months  $\pm$  1

1150 – 1300 lbs.

### Feedlot

ADG: 3.2; + 375 lbs

117 days

### Slaughter

Age 14 Months,  $\pm$  1

1125 – 1275 lbs.

### Feedlot

ADG: 3.0; +575 lbs

192 days

### Slaughter

Age 12 Months,  $\pm$  1

1025 – 1175 lbs.

# Why the various options for weaned calves?

1. Spread production across the entire year to allow consistent beef supply across seasons.
2. Take advantage of the growth and maturity patterns of cattle of varying genetic backgrounds.
3. Optimize grazing opportunities.



# ***Environmental Footprint of U.S. Beef Production (1977 vs. 2007)***

- **Improvement over time**
  - **Management**
  - **Genetic selection**
  - **Ration formulation**
  - **Growth-enhancing technologies**
- **What has this meant for the U.S. beef industry?**
  - **Improved productivity**
    - **Beef carcass yield increased 22%**
    - **Time to slaughter reduced 21% (609 days vs 485 days)**
    - **Total beef production increased 11%**
    - **Slaughter pop. decreased 5 million head**



Source: Capper, J.L. (2011). The Environmental Impact of U.S. Beef Production: 1977 compared with 2007. J. Animal Science

- In 1977, it took **five** animals (3,030 animal days) to produce the same amount of beef as **four** animals (1,928 animal days) in 2007
- Improved productivity means fewer resources required to produce the same amount of beef
  - Beef per animal increased 31%
  - 30% fewer animals
  - 19% less feed
  - 12% less water
  - 33% less land
  - 18% less manure
  - 18% less methane
  - 12% less nitrous oxide
  - 16% lower carbon footprint



Source: Capper, J.L. (2011). The Environmental Impact of U.S. Beef Production: 1977 compared with 2007. J. Animal Science



# ***Consumers Have Three Production System Choices When Buying Beef***

- **Conventional:**

- Pasture-based system until weaning (7 mo)
- Animals enter feedlot either at weaning or 12 mo old
- Production-enhancing technology\* used in each sector

- **Natural:**

- Identical to 'conventional' system but production-enhancing technologies are not used

- **Grass-fed:**

- Pasture-based system from birth to slaughter
- Production-enhancing technologies are not used

**BEEF**

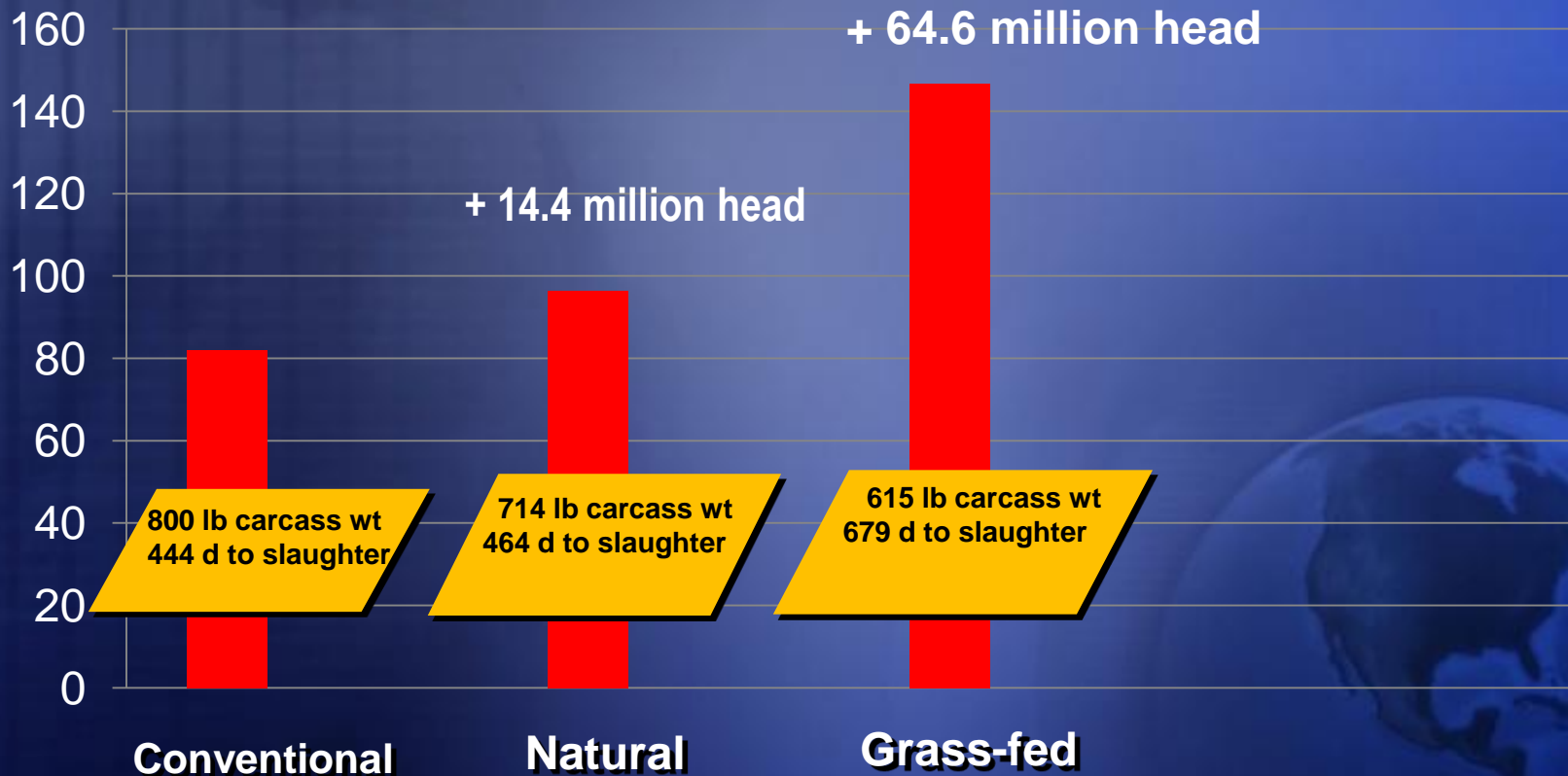
**USA**

\* Technologies included: ionophores, implants, MGA, beta-agonists

Source: Capper, J.L. Producing Greener Beef: Past, Present and Future - Drovers Webinar - March 2012

# Removing Technology from Beef Production Requires Increase in Animal Numbers

Animals required  
to produce 26.1B  
lb beef (millions)



Source: Capper, J.L. Producing Greener Beef: Past, Present and Future - Drovers Webinar March 2012

# ***Environmental Consequences of Removing Technology from Beef Production***

- **If all U.S. beef was grass-fed:**
  - **Land use would increase by 131 million acres (75% of land area of Texas)**
  - **GHG emissions would increase by 134.5 million tons CO2 eq. (equal to annual emissions from 26.6 million cars)**
  - **Water use would increase by 468 billion gallons (equal to annual usage by 53.1 million U.S. households)**



Source: **Capper, J.L. Producing Greener Beef: Past, Present and Future - Drovers Webinar March 2012**

# ***Water Use in the U.S. Beef Industry***

	Water Footprint Network	U.S. Average
Boneless beef yield (lb.)	441	605
Dressed carcass weight (lb)	588	806
Slaughter weight (lb)	948	1,300
Days to slaughter	1,095	415
Overall growth rate (lb/d)	0.80	2.95
Water (gal) per lb boneless beef	1,857	367*



Source: Capper, J.L. Producing Greener Beef: Past, Present and Future - Drovers Webinar March 2012, including reference to study by \*Beckett & Oltgen (1994)



# ***U.S. Beef Industry Works for Continuous Improvement Over Time***

- **Sustainability Assessment**
  - **Holistic approach**
    - **Environment**
    - **Social**
    - **Economic**
  - **Sustainability is a journey, not a destination**
    - **Continuous improvement over time**
  - **NCBA has partnered with BASF Corporation**
    - **Methodology is certified by NSF, TUV**



- **BASF's assessment (S.E.T. – Sustainability, Eco-Efficiency, Traceability) comprised of four parts**
  - **“Hot spot” analysis**
  - **Eco-Efficiency Analysis, SEEBALANCE (baseline sustainability analysis)**
  - **On-line tool for individual producer use**
  - **Certification by Det Norske Veritas (DNV – Prosustain Standard for more sustainable goods)**



# ***Opportunities for Continuous Improvement***

- **Reduce time to reach target weights across all systems**
  - Increase growth rate and feed efficiency
  - Improve performance technologies
  - Optimize diets
- **Minimize losses**
  - Reduce morbidity and mortality
- **Improve reproductive efficiency**
  - Currently, only 88% of cows have one live calf/yr
- **Increase land carrying capacity**
  - Improve pastures/better forage varieties
- **Reduce post-harvest resource use and emissions**



Source: Capper, J.L. Producing Greener Beef: Past, Present and Future - Drovers Webinar March 2012

In honor of Earth Day, she vowed  
to release no methane for 24 hours.



# Questions?