U.S. Dairy Sustainability: A One Health Perspective from Cow to Consumer
Sustainability: Cow to Consumer

- Drug Residues in Milk
- Drug Residues in Cull Cows
- FDA CVM Drug Residue Survey
- Producer Resources
U.S. Dairy Industry

Milk production occurs in all 50 states. The top 5 dairy states in 2011 produced ~59% of all milk in the U.S.

~95% FAMILY-OWNED

192.6 billion POUNDS OF COW MILK

51,481 LICENSED DAIRY FARMS

9.2 million DAIRY COWS

1,278 DAIRY PLANTS PRODUCED

199.4 billion POUNDS OF DAIRY PRODUCTS.

HOW ALL THAT MILK WAS USED

43.2% Cheese
21.6% Fluid Milk
35.3% Other Products: butter, nonfat dry milk, frozen products and more

13.3% OF DAIRY PRODUCTS WERE EXPORTED (by weight).

AVERAGE NUMBER OF MILES FROM FARM TO PROCESSING PLANT IS 275 miles

Milk and dairy products are distributed to schools and retail outlets ranging from small neighborhood stores to warehouse outlets.

Americans spent ~6% of their 2011 food budgets on dairy products at home.

Milk and dairy foods supply 70% of the calcium and 18% of the protein in the average American diet.


Connecting Cows, Cooperatives, Capitol Hill, & Consumers
Dairy Industry at a Glance

**Economic**

- 200.3B pounds of milk
- $31.4 B at farm
- Farm Economic multiplier of $2.50 to local economy
- 9.4% of agriculture
- $140 billion value of 1,200 processing plants
- 11.5% export

**Environmental**

- Compared with 1944, the U.S. dairy industry now produces a gallon of milk using:
  - 90% less land,
  - 65% less water,
  - 76% less manure,
  - 63% small carbon footprint
- GHG: 2% of total U.S. GHG emissions
- Voluntary goal to reduce 25% by 2020

**Nutritious**

Milk is the No. 1 food source of calcium, vitamin D and potassium*

<table>
<thead>
<tr>
<th>Vitamin A</th>
<th>Protein</th>
</tr>
</thead>
<tbody>
<tr>
<td>10%</td>
<td>16%</td>
</tr>
<tr>
<td>Riboflavin</td>
<td>Phosphorus</td>
</tr>
<tr>
<td>20%</td>
<td>20%</td>
</tr>
<tr>
<td>Niacin</td>
<td>Vitamin D</td>
</tr>
<tr>
<td>10%</td>
<td>25%</td>
</tr>
<tr>
<td>Potassium</td>
<td>Calcium</td>
</tr>
<tr>
<td>11%</td>
<td>30%</td>
</tr>
<tr>
<td>Vitamin B12</td>
<td></td>
</tr>
<tr>
<td>13%</td>
<td></td>
</tr>
</tbody>
</table>

**Social**

- 49,300 dairy farmers in 50 states
- 95% of US Dairy farms are family owned
- 86% of all milk managed through cooperatives

*NHANES, 2003-2006, ages 2+ yr.

---

1. National Milk Producers Federation 2013
5. National Milk Producers Federation, “2013 Dairy Data Highlights,” Table 46 on page 42
Innovation Center for U.S. Dairy

- 32 CEOs or Chairmen of companies representing 80% of Milk
- Focused on advancing pre-competitive science, strategy and insights
- 800+ professionals working on sustainability
Alliance Dairies
Clauss Dairy Farms
Fair Oaks Farms
Fiscalini Farms
Foster Brothers Farm
Gar-Lin Dairy Farm
Graywood Farm
Haubenschild Farms Inc.
Holsum Dairies
Kooistra Farms
Maddox Dairy
MarBec Dairy
Medeiros & Sons Dairy
McCarty Family Farms
Mystic Valley Dairy
Nobis Dairy
Prairieland Dairy
Rovey Dairy
Simonson Dairy
Spruce Haven Farm
Triple A Farms
Werkhoven Dairy

We commit to being leaders in sustainability, ensuring the health and well-being of our planet, communities, consumers and the industry

112 companies & 150 professionals in the Sustainability Council
Leading 8 project teams with over 800 industry members contributing over $6M
Guiding Principles align on a vision for the industry

The U.S. Dairy Industry supports socially responsible, economically viable and environmentally sound dairy food systems that promote the current and future health and well being of:

We commit to these principles through our shared values of honesty, integrity, inclusiveness, and transparency

- **Our consumers** – through access to safe, nutritious, high-quality products.
- **Our communities** – through contributing, participating, and investing where we live and operate.
- **Our cows** – through animal stewardship.
- **Our employees** – through ensuring a safe and respectful workplace.
- **Our planet** – through the stewardship and responsible use of natural resources.
- **Our businesses** – through a focus on long-term economic vitality.
Sustainability for Human Health
2010 USDA Dietary Guidelines Recommend Nutrient-Dense Diets

- **Consume more**
  - Fruits and vegetables
  - Whole grains
  - Low-fat or fat-free milk or milk products
  - Lean protein

- Increase foods that supply “nutrients of concern”
  - Calcium
  - Potassium
  - Vitamin D
  - Fiber

- **Consume less**
  - Added sugars
  - Solid fats/saturated fat
  - Refined grains
  - Sodium

*Milk is the No. 1 food source*
2010 USDA Dietary Guidelines Low-Fat & Fat-Free Dairy as Foods to Increase

• Call to increase intake of low-fat milk and milk products to meet 3 servings* recommendations
• Recognized dairy’s health benefits
  o Bone health
  o Cardiovascular disease
  o Type 2 diabetes
  o Blood pressure
• Key to children’s health
• Supplies 3 of 4 “nutrients of concern”
• Important for those w/lactose intolerance

*9 years and older
Most Americans Do Not Meet Dairy Recommendations

Average Daily Consumption of Milk, Cheese and Yogurt in the U.S.

Source: What We Eat in America, NHANES 2009-2010, individuals 2 years and over (excluding breast-fed children), day 1 dietary intake data. Food Patterns Equivalents Database 2009-2010.
Even at Current Intakes, Dairy Foods an Important Source of Nutrients

Dairy Research Institute, NHANES, 2003-2006, ages 2+ yr.
Milk Safety – Cow to Consumer

Pasteurized Milk Ordinance
- Federal/State Cooperative Program for Milk Safety

Farm Requirements
- Animal health
- Facilities, Equipment, & Water Source
- Temperature, Bacteriological, SCC
- Drug Residues
- Transport

Processing Requirements
- Facilities, Equipment, & Water Source
- Pasteurization
- Temperature, Bacteriological, Coliform
- Drug Residues
- Transport
Pasteurization

1938 milk causes 25% foodborne illness
Today milk causes <1% foodborne illness

U.S. CDC Report – Majority of dairy-related disease
outbreaks linked to raw milk
• Higher rates of “Raw” Milk outbreaks in States where legal
• 150 times higher rate for outbreaks caused by raw milk
products
Sustainability for Environmental Health
Heritage of doing more with less

Producing 1 billion kg of milk: 1944 vs. 2007

- **Animals**: 21%
- **Water**: 35%
- **Land**: 10%
- **Carbon Footprint**: 37%

Source: Capper et al., 2009, *Journal of Animal Science*
Dairy LCA: Understanding Dairy’s Impact from Grass to Glass

Farm to Table
The Dairy Supply Chain

Processing
There are more than 1,000 U.S. processing plants that turn milk into cheese, yogurt, ice cream, powdered milk and other products.

Milk Transport
Milk is transported from farm to processing company in insulated tanker trucks. The average truck carries 5800 gallons of milk and travels approximately 500 miles round trip.

Milk production
Dairy cows are housed, fed and milked on dairy farms across the country. On average, a cow in the United States gave about 21,345 pounds of milk in 2012.

Production of feed for cows
The dairy supply chain begins with growing crops such as corn, alfalfa hay and soybeans to feed dairy cows. About 35 percent of feed is grown on the farm by dairy farmers; the rest is purchased from other farmers.

Packaging
Packaging is typically done by the dairy processor. Both paperboard and plastic containers are designed to keep dairy products fresh, clean and wholesome.

Distribution
Distribution companies deliver dairy products from the processor to retailers, schools, and other outlets in refrigerated trucks.

Retail
Milk and dairy products are available at 178,000 retail outlets of all shapes and sizes—from convenience stores and neighborhood groceries, to large discount stores and warehouse outlets.

Consumer
Milk and milk products deliver many essential nutrients to the diet of Americans.
U.S. Dairy Carbon Footprint — All Products

Total emissions = 137 MMT (2% of total U.S. GHG emissions)

Fluid Milk:
- 26% of total GHG emissions
- 35 MMT CO₂e
- 0.5% of US Total

Cheese & Whey:
- 39% of total dairy GHG emissions
- 54 MMT CO₂e
- 0.75% of US Total

Other Dairy (estimates):
- 35% of total dairy GHG emissions
- 48 MMT CO₂e
- 0.67% of US Total

Milk/Cheese carbon footprint from farm to table

The carbon footprint of cheese = 8.3 kg CO$_2$e per kg of cheese
What we learned: management practices matter

- Increasing feed efficiency
- Reducing enteric methane
- Improving manure management

- Reducing electricity usage
- Consolidating distribution network
- Considering alternative packaging materials

- Good truck maintenance
- Better route design
- Reducing long distance milk hauling

The basis for differences is best management practices – not size, region or age.
American dairy producers’ leadership position

- One of largest producers of milk in the world
  - U.S. produced 192 billion lbs. of milk in 2010

- One of the highest producers of milk per cow per year in the world
  - U.S. dairy cows produce 4 times more milk than the world’s average cow

- The smallest GHG emissions per 1 gallon of milk produced

U.S. dairy farmers have the smallest impact

Website: [http://faostat.fao.org/site/569/default.aspx#ancor](http://faostat.fao.org/site/569/default.aspx#ancor)
Voluntary reduction goals

32 Dairy industry CEOs and chairpersons committed to...

25% by 2020

GHG reduction for fluid milk

$238 million

Estimated business value across industry
Innovation projects create value across the supply chain while reducing dairy’s environmental footprint

**Farm Smart™**
Goal: Provide farmers with a robust real-time, on-field decision support tool for better environmental farm management.

**Dairy Fleet Smart™**
Goal: Reduce fuel consumption, costs and GHG emissions in the transport and distribution of milk.

**Cow of the Future™**
Goal: Reduce enteric emissions through feed efficiency, herd health and breeding.

**Dairy Plant Smart™**
Goal: Reduce GHG emissions and energy costs at fluid milk and cheese processing plants.

**Farm Energy Efficiency™**
Goal: Reduce on-farm energy use and costs.

**Dairy Power™**
Goal: Put 1,300 methane digesters on dairy farms by 2020.

**Crop Production** | **Milk Production** | **Processing** | **Packaging** | **Transport/Distribution** | **Retail**
Sustainability for Animal Health

The National Dairy FARM Program:
Farmers Assuring Responsible Management™
National Animal Care Program

- Education
  - Animal Care Manual, Quick Reference User Guide, Animal Care DVD
  - All materials available online in English and Spanish

- On-Farm Evaluation

- Third-Party Verification

90% of U.S. Dairy Industry Enrolled
Animal Care Manual

Animal care guidelines, protocols, and practices for entire lifespan of dairy cattle

Chapter 1 – Introduction
Chapter 2 – On-Farm Evaluations
Chapter 3 – Management: SOP, Training, Record Keeping
Chapter 4 – Newborn and Milk-Fed Dairy Calves
Chapters 5 – 8 Lifecycle from Weaning to Maturity
  ✓ Nutrition
  ✓ Animal Health
  ✓ Environment and Facilities
  ✓ Handling, Movement and Transportation
Chapter 9 – Special-Needs Animals
Chapter 10 – Dairy Beef
Chapter 11 – Third-Party Verification
Herd Health Plan

- Written in consultation with herd veterinarian
- Reviewed annually
- Key Protocols
  - VCPR
  - Disease prevention, detection, and control
  - Vaccination
  - Calf Care
  - Euthanasia
  - Non-Ambulatory Care
  - Worker training
  - Food Safety

XYZ Facility

Herd Health Plan

Instructions: This template covers the basics of herd health. It will be the responsibility of the individual dairy facility to fill this form out in accordance with the dairy operation and should be reviewed on an annual basis to address any changes that have occurred with individual practices.

Farm name: ____________________________
Consulting veterinarian: ____________________________
Date last reviewed: ____________________________
Individual or position responsible for this process: ____________________________

*Attach current vaccination schedule, including the attending veterinarian’s name and contact information.
*Attach any special or temporary treatment and care protocols beyond those already listed.
On-Farm Evaluations

✓ External review of animal care practices using management checklists
  ➢ Completed by a FARM certified veterinarian, extension agent, co-op field staff
  ➢ Provides a status report and action plan for improvement if necessary
  ➢ Subsequent on-farm evaluations, at least once every three years
Program Verification

- 2014 Year in Review available online
- Transparency
- Covers aggregate results, 3rd party verification process, participants

The U.S. dairy farming community is committed to ensuring the well-being of the animals in our care. The National Dairy FARM Program (Farmers Assuring Responsible Management™ (FARM) Program) provides transparency and uniformity to best practices in animal care and quality assurance through a nationwide, verifiable program. Third-party verification of the program’s content and execution helps ensure its credibility and integrity to our customers and consumers.

In 2014, FARM Program participation expanded with additional involvement of cooperatives, proprietary processors, and individual producers, which progressively demonstrates the dairy industry’s continued commitment to providing high-level care to dairy animals. Participation increased to more than 75 percent of the U.S. milk supply.

The strength, scope and science-basis of the animal care program has been critical to helping shape international initiatives on animal welfare. The broadly-accepted animal care program for the U.S. dairy industry has helped the U.S. government and dairy industry representatives to provide consistent, constructive feedback during the public comment process to both the World Animal Health Organization (OIE) and the International Standards Organization (ISO), which have been working to develop international standards on animal welfare. Through FARM representation, the FARM Program participates in the standards-setting process to represent the best interests of the U.S. dairy industry. The program is also utilized in animal-welfare discussions at the Food and Agriculture Organization (FAO) and the International Dairy Federation (IDF).
Third-party Verification

Validus certification Services is the verifier of the program

✓ Annual process designed to demonstrate the integrity of the program
✓ Verification approach results in a greater than 95% confidence
✓ Not every farm goes through this process; selected farms are contacted to schedule the verification
Hitting the Bullseye
On-Farm Best Practice Observations from Second-Party Evaluations

Animal Care Standard Operating Procedures: 86.8%
- Oral or written instructions in specific areas to ensure animal care practices are consistently implemented

Daily Animal Observations: 99.3%
- Observation is key to identifying health issues early in order to provide effective treatment

Calf Handling: 98.4%
- Personnel are trained to handle and restrain calves with a minimum of stress to the animal

Veterinary/Client/Patient Relationship: 84%
- To properly diagnose, treat, and prevent disease

Colostrum: 98.2%
- All calves receive colostrum soon after birth

Calf Navel Dipping: 67.7%
- Application of antiseptic after birth is an effective preventive treatment

Herd Health Plan: 93.7%
- Oral or written protocols developed with veterinarian for common diseases, calving, and special needs animals

Painful Procedure Management: 78.1%
- Necessary medical procedures should be performed as soon as possible with appropriate pain management

90%+

Euthanasia Protocols: 93.8%
- Personnel must be properly trained on the need for and recognition of animals to be euthanized

80-89%

Annual Training for New and Existing Personnel: 84%
- To maintain a level of animal care that is consistent with the producer's values and expectations

65-79%

Non-Ambulatory Animals Movement Training: 94.6%
- Designated personnel must be properly trained to utilize appropriate equipment to move non-ambulatory animals
Participation

✓ Almost 500 Second–Party Evaluators certified
✓ Almost 30,500 on-farm Second Party Evaluations completed
✓ Over 370 Third-Party Verifications completed
Sustainable U.S. dairy food system

NUTRITION & HEALTH BENEFITS

Few foods deliver dairy’s powerhouse of nutrients in such an affordable, delicious and readily available way.

- 1 cow produces on average 144 servings of milk per day.
- That’s enough to provide 48 people with 3 daily servings of low-fat milk.
- Dairy intake is associated with:
  - Strong bones and teeth
  - Reduced risk of cardiovascular disease and type 2 diabetes
  - Lower blood pressure in adults
- And this would deliver:
  - 90% DV for calcium
  - 90% DV for vitamin D
  - 30% DV for potassium
  - 48% DV for protein
  - + additional nutrients essential for health

VALUE FROM BY-PRODUCTS

Having four stomachs means cows can recycle food that people can’t eat.

- 75% of a cow’s diet is not consumable by humans.
- By-products from the human food and fiber industries (e.g., citrus pulp and cottonseed) are converted to milk rather than sent to landfills.

TAKING IT FURTHER

Manure is also becoming a source of additional value. Anaerobic digester systems convert manure and commercial food waste into:

- Electricity
- Fuel for cars and trucks
- Fertilizer and fiber

$200 per cow per year in combined revenues and cost savings
National Milk Producers Federation
Connecting Cows, Cooperatives, Capitol Hill, & Consumers

Jamie Jonker, Ph.D.
Vice President, Sustainability & Scientific Affairs
jjonker@nmpf.org