

SUSTAINABILITY IN DAIRY PRODUCTION



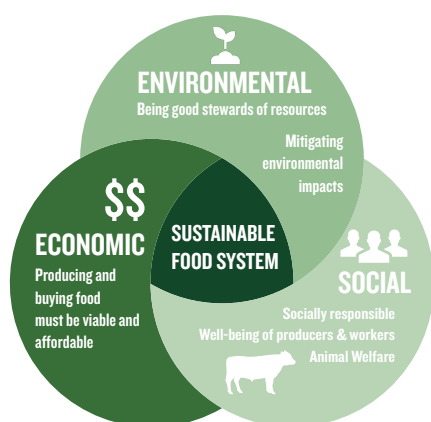
COLORADO STATE UNIVERSITY

SUSTAINABLE SOLUTIONS
FOR ANIMAL AGRICULTURE

The dairy industry is a vital element for global food security and the economy. The United States dairy industry contributes 3.5% of the U.S. gross domestic product and provides approximately 3.3 million jobs.

— [IDFA](#), 2024

The three pillars of sustainability:



In Colorado, dairy production plays an essential role in generating **\$3 billion** in economic activity, producing **558 million gallons** of milk per year, and creating about **53,000** direct and indirect jobs.

— [Colorado Agriculture](#), 2024

U.S. Dairy Industry Stewardship Goals



■ Lower greenhouse gases (GHG) per gallon of milk



■ Continuous improvement of environmental stewardship

2050

■ Industry-wide goal is GHG neutral production by 2050

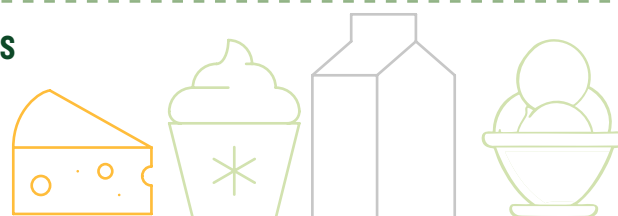


■ Reduce antimicrobial use, preventive medicine, targeted treatment, organic dairy production, biosecurity, and improve worker safety

— usdairy.com/sustainability

Upcycling inedible foodstuffs into human edible products

Dairy animals **upcycle** waste from food production and turn it into **nutritionally dense and affordable** food products like **milk, cheese, yogurt and ice cream**.

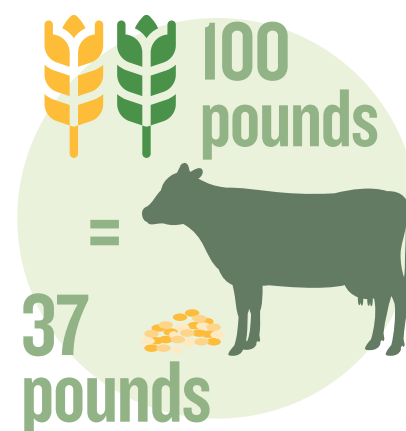


Oftentimes, dairy cattle are eating foodstuffs that have been harvested from other food production processes.

Human food waste, like peels and hulls, can be added to a dairy cow's diet, keeping byproducts out of landfills and upcycling them into human edible products.



For every 100 pounds of human food generated from crops, 37 pounds of byproducts are produced and those can be fed to dairy cattle



GHG & Dairy Production

U.S. average breakdown of dairy's carbon footprint:

Enteric Methane

CH₄

43%

Manure Emissions

28%



Feed Production & Inputs

26%



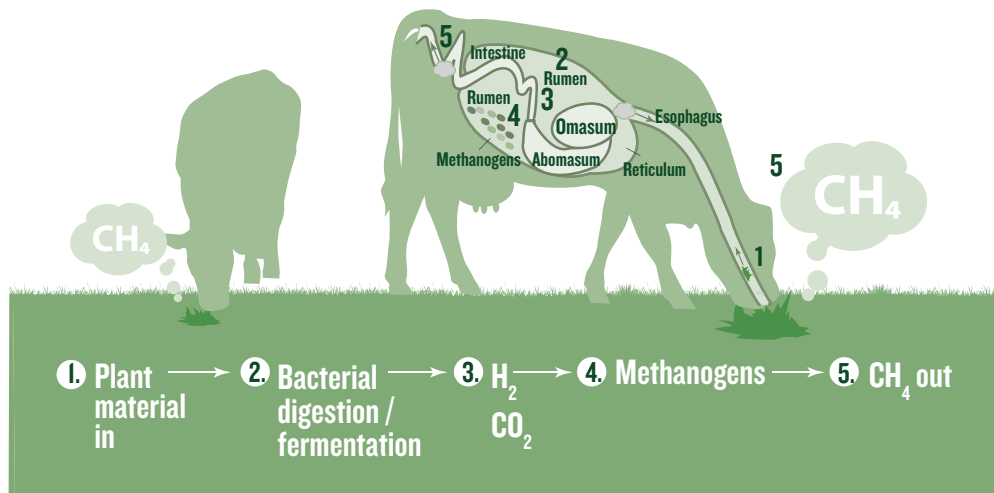
On-Farm Energy Use

3%



As part of its effort toward sustainability, the U.S. dairy industry must use all of the tools in its tool box to make improvements across the board: continuously improve methods to preserve the environment; improve biosecurity and worker safety; lower greenhouse gas (GHG) emissions; and achieve GHG neutral production. A look at some possible tools:

Enteric Methane Mitigation on Dairies



Enteric Methane Mitigation Options:

Enteric Methane is a naturally occurring biological process from rumen fermentation — 95% comes out of the animal's mouth.

- More concentrate feeds relative to forages
- Fat content of diet
- Feed processing
- Ionophores
- Feed additives like 3 nitrooxypropanol (3-NOP)

Manure Mitigation on Dairies

Mitigation Options:

Opportunities to reduce methane from manure vary by how manure is managed. Options include:

- Reducing manure output through animal efficiency
- Covering manure storage systems
- Reducing the time of manure storage
- Composting
- Anaerobic digestion

Options for reducing nitrous oxide emissions from dairy cattle manure include:

- Reducing nitrogen excretion in manure through animal efficiency and diet formulation
- Reducing storage time of manure
- Composting
- Covering manure storage

Covering a manure lagoon can capture the methane emitted, recycle water, and produce energy.



Rotz et al., 2021. Environmental assessment of United States dairy farms. J. Cleaner Prod. 315: 128153.

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