

# Major greenhouse gases (GHG) produced on dairy farms

## Methane (CH<sub>4</sub>)

enteric fermentation by cows  
manure storage  
silage bunkers and piles

## Nitrous oxide (N<sub>2</sub>O)

(released from soil)  
fertilizer on crops  
manure on crops  
manure on pastures

## Carbon dioxide (CO<sub>2</sub>)

energy use on farm, in field  
production of N fertilizer

## Volatile organic compounds (VOC)

silage bunkers and piles

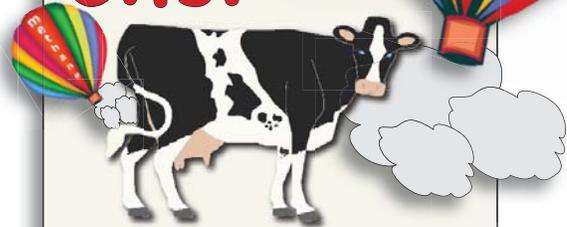
## Ammonia (NH<sub>3</sub>)\*

manure in barns and storage  
silage bunkers and piles  
soils

\* Not a GHG, but emissions can be regulated



**WHICH END**  
of a dairy cow  
produces more  
**GAS?**



The **FRONT** end!  
Methane source is  
**95%** belching  
(burps)  
**5%** flatulence  
("toots")

## Ways to reduce GHG emissions on dairy farms: now and in the future (research needed)

### COW

1. Optimize efficiency of dairy cows; higher producing cows produce less methane per unit of milk produced.
2. More efficient diets, better balance of protein and energy, better utilization of feedstuffs.
3. Better controlled barn ventilation.

### silage bunkers and piles

4. Cover silage bunkers and piles; manage face to reduce exposure to air.

### manure

5. Improve manure collection and storage systems; reduce water content of manure; separate urine and feces.
6. Use anaerobic digesters to produce methane from manure; develop economic small-scale manure digesters.

### soils

7. Incorporate manure into soil; improve manure injection systems.
8. Change cropping and fertility practices to maximize nitrogen uptake.



# Who's measuring GreenHouse Gases and estimating carbon footprints?

United Nations Food and Agriculture Organization (FAO)

**World: 2.7%** of human-generated greenhouse gases come from the dairy sector.\*

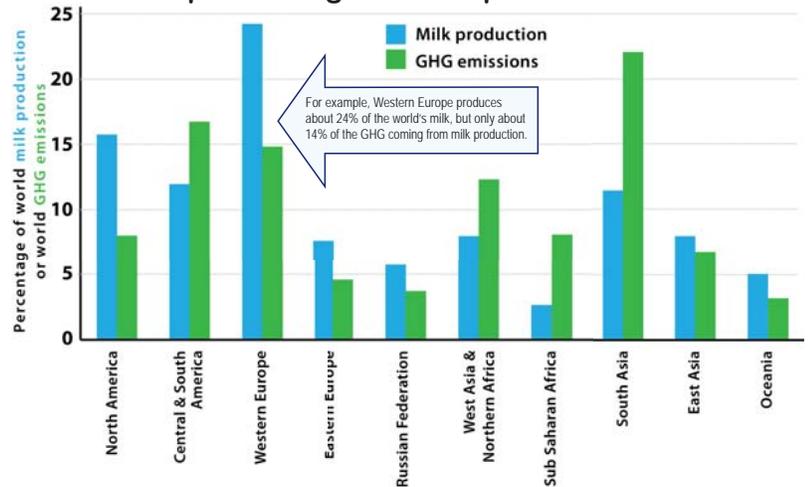
\* This climbs to 4% when meat production from dairy animals is included.



Source: United Nations Food & Agriculture Organization -- *Greenhouse Gas Emissions from the Dairy Sector, A Life Cycle Assessment, 2010.*

[www.fao.org/docrep/012/k7930e/k7930e00.pdf](http://www.fao.org/docrep/012/k7930e/k7930e00.pdf)

Relative contribution of world regions to milk production and GHG emissions associated with milk production, processing and transportation.

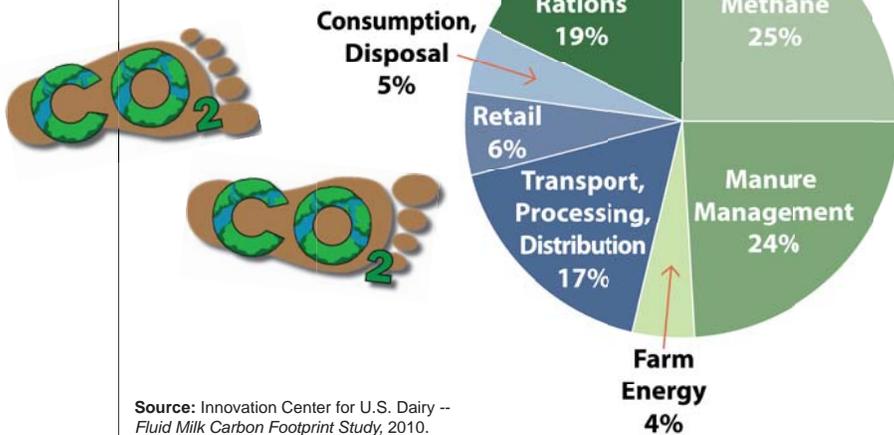


Source: United Nations Food & Agriculture Organization -- *Greenhouse Gas Emissions from the Dairy Sector, A Life Cycle Assessment, 2010.*

## Innovation Center for U.S. Dairy -- Sustainability

### Supply chain contribution to carbon footprint of fluid milk

(kg CO<sub>2</sub> equivalent per kg milk consumed)



Source: Innovation Center for U.S. Dairy -- *Fluid Milk Carbon Footprint Study, 2010.*

**USA: 2.0%** of human-generated greenhouse gases come from the dairy sector.



Source: Innovation Center for U.S. Dairy -- *Fluid Milk Carbon Footprint Study, 2010.*

[www.usdairy.com](http://www.usdairy.com)