Climate Change and New York Dairy Farms

DR. L. E. CHASE

PROFESSOR EMERITUS – DAIRY NUTRITION

CORNELL UNIVERSITY

Background

- A joint project by Cornell University, The City University of New York and Columbia University.

- Project was done for NYSERDA.

- Initial report in 2011 (updated in 2014).

- Projected changes in climate in 7 regions of NY for the 2020's, 2050's and 2080's.

Temperature

- Yearly average temperature changes:
  - 2020's = increase of 2 – 3.4^{o} F.
  - 2050's = increase of 4 – 6.8^{o} F.

- Number of days > 90^{o} F (Rochester):
  - 2020's = increase of 12 – 19 days.
  - 2050's = increase of 18 – 42 days.

- Number of days <32^{0} F (Rochester):
  - Base year = 133 days.
  - 2020's = 99 – 116.
  - 2050's = 78 – 102.

Precipitation

- 2020’s = increase of 1 – 8%.
- 2050’s = increase of 3 – 12 %.

Extreme Events

- Frequency of heat waves, intense precipitation and coastal flooding are all projected to increase.

-Frequency of cold events is projected to decrease.

- Risk of drought may increase.

Impacts on Agriculture

- Longer growing season.
- Increased insect, disease and weed pressure.
- Increased risk of decreased milk production.
- Shift in crop hybrids, varieties or rotations.
- Changes in crop yields and quality.
- More potential for cover crops or double crops.
- Increased risk of late-summer drought.
- Increased frequency of high rainfall events (delayed planting, floods, soil compaction or runoff of chemicals or manure)

Adaptation Strategies

- Adjustment of rations and feeding management.

- Changes in fans, sprinklers and other animal cooling systems.

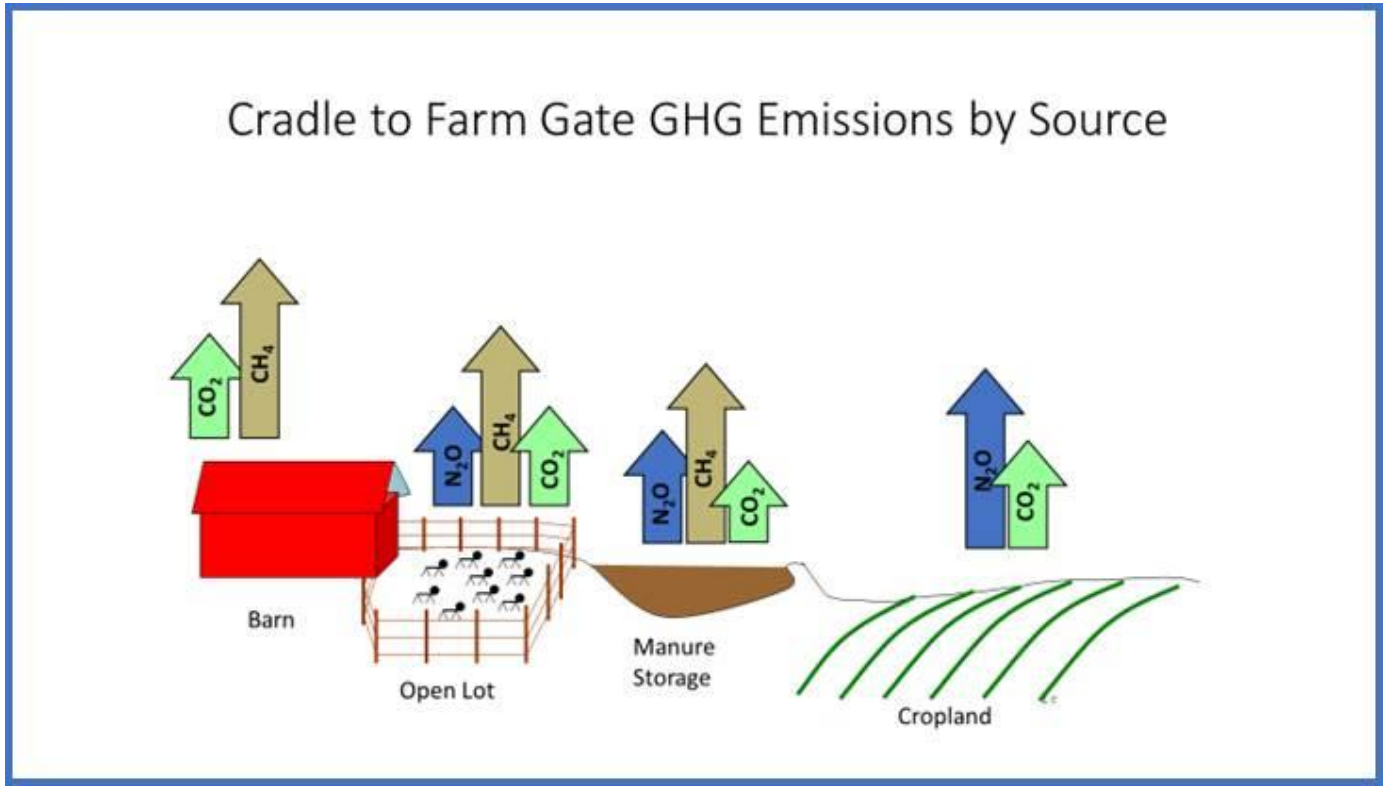
- Adjustments in planting and harvest date to lower risk of heat stress or low rainfall.

- Shift in hybrids or varieties with increased heat or drought resistance.

- Shifts in hybrids or varieties with more pest or disease resistance.

- Increased emphasis of maintaining or improving soil health.

- Observing practices used by farms in the southern U.S.


Cradle to Farm Gate GHG Emissions by Source
CO_2
CH_4
N_2O
CH_4
CO_2
N_2O
CH_4
CO_2
N_2O
CO_2
Barn
Open Lot
Manure
Storage
Cropland