Agriculture and the Environment

• All agriculture has an impact on the environment
  • By definition, cultivating the land will perturb it and thus the immediate and surrounding ecosystem
  • The goal is to understand and manage the impact and resources in sustainable ways
Current Challenges
Paris Agreement:

Limit warming to below 2°C, preferably below 1.5°C

Global Context

Agriculture contributes ~12% of Global emissions

FAO Stats
Global Context

FAO Stats

Some US Context

EPA, 2021
Some US Context

EPA, 2021

- Small overall increases in enteric and manure emissions
- Small decreases in dairy’s contribution
What about efficiency?

GHG Intensity Decreases with Increasing Production

Figure 10: Trends in emission intensity of milk by region (2000, 2010 and 2015)

FAO Stats

Figure 12: Emission intensity and milk yield
Note: Each dot represents a country. The fitted line clearly indicates an inverse relationship between milk yield per cow and emission intensity, i.e., as milk yield increases there is more milk to spread the emissions over.

FAO Stats
US Dairy is still decreasing emissions intensity

Efficiency vs. Total Impact

Baseline

High-Efficiency
Efficiency vs. Total Impact

Baseline

High-Efficiency + Increased Production

What is Sustainable Agriculture?
What is Sustainable Agriculture?

- Agriculture that...
  - Continues to provide sufficient quantity and quality of food and fiber
  - Preserves and enhances conservation of natural resources
  - Efficiently uses non-renewable resources
  - Maintains economic viability of farmers
  - Enhances the quality of life in rural societies
  - Maintains animal health and welfare

The Dairy Farm System

Cycling: -N, -P, -C, -H₂O, MANURE
Losses: SOIL + CROPS
Exports: ANIMAL, STORAGE