What do greenhouse gases do?

Greenhouse gases (GHG’s) cause climate change by trapping heat within the Earth’s atmosphere. Over the last century, the Earth’s temperature has risen 1.4°F, and is projected to rise another 2-11.5°F over the next century.

Where do GHG’s come from?

Main GHG’s include Carbon Dioxide (CO₂), Methane (CH₄), Nitrous Oxide (N₂O), and Fluorinated Gases. Electricity production, transportation, fossil fuel use, and agriculture all contribute to increasing levels of greenhouse gases.

How are dairy cattle affected by climate change?

Rising temperatures can increase the risk of heat stress in cows, resulting in reduced feed intake, weight gain, and milk production. Production losses from heat stress cost the dairy industry almost $1 Billion per year. In addition, increased severe weather events and changes in precipitation can impact crops used for feed production.

2011 Top Methane Contributing Livestock:

- Beef: 72%
- Dairy: 24%
- Pigs: 1.5%
- Horses: 1.2%

How do ruminants affect climate change?

Within the agricultural sector, normal enteric fermentation during the digestion process in ruminants contributes 18% of GHG emissions to climate change, which only accounts for 1.5% of total GHG emissions.

The chart at the right represents the flow of energy during digestion. Methane production from enteric fermentation represents a loss of dietary energy, and can be affected by different diets, feed intakes and quality, and rumen microbial diversity.

How are methane emissions affected?

Methane production primarily depends on the digestibility and rate of passage of feeds in the digestive system. These factors are affected by the quality and quantity of the feed consumed. High quality forages are associated with higher intakes and faster passage rates than low quality forages.

At high intake levels, more substrate is available for fermentation in the rumen causing more methane to be produced. However, animals that consume higher quality diets will produce more milk than an animal that consumes less of a low quality diet, reducing the amount of methane produced per unit of milk (more efficient).

How do different systems compare?

Pasture based dairies tend to have a slightly higher global warming potential than confinement dairies, but have more opportunities to decrease methane outputs through manure management, forage types, and less use of fossil fuels for feed production.

How do we reduce enteric methane production?

Feed intake and digestibility are important factors when trying to reduce methane outputs. Legume based pastures (top right) have higher digestibility and rates of passage when compared to grass based pastures (bottom right). Increasing the quality of pastures by the addition of legumes can decrease methane production by 10%. Grinding or pelleting of feeds can decrease methane production 20-40% due to the increase in passage rates of digesta. The addition of lipids can also decrease methane losses by decreasing the amount of fermentable substrates in the digestive tract.

By selecting the proper high quality feeds to maintain high producing cows and through other daily management practices, we can work to minimize the production of methane and strive for higher efficiencies and a smaller footprint on the environment in agriculture.

What are we doing at KBS?

At KBS we focus on pasture management, rotational grazing, increasing feed and energy efficiencies, effects of forages on methane and carbon dioxide emissions, and maintaining pastures for carbon capture (sequestration).