

# Dairy's Toolbox for Reducing Emissions

## How Family Farms Are Part of the Solution to Climate Change



**The Original Recyclers:** Farmers recycle resources wherever possible, including using manure as a natural fertilizer and feeding byproducts to cows. More than 80% of what dairy cows eat cannot be consumed by humans; one-third of their diet are byproducts from other industries. Farms use nutrition models like the Cornell Net Carbohydrate and Protein System to calculate nutrient balance to help reduce the carbon footprint.



**Draglining and Manure Injection:** This management practice improves nutrient application efficiency and reduces road traffic by bringing manure directly from storage to field. A tractor with hundreds of yards of hose applies the natural fertilizer by injecting it directly below the soil surface. This helps reduce odor and emissions from the field.



**Cover Crops:** Cover crops improve soil health and water quality. Their roots increase water filtration, absorb excess nutrients like nitrogen, support soil structure and integrity, and help prevent runoff and erosion. Some farms harvest cover crops as a feed source for their livestock.



**Carbon Sequestration:** Cows participate in the natural process of recycling carbon into our atmosphere, known as the biogenic cycle. Cropland and surrounding vegetation are prime sites for carbon to be used and stored in plant biomass and soils. Cover crops sequester carbon and absorb excess nutrients while maintaining soil integrity.



**Anaerobic Digestion:** This process captures and utilizes methane from manure to significantly reduce emissions through a natural biogenic process. Micro-organisms inside digesters break down cow manure into two forms: biogas and digestate. The biogas – mostly methane and carbon dioxide – can be used as renewable energy. Digestate can be separated further into solid materials for cow bedding, and the nutrient-rich liquid leftover can be used as natural fertilizer in the fields. This process is an important source of biofuels that can offset the use of fossil-based fuels.



**Cover and Flare:** Farmers store manure in professionally engineered storage units. Gas-tight impermeable covers can be installed to capture biogas and reduce odor. This system helps reduce emissions by flaring off methane gas captured in the structure. Covers also prevent rainwater from entering the storage and adding to the volume.



**Reduced Tillage:** Farms utilize no-till or strip tillage practices in the fields to minimize soil disturbance and keep nutrients in place. This conservation practice supports soil health and reduces fuel use with fewer trips driven across the field.