Practices ...
Targeting Continuous Improvement

Identify management practices that can help you to increase efficiency, save resources, reduce costs, and improve profitability.
**Cow of the Future™**

Management practices for the cow

The dairy industry has made great strides in reducing GHG emissions on the farm, however, the fact remains that enteric methane from the cow is the largest source of greenhouse gas (GHG) emissions associated with milk production. A dairy cow’s rumen allows her to digest the high-fiber feed necessary for milk production, but it also causes her to produce enteric methane gas.

The Cow of the Future™ project seeks scientifically sound, economically viable and socially responsible ways of reducing enteric methane emissions through improvements in dairy cow nutrition, genetics and health. The project’s goal is to reduce GHG emissions for fluid milk by 600,000 metric tons through the adoption of existing technologies and practices and research into new opportunities.

This summary of management practices will be published in a Cow of the Future™ resource being developed by the Innovation Center.

**Ration formulation**

Good ration formulation practices for dairy cows positively affect the bottom-line and reduce enteric methane.

- A balanced diet that meets animal requirements for high levels of productivity (i.e. growth and milk yield), health and reproduction will improve profits and reduce enteric methane emissions per unit of fat-and-protein-corrected milk.
- The implementation of advantageous ration formulation practices requires consideration of rumen function, animal requirements, the net energy system and energy partitioning and concepts of feed efficiency and dilution of maintenance.

- Ingredient and diet nutritional analyses (i.e. composition and digestibility) are also essential components of ration formulation practices leading to improved profit and enteric methane mitigation.

**Forages**

High-quality forages promote feed intake, overall ration digestibility and high productivity, leading to more profits and reduced enteric methane emissions per unit of fat-and-protein-corrected milk. Forage quality is dependent on field conditions, plant species and variety, fertilization, maturity at harvest, length of cut, processing and preservation. Emphasis is placed on reducing digestible dry matter losses at harvest and during storage to improve animal performance and reduce enteric methane emissions.

**Concentrates**

The inclusion of concentrates (grains and byproduct feeds) in dairy cattle rations will reduce enteric methane emissions per unit of fat-and-protein-corrected milk under various dietary conditions by directing rumen fermentation away from methane-producing pathways and increasing animal performance.

It is a true balancing act to provide proper nutrition to high-producing dairy cattle while also keeping their digestive systems healthy. Attention must be paid to total dietary starch and sugars, the speed and extent of starch digestion, dietary fiber and the amount of...
chewable fiber in the diet. Dietary lipids reduce enteric methane emissions primarily by replacing ruminal fermentable carbohydrates in the diet. Caution, however, must be exercised with both high-starch and high-lipid feeding to avoid reductions in fiber digestibility, feed intake, milk fat production and animal performance. Concentrate feeds supply a large proportion of the nitrogen and amino acid needed for rumen microbial protein synthesis as well as dietary amino acids, which escape the rumen for use directly by the dairy cow.

- Concentrates can also serve as vehicles for dietary inclusion of feed additives that improve rumen function and animal health, leading to improved animal performance, increased profits and reduced methane emissions.

**Young livestock nutrition**

Sustained health and timely growth and development of calves and heifers into productive, efficient cows can positively affect the bottom line and lead to on-farm reductions in enteric methane emissions per unit of fat-and-protein-corrected milk.

- Thriftiness, reduced incidence of disease, reduced mortality and timely reproductive performance reduce overall involuntary herd culling and unproductive days.
- Opportunities for improving calf and heifer health and development rely on adequate colostrum feeding, diarrhea and respiratory disease prevention, implementation of vaccination and breeding programs, and nutrition to meet the specific requirements for each animal category.
- Recordkeeping to monitor growth and to target age-at-first calving is an essential practice conducive to future enteric methane mitigation in adult animals.

**Transition cow nutrition**

Effective nutrition and management of the transition cow will decrease dairy’s carbon footprint by improving milk yield, reducing non-productive days, reducing involuntary culling, increasing lifetime productivity and reducing replacement costs.

- The goals of the transition period are to prepare for a successful calving and subsequent lactation by promoting cow comfort and dry matter intake, meeting nutritional requirements and reducing the incidence of postpartum metabolic diseases.

**Milking procedures**

Improving the efficiency of high-quality, saleable milk production on the farm increases profit and reduces enteric methane emissions per unit of fat-and-protein-corrected milk. To achieve this, steps can be taken to optimize milk yields, improve the quality of milk and increase the productive life of the cow.

- Opportunities begin in the milking parlor, where consistent milking procedures, routines, and equipment maintenance that optimize cleanliness and sanitation improve the harvest of high-quality milk.
- Prevention, identification and treatment of mastitis can also reduce milk wastage, reduce losses in potential milk yield and increase the length of a cow’s productive life.
- Management practices and facilities that improve cow comfort, cow time budgets and reproductive efficiency lead to improved milk production efficiency of the whole herd and increase the productive life of the individual cow.

By reducing the loss of saleable milk and increasing production efficiency, producers will enjoy improved profits even as they contribute to methane reduction.
Farm Energy Efficiency™
Management practices for the dairy farm

Energy savings translate directly to cost savings and thus improved profitability for the dairy operation. Energy saving also reduces GHG emissions from on-farm energy use, which is about six percent of all on-farm GHG emissions from dairies. As part of an overall management plan, a farm energy audit is a tool that removes the guesswork and identifies inefficient equipment.

The Innovation Center’s Farm Energy Efficiency project promotes energy conservation and farm energy audits as a good starting point. The project is focused on connecting dairy producers with solutions and funding resources that help them to cut costs, save energy and gain efficiencies that reduce GHG emissions.

The best practices guide in this section was developed by program partner and agricultural energy leader EnSave, Inc. and supported by USDA-Natural Resources and Conservation Services and the Innovation Center for U.S. Dairy.