

Managing Sustainable Dairy Farms

NC-1042 (2007-2013)

Managing Dairy Farms is a Complex Process



Photo courtesy of Utah State University .

In addition to maximizing their profits, dairy producers must meet the public's demands for animal well-being, environmental stewardship, and product quality. Dairy producers must make many decisions each day about all aspects of their farms. Decisions about when to breed cows, what to feed them, whether to treat them for pests and diseases, and how to house and handle them must take into account the individual cow's age, size, weight, immunities, and other physical and psychological traits. Decisions must also account for industry trends, environmental conditions, and availability of resources. Farmers' decisions can also impact the environment. For example, diet influences how much methane, nitrogen, and phosphorous cows excrete in their gas, urine, and waste, which—in excess—can accumulate in surrounding soil, water, and air.

To make these complex decisions, farmers need data, simulations and models, and written or computerized decision-support tools that are user-friendly and cost-effective. In particular, there is growing demand for decision aids to evaluate niche markets and alternative management schemes, including organic farming, pasture grazing, and feeds made from byproducts of biofuel processing.

Multistate Research Makes Dairy Management Decisions Easier

For the past six years, Multistate Research Project NC-1042 has fostered collaborative research among dairy scientists. Here are a few examples of how recent findings and developments are supporting sustainable dairy enterprises nationwide:

Research and outreach has increased knowledge and adoption of new tools for dairy farm management.

- Outreach events and conferences introduced more than 30,000 dairy farmers to up-to-date, field-tested decision aids.
- Tests and interviews conducted before and after outreach events in Idaho showed significant improvement in dairy workers' knowledge.

Research-based suggestions have improved labor management on dairy farms.

- Practices like investing in workforce training and effective communication helped dairy farmers recruit and retain satisfied, capable employees who help run efficient, profitable farms.
- By providing guidance specifically for new farmers entering into the dairy industry, NC-1042 helped beginning farmers make positive investment—a key element of long-term, industry-wide viability.

Easy-to-use, customizable databases, spreadsheets, and models have made it easier to develop realistic budgets and reduce farmers' risks of future financial difficulties.

- Farm Services and commercial banks used the Dairy Business Analysis Project database to evaluate loans and work with customers, helping dairy farmers secure loans and investors support the dairy industry.
- Easier access to data helped government officials set appropriate regulations for dairy farms.

NC-1042 has designed nuanced diets and feeding programs that better meet specific cow dietary needs.

- With new feeding tools and strategies, dairy farmers can better manage and control variation in the delivery of nutrients. Controlling variation improves profitability by an estimated \$0.25 to \$0.27 per cow per day—adding up to about \$840 million per year for the U.S. dairy industry.

Better diets have increased milk production.

- Cows eat less when fed diets with lower starch concentrations, but produce similar milk yields compared to cows fed conventional diets.
- Adjusting potassium in the diets of lactating dairy cows increased milk production.

Since cows are getting better nutrition from diets and wasting less food, producers are spending less money and energy on feed, leaving a wider margin for profit.

Discoveries about alternative feed sources have helped farmers cut feed costs even further, keeping dairy products affordable for customers.

- Pregnant heifers raised primarily on pasture had similar average daily weight gain, body condition, skeletal growth rates, and milk production as heifers fed conventional diets in confinement facilities.
- Alternative protein sources including canola meal, field peas, and microbial protein can replace soybean meal in dairy cow diets while maintaining or improving milk production and milk composition.

NC-1042 studies have shown the value of distiller's grains (DDGS, the byproducts of processing corn into biofuel) as feed, changing how many producers and nutritionists view these byproducts. Adoption of this alternative feed source by dairy producers has been high.

- Effectively using DDGS as a feed source, dairy producers could save as much as \$ 0.06 to \$ 0.09 per cow per day in feeding costs.

Use of byproducts conserves corn and soybeans and agricultural land for food uses, reducing competition of crops grown to feed a rising world population and those grown to feed livestock.

When diets are better suited to cows' needs, fewer excess nutrients are released into the environment in their manure, helping dairy farms meet environmental constraints

Along with changes to improve diet, NC-1042 research has also promoted more comfortable dairy facilities, leading to healthier cows, which in turn produce more milk.

- Many producers saw substantial improvements in foot and leg health and longevity of their cattle using composting bedding in their barns.
- Cross-ventilated barns reduced heat stress among cows, resulting in less lameness, better reproduction, and higher milk production.
- Advanced strategies and technology for earlier detection of changes in cow health and condition could reduce incidence of major animal welfare problems and avoid related economic losses.



NC-1042 has made significant discoveries about how to control diet to reduce impacts on the environment. For example, better control of diet variation reduces nitrogen excretion by an estimated 44 grams per cow per day, or 147,752 metric tons per year for the entire U.S. dairy industry. This means there is less potential for excess nitrogen to runoff into nearby bodies of water. Other NC-1042 studies found that coconut oil reduced methane emissions by 39%, but lowered feed intake and milk yield, and forages such as Birdsfoot trefoil could help confinement dairy farms reduce the nitrogen content of cows' urine. Photo by Gerry Dincher, Flickr, Creative Commons 2.0 License.



NC-1042 research identified cost-saving feeding alternatives for calves. For example, small farms could save \$5,000 per year by pasteurizing non-saleable waste milk and feeding it to half of their calves; farms ten times as large could save 20 times that amount. Photo by La Fattina, Flickr, Creative Commons 2.0 License.



NC-1042 studies showed that diets with up to 30% low-fat DDGS did not affect milk yield. NC-1042 research has also helped small farms adopt byproduct feed by developing ways to prevent spoilage of stored distillers grains so that farms do not waste feed if they are unable to use it up quickly. Photo by Kay Ledbetter/Texas A&M AgriLife Research, Flickr, Creative Commons 2.0 License.

Want to know more?

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