National Dairy Forage Road Map

U.S. Dairy Forage Research Center

Agricultural Research Service

INTERSTATE 1

Why create a road map?

Since 1981, researchers at the U.S. Dairy Forage Research Center (USDFRC) have been developing knowledge and tools to enhance sustainable and competitive dairy forage systems that protect the environment, promote animal health, and ensure a safe, healthy food supply. The USDFRC is the only unit in the USDA Agricultural Research Service with the mission of improving forage use by dairy cattle.

Through the years the USDFRC has successfully navigated through a changing landscape by updating CRIS projects, adding staff, and building the Environmentally Integrated Dairy Management Research Unit, Marshfield, WI. More recent changes have prompted the USDFRC to ask, "Is it time to create a new road map to help us navigate through these changes and beyond?"

This is an attempt to do that – to create a road map for dairy forage research based on what we know are critical concerns facing the industry at this time – realizing that this road map will need to change as the years advance.

Here are some changes that have prompted the USDFRC to create a road map that will help plan for the future:

1. Increased competition for corn that has driven up grain prices for dairy producers who will have to rely more heavily on forages.
2. Increased milk production in dairy cattle that has changed the way cows utilize feed and how dairy cattle diets are formulated.
3. New scientific methods that allow for new research possibilities.
4. Increased interest in the environmental impact and carbon footprint of milk production in the U.S.
5. Recent and pending retirements of some USDFRC scientists.
6. Aging USDFRC research farm facilities at Prairie du Sac, WI.

The destination:

To cover more ground with forages and create more economically and environmentally sustainable dairy forage farm systems.

The vehicles:

Forages: Improved forage plants and systems

The cow: Better utilization of forages in dairy cattle diets

The main research highways:

1. Modify plants to improve nutrient availability
2. Develop new cropping & pasture systems
3. Improve harvest & storage systems
4. Improve nutrient utilization by cows
5. Reduce nutrient escape to the environment
6. Develop new bioenergy & bioproduct uses

The drivers:

U.S. Dairy Forage Research Center scientists
Other ARS researchers
Consortia with public and private partners
Collaboration with public and private partners
Dairy/forage stakeholders (producers/industry)

Cover more ground with forages

A road map for more economically and environmentally sustainable dairy forage farm systems.

Research objectives in brief

Modify plants to improve nutrient availability

Increase yield and persistence • Increase cell wall digestibility • Improve protein utilization

Develop new cropping & pasture systems

Improve use of forages as companion crops • Reduce number of cuttings per season • Develop alternative forage systems for special uses • Improve pasture forage plants & management • Improve understanding & use of innoculants

Improve harvest & storage systems

Separate alfalfa leaf and stem fractions at harvest • Develop techniques to increase silage density and reduce losses • Limit spontaneous heating in hay packages

Improve nutrient utilization by cows

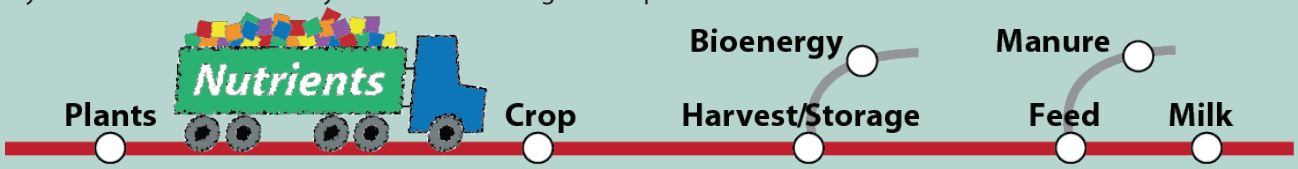
Improve understanding of rumen microbes • Improve forage protein utilization in rations • Optimize diets to utilize more forage and increase conversion of feed to milk • Understand effects of non-fiber carbohydrates on digestibility/utilization of fiber and protein • Reduce cost and carbon footprint of raising replacement heifers • Develop rapid techniques of feed analysis for on-farm use to reduce diet variability • Develop a more accurate system to functionally characterize value of forage fiber to cow

Reduce nutrient escape to the environment

Develop strategies to minimize emissions of ammonia and greenhouse gases • Evaluate new manure application technologies • Develop alternative cropping systems that open more opportunities for manure application • Identify fate of pathogens in manure systems

Develop new bioenergy & bioproduct uses

Develop improved forages for bioenergy/bioproduct uses • Use anaerobic fermentation to create VFAs for bioproducts and biofuels • Develop ways to create new products from alfalfa leaves

Research aims to reduce the loss of nutrients at every stretch in the on-farm highway

The goal of an economically and environmentally sustainable dairy forage system is to make the best use of nutrients from start to finish – to get those nutrients all the way from the forage plant to the milk produced without losing too many along the way. Lost nutrients cost money and can have a negative impact on the environment.