

## Dairy CAP News November 14, 2013

Climate Change Mitigation and Adaptation in Dairy  
Production Systems of the Great Lakes Region



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Photo by Bryce Richter.

The winter issue of ***On Wisconsin***, UW-Madison's Alumni Magazine, features a piece on the Dairy CAP as part of its cover story, "Moo U" by John Allen. Project co-directors Matt Ruark and Molly Jahn are quoted in the story. The magazine has a circulation rate of 340,000.

### **Glasses of Gases**

#### **Pardon their Rudeness, but cows burp - a lot**

It's the price of being ruminants. All that cud going up and down the esophagus results in the expulsion of a lot of gas right out of the mouth.

How much is a lot? According to assistant professor Matt Ruark, a dairy cow will belch out the equivalent of 4.42 pounds of carbon dioxide for every gallon of milk it produces. This is important because the world is getting warmer, and all those burps aren't helping. Dairy farms contribute about 2 percent of U.S. greenhouse gas emissions. That's why Ruark is directing a research project — funded by a \$10 million grant from the U.S. Department of Agriculture (USDA) — to investigate how dairies can help mitigate and adapt to climate change.

The five-year study was launched in spring 2013, and it includes contributions from a variety of different disciplines. (Ruark himself is a soil scientist, although he does describe himself as a big milk drinker.) Project participants include seven different universities, as well as several government facilities. The study's funding comes from a USDA CAP grant — that's a Coordinated Agricultural Projects grant — a program that looks at farming as a unified process, rather than as a series of discrete activities.

"We're looking at the entire milk cycle — cows, manure, land, crops, and back," Ruark says. He believes that one of the key reasons why his research project won its CAP grant was because it will actively involve working farmers and has the support of the dairy industry.

"The USDA project not only includes research activities, but also funds education and outreach," Ruark says. "My Extension appointment puts me in a unique position to integrate all these activities." The UW's relationship with the dairy industry dates at least back to 1886, when it began offering educational outreach programs called farmers' institutes. The Dairymen's Association sponsored the bill that created them. More than a century later, the UW is still working to help the dairy industry deal with the leading problems of the era. These days, that's climate change.

Dairy farms produce the equivalent of 49,000 teragrams — that's 49 million billion grams — of carbon dioxide every year, and yet dairy production shows no sign of decline.

"Milk is actually one of the few foods that nutritionists say we should consume more of," says Molly Jahn, the co-director of the climate project and former dean of the College of Agricultural & Life Sciences.

But the dairy industry has signed a memorandum of understanding with the USDA, agreeing to reduce emissions 25 percent by 2020. That's why the industry — through its trade organization, Dairy Management Incorporated, and its scientific arm, the Innovation Center for U.S. Dairy — is so interested in this study. It needs Ruark, Jahn, and their team to help prepare dairy farmers for a changing world.

"Our main goal is to promote dairy sustainability," Ruark says, "which has both economic and environmental aspects. We want to work with the industry and provide them with tools to mitigate greenhouse gas emissions and adapt to future changes in climate."

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## Team Talk

The Soil Measurement Team (Objective 1c) met in Florida last week while at the Tri-Society Soils Conference. They discussed sampling protocols and sampling equipment needs to finalize data collection needs for next year's field season.

Modelers (Objective 2) will meet via conference call in the next few weeks to discuss data needs and model comparisons for one farm versus watershed-scale systems. Modelers will be contacted soon.

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## Task Force on Climate Preparedness

USDA says a task force established by President Obama will assist agricultural communities facing the impacts of climate change.

The [Task Force on Climate Preparedness and Resilience](#) will advise the Federal Government on

strategies to help American agriculture mitigate and adapt to the impacts of a changing climate. Robert Bonnie, Under Secretary, Natural Resources and Environment, says the USDA A programs will help farmers and ranchers counter the impacts of climate change and help create modern practices for producers to capitalize on their good stewardship.

As part of the broader Climate Action Plan, the [USDA announced steps in June](#) to create modern solutions against climate adversity. In addition to regional sources on climate information and forecasts, the USDA created the "Carbon Management and Evaluation Tool" (COMET-FARM), showing farmers how much carbon their land removes from the atmosphere.

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## Other News

### Award-winning Wisconsin Farms Successfully Use Bio-digester

Cows in a 3500 head operation are healthy, comfortable and more productive since a biodigester now makes the biosolids that use for bedding. Milk production immediately jumped 8 lb. per cow per day when they switched from sand to biosolids that save \$245,000 per year in bedding costs, plus it limits traffic, emissions and fuel.

The digester also contains the odors and creates a nutrient-rich, pathogen-free stream that is piped underground to the fields where it is injected to fertilize crops. In addition, the dairy produces about 1,200 kwh of electricity each day. That's enough to power itself, plus supply some energy to the local power grid.

[Read the story here.](#)

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### LCA - Energy demand analysis as a sustainability indicator in dairy production

A cradle to farm-gate study of 22 dairy farms in Ireland by the Livestock Systems Research Department, Animal & Grassland Research and Innovation Centre found that energy demand to produce a litre of milk averaged 2.5 MJ/L of milk produced, ranging from 1.25 to 3.90 MJ/L, of which 20% was direct and 80% was indirect energy.

- Fertilizer: there were large differences in the chemical fertilizer application rates in this study. Mean energy input by chemical fertilizer was 1.14 MJ/L (range 0.87-2.44 MJ/L). The main fertilizer applied was chemical fertilizer nitrogen.
- Feed: The average farm fed 542 kg of feed per milking cow per annum, which equated to 0.5 MJ/L of milk produced.
- Electricity: consumption was centred around milk harvesting operations, with 80% of electricity being consumed in the milking parlour and the remaining 20% being used by water pumps and the winter housing facilities. Electricity consumption amounted to 0.31 MJ/L.
- Fuel: this accounted for 66% of total fuel energy input and amounted to 0.2 MJ/L. These inputs were specifically: diesel (97.5% of on-farm fuel use), gear oil and transmission oil (1.3%) and kerosene (1.2%). Fuel used by contractors accounted for 31.7% of fuel use and transport of feed, fertilizers and forage to the farm accounted for just 2.3% of fuel use.

[Read the story.](#)

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