

Linda Engle Introduction: Sustainable Idaho is brought to you by the Portneuf Resource Council.

Madison Long: Welcome to Sustainable Idaho. I'm your host Madison Long and this is the second episode in a two-part series continuing my conversation with Mireille Chahine, a professor and extension dairy specialist in the Department of Animal Vet and Food Science at the University of Idaho.

As ranked 3rd in overall U.S. milk production, Idaho accounted for the production of 18.26 billion pounds of milk in 2025. A total of 437 dairies operate in Idaho, most of which fall in the Magic Valley region. Because of this, researchers at the University of Idaho became interested in researching the environmental impacts behind commercial-scale dairy processes.

They have created a 649-acre Rupert research dairy titled the Idaho CAFE, the Center for Agriculture, Food, and the Environment. As the nation's largest research dairy, operations will include a demonstration farm, a 60-unit rotary, and distance learning classrooms to provide hands-on field learning for students.

Mireille Chahine: The long-term vision is really to be a regional and a national center of excellence where research is conducted, where recommendations are based on sound science, in my opinion, and to have that necessary data for future success. Because this is relevant to our region, but we can contrast with other regions, with other countries to generate important data that is missing at least at a commercial scale.

ML: Recently, regenerative agriculture has become popular in the ag-industry, where farming is focused on improving soil health, increasing biodiversity that will support a wide range of animals and plants, and improving the yield and nutritional quality of food.

Is there a role that regenerative agriculture plays in the CAFE's long-term research goals?

MC: Absolutely. This is important for us, to also make sure that whatever we do is sustainable environmentally, but also sustainable from an economic point of view. We have a wonderful team of scientists that will tackle all those questions, an irrigation specialist, a forest specialist that will be looking at all these aspects.

ML: Idaho's agricultural region depends heavily on the Eastern Snake River Plain Aquifer, the largest aquifer in Idaho. In order to irrigate crops and take care of their animals, farmers use these underground aquifers as a reliable and renewable source of water.

However, if these water resources are not replenished or are overused by farmers, this can lead to land subsidence, decreased river flows, and plummeting crop yields.

So, how does the Idaho CAFE plan to study or limit its water footprint and reduce the strain on the local aquifer?

MC: From the beginning, one of our objectives is to focus on using water responsibly. We want to understand water usages and develop opportunities to reuse, recycle, conserve water.

For example, when milk leaves the body of the cow, it's at 101 degrees, but we need to cool it quickly to 38 degrees to maintain its quality. So we use water to cool milk and that water will be reused, recycled to clean some areas of the dairy. And ultimately, when it ends in the lagoon, it will be used to irrigate crops.

ML: Potentially to continue this year, Idaho has faced several years of water shortages and additional concerns about aquifer quality. This is in part due to agriculture waste and residential growth polluting drinking water, a rise in water demand, wildfires, and dry winter conditions.

Given these concerns about aquifer sustainability and water issues, will the CAFE share research data to inform water policy or irrigation practices statewide?

MC: One of our priorities is to understand how are we going to improve irrigation efficiencies. We're going to be using sensors to understand, are crops getting enough water? Do we need to change the way we irrigate? We are going to be able to study that whole cycle and to explore different tech.

I mean, this is one of our missions as a land grant university. We will do research, generate data, and we will share that data with our communities, of course, to inform water policy. I look at it as data transparencies will reduce skepticism, any allegation of bias.

ML: With Idaho's nearly 1 million cows, 94 million pounds of solid waste is generated per day. And according to the Idaho Conservation League, over the course of a year, a football field-sized manure pile would reach 15,000 feet high. This is taller than Mt. Borah, Idaho's tallest peak.

As mentioned in our previous episode, a main focus of the Idaho CAFE will be to research new innovations and test handling systems for these manure and dairy wastes. They hope to find ways to reduce, reuse, and recycle this dairy waste.

MC: We've started with the Idaho Sustainable Agriculture Initiative for Dairy grant which is USDA Sustainable Ag System Initiative. And what we want to do is respond to the challenges posed by the exponential growth of the dairy industry. We wanted to add value to the manure, use manure to develop bioproducts, to look at using the nutrients in manure to develop commercial fertilizers, potentially even bioplastics.

We want to build a flexible manure system that will allow us to evaluate different technologies.

ML: Do you think that if you find a system that works for the CAFE at a commercial scale, and other dairies start to adopt these, could that reduce the impact of dairies on the environment?

MC: Absolutely. And I think this is where we are willing to take that risk. We want to show that it can be done. What we want to do is create a portfolio of choices, best management practices, because what works for one dairy, wouldn't work for the other.

But if we give them that portfolio, we tell them, hey, this will work under these conditions, this is what your investment is, that's what you're going to get out of it, it will absolutely help those dairies and it will make a huge impact on the dairies in the state.

ML: Often conversations around dairies and farms revolve around their concentrated and undesirable smell, loud noises from both the animals and farm equipment, and risks to streams and land from dairy runoff.

How do you think that research at the CAFE will contribute to reducing odors, greenhouse gas emissions, or pollution risks that we're seeing from large-scale dairy operations?

MC: I think there are lots of dairies that are doing amazing work. And what CAFE is going to help us do is provide evidence-based mitigation strategies. If we're validating those technologies at scale, if we're translating findings into operational best management practices, policy frameworks, etc, we're giving them tools to be able to deal with those issues.

For example, we're working on solid-liquid separation in manure. Those systems ultimately could potentially remove more of the volatile solids that drive odor formation.

ML: Along with the dairy will be the use of a demonstration farm to test the uses of manure. Are there any specific measuring tools that you're going to be using to track the air and water quality around this demonstration field?

MC: We want to explore the usage of portable machines or units that could measure gas emissions, methane, carbon dioxide, from ruminant livestock in real times. And what we do with those cows, is they will have an ID that the machine will track.

And typically, what they do is provide a small amount of feed. And while the animal is eating, we can actually measure the gas that they're producing and send that data to a central system where we can look at it later.

ML: Is there anything else you would like to add about the creation of the Idaho CAFE?

MC: I want people to feel the excitement that we have around that project because we've worked hard for it to happen. Hopefully what we can do is build a center that can answer questions and provide relevant solutions to our state.

ML Outro: Thank you to Mireille Chahine, a professor and extension dairy specialist in the Department of Animal Vet and Food Science at the University of Idaho, for sharing the

sustainability initiatives that will be introduced and worked on at the Idaho Center for Agriculture, Food, and the Environment.

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