

'Virtual farm' website provides a plethora of dairy sustainability information

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A new website is a "one-stop shop" for dairy sustainability information, according to Eileen Fabian, professor of agricultural engineering and environmental biophysics in Penn State's College of Agricultural Sciences. Credit: Eileen Fabian

Changing weather patterns pose significant challenges for modern dairy farmers—excessive hot or cold temperatures, drought and humidity can have a detrimental effect on cows' health, which ultimately can lead to decreased milk production.

Deciding how best to react to those changes to ensure the vitality of dairy farms—while being good stewards of the environment—can present a bit of a conundrum for some farmers, especially if they are pressed for time and resources. What are the [best management practices](#)? Are there technologies that can help? Is there current research on the subject?

Now, those farmers can see sustainability principles in action with just a few mouse clicks, thanks to an interactive ["virtual farm" website](#) developed by researchers in Penn State's College of Agricultural Sciences and Penn State Extension, in partnership with the project's lead, the University of Wisconsin-Madison, Cornell University and the Dairy Innovation Center.

"The objective of this project is provide a 'one-stop shop' for all dairy sustainability information," said Eileen Fabian, professor of agricultural engineering and environmental biophysics in Penn State's Department of Agricultural and Biological Engineering. "The beauty of it is that one can take a tour of a sustainable dairy [farm](#) without stepping foot on an actual farm. The resources are accessible, free and can be viewed anytime from anywhere."

Fabian explained that the catalyst for this major undertaking was a growing movement in the dairy industry to adopt practices that mitigate the negative effects of agricultural operations on the environment, while securing the future sustainability of farms.

In Pennsylvania alone, there are 6,650 dairy farms—the second largest

number of [dairy](#) farms nationally—according to the Center for Dairy Excellence. In addition to producing 10.7 billion pounds of milk annually, the state's [dairy industry](#) provides 60,000 jobs and has an estimated annual economic impact of \$7 billion.

"It's a tremendous industry, and its people really care about the environment and their farms," Fabian said. "Those farmers want to do their part to protect the integrity of soil, water, air and animal habitats and to keep agriculture a strong industry. And it's our mission at Penn State to help them do just that—we believe this website will really help to move the needle."

The website, designed and developed by the creative services team at WPSU Penn State, has two virtual farms: One is a model of a 1,500-cow facility, while the other is a smaller-scale operation of 150 animals. Users can click on the various aspects of the farm, such as pastures, housing, manure storage facilities, feed silos, milking facilities and more, and information related to that specific area will pop up, allowing for further exploration.

Topics include herd management, feed management, milk production, crops and soils, manure management and greenhouse gases. The site's database includes a broad range of articles, extension fact sheets, models, images and graphics. The layers of information range from exploration of the farm site with basic information to higher levels of technical and research information, data, and models.

For example, if one clicks on the manure storage facility, several links will appear, enabling viewers to scan information on manure management plans, potential hazards caused by improper treatment, preventing infiltration into surrounding water sources, and other subjects.

"The site is user-friendly, meaning it's fairly easy for users to interact at a level they feel comfortable with," Fabian said. "They can keep it simple or dig down deep and find peer-reviewed research papers."

Fabian said a project of this magnitude requires interdisciplinary collaboration, and she acknowledged the support of Penn State researchers Daniel Hofstetter, extension and research assistant in agricultural and biological engineering; Tom Richards, professor of agricultural and [biological engineering](#); Heather Karsten, associate professor of crop production/ecology; Douglas Beegle, distinguished professor emeritus of agronomy; and Robert Nicholas, research associate, and Chris Forest, associate professor of climate dynamics, College of Earth and Mineral Sciences.

Now that the team successfully has launched its website, Fabian sees great potential in creating additional virtual farms, perhaps focusing on poultry production and animal welfare issues.

More information: To tour the farm, visit virtualfarm.psu.edu

Provided by Pennsylvania State University

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