California Dairy Feed: at the Cutting Edge of Water Conservation

Above, California dairy farmers use a soil probe to check moisture. Through precision farming, they are reducing water use.

With the looming drought and increased water scarcity, water could not be a more precious resource. Dairy farmers have been making every drop go farther. **Over the past 50-plus years, the amount of water needed to produce each gallon of California milk has decreased more than 88 percent.** Water reuse is standard practice on California dairies—using water about four times before applying it to irrigate crops. How California dairy farmers feed their cows today is a tremendous story of water conservation, and more progress is still being achieved.

California dairy farmers' use of byproducts reduces the amount of water needed to grow feed. About 40 percent of the feed ingredients on California dairies are agricultural byproducts, such as almond hulls and brewer's grain, which could otherwise be wasted. Of the remaining feed ingredients, some are grown out-of-state, further reducing in-state water use. The limited portion of dairy feed ingredients grown in California are high-quality, high-moisture forages, which help ensure optimum cow nutrition and milk production. Dairy farmers continue to invest their time and resources into finding ways to keep producing more feed with less water.

Ongoing Investment in Precision Farming

At the onset of "precision farming" adoption in 2005, a small group of Tulare County dairy farmers came together to split the cost of building and maintaining a shared network of local base station towers that are needed for GPS signals to reach tractors. The group has now grown to include about 60 growers in Tulare and Kings counties, mostly dairy farmers. Farmers in other areas of the state have made similar investments. This infrastructure allows tractors to access GPS data, enabling a growing and wide range of technologies to be tapped into—from guided steering to efficient fertilizer applications that are tailored to unique zones within a field. Possibilities are seemingly endless but require investment in equipment, training, and data management.

"Yields are going up, so I know we're headed in the right direction," said dairy farmer Jonathan Lawrence, who started using a state-of-the-art variable-rate applicator two years ago. "It's a continuing education every year. As we keep building field maps, we're getting better dialed in, and the efficiency benefits are greater."

Using Tech to Protect the Environment

Real-time data opportunities also exist to help dairy farmers make sure planting, irrigating, and other tasks are performed to maximize efficient use of water, fuel and other key resources. Through a cellular "ecosystem," tractors can communicate to mobile devices and to one another, sharing maps, GPS lines, fertilizer data, and more. As cellular coverage improves, so does the potential for even greater accuracy.

"Cellular coverage is becoming more and more of a necessity on the farm," said Richie Mayo of De Jager Farms, who grows forage crops for eight family dairies. "Our coverage is okay in most areas. Some places have reduced quality, which can lead to lower accuracy and speed of communication in real time, leading to crooked lines, and slow reactions and responses to the controllers. This can be frustrating, but overall, we're improving each year. The more accurate we can be, the more we can grow, even with less water."

Improving Water Management in Many Ways

Dairy farmers have been finding many ways to improve how they manage water while growing feed. For Lawrence, Mayo, and others, this includes converting to less intensive tillage practices, which allows for earlier irrigation and improves soil health and overall water use efficiency. For the last seven years, Jonathan has also been hosting trial plots of new seeds. This helped him identify a unique variety of barley that he likes to grow as a winter forage. The barley grows faster, allowing him to harvest it sooner, and then plant his corn crop earlier in the year, which ultimately results in less irrigation water needed to grow corn. This year, he's also using a new drought-tolerant corn seed, which he hopes will allow him to grow his crop with one less irrigation.

Farmers are also improving water conservation by investing in new irrigation technologies. Through the adoption of drip irrigation, a growing number of California dairies are greatly reducing farm-water use and improving water quality protection, while also reducing greenhouse gas emissions. De Jager Farms is using a subsurface drip irrigation system that also applies the farm's manure effluent directly to the root zone. This approach has demonstrated a 38 percent increase in water efficiency (yield per acre/inch of water), using about 36 percent less water, while maintaining or increasing crop yields. Initially demonstrated on three farms, there are now about 20 more California dairy farms in various stages of implementing the technology. Incentive programs support the adoption of both traditional and manure-effluent drip irrigation, but the financial and labor investments are still significant, leaving many farmers still researching, planning, and weighing options.

Examples of Precision Farming on a California Dairy

Here's a few of the ways De Jager Farms uses precision farming to grow more nutritious dairy feed with fewer inputs:

Driving Straight – Tractors receive GPS corrections to ensure they stay on track within 1" from pass to pass.

Seed Rate Control – High-tech controllers ensure the right rate of seeds are distributed when planting.

Hydraulic Down Force – This system ensures uniform seed depth, so crops can grow at the same rate.

Liquid Fertilizer & Herbicide Rate Control – The exact flow of all applications is monitored and precisely controlled.

Auto-Leveling – Fields are leveled to ensure uniform irrigation.

Subsurface Drip Irrigation – The right amount of water is applied directly at the root zone. Different amounts of water can be applied per zone if needed.

Soil Moisture Sensors – Real-time data informs irrigation monitoring and management decisions.

Implementation of the Sustainable Groundwater Management Act (SGMA) is also creating confusion and slowing adoption. SGMA is expected to result in the fallowing of an estimated 500,000 to one million acres of farmland, or more. While farmers are doing what they can to prepare, making large capital investments amid ongoing uncertainty is challenging.

"We are trying our best to look to the future," said Lawrence. "We don't know yet how much water we will be allowed under SGMA, so it makes it harder to know what direction to go. You don't want to make an investment that you may end up not being able to use."

Ongoing Commitment to Producing More with Less

The state's dairy farmers have a long history of supporting cutting-edge research and pioneering new practices. They are open to all kinds of new ideas that may be part of the solution. For example, River Ranch dairy in King's County will soon be building an indoor vertical feed production center. It will take a wide array of technologies and partnerships to help California dairy farmers meet the water scarcity challenge while still providing high-quality feed to cows, and ultimately continuing to produce nutrient rich foods that support the health and livelihoods of local communities.

California's dairy families remain committed to further advancing their planet-smart practices, producing even more milk with a smaller environmental footprint.

Dairy Cares is a statewide coalition supporting economic and environmental sustainability and responsible animal care. Our members include Bar 20 Dairy Farms, California Dairies Inc., California Dairy Campaign, California Dairy Research Foundation, California Farm Bureau Federation, Dairy Farmers of America-Western Area, Dairy Institute of California, F & R Ag Services, Hilmar Cheese Company, Joseph Gallo Farms, Land O'Lakes, Milk Producers Council, Ruan Transport Corp., Yosemite Farm Credit, Zenith Insurance Company, and others. For information, visit DairyCares.com or call 916-441-3318. To subscribe to the newsletter, contact news@dairycares.com.

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