Farm water use comes under scrutiny

How can agriculture save water? A growing debate in California

Jesse Marx and Ian James, Palm Springs Desert Sun, 4-21-15

Jeff Percy parked his pickup truck beside a lush green field in Coachella, sending a spiral of dust into the morning air.

Behind him, the road led to a reservoir, fenced off by barbed wire. At his feet, a pipe emitted droplets of water to soak the roots of jalapeno pepper plants.

At any time of the day, all Percy needs to do is open an app on his manager's iPhone to check the precise condition of the soil. Remotely, he can tap a button and release more or less water from his pumping station, so that not a single gallon goes wasted.

"We need to preserve any resource as wisely as we can," Percy said. "If we don't take care of the land, it won't take care of us."

Now that California is in its fourth year of drought, such technology has become all the more necessary — not just to stay financially solvent, but to meet the demands of the public.

Gov. Jerry Brown's order for a mandatory 25-percent statewide reduction in potable water use has focused on urban areas and has mostly excluded the agriculture industry. In defending that approach, state water managers have pointed out that farmers in many areas are already being forced to leave fields fallow and cut jobs.

The backlash has been widespread. And it's been directly primarily at water-intensive crops like almonds and pistachios and alfalfa, which suck up more water than everyone's showers, toilets, dishwashers and lawns combined.

State water managers say that, historically, about 11 percent of California's water has gone to urban use, while 49 percent has gone to the environment by flowing through rivers, deltas and wetlands. The remaining 41 percent has benefited the production of food and animal feed, ending in some cases overseas.

Looked at another way, not considering the water that is allowed to flow through rivers and streams for environmental purposes, agriculture consumes about 80 percent of the water that Californians put to use.

In response, farmers like Percy point to their gadgets as proof that they're already improving the efficiency of their operations — and have been for many years — doing more with less. The situation is far more complex, they contend, than critics realize, but the pressures on supplies will further force the invisible hand of the market toward greater conservation.

They say all this while admitting that the traditional practices of the farm are wasteful.

"The lack of attention to agriculture is a huge problem," said Jay Famiglietti, a hydrologist and senior water scientist at the NASA Jet Propulsion Laboratory. "The number one thing that we have to do is to work with agriculture, and that may mean imposing restrictions on agriculture to become more efficient. Yes, they're making tremendous progress, but much more progress can be made."

Calls for restrictions on agricultural water use have flared alongside questions about California's system of water rights, under which farmers with seniority haven't had to cut back. Such sentiment appears to have had an effect on the governor, who suggested in a recent television interview that every option could be on the table if the drought persists, including the historic system of water rights.

"If things continue at this level," Brown told ABC, "that's probably going to be examined."

Who owns the water?

In the Central Valley, vast patches of farmland have withered without flows of surface water. Instead, growers have turned heavily to groundwater, drilling deeper wells to reach increasingly scarce supplies.

It's a very different situation for farmers in Southern California. Vast amounts of water have continued flowing to the Imperial Valley from the Colorado River.

The Coachella branch of the All-American Canal has also been carrying increasing amounts of water to the Coachella Valley under a 2003 water transfer deal. Agriculture accounts for about half of the water used within the boundaries of the Coachella Valley Water District.

The area's privileged rights to water from the Colorado River have long made the desert a relatively stable place to invest in farming.

Years of drought in the Colorado River basin, however, have left dwindling reservoirs. But even if dropping water levels eventually prompt a shortage declaration, Arizona and Nevada would be forced to take cuts in deliveries of water before California would lose a single drop.

Farmers say the cost of water gives them a financial incentive to be efficient and produce as much as possible with the water they have. But some water specialists say much more could be done to improve the efficiency of farms by swapping out irrigation systems or managing them differently.

"Farmers don't like to be told what to do any more than any of the rest of us do. But we're in a drought, and what do you do in an emergency?" said Peter Gleick, president of the Oakland-based Pacific Institute, a think tank. "And I do think there's been an effort on the part of policy-makers to try and treat agriculture with kid gloves."

Some have suggested paying farmers to swap out outdated irrigation systems or regulating the crops they plant — an idea that puts farmers on the defensive.

"Are you going to have a crop czar for California deciding who and where?" said Cannon Michael, a farmer in the Central Valley whose family company produces tomatoes, melons and corn. "I think the market will weed out if these guys can't make money growing the crops that they're growing."

Michael said that more than 60 percent of his farm is equipped with drip irrigation systems, and he is continuing to invest.

Crop complaints

Desert farmers are responsible for a wide variety of winter veggies — most of the ingredients that end up in America's salad bowls — as well as grapes and dates.

But the desert also happens to be home to another kind of plant, one held high in the public eye with contempt: alfalfa.

Alfalfa sucks up more water than any other crop in California, and primarily feeds dairy cows overseas to meet growing demands for beef and milk there. Its production, however, has fallen dramatically in recent years due to the pressure to conserve water.

Lyndon Ichida, who operates Hayday Farms in Blythe, said he's been forced to cut his alfalfa production by half in the last year. He sends almost three-fourths of his lot to Asian markets, but noted proudly that all of his supply ends up in the stomach of someone, somewhere.

"We have to feed families," he said, "but we don't have to golf."

The point that's been missed in much of the alfalfa criticism, mostly on the Internet, in recent weeks — and even much of its defense — is the toughness of the plant, especially during a drought. Dan Putnam, an agronomist at UC Davis, said alfalfa doesn't need to be watered all year long, or even every season. His own trials have shown that it can be left to dry for long periods of time and spring back to life when water is reapplied.

The attention paid to water-intensive crops has inspired some to create digital tools whereby individuals can determine their own "water footprint." In turn, more than a few writers have gasped at the fact that half the water which agriculture touches in California ends up in export products — a measurement known as "virtual water."

But in a recent blog post, UC Davis professor Jay Lund took issue with the "kvetching." Lund, who leads the university's Center for Watershed Sciences, pointed out that many of the foreign products Californians rely on every day require water in some stage of production, including the cotton in T-shirts and the steel in cars. Water footprint calculations may be cute and popular, but they can also be also misleading.

A 2012 report by the Pacific Institute backs this up. Researchers there found that Californians import more than twice as much "virtual water" as they export.

Costs and incentives

So what more can farmers be doing?

The age-old practice of flood irrigation is inefficient for obvious reasons. It essentially blankets the field in water, wetting the plant as well as the area around the plant, which can also cause more weeds. It also distributes water unevenly to roots.

One alternative is drip irrigation, which can be hung above the ground or buried — as it is on Jeff Percy's land — delivering a steady stream of water directly to the root. It also ends up saving on fertilizer, which can be added at a pumping station rather than tossed by hand.

But if farmers are going to employ better methods, there has to be an economic incentive.

The chief disadvantage of drip is that it's an expensive system. A permanent one can cost anywhere from $1,800 to $3,000 an acre, according to farmers, researchers and salespeople. That price, however, depends largely on the type of crop and does not always include the cost of installation.

A temporary system is cheaper — about $1,500 an acre — though both systems require maintenance, usually $200 to $300 an acre every year. The costs sometimes don't pencil out.

Last year, Imperial County farmer Craig Elmore experimented with drip technology, laying pipes on 280 acres of onion fields. But when the savings in water costs did not immediately make up for the drop in yield, he went back to conventional methods.

Elmore said he's open to trying drip technology again, "but the economics will have to dictate that possibility. I can't jeopardize the financial well-being of my company."

Drip irrigation systems are already used by about 90 percent of growers in Riverside County and 80 percent of growers in the Coachella Valley, according to the county farm bureau and the water district. Of the 65,745 acres of farmland in the Coachella Valley, approximately 10,000 still rely on old-fashioned flood irrigation.

Farmers would see bigger incentives to save water if they were charged higher prices, but the water district calculates those rates based on the cost of delivering untreated water from the Colorado River by canal. And the prices for agricultural water are significantly less than what domestic customers pay for an equivalent quantity of drinking water that is pumped from the district's wells, delivered through pipes, and tested and treated to meet state standards.

Farmers, for example, pay the Coachella Valley Water District $28.95 per acre-foot for water from the canal, plus additional fees for operating the water system that can add up to nearly $10 per acre-foot (which is enough water to cover an acre 1 foot deep, or 325,851 gallons). For farms that pump water from wells, they pay a fee of $52 per acre-foot. That volume of water, if delivered to a home at the base rate of $1.12 for 100 cubic feet, would end up costing about $488.

Two of the five CVWD board members work in agriculture. Peter Nelson is a division manager with the company Paramount Citrus, and John Powell, Jr., is president and CEO of Peter Rabbit Farms, which produces carrots, bell peppers, table grapes, lemons and dates.

Nelson and Powell point out that it's normal for board members of water agencies to be subject to the rates they approve, and that the water prices for agriculture have been carefully determined by the agency's staff based on the costs.

The district has also hired a consultant to prepare a cost study, Powell said, in order to "make sure that the costs to provide these services are properly accounted for."

Separately, the district has proposed a project with an estimated price tag of $44 million to build pumps and reservoirs that would carry some Colorado River water to farms in the Oasis area. If the project is approved, CVWD says it would help reduce pressures on the groundwater supply by allowing farmers to pump much less from wells.

Powell and Nelson have recused themselves from board votes related to the project because their companies both farm land in areas that would receive the water. To avoid any potential conflict, they said they haven't participated in discussions about the Oasis project and have stepped out of the room whenever it has come up.

The water district's staff is also considering a rebate program to help more farmers offset the costs of converting to drip systems, said Patti Reyes, the agency's planning and special programs manager. She

has estimated that based on current water prices, the owner of a 40-acre parcel could end up saving $4,800 in water costs every year by switching to a drip system.

On the other side of the Salton Sea, in the Imperial Valley, farmers face different conditions that require different approaches. The soil there is heavier, meaning drip technology will not work as efficiently. The ground often needs an extra amount of water to flush out salts — a practice known as leaching — which is why regional experts say the best system may be one that applies both drip and flooding methods.

"There is no silver bullet," said Khaled Bali, an irrigation and water management adviser and the director of the University of California research station in Imperial County.

Last week, Bali and his colleagues invited farmers to see the fruits of their labor. A hayride tour in Holtville began by showing off experiments with canola, a plant that they believe has great potential in the desert.

One of leading producers of canola globally is Australia, a country well acquainted with drought.

A field of turf is irrigated near Avenue 50 and Tyler Street in the eastern Coachella Valley.

Watching water

So, too, is Israel: The nation abides by a strict conservation ethic and for years has led agricultural research.

While California's drought was deepening, David Kohl, a date farm owner, went in search of advice from the Israelis. He found Moshe Kirat, a grower and teacher, and asked him to come update the company's practices.

Besides experience in a tough environment, Kirat brought a global perspective and some honest talk. Sitting in the company's Thermal office, he estimated that this region's farmers are decades behind the times — if not technologically, then environmentally.

Since coming here, he's gleaned that conservation hasn't always been a top priority, in part because the cost of water is so low. In Israel, he said, agricultural knowledge is widely paid for and distributed by the government.

On his laptop, Kirat checked the water flow and moisture levels. He pulled up two photographs with November 2013 timestamps, showing how the soil around the farm's date trees had been littered with salt.

Later, while touring the grounds, Kirat would point proudly to those same trees and rub his sandals in the dirt to show how the salt had disappeared.

"The trees are smiling now," he said.

On average, each acre of date trees sucks up more than 3 million gallons of water per year. However, Tom Levy, a retired chief engineer at the Coachella Valley Water District, said that with Kirat's guidance that number could fall by a third.

Kirat, Levy and researchers from UC Davis are in the process of setting up experiments to gauge a correct balance of drip and flood irrigation techniques — research that could end up benefiting others.

Kohl declined to say how much all this technology and research is going to cost, but expects it'll pay for itself within a couple years. He can envision a day when the government puts tighter regulations on farm methods and would rather be ahead of the curve in conservation.

"I don't want to be sanctimonious," he said, "but it's the right thing to do."