Drip irrigation provides far more than water use efficiency

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Winter rains, early dam releases and optimistic water delivery allocations by federal and state irrigation water providers point to an exciting year for California producers.

So do high prices for cotton and grain. Like most growers, Alan Sano of Sano Farms, Firebaugh, Calif., is optimistic about this upcoming growing season. However, he is cautious in outlining this year's plan for his 4,000-acre central San Joaquin Valley farming operation

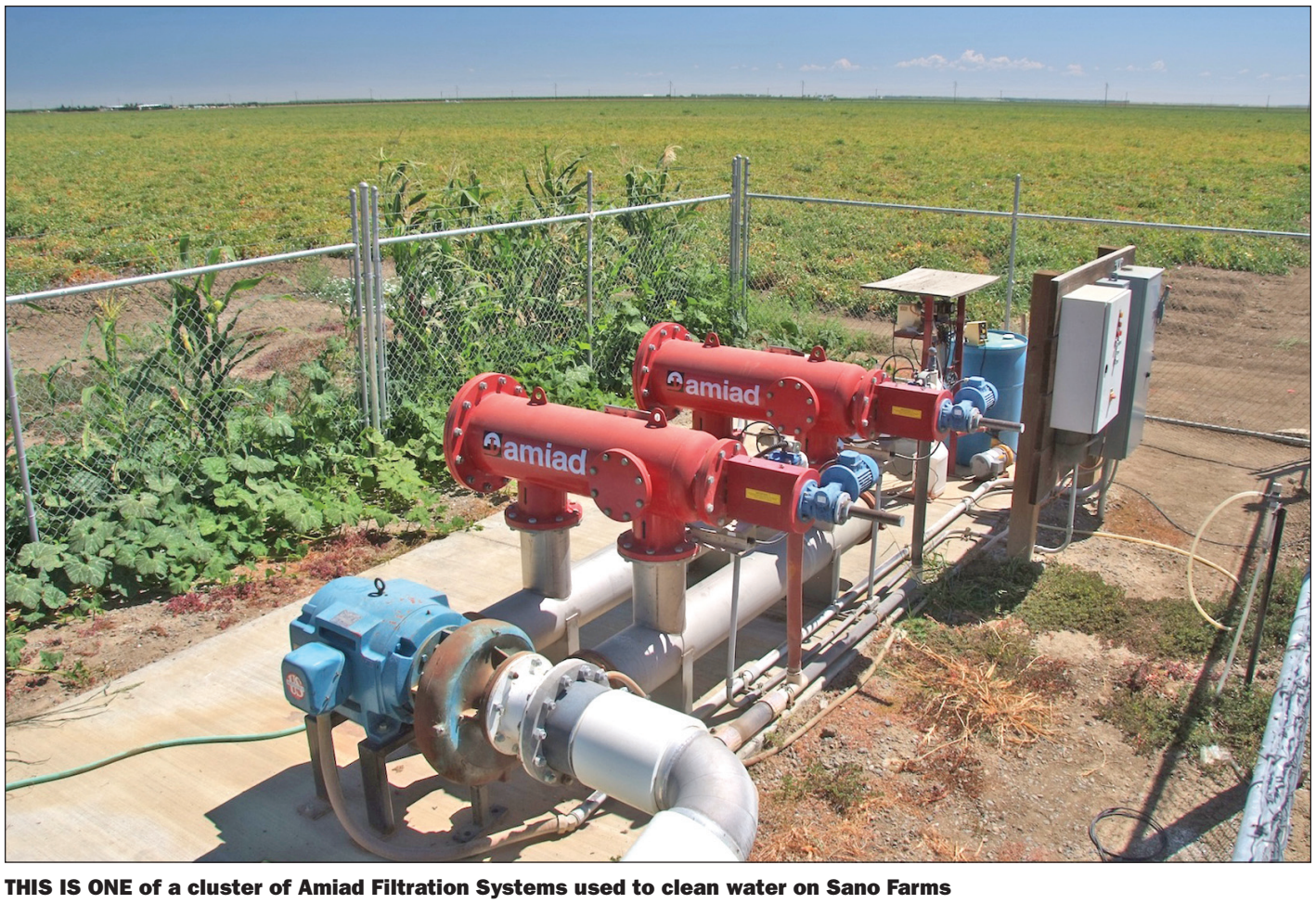
A decade of meager water allocations to Westlands Water District has him hedging his bets as well as the constant risk that environmental litigation will shut the Delta pumps again.

"It's great to get a good allocation, but the main thing is whether they're going to let the pumps run," he notes. Or maybe it's just hard to believe that the state may finally be floating out of the latest drought cycle.

Even with the relatively abundant surface water allocation, he will still blend the saline, boron-rich water from his three wells with high-quality canal water to nurture his 1,200 acres of almonds, which perform below their potential on groundwater. An early, deep irrigation across his farm will also help push salts far into the soil profile, allowing him to take advantage of more plentiful supplies to build up subsoil moisture and clean out his root zone at the same time.

This would be a great year to put some fields in cotton. However, Sano sold his cotton harvest equipment about five years ago and isn't inclined to invest in the necessary machinery to chase the current prices. He will continue to focus his annual crop acreage on tomatoes.

ALAN SANO relies on buried and above ground drip systems on his farms to supply water and minimize tailwater.



THIS IS ONE of a cluster of Amiad Filtration Systems used to clean water on Sano Farms

However, Sano says he will be planting fewer acres than usual in 2011 to processing tomatoes. He pulled hundreds of acres out of tomatoes over the past few years to build up his almond orchards and 300 acres of pistachios and pomegranates which fare well on relatively saline water. He planted wheat last fall on part of his tomato ground to rebuild the soil, and he and partners have been building a fresh market tomato business that accounts for still more acres in Firebaugh and on a farm Sano is managing in Merced.

Water efficiency is at the heart of many of Sano's decisions — even in Merced, where water is far more plentiful than on his home place. Last year, his second season managing the Merced market tomato fields, he installed buried drip lines to improve his management efficiency. He's even irrigating half of his wheat with buried drip tape running down the center of last year's 66-inch tomato beds. And his commitment to cover crops and conservation tillage saves moisture as well as money.

That's why, even with the possibility of a good water year ahead, Sano and his irrigation manager, Jesse Sanchez, watch every drop that goes into – and out of – Sano Farms' drip irrigation system. Sano and Sanchez irrigate with buried drip lines under the farm's processing tomatoes, and run surface drip in the Sano almonds, pomegranates and pistachios.

It was another kind of water efficiency – minimizing back flush water from the 45 water filters that protect the farm's drip system – that led them to low-back flush filtration technology.

When Sano invested in drip, he knew he had tapped into a powerful tool for the efficient delivery of water and fertilizer.

"In processing tomatoes, yields of 36 to 38 tons used to be good," he says. "Then we used to figure on 42 to 44 tons on average, and now we shoot for 50."

By fastidious maintenance of the operation's buried lines, he and Sanchez have been able to eke five seasons or more out of the farm's original drip tape, and they're aiming for seven or eight. Part of that maintenance involves regular flushing of the lines. Another vital element is protecting them from the sand that can be pumped up with well water and the algae that can develop in canals.

Variable water quality can be a challenge for many filtration systems – some technologies that are good for capturing hard materials like grit or sand, for instance, have more trouble with softer materials like algae or bacterial buildup. Sano and Sanchez knew they didn't want back flush-intensive sand media systems, and an experiment with another technology didn't provide the flow or flexibility they were looking for.

Then Sanchez came across automatic self-cleaning screen filters at the World Ag Expo. The technology, like drip irrigation itself, was developed in Israel,

and was strongly geared toward water efficiency, notes Matt Aguiar, the Merced-based national sales manager for Amiad Filtration Systems, which manufactures the systems.

When a target pressure differential is reached between the clean and dirty sides of the filter screen, a flush valve opens, Aguiar explains. Water begins rushing from the pressurized inside of the filter to the lower atmospheric pressure of the flush valve, pushing trapped particles, or filter cake, with it. The system focuses that back flush action through small suction nozzles, which concentrate the cleaning action on one square inch at a time. The nozzles are mounted on a scanner that spirals down the screen, ensuring that every square inch of the screen is cleaned during the cycle. Meanwhile, the filter continues trapping new particulates as irrigation water continues flowing through the system.

"Water efficiency should carry through every aspect of a good drip irrigation system, all the way through back flushing the filters," Aguiar says. "This suction scanner technology uses up to 75 percent less water for back flushing than sand media systems do, which has a double benefit – not only a water savings going into the process, but also a reduction in the amount of tailwater coming out."

Sano knew from the start that tailwater was going to be a challenge multiplied by each of the nearly four dozen filters he needed to install on his operation.

"The problem with sand media is they waste a lot of water when they flush," Sano says.

"Over here, that's expensive, and there's hardly any water. Also, in this part of the Valley, we have no drainage system – we have to re-circulate all our water. You have to have reservoirs and pump the tailwater back into the system."

Managing tailwater was easier to do when Sano furrow-irrigated his row crops, though the reservoirs took up acres of valuable space. When he put drip under his row crops, he began focusing his small amount of tailwater on his pomegranate orchards, which can tolerate lower-quality water. Then he reclaimed acres that had once been dedicated to storing excess water.

"We used to have 10 reservoirs with concrete ditch lines to all of them," Sano says. "Now we have two, and we only pump out of them maybe once a year, when we flush our lines. We filled up the others and planted them with the rest of the field, or used them as storage or cleaning areas – eight to 10 acres' worth."

As with his drip lines, Sano believes in a meticulous maintenance program for his filters.

He says the self-cleaning screen systems look complicated, but actually have far simpler – and less leak-prone – plumbing than sand media tanks do.

"Once you get to know them, it's easy," he says. "You have to acid-bathe the screens in muriatic acid every year in this part of the world, and we do an annual lubrication of the moving parts. We have to replace solenoids every once in a while, but it's not hard."

The compact size of the Amiad filters – they're less than 5 feet long and easy to lift with a fork or bucket – is another benefit over multi-tank sand systems, Sano adds. "We can easily pop these filters out and move them to another ranch," he says.

For Sano, it all comes down to efficiency. "We got tired of dealing with water issues," he says. "A minimal amount of drainage – that's the key out here."

The 2011 season will surely present its challenges, from late-planted triticale cover crops that need to be burned down to make way for Sano's conservation-tilled tomato transplants to the constant challenge of battling morningglory. But even with the water supply looking promising, Sano says his biggest long-term concern remains water – the water he brings or pumps onto the farm, and the water that can't leave.