SOUTH SAN JOAQUIN IRRIGATION DISTRICT

Irrigation district conserves water in California

As much of California's Central Valley shriveled from the recent drought, one irrigation district remained green with almond trees and grapevines. Five years ago, the South San Joaquin Irrigation District switched from water-intensive canal delivery and field flooding to a pressurized irrigation system that conserves water while allowing farmers greater control over their water usage. The result: While other farmers' fields turn to dust, this community is producing 30 percent more crops with 30 percent less water.[18]

Historically, the district used an open canal system built in 1909. Gravity delivered surface water from nearby hills into a district reservoir and then to farmers. The irrigation district would forewarn farmers when it turned on the system, and gravity would send water down open-air canals to flood their fields. Because farmers had little control over when they had access to water, they would frequently overwater when they had the chance to irrigate. The water that was not absorbed during the flooding would run off into other waterways, often taking fertilizer chemicals with it.

Farmers disliked that they had little control over when they could irrigate, so many of them instead relied on diesel generators to pump groundwater up from private wells. But this was an imperfect solution—the groundwater was of poor quality, and the salinity was not ideal for the almonds and fruit grown in the region. To make matters worse, the diesel generators emitted exhaust, contributing to an air pollution problem in the area that was already significant.

In 2012, the irrigation district realized it was time to explore alternatives that could conserve water and provide farmers with greater flexibility for irrigation schedules. The district decided to install a pressurized, on-demand delivery system on 3,800 acres of irrigated land as a pilot project.[19] The new system pumps water from the reservoir through pipelines to individual fields, where sprinklers and drip systems are now used to irrigate crops, avoiding the wasteful flooding of the past. Moisture sensors are embedded in the earth, and farmers can use smartphones or computers to check the levels in real time. If moisture levels look low, farmers no longer have to wait until the next time the gravity-flow system is turned on to irrigate—they can instead go online and immediately order more water for irrigation.

Many farmers were initially hesitant to implement the new approach because it came with a cost. The $14 million pressurized system was largely paid for by revenue from existing hydropower plants that the irrigation district had installed on its reservoir, but farmers still had to pay a portion of the cost to install these new technologies on their individual fields. Farmers who elected to link their land to the new system paid the district $2,500 for equipment and installation—with the district covering an additional $37,500 cost per farm. In addition, the base cost of pumping water increased from $24 to $30 per acre for farmers who adopted the pressurized system.[20]

In the end, the amount of water conserved—and, as a result, the extra money left in farmers' pockets—has changed many opinions on the new system. The adoption of a pressurized irrigation system has saved about 12,500 acre-feet of water each year by preventing it from evaporating, spilling out of open canal systems, or overwatering cropland.[21] Now, even though the irrigation district has stopped helping cover the costs, many farmers have proven willing to pay the full $40,000 for the infrastructure to hook into the pressurized system.

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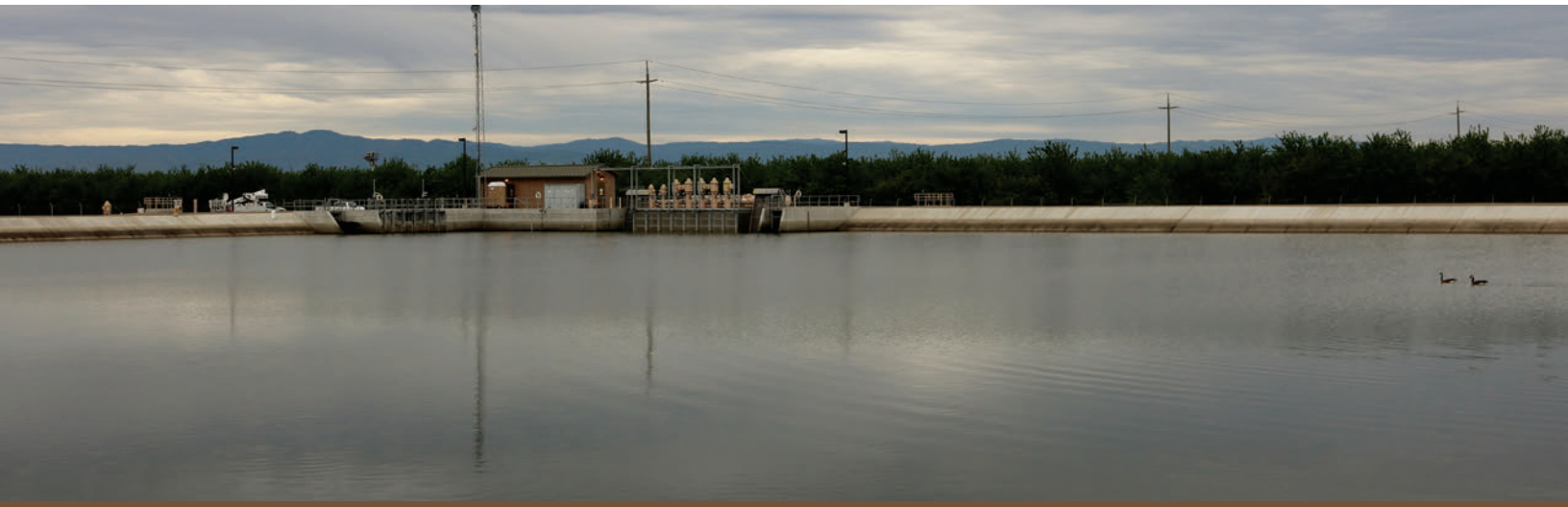

The pressurized water system in the South San Joaquin Irrigation District allows farmers there to grow 30 percent more crops with 30 percent less water (top left). Workers install a pressurized water system (top right). Despite drought, the South San Joaquin Irrigation District was able to ensure its farmers had ample water (bottom).

In the future, the South San Joaquin Irrigation District would like to expand the pressurized system throughout the entire district by piping its open canals, but the endeavor would cost $300 million. To raise the money, the irrigation district would ideally trade some of its excess water to other districts downstream, whose farmers pay as much as $1,200 per acre-foot.[22] The scheme would help allocate water to areas where it is exceptionally scarce, while also funding conservation efforts in the San Joaquin. Unfortunately, the plan is on hold because California's complicated and lengthy regulations on trading water make it incredibly difficult to transfer water between irrigation districts.

Even at its small scale, the conservation benefits of the district's pressurized system have had a big impact. It has conserved immense amounts of water, and more direct irrigation means less chemical runoff from fertilizers, benefiting farmers downstream. In the midst of the recent drought, crops in the San Joaquin flourished, and farmers found themselves with more cash in their pockets thanks to reduced water costs and increased profits. As we continue to face water shortages, the efforts by the South San Joaquin Irrigation District provide an example of how to improve water quantity and quality while still providing for agricultural needs.