

# Spirent IoT

## IoT in Agriculture

**IoT Enables Avocado Farmer to Recover Investment in Connected Hardware in Less than Six Months by Slashing Water Consumption**

California avocado farmer Kurt Bantle decided to experiment with Internet of Things (IoT) connected technology to see if costly water consumption could be reduced in growing his 900 avocado trees.

He spent \$8,200 for [LoRa](#) stations with soil moisture sensors, valve controllers, a LoRa gateway and cellular backhaul to monitor soil moisture and automate just-in-time irrigation.

The results proved staggering. The annual cost of watering his 900 avocado trees was \$47,336. By connecting his trees with IoT technology, his annual water bill dropped to just \$11,834 ... a 75% cost reduction. The hardware investment was recovered within the first six months.

But the results go far beyond the world of this pioneering farmer. It paves the way for millions of small, medium and large-sized farms around the globe to emulate his experiment and slash millions of dollars off the cost of growing fruit and vegetables.

The only downside for the farmer in harnessing the power of IoT to reduce water consumption and slash costs was that he was placed under state surveillance for meter tampering. Millions of others face the same fate.

### The story

It takes [74 gallons of water](#) to produce one pound of avocados and drought-stricken California produces 95 percent of avocados grown in the United States. Nearly all are grown in Southern California, in a five-county region that straddles the coast from San Luis Obispo to San Diego.

Like the rest of the state, the southern coastal region is locked in a drought and largely cut off from the flow of surface water from the state's big irrigation projects. Avocado groves have been hit badly with sky-high water costs and reliance on water pumped from underground aquifers.

Water consumption is regulated in California with the state entering its fourth year of drought resulting in water regulators imposing sweeping and draconian restrictions on the use of water. The State Water Resources Control Board has even urged Californians to let their lawns die.



## Spirent services

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## Smart Farming, Spirent style

Bantle divided his farm into 22 irrigation blocks and inserted two soil moisture measurement units into each block. The units contain a LoRa unit for narrow band data communication to a LoRa gateway which has broadband cellular uplink connectivity functionality.

The gateway also contains a [Spirent](#) partner [Oasis](#) re-programmable SIM which becomes the enabler in remote water provisioning. All soil moisture data is collected from the avocado trees into a cloud and visualised by a presentation layer.

When a tree needs to be watered, the solution turns the sprinklers on automatically to get the correct level of soil moisture for each tree. It then turns them off when the correct moisture levels are reached. The connected trees are monitored constantly day and night.

“Avocado trees typically take 4 acre feet (1 acre foot = 326000 gallons) of water per acre per year. This is not only to supply the needed water, but also to leach the salts which build up in the soil,”

“The soil moisture sensors let me drastically reduce water usage by telling me when to water and how deep to water to push the salts past the bulk of the rooting zone. The majority of the roots are in the top 8 inches of soil so there is a sensor there and one at 24 inches so I can see when I’ve watered deep enough to get the salts out of the rooting zone,”

“By keeping the salts in check along with keeping nutrients supplied, stress on the trees is reduced and they are able to have better crop production.”

— Kurt Bantle



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