



SOIL HEALTH BOTTOM LINE PROGRAM

JUNE 2025

Irrigation Efficiency & Long-Term Economic Case Study Richard Matoian, Matoian Brothers Farm

Richard Matoian and his brother, George, own Matoian Brothers Farm, where they grow 130 acres of pistachios and table grapes in Fresno County, California. Their father purchased the land in 1928 and originally planted vegetable crops. Over time, the farm transitioned to raisins and table grapes.

Richard and George grew up working alongside their father, and in the late 1990s, they began installing drip irrigation systems. In 2020, they planted pistachios and installed state-of-the-art equipment with a goal to maintain optimal tree productivity and yields, and to conserve water and energy.

Both brothers are active in the agricultural community. Richard is a past President of American Pistachio Growers and George serves as the director of the Grape Division at Mountain View Cold Storage and Fruit Sales.

This Irrigation Efficiency and Long-Term Economic Case Study describes the adoption of efficient irrigation practices in their (20) acre pistachio orchard and quantifies the predictive economic outcomes from soil moisture monitoring (soil sensors), plant water stress monitoring (dendrometers), evapotranspiration data, flow measurement, and a pump motor variable frequency drive (VFD) installation.

Irrigation Water Supplies

The trees are served by dual water sources: drip irrigation and an existing flood system. Flood irrigation is applied to germinate cover crop seeds and can also help recharge groundwater during the winter. The region is affected by long-term drought and declining aquifer levels. On-farm groundwater pumping is regulated by California's Sustainable Groundwater Management Act (SGMA), to ensure sustainable water supply. To replenish the aquifer during dormant season, on-farm recharge practices are gaining acceptance. In 2022, Richard received funds for on-farm recharge, through a collaboration

with the Sierra Resource Conservation District, Natural Resources Conservation Service (NRCS), American Farmland Trust, and Fresno Irrigation District. Richard says, "My motivation is to be an example to others to replenish groundwater and I want to be part of the solution for long-term groundwater sustainability."

Financial Assistance Programs

A passionate steward of the land, Richard shares, "The farm is my family's livelihood across three generations and counting. We are farming sandy soils that require a lot of water, and after planting I realized that improving the soil conditions and irrigating precisely would be the key to tree vitality and solid production in the long run." To help pay for cover crop seeds and compost, the farm received funds through USDA's Environmental Quality Incentives Program (EQIP). Richard reports positive results, seeing a reduction in compaction and runoff and a visible increase in soil organic matter. The brothers also received funds from the San Joaquin Valley Air District to replace older, high emissions tractors and all-terrain vehicles.

Efficient Irrigation Practices

Richard isn't afraid to adopt new technology. Guided by research and technical assistance from service providers, multiple practices have been implemented. Automated soil sensors were installed to allow for viewing real-time soil moisture levels throughout the soil profile. Automated dendrometers (pictured on page 2) measure tree trunk growth rates and indicate water stress periods. Richard combines data from the sensors, dendrometers, locally published ET rates and visual observation to his irrigation scheduling.

Richard also installed a flow meter at the pump to measure water use per irrigation and to help calculate water application per tree. After

Key Facts

COUNTY: Fresno, California

WATERSHED: Kings River

CROP ASSESSED: Pistachios

STUDY AREA: 18 acres

SOIL: Sandy Loam

IRRIGATION EFFICIENCY PRACTICES:

- Soil moisture sensors
- Dendrometers
- Pump Variable Frequency Drive
- Pump flow meter
- Dual irrigation system- drip and flood options for groundwater recharge

American Farmland Trust's **SOIL HEALTH BOTTOM LINE PROGRAM** supports research and on the ground programs that assist in the protection of California's diverse farms and ranches. AFT's Soil Health Bottom Line Program supports on-farm research that showcases the economic and environmental benefits of using efficient irrigation practices.

understanding the water requirement for the orchard, the flow readings help to inform how often and how much to apply. “How Often and How Much to Apply.” Richard says “We added these tools to be more efficient, in terms of not over-irrigating, but also not stressing the plants,” Richard explains, “It’s always best to stay in the “sweet spot” as far as watering is concerned. As a result, I’m saving water and lowering my power bills”

Additionally, Richard installed a Variable Frequency Drive (VFD) on the pump motor panel. VFD’s automatically decrease or increase the motor speed to meet the actual flow demands of the irrigation system. Richard explains that operating at less than full throttle saves energy costs for the farm.

In the future, Richard plans to add further improvements. An Irrigation Evaluation will be performed to determine the Distribution Uniformity (DU) of water applied throughout the orchard. Coupled with this are recommendations to boost performance provided by Resource Conservation District staff. Some examples are adjustments to flow and pressure, checking emitter types, or proper filtration system maintenance. A pump efficiency test is also planned to determine the pump condition and to flag pump wear.



The Bottom Line

American Farmland Trust (AFT) conducted a **predictive, or long-term economic analysis**, to estimate the annual benefits and costs from irrigation practice adoption during the full bearing life stage. Pistachios require 12–15 years to reach peak production and based on the Matoian’s 2020 planting date; the most productive years will occur

during 2030–2040. This study estimates revenue gains of **\$544/acre/year** for that period due to precise water application and lower input costs.

Final Thoughts

Richard fosters a love of the land and maintains sound and regenerative farming practices with an eye toward future generations. Challenged by growing crops with impacted water supplies, Richard is a strong advocate for healthy soils practices, efficient irrigation methods and irrigation technology to conserve water resources and boost tree productivity. As a life-long farmer, Richard shares, “Find something you love and stick with it, and give back to Mother Nature.”

American Farmland Trust utilized the following tools to quantify economic and environmental benefits of efficient irrigation practices: NRCS’s Level III T-Chart analysis to produce costs and benefits.

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T-CHART: LONG-TERM BENEFIT & COST ANALYSIS FROM IMPLEMENTING EFFICIENT IRRIGATION PRACTICES

MATOIAN BROTHERS FARM			
Fresno, CA • May 2025			
POSITIVE EFFECTS		NEGATIVE EFFECTS	
REDUCED COSTS	\$/AC/YR	INCREASED COSTS	\$/AC/YR
Reduction in electrical pumping costs due to decreased water use (0.5 Acre-feet/acre/year savings)	\$200	Phytech soil sensors (\$5,000, 10-yr ammortization)	\$32
Reduction in electrical costs due to the VFD energy efficiency	\$200	Phytech dendrometers (\$1,600/10-yr ammortization)	\$10
Total Reduced Costs	\$400	Combined soil sensor & dendrometer maintenance	\$100
INCREASED REVENUE	\$/AC/YR	VFD installation (\$6,000/10-yr ammortization)	\$38
		Annual management labor <ul style="list-style-type: none">• Monitor soil sensor data• Monitor dendrometer data• Monitor ET data• Monitor flow meter data	\$12 \$8 \$4 \$2
Anticipated Increased yields due to improved irrigation practices ¹ (15% average increase in yield when full bearing (2030-2040))	\$350	Total Increased Costs	\$206
Total Dollar Benefits	\$750	Total Costs = \$18/ac/yr	\$206
\$750/yr Total Benefits – \$206/yr Total Costs = \$544/ac/yr Net Benefits during 2030–2040			

References:

1. 15% projected increase in crop revenue, attributed by Matoian Bros. Farm, to improved irrigation practices, based on the farm’s projected average yield and price at full bearing age, during 2030–2040.

All vaues are in 2025 dollars