



## SOIL HEALTH BOTTOM LINE PROGRAM

FEBRUARY 2021

# A Soil Health Farmer Profile

## Rich Gemperle, Gemperle Farms

### Introduction

Rich Gemperle and his family grow almonds on 1,500 acres in Stanislaus County, California. The land consists primarily of sandy loam soils on flat terrain, and some acreage has been in the family for 60 years. Rich's father, Ernie Gemperle, emigrated from Switzerland in 1949 and established a successful egg business. In 1961, Ernie was joined by his brother, Walter, who expanded the farm acreage and planted almonds.

Gemperle Farms is recognized as a leader in sustainable farming methods and in pioneering progressive egg production practices. The business is now operated by three generations of Gemperle family members. Rich returned to the farm in 1999 after a career as a hydrogeologist, and Rich's daughter, Tanya Gemperle-Goncalves, serves as the director of sustainability.

Since the planting of the first orchards, the Gemperles have committed to regenerative farming practices, focusing on improving soil health through cover cropping, applying compost, and nutrient management. As a result of adopting healthy soil practices, Rich and Tanya have observed improved water infiltration and water-holding capacity, more beneficial insects, less soil compaction, and overall improved soil tilth. Many orchard blocks are certified organic or transitional organic through the California Certified Organic Farmers (CCOF) program, and the remaining blocks are farmed using Integrated Pest Management (IPM) with minimal use of fertilizers and pesticides. Rich strives to irrigate precisely to meet the crop water demand and avoid over-irrigation and leaching into groundwater. Most of the orchards have micro-sprinkler irrigation systems, and Rich utilizes soil moisture sensors, evaporation rates, and distribution uniformity tests to help guide his irrigation scheduling. The



Gemperles value biodiversity in their orchards and work to maintain native habitat throughout the farm.

Rich credits his father and uncle for instilling a passion and sense of purpose for regenerative farming. Walter Gemperle farmed with an "old country" philosophy of building soil health and reducing reliance on heavy usage of fertilizers and pesticides. As Rich explains, "We consider how everything we do in the orchard affects the soil and the health of the trees. Since we farm with coarse soils, we do a lot of work to keep the soil alive. Our program of cover cropping and composting is well worth the effort, and we are seeing numerous benefits, especially better tree vigor, reduced costs, and increases in yield."

### Balancing Stewardship, Crop Production, and Costs

This study focuses on a 67-acre block where Rich and Tanya adopted healthy soil practices in 2016. At that time, they were experiencing soil compaction problems and poor water infiltration. They planted cover crops, added compost, and

### Key Facts

**COUNTY:** Stanislaus, California

**WATERSHED:** San Joaquin River

**CROPS:** Almonds

**FARM SIZE:** 1,500 acres

**STUDY AREA:** 67 acres

**SOILS:** Montpellier Course Sandy Loam

**SOIL HEALTH PRACTICES:** Cover cropping, compost application, and nutrient management

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 soil health practices.

applied new-generation micro-nutrient fertilizers. Through these practices, the Gemperles saw an increase in soil organic matter content, a decrease in production costs, and an increase in yields by 18% over the past seven years. Rich attributes 50% of the yield gains to healthier soils and 50% to improved irrigation management.

Changes in farming practices were not easy from the start, however, and cover cropping presented some early challenges for Rich and Tanya. After several years of experimenting with different seed varieties, planting dates, and mowing heights, as well as dealing with variable weather conditions, they have found a mix that works for them. They plant the Project Apis m. annual clover mix, in every other row of the orchard middles. In the alternate rows, native vegetation is allowed to grow instead of maintaining bare floors. The cover crops are terminated by a mowing pass in early summer, and the orchard floor is prepared for harvest, with two or three additional mowing passes. In late fall the clover seed mix is planted

again, in the previously unplanted rows. Cover cropping increases soil microbial biomass and activity, soil organic matter content, water retention, and improves aeration. In addition, Rich and Tanya report better water infiltration, beneficial insect habitats, weed suppression, less dust, greater bee activity, and earlier access to the orchard after rains. Cover cropping increases their annual farm expenses, as the cost for seed, planting, and maintenance averages \$63 per acre.

Compost applications improve soil health by increasing microbial activity, nutrient availability, soil moisture retention, and enhanced soil structure. Rich applies 4 tons per acre of composted chicken manure, sourced from the family's egg business. The compost benefit to soil health allowed Rich to reduce applications of UN32 and CAN17 fertilizers and still meet the crop nutrient demand. Additionally, potassium levels have stabilized throughout the growing season and Rich was able to eliminate potash applications. As part of nutrient

management, Rich applies highly efficient micro-nutrient fertilizers, humic acids, and bio stimulants through foliar application. Leaf tissue samples are taken regularly to track seasonal plant nutrient levels and foliar fertilizers are occasionally used to maintain tree health.

Cost reductions occurred when Rich and Tanya began adopting healthy soil practices. Herbicide use decreased by 46%, made possible by the weed competition from the cover crops. Insecticide use decreased by 56% due to higher beneficial insect populations. The cost for nitrogen fertilizers and potash were reduced due to the combined benefit from compost, cover crops, and the use of high efficiency micro-nutrient fertilizers. The expense for compost and spreading is approximately \$88 per acre, although the cost is offset by the savings of \$168 per acre from reduced fertilizer applications.

The Benefit & Cost Analysis T-Chart (shown below) captures the changes in costs and yields from 2015 to 2019. It is

## BENEFIT & COST ANALYSIS T-CHART

RICH GEMPERLE, GEMPERLE FARMS	
Stanislaus County, CA	
February 2021	

SOIL HEALTH PRACTICES	
Nutrient Management—began in 2016	
Cover Crops—began in 2016	
Compost Application—began in 2006	

POSITIVE EFFECTS	
REDUCED COSTS	\$/AC/YR
Decreased fertilizers	\$200
<ul style="list-style-type: none"> <li>Eliminated UN32 &amp; CAN17 (\$100/ac)</li> <li>Eliminated potash (\$100/ac)</li> </ul>	
Decreased insecticides and applications as a result of cover crops	\$53
Decreased herbicides and applications as a result of cover crops	\$46
<b>Total Reduced Costs</b>	<b>\$299</b>

INCREASED REVENUE	
Increased almond yield due to soil health practices (9% increase)	\$309
<ul style="list-style-type: none"> <li>(Comparison of the average yields during 2013–2015 to the average yields during 2016–2019)</li> </ul>	

<b>Total Dollar Benefits = \$608/ac/yr</b>	<b>\$608</b>
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RESOURCE CONCERNS/BENCHMARK CONDITION	
67 acres of almonds planted in 2008	
Sustainably farmed with regenerative agricultural techniques.	
Resource concerns include soil compaction, poor water infiltration, poor water retention and nutrient cycling.	

NEGATIVE EFFECTS	
INCREASED COSTS	\$/AC/YR
Foliar fertilizers	\$32
Cover Crop costs	\$63
<ul style="list-style-type: none"> <li>Seed, equipment and labor</li> </ul>	
Compost Costs	\$88
<ul style="list-style-type: none"> <li>Chicken manure, produced on-farm (\$70/ac)</li> <li>Spreading (\$18/ac)</li> </ul>	
<b>Total Increased Costs</b>	<b>\$183</b>

<b>Total Dollar Costs = \$183/ac/yr</b>	<b>\$183</b>
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<b>\$608/ac/yr Total Benefits - \$183/ac/yr Total costs = \$425/ac/yr Net Benefits</b>
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American Farmland Trust utilized the following technical tools to quantify the economic and environmental benefits of soil health practices implemented on Gemperle Farms: NRCS's Level III T-Chart, USDA's Nutrient Tracking Tool, and USDA's COMET-Planner.

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a partial budget analysis that compares the associated input costs from the period before healthy soil practice adoption (2015) and the current period (2019). For the 67-acre study area, the T-Chart shows a reduction in production costs of \$116 per acre.

The increased revenue is due to gains in almond yields, from the period 2013–2015 (before practice adoption) compared to 2016–2019 (after practice adoption). Crop proceeds increased by \$309 per acre. In total, the Gemperles improved their bottom line by \$425 per acre, or \$28,475 for the 67-acre block.

## Water Quality and Carbon Sequestration

The USDA's Nutrient Tracking Tool (NTT) was used to calculate the water quality

benefit due to Rich's farming practices. Soil and farm input data, such as fertilizer and water use, were collected. The NTT found a 27% reduction in nitrogen losses and a 58% reduction in sediment losses when comparing 2015 farming inputs with 2019 inputs. These values show a significant benefit to soil and water quality, documenting potential decreases in nitrogen leaching and soil erosion, and an improvement in nutrient availability.

USDA's COMET-Planner tool estimates carbon sequestration and the reduction in greenhouse emissions from regenerative farming practices. Information from cover cropping, compost, nutrient management, and soil types were entered into the tool. COMET-Planner found a reduction in greenhouse emissions and the sequestering of carbon equal to 403 CO<sub>2</sub> equivalent, or 6,660 tree seedlings grown for ten years.

## Final Thoughts

Rich and his family's passion for stewardship of their land is demonstrated by their multi-generational approach to farming. Rich says that his farming practices continue to evolve as he learns about the best methods to manage his orchards. "We want to grow our trees on living soils that are healthy from year-to-year. With three generations on the land, we try to farm in ways that sustain the soil over time, sequester carbon, and benefit the environment."