



SOIL HEALTH BOTTOM LINE PROGRAM

JUNE 2025

Soil Health Economic Case Study

Daniel Taylor, Lower Bear Ranch

Daniel Taylor manages 593-acres of almond orchards for the Lower Bear Ranch in Merced County, California. Originally used for cattle grazing, the trees were planted in 2015. The soil is predominantly cobbly clay on rolling hills. Water for Irrigation is sourced from a combination of surface water and groundwater, and micro-sprinklers are deployed to irrigate the trees. Daniel says, “Many farmers may have considered the land unsuited for almonds, but there was a great opportunity with investments in soil amendments to build organic matter and increase irrigation penetration.”

Daniel joined the Lower Bear Ranch in 2021 as the orchard manager after attending UC Davis for Ag Business. Soon after starting with the ranch, he adopted and expanded an approach of soil health improvement through cover cropping, compost applications, and nutrient management. Daniel says, “We are farming on tough clay soils, so it’s imperative to invest in building soil health to conserve water and fertilizer.”

This Soil Health and Economic Case Study focuses on a 156-acre block, highlighting the soil health practices and evaluating the environmental and economic impacts of practice adoption.

Regenerative Soil Health Practices and Challenges

Daniel plants cover crops to improve soil structure, fix nitrogen, and stimulate pollinators before almond bloom. He seeds a Bio Build Mix consisting of triticale, bell beans, peas, canola, and radish. Using a no-till drill, every fourth alleyway is planted in a 6-foot swath. In subsequent years, previously unplanted alleys are seeded. Over a 4-year period, cover crops have been planted in each alleyway. Additionally, resident vegetation is maintained in the unseeded alleys, providing winter vegetative cover across the entire orchard every year. The farm has participated in Project Apis M. and the

Pollinator Partnership programs, receiving funds to offset seed costs. These organizations promote the establishment of flowering plants to build beneficial insect populations.

Research confirms that cover crops increase soil organic matter and improve water-holding capacity, water infiltration, and porosity. A decrease in runoff and erosion is evident. Daniel shares, “I believe in cover cropping. We plant them to invigorate our trees, add organic matter, and suppress weeds. I think our bees are stronger from foraging on the flowering plants.”

However, cover crop management brings challenges. Daniel notes, “We experimented with termination dates and mowing heights. We have terminated too late in May and dealt with too much plant residue at harvest. We still experiment with the seed mixes and planting dates. After much trial and error, we are still learning. But I believe the costs don’t compare to the benefits, such as less dust, a cooler floor, and getting into the fields sooner after a storm.”

Compost is also applied to build soil health. Rich in nutrients, it accelerates soil microbial activity, leading to greater nutrient cycling and aeration. The farm applies three tons of composted chicken manure banded onto the tree berms on an annual basis in the Fall. Daniel reports gradual gains in soil organic matter content and increased water-holding capacity, resulting in more vibrant trees.

For nutrient management, Daniel tests the soil annually and takes tissue and sap samples frequently to guide fertilizer applications with a focus on targeted micronutrient applications. Furthermore, he injects humic and fulvic acid blends using an Ag Solution Master to complement synthetic fertilizer applications. The acid blends are known to stimulate nutrient uptake and improve water retention.

Key Facts

COUNTY: Merced, California

WATERSHED: Merced River

CROP ASSESSED: Almonds

STUDY AREA: 156 acres

SOIL: Clay

SOIL HEALTH PRACTICES:

- Cover Crops
- Compost Applications
- 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 efficient irrigation practices.

Climate Benefits

To estimate the climate benefits associated with the farm’s soil health practices, USDA’s COMET-Planner Tool found that the cover crop, compost applications and nutrient management resulted in an average reduction of 421 tonnes CO₂-equivalent/yr, corresponding with carbon sequestered by 7,000 tree seedlings grown for 10 years.

The Bottom Line

The Benefit & Cost Analysis, displayed in a T-chart (shown below), assesses the income and cost variables impacted by the cover crops, compost, and nutrient management. The analysis found that Lower Bear Ranch realizes a **financial gain of \$527/acre/year**. Crop yields improved by 9% and cost reductions consist of reduced nitrogen fertilizers (\$46/acre), herbicides (\$45/acre), water (\$165/acre), and pumping (\$26/acre). Increased costs stem from cover cropping (\$8/acre), compost (\$172/acre), and nutrient management (\$25/acre).



Final Thoughts

Daniel is a firm believer in healthy soils and regenerative farming practices. Combined with his ready adoption of equipment and technology, he is achieving success through increased yields and reduced costs. Daniel reflects, “The extra work and costs to improve the soil is challenging at first, but well worth it in the long run.”

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 SOIL HEALTH PRACTICES

LOWER BEAR RANCH			
Merced, CA • June 2025			
POSITIVE EFFECTS		NEGATIVE EFFECTS	
REDUCED COSTS	\$/AC/YR	INCREASED COSTS	\$/AC/YR
Decreased fertilizer applications—30# N, 5# P, 15# K per acre	\$46	Cover crop costs	
Decreased herbicides as a result of cover crop weed suppression	\$45	• Seed funded by Seeds For Bees/Pollinator Partnership	\$0
Decreased water use (0.5 acre-feet/ac).	\$165	• Planting costs (25% planted/yr)	\$8
Decreased water pumping costs	\$26	Compost Costs	
Total Reduced Costs	\$282	• Composted chicken manure, 3 tons/acre	\$144
		• Compost spreading	\$28
INCREASED REVENUE	\$/AC/YR	Nutrient Management	
9% increased yields attributable to improved soil health practices ¹	\$450	• Humic/Fulvic acids	\$10
		• Soil & tissue testing	\$15
Total Dollar Benefits	\$732	Total Increased Costs	\$205
		Total Costs	\$205
\$732/ac/yr Total Benefits – \$205/ac/yr Total Costs = \$527/ac/yr Net Benefits			

References:

1. Lower Bear Ranch average yield and price, 2022–2024.