



SOIL HEALTH BOTTOM LINE PROGRAM

JULY 2025

Predictive Soil Health & Economic Case Study Bixler Ranch

Gary Williamson manages the Bixler Ranch in San Joaquin County, where he oversees 1,500 acres of almonds, blueberries, and citrus. The land was purchased in 2015 by Bixler Ranch's parent company, AC Foods, a vertically integrated producer that prioritizes healthy food production and regenerative farming practices. The soils are primarily shallow silt loams on relatively flat terrain. Surface water irrigates the crops through a micro-irrigation system.

From the start of establishing the orchards and blueberry crops, Gary integrated a targeted nutrient management program using state-of-the-art soil and irrigation monitoring equipment to enhance tree vigor, improve soil nutrition, and apply the proper amounts of water.

Gary says "Soil and water are the most important inputs for productive trees. Our soil is poorly drained, and it takes intensive management to be profitable. Our concerns are poor water-holding capacity, nutrient availability, and low organic matter content. We want to plant cover crops and add compost to improve overall the soil health, reduce synthetic nitrogen fertilizers, and conserve water when possible."

Bixler Ranch also prioritizes whole-farm environmental and regenerative approaches. Sustainability Manager Kristin Jacobs says, "We look at the ecological aspect of the entire farm, and we have been planting hedgerows and permanent vegetation to build insect diversity and hold soil moisture."

This **Predictive Soil Health & Economic Case Study** describes the **predictive, or projected** soil health, environmental, and economic outcomes from adopting cover crops and compost applications on the northern **25-acre** block.

Cover crop management

Research shows cover crops add biomass to the soil profile, which improves water retention, water

infiltration, and reduces compaction and run-off. Cover crops also provide forage for beneficial insects and bee pollinators. Financial assistance for cover crops seeds may be available through USDA's Environmental Quality Incentive Program (EQIP), California Department of Food and Agriculture's (CDFA) Healthy Soils Program and additionally, Project Apis. M's Seeds for Bees program.

This study projects the benefit from seeding a common Bio-Build mix consisting of triticale, bell beans, peas, canola, and radish in the fall after harvest. Germination is typically reliant on fall and early winter rains but may require irrigation during dry years.

Gary explains, "We currently maintain resident vegetation. There are pros and cons with cover cropping, such as the possibly incurring water costs in the fall, but we think the benefits outweigh the costs when considering the plants that fix nitrogen and open up the profile." Some farmers also report decreased water use due to improved water retention and lower herbicide use due to weed suppression.

Compost application

Gary and Kristin are considering compost applications to further boost overall soil health. Compost is known to accelerate microbial activity, improve soil structure, and improve nutrient cycling (nutrient availability). Typically, composted green waste, or composted manure, is applied at rates of 5-10 tons/acre, depending on existing soil fertility. Normally, rainfall serves to incorporate the compost below the soil surface

Climate Benefits

To estimate the climate benefits associated with the farm's soil health practices, USDA's COMET-Planner Tool found that adding the cover crop and

Key Facts

COUNTY: San Joaquin, California

WATERSHED: San Joaquin River

CROP ASSESSED: Almonds

STUDY AREA: 25 acres

SOIL: Silt loam, poorly drained

PREDICTIVE SOIL HEALTH PRACTICES:

- Cover Crops
- Compost application

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.

compost practices will result in an average reduction of 150 tonnes CO₂-equivalent/yr, corresponding with the carbon sequestered by 150 acres of US forest in one year.

The Bottom Line

American Farmland Trust conducted a **predictive economic analysis** in a T-Chart, (see below) to estimate the projected annual benefits and costs from cover crops and compost application during 2030–2035, four years after planned practice adoption. This planning horizon accounts for the time required for the practices to build soil health and improve tree yields. This study estimates revenue gains of **\$173/acre/year**.

Final Thoughts

Regenerative farming practices encompass on-farm soil health, biodiversity, water-use efficiency, and reduced inputs of fertilizer



and pesticide. Kristin shares, “Farming is not without challenges. Short water supplies, thin margins, and extreme weather are considerable concerns. But we are committed to regenerative practices to sustain the farm in the long run, to sequester carbon, reduce costs, and build resilience to drought and climate change.”

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.

Funding for this analysis and case study was made possible by a U.S. Department of Agriculture’s (USDA) Agricultural Marketing Service through grant NR219104XXXXG001. Its contents are solely the responsibility of the authors and do not necessarily represent the official views of the USDA.

Authored by Paul Lum, AFT Senior Agricultural Specialist.

T-CHART: PREDICTIVE BENEFIT & COST ANALYSIS FROM IMPLEMENTING SOIL HEALTH PRACTICES

BIXLER RANCH			
San Joaquin, CA • June 2025			
POSITIVE EFFECTS		NEGATIVE EFFECTS	
REDUCED COSTS	\$/AC/YR	INCREASED COSTS	\$/AC/YR
Decreased fertilizer applications - 20# N, 5# P, 10# K per acre	\$30	Cover crop costs	
Decreased herbicides as a result of cover crop weed suppression	\$25	• Seed cost-chare funded by Seeds For Bees	\$15
Decreased water use (0.4 acre-feet/ac)	\$40	• Planting costs	\$20
Decreased water pumping costs as a result of decreased water use	\$13	• Extra mowing cost	\$25
Total Reduced Costs	\$108	Compost Costs	
		• Composted green waste, 8 tons/acre @\$50/ton	\$400
		• Compost spreading	\$25
		Total Increased Costs	\$485
INCREASED REVENUE	\$/AC/YR		
11% increased yields attributable to improved soil health practices¹	\$550		
Total Dollar Benefits	\$658	Total Dollar Costs	\$485
\$658/yr Total Benefits – \$485/yr Total Costs = \$173/ac/yr Net Benefits			

Reference:
1. Bixler Ranch 26 acre block average yield and price, 2022–2024