East Stanislaus
RESOURCE CONSERVATION DISTRICT

NOVEMBER 2025

Soil Health Economic Case Study

Nav Athwal, Westley Farms

Nav Athwal is a participating almond farmer in East Stanislaus Resource Conservation District's (ESRCD) **Soil Health Management Systems for Orchards in California's Central Valley project**. Funded by a Natural Resources Conservation Service (NRCS) Conservation Innovation Grant (CIG), the project addresses regional resource concerns, including poor water infiltration, low soil organic matter content, and compaction. From 2021 to 2025, four cover crop and compost comparison trials were conducted in almond and walnut orchards throughout the Northern San Joaquin Valley.

Nav's father started farming in the 1980s, originally planting grapes. Eventually, Nav and his father diversified and established orchards of almond, pecan, cherry, peach, apricot, and pistachio. Located in Stanislaus County, the soil is a gravelly clay loam on slightly rolling hills.

Throughout Nav's career, he sought to learn about farming methods that build soil health, conserve water, and improve crop production. Nav's says, "My goal is to overcome the challenges of farming on clay soils and dealing with limited water supplies. I believe that building soil health is the key to productivity and resilience." Over time, Nav adopted nutrient management, efficient irrigation practices, and established hedgerows. He found the opportunity to apply compost and cover crops through the ESRCD project. "The technical and financial assistance from ESRCD was extremely valuable."

This **Soil Health and Economic Case Study** describes the economic and climate impacts on Westley Farms' adoption of cover crops and compost application on a **50-acre Treatment** orchard compared to an adjacent **25-acre Control** orchard, which was not planted to cover crops nor received compost. ESRCD's partners in this project include UC Merced, Community Alliance with Family Farmers, Project Apis m., and American Farmland Trust. The field trial objective is to better understand the effectiveness of the soil health practices, quantify the benefits, and share the findings with the agricultural community to inform and encourage greater acceptance.

Compost Application

Primary benefits of compost include enhanced microbial activity, nutrient availability (nutrient cycling), soil moisture retention, and soil aeration. In the Treatment orchard, green waste compost was applied at a rate of 8 tons per acre each year in late fall or early winter. ESRCD's research objective is to analyze and quantify soil health parameters, including soil respiration, active carbon, and aggregate stability. Compost costs was $28 per ton, and the field application cost was $25 per acre.

Cover Crop Management

Research confirms the cover crop benefit to soil health through improved soil structure, porosity, and soil organic matter content. Increased water holding capacity and infiltration is well-documented. Nav reports decreased runoff and erosion, and a cooler orchard floor. "I'm pleased to see better soil tilth, weed competition, and a boost in pollination activity. I believe the number of beneficial insects is up, and I hope to reduce insecticide sprays in the near future." Cover crop seeds were provided by project partner Project Apis m., a beekeeper and farmer collaborative. The seed mix includes 35% bell beans, 30% triticale, 28% peas, 3% yellow mustard, 3% daikon radish, and 1% canola. Plant diversity extends the emergence, bloom, and growing periods and provides resiliency to weather conditions. Bell beans and peas fix nitrogen, and the rooting activity from mustard, canola, and radish penetrates compaction layers. The seeding rate was 60lb./acre at a cost of $50/ acre. Planting costs were $12 per acre. Cover cropping has now become a regular practice for Nav's farm.

Farm at a Glance

COUNTY: Stanislaus, CA

WATERSHED: San Joaquin River

CROPS: Almonds

TRIAL SIZE: 50 acres

SOIL: Gravelly Clay Loam

REGENERATIVE PRACTICES:

- Cover cropping
- Compost application
- Nutrient Management
- Irrigation Management
- Pollinator Habitat

The trial gave me a chance to see a side-by-side comparison of cover crop against no cover crop, and the same comparison with compost. It was my first experience with cover-cropping, and after observing the benefits and healthier trees, I'm expanding to other orchards across the farm.

—NAV ATHWAL

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However, Nav described challenges with seeding and termination. "Germination relies on rainfall, and seeding before storms can be unpredictable. The planting window is short but critical for establishment before heavy winter rains and cold temperatures arrive. In 2021 and 2022, I hired custom operators, but scheduling the planting dates weren't ideal. In 2023, we purchased two new seed drills to plant with our crew and control the planting dates."

Termination also presented a learning curve. "By Spring, the crop is 3′–4′ tall. Although it is important to build the biomass and fix nitrogen, we need to mow early enough to allow for tractor operations and to start preparing the floor for harvest."

Climate Benefits

USDA's COMET-Planner Tool was utilized to estimate the climate benefits associated with the farm's soil health practices.

Implementing compost, cover crops, hedgerows, nutrient and irrigation management on Westley Farms results in an average reduction of **329** metric tons CO_2 equivalent, equal to the carbon to the carbon sequestered by **330** acres of US forest in one year.

The Bottom Line

A **Partial Budget Analysis** (PBA), displayed in a T-Chart, was used to analyze the marginal benefits and costs of adopting cover crops and compost in the Treatment orchard. We used published machinery and materials costs, and producer-provided data to estimate the cost of operations.

This study estimates a net revenue gain of **$99 per acre per year** over the trial. Nav explained that while yields in the Treatment were only slightly greater than the Control, the trees are young at 8th leaf and haven't reached full production. Nav is already observing improved soil conditions and is confident that the practices will contribute to yield gains as the trees mature.

Closing Thoughts

Nav is expanding cover crop and compost applications across the farm's acreage when feasible. "I'm always seeking financial and technical assistance programs to participate in. I'm passionate about managing the land sustainably, and I take the responsibility to heart."

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

WESTLEY FARMS

RESOURCE CONCERNS/BENCHMARK CONDITION
75 acres of almonds planted 2018
Resource concerns include soil compaction, poor water infiltration, poor water retention, and nutrient cycling.

SOIL HEALTH PRACTICES, 2021–2025
Treatment 50 acres: • 8 tons/ac greenwaste compost annually • 60lb/ac cover crop mix (PAm BioBuilder) annually
Control 25 acres: No cover crop or compost applied

POSITIVE EFFECTS

REDUCED COSTS	$/AC/YR
Fertilizer costs—no reduction through 2025	
Irrigation/water—no reduction through 2025	
Mowing—no reduction through 2025	
Herbicides—no reduction through 2025	
Benefit-earlier access to orchard after rains due to cover crops	$25
Total Reduced Costs	**$25**

INCREASED REVENUE	$/AC/YR
Almond yield improvement 10% attributed to cover crops/compost	$380
Total Benefits = $425/ac/yr	**$425**

NEGATIVE EFFECTS

INCREASED COSTS	$/AC/YR
Cover Crop costs: • Seed—60lb/acre annually • Planting equipment & labor • Light tillage/soil prep for seeding	 $50 $12 $15
Compost Costs • 8 tons/ac greenwaste annually x $28/ton • Application—custom hire	 $224 $25
Total Increased Costs	**$326**

DECREASED REVENUE	
None identified	
Total Costs = $326/ac/yr	**$326**

$425/ac/yr Total Benefits **– $326**/ac/yr Total Costs **= $99/ac/yr Net Benefits**

Change in Net Income Per Acre = $99/ac/yr

This table represents estimated average costs and benefits reported in 2025 dollars by the producer over the 75 acre study area. • American Farmland Trust utilized the following tools to quantify economic and environmental benefits of soil health farming practices: NRCS's Level III T-Chart analysis to produce cost and benefits and USDA's COMET-Planner to estimate climate benefits. • Almond price determined by 2022-2025 average of $2.00/lb. (USDA NASS Quick Stats) • Funding for this case study was possible by a US Department of Agriculture Conservation Innovative Grant #NR203A750008G013. Its contents are solely the responsibility of the authors. • Authored by Paul Lum, AFT Sr. Agricultural Specialist.

For more information about this study or to discuss soil health practices, please contact
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To read more case studies, visit https://farmland.org/soil-health-in-california
For USDA's COMET-Planner Tool, see https://comet-planner-cdfahsp.com