



SOIL HEALTH BOTTOM LINE PROGRAM

JUNE 2024

A Soil Health Farmer Profile

Baljit Batth, Manjit Farms

Baljit Batth and her husband, Manjit, emigrated in 1988 from the state of Punjab, India, where their families grew sugar cane, rice, corn, and wheat. In 2016, they planted a 135-acre almond orchard in Tulare County, California, and established Manjit Farms. Their sandy loam soil sits on a flat terrain in a region dominated by almond trees.

Regenerative Agricultural Practices

When Baljit purchased her farm, she was concerned about the low soil organic matter, soil compaction, and poor water retention and infiltration. Her farming experience in India helped her appreciate regenerative agriculture, and in 2018, she began planting cover crops, applying compost, and implementing nutrient management to improve soil health and water quality, sequester carbon, reduce fertilizer and herbicide costs, and increase profitability. These combined practices improve nutrient cycling, water-holding capacity, water infiltration, microbial activity, and organic matter content. They also create less compaction, erosion, and dust

Healthy soil has been proven to grow more vigorous plants with greater climate resilience. Baljit reports less reliance on fertilizers and herbicides, which reduces her input costs. This profile analyzes the costs and benefits of her adoption of cover crops, compost, and nutrient management.

Cover Crops

Baljit plants cover crops in the orchard alleyways, every other year in November or December. The seed mix consists of bell beans, green beans, and barley. A conventional seed drill is used to sow seeds. Before planting, the soil is lightly tilled to loosen the surface. The cover crops are mowed twice in spring to allow labor and tractor operations to prune and apply insecticides or fungicides. The cover crop dies naturally in summer when the soil dries out. The seed, equipment, and planting labor cost approximately \$85 per acre. However, the cover crop eliminated the need for two herbicide applications previously applied to suppress weeds, saving \$60/ac.

Cover crops improve soil health by increasing the organic matter content and microbial activity. Other benefits include improved water-holding capacity and water infiltration, decreased compaction and dust, and cooler ground temperatures. The plants also provide forage and habitat for beneficial insects, like bees. Baljit says, "After planting cover crops, the bees are more active and better pollinate my almond flowers." More beneficial insects saved him \$40/acre in insecticide use.

Compost Applications

Baljit applies composted manure at a rate of 4 tons/acre, every other year. The compost is bought locally and spread by a custom operator. Compost improves soil health by supplying microbes that provide plant-available nutrients. It also increases soil aeration and insect activity. The compost and application cost \$40/ton or \$160/acre. She says, "My goal is to reduce CAN-17 and UN-32 fertilizer due to compost's benefit of more efficient nutrient availability to the trees. After five years, I already see better soil conditions that feel more like mulch."

Nutrient Management

Baljit consults with a Certified Crop Advisor (CCA) to develop a nutrient management plan based on regular soil and plant tissue sampling. This includes analyzing soil nutrients and the trees' demand for fertilizers. It recommends fertilizer types and application rates to meet that demand and avoid unnecessary applications. The plan is based on the 4R's of nutrient stewardship (right source, rate, time, and place). Baljit reports, "The nutrient management plan helps me apply the right amount of fertilizers when needed. It saves \$55/acre each year since I no longer over-apply fertilizers."

Irrigation Water Management

The farmers installed a highly efficient drip irrigation system when their orchard was planted. A deep well delivers groundwater to an on-farm reservoir filtration station when needed for irrigation. Filtered water is conveyed to the trees

Key Facts

COUNTY: Tulare, California

WATERSHED: Tulare Basin Watershed

CROPS: Almonds

FARM SIZE: 135 acres

SOIL: San Joaquin Loam

REGENERATIVE FARMING 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 soil health practices.

at the orchard through double-line drip tubing. Baljit worked with a local Resource Conservation District (RCD) to conduct an irrigation evaluation to determine the Distribution Uniformity (DU), or uniformity of water application to the trees, and to learn how to improve the system’s efficiency.

Baljit is applying for Environmental Quality Incentive Program (EQIP) grants through the Natural Resource Conservation Service (NRCS) to help fund automated soil moisture sensors. Baljit will monitor soil moisture levels all season and establish a schedule to meet water demands and avoid over-watering. She adheres to strict water budgets set by the Sustainable Groundwater Management Act (SGMA) to avoid over-pumping the aquifer when irrigating her fields.

Regenerative practices have improved Manjit Farms’ water-holding capacity of the soil, which has reduced water use by 10%. This is a cost reduction of \$33 per acre/yr.

“Our limited water supplies make pumping very expensive,” she says. “We want to

improve our irrigation schedule with moisture data provided by the sensors to only irrigate when needed. Not more, which would be wasteful.”

Increased Yield

Baljit says cover crops, compost applications, and nutrient management helped increase almond yields by 8%, from 2,300 lbs/ac to 2,500 lbs/acre. Based on the current market value (\$2.15 per lb), Baljit increased production by \$430 per acre.

Carbon Sequestration

USDA’s COMET-Planner tool estimates the reduction in greenhouse emissions from regenerative farming practices. Farm information from cover cropping, nutrient management, compost, and soil types were entered into the tool. COMET-Planner found a reduction in greenhouse emissions and the sequestering of carbon equal to 435 metric tons of CO₂-equivalents/yr, or 104 gas-powered passenger vehicles driven for one year.

Conclusion

Every aspect of Manjit Farms reflects Baljit’s vision for a sustainable future. By embracing these regenerative practices, she is inspired to see greater crop yields while, at the same time, reducing her environmental impact. She takes pride in contributing to the planet’s climate resilience.

American Farmland Trust utilized the following tools to quantify economic and environmental benefits of regenerative farming practices: NRCS’s Level III T-Chart analysis to produce costs and benefits and USDA’s COMET-Planner to estimate climate benefits.

Funding for this analysis and case study was made possible by the U.S. Department of Agriculture’s (USDA) Agricultural Marketing Service through grant 21SCBPCA1002. Its contents are solely the responsibility of the authors and do not necessarily represent the official views of the USDA.

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T-CHART: BENEFIT & COST ANALYSIS FROM IMPLEMENTING REGENERATIVE PRACTICES

MANJIT FARMS			
Tulare County, CA • June 2024			
BENCHMARK CONDITIONS/RESOURCE CONCERNS		SOIL HEALTH PRACTICES	
135 acres of almonds planted in 2016		Cover Crops	
Resource concerns include low organic matter content, poor water retention, poor water infiltration, and nutrient cycling		Compost Application	
		Nutrient Management	
POSITIVE EFFECTS		NEGATIVE EFFECTS	
REDUCED COSTS	\$/AC/YR	INCREASED COSTS	\$/AC/YR
Reduced nutrients applied	\$55	Cover Crop costs	\$43
Reduced insecticide applications due to cover crops (\$40/ac, every other year)	\$20	• Every other year planting	
Reduced herbicide applications due to cover crops (\$60/ac, every other year)	\$30	• \$85/ac/planting/2 years	
Reduced water usage due to soil health benefit from cover crops, from 40 to 36 acre-inches/ac (10% reduction). Water cost of \$200/acre-ft/2 years (every other year planting)	\$33	• (Seeds, equipment, and labor)	
Total Reduced Costs	\$\$138	Cover crop mowing	\$25
		• \$50/ac/every 2 years	
		Compost	\$80
		• 4 tons/acre, every other year.	
		• \$160/ac per year/2 years = \$80/ac/yr (including application costs)	
		Total Increased Costs	\$\$148
INCREASED REVENUE	\$/AC/YR	DECREASED REVENUE	\$/AC/YR
Increase in almond yield as a result of regenerative practices (8% increase)	\$430	None identified	\$0
Average price \$2.15/lb, average yield 2500 lbs/ac			
Total Benefits = \$568/ac/yr	\$568	Total Costs = \$129/ac/yr	\$148
\$ 568/ac/yr Total Benefits - \$148/ac/yr Total Costs = \$420/ac/yr Net Benefits			
Change in Net Income Per Acre = \$420/ac/yr			

References

This table represents estimated average costs and benefits reported by the producer Baljit Bath, with her adoption of cover crops, composting, and nutrient management.

NRCS Economics Technical Note No.: TN.200.ECN-1
NRCS Level III T-Chart, Soil Quality Improvement