A Soil Health Farmer Profile

Balbir Singh, Batth Bros. Farms

Balbir Singh was born into an Indian farming family from the state of Punjab, where they grew rice, wheat, corn, and sugar cane. He emigrated to the U.S. in 1988 with a dream of becoming a farmer and business owner. In 2020, Balbir established the Batth Bros. Farm in Tulare County, when he purchased 315 acres of table grapes planted in 2014 by the previous owner.

Regenerative Agriculture

Balbir's generational farming experience led him to already value regenerative agriculture, which improves soil health, biodiversity, carbon sequestration, and climate resilience. These practices include cover cropping, compost applications, and nutrient management. Research shows they improve the soil's plant-nutrient availability, water-holding capacity, water infiltration, microbial activity, and organic matter—while reducing compaction, erosion, and dust. Healthy soil is key for vigorous and productive plants, and farmers report reduced costs and higher yields using these practices. This profile analyzes costs and benefits of adopting cover crops, compost applications, and nutrient management.

Cover Crops and Compost Application

Balbir plants a seed mix with bell beans, green beans, and barley in the vineyard alleyways every other year in November or December. The alleyways are mowed twice during the season. Before planting, the soil is tilled to loosen the surface, and seeds are planted with a conventional seed drill. Irrigation is applied if rainfall doesn't occur after planting. Cover crop termination occurs naturally in summer once the soil dries out. The cost for seed and planting labor is approximately $85/acre. However, the cover crop's ability to compete with weeds eliminates the two herbicide applications previously applied to suppress weeds for a savings of $50/ac/yr.

It was challenging at first. "My biggest problem was determining the best timing and mowing height of my cover crops," says Balbir. "Now I manage it by mowing twice at a lower crop height instead of once when dense and tall."

Cover crops improve water-holding capacity, lower soil temperatures, and provide habitat, shelter, nectar, and food sources for predators and parasitoids. "The cooler soil keeps the vines fresh on hot days," he adds. "I see fewer pests from the greater number of natural enemies." He reduced insecticide use, saving $45/acre. With better water-holding capacity, he reduced water use by 10%, saving $50/acre.

Compost feeds soil microbes that provide plants with available nutrients and enhances soil aeration and insect activity. "After applying compost, the soil becomes loose and feels like a sponge," reports Balbir. He applies composted manure every other year at a rate of 2 tons/acre, costing $72/acre for the material and custom spreading. Due to improved soil nutrition, he hopes to reduce synthetic fertilizer applications soon.

Nutrient and Irrigation Water Management

At Batth Bros Farm, a nutrient management plan is developed by a Certified Crop Advisor. The plan has an annual nutrient budget that recommends fertilizer applications based on the 4R's of nutrient stewardship (right source, rate, time, and place). "My nutrient management plan helps me apply the correct fertilizer applications and increase my profitability," adds Balbir. "I estimate I saved about $40/acre on nutrient application."

The farm uses groundwater wells to supply water to vines, and a filter station ensures delivery of clean water via a single-line drip irrigation system. Balbir plans to use automated soil moisture sensors to monitor soil moisture and guide an efficient irrigation schedule so he can avoid over- or under-watering. "It's critical the vines are not water-stressed during the summer," he explains. "As we have limited groundwater, we must be very careful with irrigation."

American Farmland Trust

Key Facts

COUNTY: Tulare, California

WATERSHED: Tulare Basin Watershed

CROPS: Table grapes

FARM SIZE: 315 acres

SOIL: Kimberlina fine sandy loam and Wasco sandy 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.

Balbir will use an automated weather station to track evapotranspiration rates that helps determine how much water he should apply. To improve his irrigation distribution uniformity (DU), an Irrigation Evaluation was performed by a local Resource Conservation District. Balbir explains, "The evaluation pointed out areas that received too much water and others that were inadequate. I fixed the system to improve the DU."

Increased Yield

Balbir reports increased grape production from regenerative practices. His average yield increased from 950 boxes/ac to 1,000 boxes/ac, a 5% increase in yield. Based on the current market value for table grapes ($11 per box), Balbir increased profits due to increased production by $550 per acre.

Carbon Sequestration

USDA's COMET-Planner tool estimates the reductions in greenhouse emissions from Balbir's farming practices. COMET-Planner found reductions in greenhouse emissions equal to 268 metric tons of CO_2-equivalents/yr, or 63.8 gas-powered passenger vehicles driven for one year.

Conclusion

From cover crops and compost to meticulous nutrient management, every aspect reflects Balbir's farm vision for a sustainable future. "We knew we could improve the soil. We started slowly due to costs and the need to learn methods," says Balbir. "But I already see stronger vines. We're improving our farm's resilience and helping fight climate change. I'm committed to these practices and am always seeking funding to help with the costs."

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.

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

BATTH BROS. FARMS

Tulare County, CA • June 2024

BENCHMARK CONDITIONS/RESOURCE CONCERNS
315 acres of Table Grapes planted in 2016
Resource concerns include over-watering, poor water retention, and nutrient cycling

SOIL HEALTH PRACTICES
Cover Crops
Compost Application
Nutrient Management

POSITIVE EFFECTS

REDUCED COSTS	$/AC/YR
Reduced nutrients applied	$40
Reduced insecticide applications due to cover crops	$45
Reduced herbicide applications due to cover crops	$50
Reduced water use due to cover crop, from 30 to 27acre-inches/ac (10% reduction). Water cost of $200/acre-ft	$50
Total Reduced Costs	**$185**

INCREASED REVENUE	$/AC/YR
Increase in grape yield as a result of regenerative practices (5% increase) Average price $11/box	$550
Total Benefits = $735/ac/yr	**$735**

NEGATIVE EFFECTS

INCREASED COSTS	$/AC/YR
Cover Crop costs Every other year planting. $85/ac/planting/2 years (Seeds, equipment, and labor)	$43
Cover Crop Mowing 2x/yr	$50
Compost 2 tons/acre, every other year. $72/ac per year/2 years = $36/ac (including application costs)	$36
Total Increased Costs	**$129**

DECREASED REVENUE	$/AC/YR
None identified	$0
Total Costs = $129/ac/yr	**$129**

$735/yr Total Benefits – $129/yr Total Costs = **$606/ac/yr Net Benefits**

Change in Net Income Per Acre = $606/ac/yr

References:

This table represents estimated average costs and benefits reported by the producer Balbir Singh, with his 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