SHAWN LINEHAN

A Soil Health Farmer Profile

Vivian Hwang, Viv Farms

Vivian's life began in Laos, South Asia, where her passion for agriculture started at a young age. She moved to Fresno, California, at 12 years old, where she began working for an agricultural company harvesting vegetables, hand weeding, and tilling the soil. In the 1990s, she started working on her parents' three-acre farm. "This farm was very small," says Vivian. "But it allowed me to gain experience managing the crops and finances of a small business." In 2013, Vivian bought her first farm in Fresno named Viv Farms. She manages the 72-acre farm with her husband.

The land has Hesperia fine sandy loam soil, which is well drained and has a high infiltration rate. Vivian grows Daikon Radish, Taiwan Cabbage, and Napa Cabbage, which are rotated annually. The crops are sold at farmer's markets. Irrigation water is supplied by a groundwater well located on the farm.

Since 2020, Vivian has applied for government funding to reduce equipment and input costs, as well as increase crop productivity. She received a grant from the Agricultural Tractor Replacement Program (ATRP) provided by the San Joaquin Valley Air Pollution Control District. This program reduces air pollution by providing farmers incentives to replace off-road mobile equipment used in agricultural operations. Her ATRP grant covered 50% of the costs of two new tractors, which replaced two older, high-emitting tractors.

Vivian was awarded a Healthy Soil Program (HSP) grant in 2023 from the California Department of Food and Agriculture (CDFA). The HSP provides financial assistance for on-farm conservation practices that improve soil health, sequester carbon, and reduce greenhouse gas (GHG) emissions. This grant allowed Vivian to apply compost on eight acres of vegetables at no cost, which helped improve soil health, prevent erosion, and combat climate change. Vivian says, "Since I started applying compost, I have noticed that the impact of pests has decreased, while the crops and soil look healthier. These programs are very valuable, since without them, I would not be able to apply compost."

Vivian is partnering with American Farmland Trust to study the benefit of compost applications on a half-acre plot and compare it with a plot without compost. Locally sourced composted green waste is applied annually at a rate of 9 tons/acre. An In-Field Soil Health Assessment (IFSHA) found soil resource concerns such as compaction, low soil organic matter, and aggregate instability. This trial will inform farmers and advisors on costs and improvements to soil health from compost applications.

The economic results of the compost application are shown in the table below. Soil health benefits from compost are not immediate, however, and are known to require annual applications to find improvement. Many farmers apply annually for five years or more. After Vivian's first application in 2023, laboratory results showed no significant increase in the amount of nutrients and organic matter. So, Vivian couldn't reduce synthetic fertilizer applications in 2023 or 2024 or reduce tillage passes. There wasn't an increase in the water-holding capacity that would allow a reduction of water applied. Furthermore, pest pressure and weed competition remained constant.

Vivian's current tillage practices generate high soil disturbance, and the soil is uncovered for much of the year. This results in poor soil structure and low organic matter content, which are key components of healthy soil. To improve Viv Farm's soil health, compost applications should be paired with a reduce-till system, cover crops, and a replacement of the furrow irrigation system with a more efficient one.

American Farmland Trust

Key Facts

COUNTY: Fresno, California

WATERSHED: Tulare Basin Watershed

CROPS: Daikon Radish, Taiwan Cabbage and Napa Cabbage

FARM SIZE: 36 acres

SOIL: Hesperia Fine Sandy Loam

REGENERATIVE FARMING PRACTICES: Compost Applications

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.

Carbon Sequestration

USDA's COMET-Planner tool estimates carbon sequestration and the reduction in greenhouse emissions associated with sustainable farming practices. Farm data from compost application, soil type, and location were entered into the tool. COMET-Planner found a reduction in greenhouse gases and the sequestering of carbon equal to 20 metric tons of CO_2-equivalent per year, or equal to the carbon sequestered by 23.4 acres of forests grown in one year.

Closing Thoughts

Vivian will continue to look for farm improvement solutions using government funding programs. "I plan to apply compost every year, and I'm interested in installing solar panels to power the water pumps and reduce my electric bill," she says. To help fund the effort, she will apply to the U.S. Department of Agriculture's (USDA) Rural Energy for American Program, which provides subsidies for renewable energy on farms.

"I also want to change my irrigation system to a more efficient one, such as drip tapes, to reduce my farm's water and energy consumption," adds Vivian. For these irrigation efficiency endeavors, she can apply to government programs, such as the Environment Quality Incentive Program (EQIP) with the Natural Resources Conservation District (NRCS) or the State Water Efficiency & Enhancement Program (SWEEP) with the CDFA.

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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

VIV FARMS
Fresno, CA • June 2024

BENCHMARK CONDITIONS/RESOURCE CONCERNS
9 acres of Daikon Radish and Napa Cabbage
Resource concerns include over-watering, poor water retention, and nutrient cycling

SOIL HEALTH PRACTICES
Compost Application

POSITIVE EFFECTS	
REDUCED COSTS	**$/AC**
Total Reduced Costs	**$0**

INCREASED REVENUE	**$/AC**
After one year of compost application, there was no increase in Daikon Radish and Napa Cabbage yield. The grower expects yield increases after three years.	$0
Total Benefits = $0/ac	**$0**

NEGATIVE EFFECTS	
INCREASED COSTS	**$/AC**
Compost purchase and application labor 3 tons/acre on 8 acres ($171 per acre Covered 100% by CDFA HSP)	$0
Compost purchase and application labor in AFT Demonstration Trial in ½ acre. ($519 per acre covered 100% by American Farmland Trust)	$0
Total Increased Costs	**$0**

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

$0/yr Total Benefits – $0/yr Total Costs **= $0/ac Net Benefits**
Change in Net Income Per Acre = $0/ac
Change in Total Net Income = $0

For more information about this study or to discuss soil health practices, please contact AFT in California at 916-448-1064.