

California Silvopasture Producer Case Study: *Incorporating sheep in a Central Valley almond orchard*

Gonzales-Siemens Family Farm

Producers:
Rebekka and Nathanael
Owners/Operators

Location:
Wasco, Kern County, CA
[35.61423628812915, -119.33609075136556]

The Gonzales-Siemens Family Farm is an 18-acre mature almond orchard on the outskirts of the Kern County town of Wasco. Owner-operators Rebekka and Nathanael Siemens both come from a family history of farming in California, encompassing both tree crops and row crops. Rebekka and Nathanael reconnected with their farming heritages in 2009 and are currently leasing and farming the almond orchard that Rebekka grew up on, in addition to farming two other pieces of land across the state.

The almonds are sold to Fat Uncle Farms, a business run by Nathanael's brother. Fat Uncle Farms sells the almonds and other value-added products direct to the consumer via a web store and farmers markets.



Rebekka and Nathanael Gonzales-Siemens, owners and operators of the almond orchard.

Management

The orchard contains 2,000 mature almond trees: two thirds are planted in Nonpareil, the most commonly grown variety in California, and the other third in Avalon, a smaller variety that is relatively drought tolerant. The trees are planted at 20' spacing both between and within the rows.

The Gonzales-Siemens family's silvopasture efforts began two years ago, in early 2021, when they began grazing sheep in the orchard. They work with a shepherd to intensively graze 150-300 sheep in the orchard for a few days each year. Given the number of sheep and the fact that the trees are mature, the Gonzales-Siemens choose to fence only the perimeter of the orchard with temporary electric fencing.

The Gonzales-Siemens family aim to graze the sheep between February and April, depending on the winter rains and forage growth. With an average stocking density of 20 sheep per acre, the sheep graze for up to a week, depending on how much forage is available.

The forage is a mix of cover crops seeded between the rows that includes grasses, oats, legumes (peas and vetch), and pollinator species (forbs), along with volunteers and weeds. Sheep will also eat any unharvested almonds from the orchard floor and "mummy nuts" that remain on the trees from the year before.



A cluster of young almonds in early spring.

The almonds are harvested in late summer. Some of the forage will regrow between the time of the sheep grazing and the almond harvest. As a result, the Gonzales-Siemens family must mow to clear the orchard floor of any regrowth before harvest. (Almonds are harvested by shaking the trees and sweeping the orchard to collect the nuts, thus the orchard floor must be clear of biomass.) This has to be done mechanically – instead of grazing animals – because of food safety best practices and regulations that require orchards to be free from animals for a 120-day interval between harvest and the depositing of raw manure for crops in contact with the soil.¹

When the Gonzales-Siemens family began managing the almond orchard, they relocated from another farm where they had their own flock of sheep. They were excited about the potential of grazing them in the almond orchard, however, they quickly figured out that they lacked a place to keep the sheep outside of the orchard during the 120-day food safety window. This led them to sell their sheep and pursue contract grazing instead, a strategy that has both benefits and challenges.

Pros and Cons of working with a shepherd, also known as contract grazing:

- **Pros:** Large flock of sheep knocks back weeds quickly. Don't need to devote land to keeping the sheep during the food safety period leading up to harvest. Allows them to experiment with silvopasture and understand the challenges of integrating animals and perennials prior to making an investment in their own flock and animal infrastructure on their farm.
- **Cons:** Under the current contract arrangement, sheep graze the orchard for about a week. However, grazing the sheep for longer and restricting the grazing area (i.e. fencing the orchard into different paddocks) would result in grazing of less palatable species, which would ultimately benefit the forage diversity. Finding sheep to graze a small orchard and scheduling the grazing with the shepherd can also be challenging.

Managing for water in a drying agricultural landscape

The Gonzales-Siemens family currently flood irrigates the orchard and plans to continue doing so, although they are also planning to install drip and/or micro sprinkler irrigation. While almond producers in the area increasingly rely exclusively on drip or micro sprinkler irrigation, the Gonzales-Siemens family would like to continue to have the option of flood irrigation because it allows them to grow cover crops with minimal irrigation infrastructure, rather than managing the orchard floor with herbicide.

¹ FSMA Final Rule on Produce Safety: Standards for the Growing, Harvesting, Packing, and Holding of Produce for Human Consumption. (2022). U.S. Food and Drug Administration. <https://www.fda.gov/food/food-safety-modernization-act-fsma/fsma-final-rule-produce-safety>

“If we are going to be putting water here, we need to try to maximize the products we get out of it. Less extractive, more intensive.”
– Rebekka Siemens

The orchard is entirely reliant on groundwater and a dropping water table as a result of the increasing frequency of droughts and prevalence of water-intensive crops in the Central Valley. Impending requirements of the Sustainable Groundwater Management Act (SGMA) to decrease pumping of groundwater in the region further reinforces Rebekka and Nathanael’s resolve to decrease overall water use and increase the efficiency of water used.

Incorporating sheep has allowed them to use nearly all of the biomass grown with their limited water resources while simultaneously increasing the fertility and water-holding capacity of their soils. This achievable goal of increased soil health – toward which they have already seen progress – justifies the small, temporary increase in water that planting between the orchard rows demands.

Motivation

Experimentation with silvopasture is helping the Gonzales-Siemens family prepare for their goal of a multistory cropping system. The orchard is 19 years old and nearing the end of its anticipated 25-year productive lifespan. This has prompted the Gonzales-Siemens family to plan for whether and how they will replace failing almond trees. Currently, their approach has been to replant some almonds and leave some tree spaces empty to assist in air flow to combat fungus. Going forward, they plan to incorporate other tree species as they move towards their end goal of a diversified agroforestry system.

The Gonzales-Siemens anticipate that a multistory system would allow them to bolster their farm’s viability by (1) increasing revenue from a diversity of crops while (2) increasing their soil fertility. They plan on significantly diversifying the tree species in the orchard, incorporating species and varieties that are better adapted for the drying environment and decreasing groundwater availability (for example: mulberry, figs, oaks). Additionally, they plan to incorporate livestock, stone fruit varieties, and understory medicinal plants of interest to their culturally diverse community as part of their plan for expanding local direct sales and their personal commitment to local food security. They also hope to own their own herd again one day and would like to experiment with goats given the local demand for goat products.

The Gonzales-Siemens Family Farm is leasing the orchard land on a 20-year term. Part of their motivation in experimenting with silvopasture is to pilot a model of regenerative perennial agriculture on leased land, given that purchasing farmland in California is prohibitively expensive for most aspiring producers.



Plans for the aging orchard include transitioning to multistory cropping systems.



A local contract grazier's sheep roam the orchard during a weeklong visit in early Spring.

Benefits and challenges of integrating sheep in an established almond orchard at the Gonzales-Siemens Family Farm in Wasco:

Benefits:

- Sheep aid in pest control, specifically managing navel orange worm, by clearing orchard floor of almonds remaining post-harvest and “mummy nuts” that remain on the trees. The latter are either harvested manually and left for sheep or browsed directly by sheep on lower branches.
- Clearing orchard floors of biomass (weeds, remaining almonds, etc.) greatly reduces the need to mow or spray herbicide, which is a common practice in the region.
- Sheep help with pruning and suckering that would otherwise require additional labor.
- Increased soil fertility from livestock manure.
- Family enjoyment of animals and personal satisfaction of experimentation.

Challenges:

- Establishing a relationship with a contract grazier.
- Scheduling the grazing in accordance with shepherd's availability and also in response to forage growth and food safety constraints
- Short term increase in water usage by forage vegetation
- Cost of permanent fencing, labor of temporary electric fencing installation, and keeping sheep contained despite fencing.