

Case Study: Climate-Friendly Farming



Wolff Vineyard

Jean-Pierre Wolff is no stranger to the notion that agriculture can offer climate solutions. Referring to his 125-acre vineyard as his “carbon management farm,” Jean-Pierre employs a combination of healthy soil practices, water management strategies and energy saving techniques. His transformative farming practices reduce on-farm greenhouse gas (GHG) emissions while increasing the resilience of his grape vines to the rapidly changing climate in San Luis Obispo’s Edna Valley.

Soil-Water-Energy Nexus

Jean-Pierre’s practices cannot be discussed in list form. Rather, they work interdependently with one another in a system-oriented approach to farming. For example, his healthy soil practices are concurrently his irrigation management practices, which at the same time reduce energy and GHG emissions.

Significantly reducing chemical fertilizer application (which are extremely energy-intensive to manufacture), Jean-Pierre plants cover crops between his rows of grapes and applies approximately 1.5 tons/acre of compost each year to provide necessary soil nutrients. These practices are proven to increase the amount of atmospheric carbon that can be stored in soil, while simultaneously improving soil structure so it acts as a sponge for water. Jean-Pierre has found that his soil also retains more water when he “primes” it with irrigation before heavy rains so it better absorbs the water, minimizing runoff and soil erosion.

Jean-Pierre also uses gravity and the natural landscape of the vineyard to manage his irrigation system. Specifically, he moves storm water from higher fields to lower fields with gravity-fed troughs, decreasing his need to use energy for pumping water, and therefore reducing GHG emissions. Jean-Pierre estimates that this method of irrigation saves him an approximate 8,000 kw-hr/yr, or approximately 4.5 tons of carbon per year.

Jean-Pierre has installed soil moisture monitors in his vines, which measure the amount of water in his soil. These monitors provide him with information allowing him to schedule irrigation both at the best time and the ideal quantity, improving the efficiency of his water application. With the installation of variable frequency drives (VFD) on his irrigation pumps, Jean-Pierre further enhances his water and energy efficiency. The VFDs allow the pumps to automatically adjust the flow of water, which is especially important with an annually changing groundwater table due to years of drought, thus reducing his energy consumption, and corresponding GHG emissions by approximately 40 percent. Both practices—soil moisture monitors and VFDs—can now be funded by a California cap-and-trade funded program that incentivizes on-farm practices that reduce both water usage and GHG emissions (see SWEEP side bar on next page).

Another innovation at Wolff Vineyards is the use of the yeoman’s plough (also known as the keyline plough). Imported from Australia, this farming implement is shared in a co-



Yeoman’s plough

State Water Efficiency & Enhancement Program

The State Water Efficiency and Enhancement Program (SWEET) is a California program designed to achieve the dual goals of agricultural water savings and GHG emissions reductions. Developed in response to California's drought in 2014 and financed by cap-and-trade dollars, it funds activities such as installation of soil moisture monitors, pump improvements (e.g., variable frequency drives), and conversion to efficient irrigation systems. A first-of-its-kind in terms of providing funding directly to farmers for on-farm water and energy reduction practices, SWEET funded over 300 projects as of September 2016. CalCAN conducted a progress report in May 2016 identifying opportunities to further improve the program. The report is available at: <http://calclimateag.org/sweep>.



op fashion with other farmers in his area. The plough has thin shanks with a foot at the end that till subsurface soil with minimal disturbance on the surface. The minimal soil disturbance provides for increased carbon sequestration. Additionally, soil permeability is increased for water and root penetration, and the plough can be used strategically on a farm landscape to passively distribute water from wet areas to drier ones.

Climate Change Adaptation & Mitigation

Jean-Pierre is not a “box checker” of best management practices, but rather manages his farm with a holistic systems approach, adapting his practices to the opportunities and challenges that are continuously shifting in a business dependent on weather and natural resources.

Jean-Pierre frames his farm and most of his practices in terms of their ability to sequester carbon from the atmosphere. By removing carbon dioxide from the atmosphere, his farm is helping to reduce the GHG emissions contributing to climate change.

Jean-Pierre's ability to adapt to the changing climate has been one of the drivers for his farm management decisions. He believes his adaptive management approach to farming is especially important in the face of climate change.

For his 55-acres of Chardonnay vines, Jean-Pierre has taken his adaptive management and sustainable irrigation practices a step further, using no added water at all, a technique called “dry farming.” Wolff Vineyard is located in San Luis Obispo County, a region with ideal conditions for dry farming—sufficient rainfall, average temperatures that are not excessive, and deep clay-loam, silty-loam, or sandy-loam soil with high organic

matter content (for more information, see CAFF dry farming fact sheet). Due to the past five years of ongoing severe drought, a small amount of irrigation has been applied in specific blocks.

Jean-Pierre trains the roots of vines—in part with the use of the yeoman's plough—to grow down vertically, deep into the soil, to access subsurface water. He disks the lateral, shallow surface roots for the first several years, thereby forcing the main roots to extend deeper into the earth in search of water. As part of a long-term replant program, his newest interest is piloting the use of “uber” vines which are three foot tall and have a long taproot that establish quickly and can yield a harvest in two years instead of the typical three to four years for conventional vineyards and dry farmed vineyards, respectively.

Farmer Leader

Jean-Pierre Wolff and his wife Elke bought their now 40-year-old vineyard in 1999 and have become a model for enhancing on-farm resilience to climate change. Jean-Pierre has been recognized countless times in his San Luis Obispo community for using sustainable practices and green business models, and he serves on a number of agriculture boards ensuring farmers voices are heard. His farm has been certified with Sustainability in Practice (SIP) since 2008. Wolff Vineyards recently received the prestigious Cool Business award from the California Air Resource Board for implementing climate-smart strategies and the San Luis Obispo County Wine Industry Person of the Year Award.

By serving as a model, educator, trailblazer and spokesperson, farmer leaders such as Jean-Pierre are crucial to ensuring agriculture plays a constructive role in addressing the climate crisis and contributes to California's GHG reduction goals.

Many thanks to Jean-Pierre Wolff for his cooperation (www.wolffvineyards.com).



The California Climate and Agriculture Network (CalCAN) is a statewide coalition that advances state and federal policy to realize the powerful climate solutions offered by sustainable and organic agriculture. We cultivate farmer leadership to face the challenges of climate change and to serve as California's sustainable agriculture voice on climate change policy.

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