

# Case Study: Climate-Friendly Farming



## Dixon Ridge Farms



Roses line the gravel road that leads you into Dixon Ridge Farms. Behind them stand neat rows of walnut trees. At the end of the road is the family home and farm office. Looking beyond the office you can see the farm's most obvious indication of environmental stewardship and climate consciousness — the large warehouses that are surfaced with 3,500 square feet of solar panels produce some of the energy to run the Dixon Ridge Farms walnut processing plant and storage facility.

It is here in Winters, California that Russ and Kathy Lester raised their five daughters and built a model sustainable organic farm. Their family was among a group of pilgrims arriving in 1498 at Plymouth Rock and they have been involved in farming ever since. Today, their daughter Jenny Lester Moffitt is Managing Director, handling the day-to-day activities of the farm and increasing the likelihood that this legacy will continue.

The family farm itself totals approximately 1,250 acres, about half in walnut orchards. The orchards are home to approximately 40,000 trees, some of which are over 100 years old. There are three different varieties including the popular Chandler.

For the Lesters, it all started in 1976 with the purchase of a 68-acre neglected almond and walnut orchard. But, it wasn't just a simple change from one nut to another — it was a slow but dramatic change to an organic farming and walnut processing system. In 1992 Dixon Ridge Farms sold their first packaged pound of certified organic walnuts. Today, over 1,500 tons of organic walnuts pass through these buildings each year and are distributed worldwide.

Russ's intention was not only to be a good husband and father, but also to make sure that the family farm would provide a safe and healthy life for his wife, daughters and workers. The Dixon Ridge Farms mission statement calls for "promoting and educating others about environmentally responsible agriculture." Russ says, "I knew I needed to take a whole

systems approach to sustainability." Russ considers the entire growing cycle, always looking for something that will improve the quality of his product, give a favorable return on his investment and do no harm to the environment.

The irrigation system at Dixon Ridge Farms is a perfect example. Many California orchards use drip irrigation, which pumps water on or just below the soil surface through plastic tubes with multiple drip heads. The system is an effective water conservation method but Russ has improved upon it. He has suspended the irrigation lines in the limbs of the trees. This design reduces how often they need to replace the petroleum-based plastic tubing that otherwise often gets damaged by rodents, harvesting equipment or pinched closed by growing tree roots. Russ sees this as a way "to decrease our dependency on oil" and cut down on resource use and cost. In addition, the new system uses less energy to water the crop, reduces energy-related greenhouse gas (GHG) emissions and labor costs, grows better cover crops, protects against frost and has a positive impact on the bottom line.

A much bigger initiative involves the effective use of the mountains of walnut shells that are a processing byproduct.



Russ Lester  
Owner, Dixon Ridge Farms



# Carbon Sequestration in Agriculture:

The removal of carbon dioxide from the atmosphere by storing the carbon in soils or woody plant material, thereby slowing the effects of climate change.

Some practices that increase carbon sequestration include:

- Cover crops
- Reduced synthetic fertilizer inputs
- Composting and adding organic soil amendments
- Planting perennial crops, trees or other woody vegetation into rangeland or farm landscapes
- Conservation tillage
- Rotational grazing

With help from the California Energy Commission and Community Power Corporation, Russ was able to transform this waste product into clean renewable energy. Dixon Ridge Farms is the first on-farm user of the BioMax 50, a 50-kilowatt biomass powered generator that converts walnut shells into heat and gas to dry the walnuts, electricity to power the large freezers. The process emits virtually no GHGs and saves the operation about \$40,000 in electricity costs and \$12,000 in propane costs per year. The residue of the burned shells is called char ash or biochar. It is 46 percent pure carbon, and Russ adds it to the soil as an amendment. Russ thinks this carbon could be sequestered, or stored, in the soil for hundreds of years, while also reducing nitrous oxide emissions, and he's working with a UC Davis scientist to study this.

Dixon Ridge is using a number of other practices with climate benefits:

- No-till and low-mow — Reducing tractor passes cuts down on fuel use, reduces GHG emissions and stores soil carbon longer since the soil isn't disturbed.
- No synthetic pesticides or herbicides — By maintaining a healthy, balanced system, Dixon Ridge uses no synthetic pesticides and virtually no organic pesticides. They apply walnut shells as mulch around trees for weed control. In addition to the water and air quality benefits, eliminating these inputs has climate benefits since they are fossil fuel-based and their use has associated GHG emissions.
- Irrigation scheduling — Water conserving management practices conserve increasingly scarce water supplies and reduce the energy needed to pump water.
- Soil management — Dixon Ridge applies no synthetic fertilizers, using only composted manure, cover crops of legumes, native grasses, mustards and clovers, chipped tree prunings, walnut hulls and biochar. These practices eliminate the need for fossil fuel-based fertilizers, reduce the GHG

emissions associated with them, and increase the soil organic matter for high yields, greater water absorption and retention, and increased carbon sequestration.

- Waste management — The operation recycles over 50 percent of all solid waste and 100 percent of all scrap metals. They use 100 percent recycled kraft boxes rather than bleach board for their shipping boxes. Kraft board uses less water and energy in production than highly processed bleach board.

Research shows the value of these management tools for reducing GHGs and sequestering carbon, indicating that operations like Dixon Ridge Farms may be vaults for carbon sequestration.

Russ doesn't like the term "global warming" or "climate change." He says "The term global warming is a confusing. It should be climate weirdness. If you look at the temperature for all of the year it may be slightly different, so some people don't consider that a big deal. But, in Solano or Yolo County, when you get freezing temperatures in June like we did in 2011, that's weird and very detrimental to our crops, reducing food production."

Russ goes on to explain that for centuries farmers have planted and harvested based on expected weather norms for their regions. Adages like April showers bring May flowers (which in the case of orchards then develop into fruit or nuts) were born out of this predictability. Another worrisome impact of climate change is predicted to be a reduction in the number of "chill hours" (time below 45 degrees F) needed to assure proper fruit and nut development, which is potentially devastating to California's producers. Practices like those used at Dixon Ridge Farms have two climate-related advantages — they make a contribution to reducing GHG emissions and addressing climate change and they also help farmers prepare for the coming challenges by increasing resilience, conserving water and energy and decreasing dependence on fossil fuel-based inputs.



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The California Climate and Agriculture Network (CalCAN) is a coalition of California's leading sustainable agriculture organizations advocating for policy solutions on climate change and 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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