



Sustaining agriculture in Arizona

Profitable farms and ranches
A healthy environment
Strong families and communities



A drop at a time

Ensuring the future of agriculture in climates like Arizona's requires farmers and ranchers to be good stewards of arid and semi-arid lands. To maintain good productivity and conserve soil and water, producers are adopting practices that are economically viable, socially supportive and ecologically sound.

UA research and extension faculty have a long history of delivering timely research-based information on sustainable agriculture, and the Western SARE program has helped develop, foster and promote sustainability through competitive grants for nearly two decades. Here we share a sampling of the successes.

For more, go to cals.arizona.edu/extension/sustainableag/ and wsare.usu.edu.

Subsurface drip irrigation can reduce water use and increase yields, but unanswered questions preclude widespread adoption. UA soil scientist Tom Thompson led a multi-year study to evaluate and demonstrate drip tube spacing and irrigation frequency's effects on yield, quality, profitability, salt buildup, soil quality and nutrient and water use efficiency. After five years, crop yields under drip have been higher than under flood irrigation and water use efficiency more than doubled. See results at <http://ag.arizona.edu/azdrip>.

Going under cover

Pests and weather can inhibit sustainable systems on arid lands. Jorge Fonseca, UA vegetable specialist, tested a silver-colored, ultraviolet plastic mulch to suppress weeds and conserve precious water in cantaloupes. Results from two growing seasons show the mulch increases yields more than 25%. A Yuma strawberry producer has begun using the mulch and a major melon producer has expressed interest.



Reduced-pesticide citrus

Citrus growers in Arizona, one of four major citrus-producing states, must manage pests to sustain quality production. UA entomologist David Kerns reports that growers reduced the average number of insecticide applications targeting citrus thrips after an integrated pest management (IPM) program helped them select and time applications, use action thresholds and conserve natural thrips enemies like the Yuma spider mite. Once considered a damaging pest, the mite was found to feed on citrus thrips, so Kerns helps growers devise an action threshold to preserve it at beneficial levels.



Slowing down the nuts

Pecan production on the hot Arizona desert suffers when nuts germinate too early, a condition known as viviparity. Warmth and moisture during late summer monsoons can prompt nuts inside the shell to germinate even while they're still hanging on the tree. Research by Mike Kilby, extension specialist emeritus, and Rick Gibson, agriculture extension agent in Pinal County, found that certain pecan varieties, Cheyenne and Sioux, are more resistant than others like Western Schley. Planting resistant trees, as one Pinal producer did in 2000, can improve production by 20-30% in high-viviparity years.

Low-thirst barley

Crops in water-scarce desert environments must be low on thirst and high on efficiency. Solum barley has served as the standard water-saving variety, maturing with one or two irrigations, saving 2 acre-feet of water and 150 pounds of nitrogen per acre. Now, with research by UA agronomist Mike Ottman, a new low-input variety – Solar – is being released. Solar has 10% higher grain yield than Solum, 11% higher test weight and 24% less lodging. It's adaptable to conservation tillage systems with cotton because it matures early and has low production costs.



Shrimp in the desert

Kevin Fitzsimmons, UA aquaculture specialist used a 2001 Western SARE grant to test effluent-laden water from desert shrimp agriculture on olive trees, tomatoes and barley. Effluent-treated olive trees grew significantly better than trees irrigated with well water and as well as those receiving well water and chemical fertilizer. Tomatoes treated with sludge collected from pond bottoms produced more fruit than untreated plants. Gary Wood, a Gila Bend producer testing Fitzsimmons' protocols, employed his own 2000 Western SARE grant in marketing his Arizona Desert Sweet Shrimp.

Every drop counts

Navajo Nation residents are making every drop of water count with help from UA agriculture engineer Ed Martin. A gravity-flow, non-pressurized drip irrigation system Martin designed is helping them grow corn and other vegetables with minimal water. A 50-gallon barrel, the bottom elevated 4 feet above the garden surface, feeds water to as many as 10 30-foot-long drip tubes. Water-soluble fertilizer can be added. Results have been excellent, and further refinements will prevent plugging of drip lines and filters.

Light-touch tillage

Limiting tillage passes across farm fields offers multiple benefits – saved fuel, improved soil quality, increased water infiltration and reduced dust. In a 2001 Western SARE project, UA weed scientist William McCloskey sought to plant cotton directly into cover crop residue of small grains. The study showed that several tillage passes could be eliminated before planting, during the season and after harvest. In another study funded by Western SARE, UA researchers found that reduced tillage systems in cotton conserved fuel and reduced dust emissions.



Finding new markets

Marketing is critical for sustaining production. Teresa Showa of Ganado Family Farm on the Navajo Nation has undertaken two Western SARE grants, first to assess production of traditional Navajo corn products, and then to estimate the demand among residents and tourists through a market survey. Given adequate production, she estimates sales could reach into the millions. Another Navajo marketing grant developed a wool sale at the Hard Rock Chapter, which pumped up sales of mohair, Churro sheep wool and Indian weavings.



Enhancing rangelands

Judicious use of Arizona rangelands is critical to environmental health and the well-being of ranches. A Western SARE grant to the Tohono O'odham Nation incorporated science with social, cultural and historical knowledge in educational seminars to enhance interactions among livestock owners, tribal leaders, government agency personnel and educators. In southeastern Arizona, a group of ranchers converting to deferred rotational plans is using monitoring skills of the University of Arizona and U.S. Forest Service to improve riparian areas on Red Rock Canyon rangelands.





Western Sustainable Agriculture Research and Education

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Western SARE is one of four SARE regions in a USDA program working since 1988 to support sustainable farms, environments, families and communities. It provides competitive grants to researchers, educators, agency personnel, nonprofit organizations and farmers and ranchers in 13 western states and four U.S. island protectorates. In Arizona, Western SARE has funded 45 projects worth nearly \$1.6 million.

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