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AUGUST 2026 Volume 45 • Number 8

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6 Farming for the Future. August settles into the valley with a heat that feels almost familiar — steady, honest, and unmistakably American. It's the point in the season when everything is running at full stride, when engines stay warm from sunrise to sundown, and when every acre reminds us that agriculture remains one of the strongest pillars holding this country together. You see it in the orchards, the dairies, the cotton fields, and in the quiet determination of the people who keep the land moving.

9 The California Avocado Commission's mid-season forecast confirmed that the projected harvest still aligns with its original estimate of 330 million pounds of avocados.

10 Honey bees encounter viruses in their environments, especially when they forage on flowers and other food sources. Being able to detect viruses is important for reducing infection and the spread of disease. Many insects, including honey bees, can detect viruses indirectly with sick nestmates, but it has been unclear if honey bees can directly detect viruses in food sources.

12 Building Resilient Agricultural Businesses in a Changing Industry. Agriculture has always been an industry built on resilience. Farmers, manufacturers, equipment dealers, and agricultural businesses have long adapted to changing weather, shifting markets, and evolving technologies. Today, however, the pace of change is accelerating.

16 California's San Joaquin Valley produces an enormous share of the nation's fruits, nuts and vegetables. But it takes an unsustainable amount of groundwater to do it. New state rules aimed at reducing groundwater use are expected to force up to 20 percent of the valley's irrigated fields out of production — a blow to farmers and communities.

18 From drought and groundwater restrictions to labor shortages and changing markets, California farmers have consistently responded to major challenges through innovation. A new special issue of ARE Update explores whether California's emerging bioeconomy could represent the next step in that tradition by creating new value from the state's biological resources while strengthening rural economies and preparing the workforce for new industries.



Why Harvest Is the Best Time to Plan Next Year's Weed Management Strategy



For many growers, harvest signals the end of another growing season. But while combines are rolling through the fields, it's also one of the most valuable times to begin preparing for next year's crop.

By Christie & Co

As growers prepare for harvest, their focus naturally turns to crop yields, equipment maintenance, and finishing the season strong. However, one of the most valuable opportunities for improving next year's performance begins before the last acre is harvested: evaluating this season's weed pressure while the evidence is still visible.

The weeks leading up to and during harvest provide an ideal window to assess how well current weed management strategies performed and to begin planning for the next growing season. Identifying problem areas before fields are cleared allows growers to make informed equipment decisions, prioritize capital investments, and avoid rushed purchasing decisions during the winter months.

This planning has become increasingly important as herbicide-resistant weeds continue to challenge producers across North America and around the world. According to the International Herbicide-Resistant Weed Database, maintained by the Weed Science Society of America, there are now more than 540 confirmed cases of herbicide-resistant weeds worldwide, involving 273 weed species with resistance to 168 herbicides. As resistance continues to spread, many growers are expanding their weed management programs beyond herbicides alone by incorporating additional technologies into an integrated approach.

University extension specialists also emphasize the importance of evaluating weed pressure before harvest is complete. Kansas State University Research & Extension recommends scouting fields before and during harvest to identify weed escapes, evaluate herbicide perfor-

mance, and document recurring problem areas. These observations help growers determine where changes may be needed, establish realistic equipment budgets before year-end, and schedule demonstrations well in advance of spring planting.

Planning ahead offers practical advantages beyond weed control. It provides time to compare available technologies, evaluate equipment compatibility, discuss financing options, and ensure new equipment is field-ready when the next growing season begins.

At LASCO, conversations with growers across the country consistently reinforce the importance of this planning window. Farmers are looking for practical, durable tools that complement existing weed management programs while helping address rising input costs and the increasing challenge of herbicide resistance.

One technology receiving growing interest is electric weed control. The LASCO Lightning Weeder™ utilizes the company's patented Electric Discharge System (EDS) to deliver electrical energy directly into unwanted weeds. By rapidly heating moisture within the plant, the system damages plant tissue from root to shoot, providing a chemical-free weed control solution that can help manage herbicide-resistant weeds, control late-season escapes, and reduce reliance on repeated herbicide applications.

Rather than replacing existing weed management practices, the Lightning Weeder is designed to complement today's integrated farming systems. The U.S. Department of Agriculture's National Institute of Food and Agriculture (USDA-NIFA) continues to encourage Integrated Pest Management (IPM) strategies that combine cultural, mechanical, biological, and chemical approaches to improve long-term profitability while reducing both economic and environmental risks. Electric weed control represents another valuable tool that growers can incorporate into these comprehensive management programs.

As growers begin evaluating equipment purchases for the next crop year, now is an ideal time to explore how electric weed control can fit into their operation. Scheduling a field demonstration before harvest planning is complete allows producers to compare available solutions, discuss equipment sizing, and determine the best configuration for their acreage, cropping systems, and weed management objectives.

Harvest season is more than the conclusion of one crop—it's the foundation for the next. By evaluating weed pressure today and planning equipment investments before spring, growers can enter the next season with a stronger, more efficient, and more resilient weed management strategy.

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DPR Releases Final Findings from State-Funded Fumigant Alternatives Study

WHAT YOU NEED TO KNOW: DPR has released findings from an independent study on alternatives to pre-plant fumigants that finds that no existing alternative can serve as a direct substitute for methyl bromide or MITC generators. More research is needed.

The California Department of Pesticide Regulation (DPR) released the fourth and final component of a multi-part study exploring alternatives to fumigant pesticides. The last report focused on the risks and benefits of pre-plant fumigants.

The research conducted by the California Council on Science and Technology (CCST) specifically looked at methyl bromide and three pesticides known as MITC generators – dazomet, metam-sodium, and metam-potassium. Similar to the findings from CCST’s previous reports, this report found that, while alternatives exist, there is no single alternative that can be used as a 1:1 substitute for methyl bromide or MITC generators. In particular, the cost and effectiveness of alternatives remain a significant barrier for growers. More crop- and region-specific research is needed to determine the efficacy of alternatives at commercial scale.

“DPR has made a strong commitment to sustainable pest management and finding alternatives to fumigants,” said DPR Director Karen Morrison. “We will continue to prioritize actions to protect human health and the environment through research and innovation.”

Both methyl bromide and MITC generators are restricted material pesticides in California – a group of high-risk pesticides that are strictly regulated to protect public health and the environment.

Methyl bromide is a soil fumigant that has been largely phased

out of use in routine agriculture under the Montreal Protocol because of its ozone-depleting properties. The U.S. EPA only allows its use in a few circumstances – primarily for quarantine and pre-shipment of commodities, imported goods, and nursery propagation to prevent the introduction and/or spread of pests across borders. MITC generators are used to protect timber from rot and to reduce the spread of soil-borne pests between crop seasons.

DPR commissioned the independent study following the release of the Sustainable Pest Management (SPM) Roadmap to evaluate fumigant use and existing alternatives with funding from the California Budget Act of 2023-24. CCST’s reports focused on soil fumigants 1,3-D and chloropicrin, alternatives to sulfuryl fluoride, and post-harvest commodity fumigation.

DPR has also created two new committees to support implementation of the SPM Roadmap.

The SPM Advisory Committee advises DPR on goals, tactics, policies, and partnerships that support the implementation of SPM statewide.

The Scientific Prioritization and Review Committee (SPARC) will provide science-based recommendations to inform DPR’s transparent, data-driven process for identifying and addressing potential risks to human health and the environment from pesticide use.

DPR is also prioritizing alternatives to fumigants in its annual pool of SPM grant funding. For example, in May, DPR awarded over \$600,000 to a project to evaluate the application of different combinations of soil fumigant alternatives.

Farming for the Future

Investing in sustainable practices for the next generation of farming.

BY JOE L. NEYER III | CALIFORNIA FARM EQUIPMENT MAGAZINE

August settles into the valley with a heat that feels almost familiar — steady, honest, and unmistakably American. It's the point in the season when everything is running at full stride, when engines stay warm from sunrise to sundown, and when every acre reminds us that agriculture remains one of the strongest pillars holding this country together. You see it in the orchards, the dairies, the cotton fields, and in the quiet determination of the people who keep the land moving.

Across every county, farmers step into August with a resolve that's hard to define but impossible to miss. It's in the way they walk a field before the sun is fully up, in the way they listen to an engine like it's speaking a language they've known their whole lives, and in the way they shoulder the weight of a season with equal parts pride and responsibility. They know the stakes. They know the risks. And they know that feeding a nation isn't a slogan — it's a calling.

The work demands more than skill. It demands endurance. It's early mornings that start before the coffee's ready and late nights that stretch long after the last light fades. It's repairing a hydraulic line in the heat, adjusting a planter in the dust, and making decisions that ripple through an entire year. It's the kind of work that shapes character, strengthens families, and builds communities that stand firm even when the season doesn't.

And even with all the challenges, farmers continue to adapt. Equipment evolves. Technology sharpens. Preci-

sion tools bring new clarity to old problems. But the heart of the industry remains unchanged. It's still built on people who can read the land, who understand the rhythm of a season, and who carry a deep respect for the soil beneath their boots. They're not just operators — they're caretakers of a legacy that stretches far beyond any single harvest.

August also brings out the unity woven into rural life. Neighbors help neighbors. A broken implement becomes a shared project. A tough season becomes a collective effort. There's a quiet patriotism in every handshake, every harvest, and every mile down a dusty farm road. It isn't loud or boastful. It's steady — the kind of patriotism that shows up in actions, not announcements.

As the month moves on, the strength of American agriculture is visible in every direction. It's in the rows that stand straight, the orchards that hold their color, and the equipment that keeps rolling no matter how hot the day gets. It's in the families who have worked the same ground for generations and in the new growers who bring fresh ideas to old traditions. It's in the hands — calloused, capable, and committed — that carry this nation forward one acre at a time.

August doesn't just mark the height of the season. It marks the heart of who we are — a country built on work, on hope, and on the people who rise every day to keep America fed, supplied, and strong. These are the hands that hold the line. These are the hands that keep the promise. These are the hands that carry America forward.

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Poll Shows Nearly 8 in 10 California Voters Want a Governor Who Prioritizes Water

by ACWA Staff

A new statewide survey conducted by the Association of California Water Agencies (ACWA) and FM3 Research found strong, broad-based and bipartisan support for prioritizing and addressing California's water issues. Among the highlights, 77% of California voters say they are more likely to support a candidate for governor who prioritizes improving California's water reliability and affordability. That support holds up across party lines, including 83% of Democrats, 77% of Independents, and 67% of Republicans.

The polling results reinforce the timing of ACWA's Vision for Our Water Future initiative to elevate water as a top priority for California's next governor, legislators and state officials. The Vision outlines a clear, solutions-focused framework to secure a resilient and reliable water system that meets the needs of California's economy, communities and environment.

"California voters have sent a clear message: they want the next governor to make water a top priority. Statewide polling shows broad support across party lines for

improving water supply reliability and affordability, underscoring that water must be a central part of California's policy agenda," said ACWA Director of Regulatory Relations Chelsea Haines. "Water is foundational to California's economy, housing, agriculture, public health and environmental stewardship. Meeting the state's long-term water challenges will require bold leadership and strong partnerships, and ACWA's Vision for Our Water Future provides a practical policy framework to help the next administration deliver lasting solutions."

Other key findings from the recent poll include:

93% said safe and reliable water supplies are critical to addressing California's goals.

88% think California needs to modernize water infrastructure to protect clean drinking water.

87% think we need to accelerate the construction of water infrastructure to prepare for droughts, floods and changing climate conditions.

69% support using state funds to improve water systems, prepare for drought and flooding, and help keep water rates affordable.

California Avocado Harvest On Track for 330 Million Pound Crop

2026 California Yield Marks Third Consecutive Year Above 300 Million Pounds



The California Avocado Commission's mid-season forecast confirmed that the projected harvest still aligns with its original estimate of 330 million pounds of avocados. California's volume ramped up significantly in May and June to satisfy consumer demand, bolstered by the Commission's increased focus on customized support for retailers who merchandise fresh, in-season California avocados.

"We have had very positive responses from retailers about this year's demand-building marketing programs and a renewed emphasis on customized programs for retailers," said Ken Melban, CAC president. "We're seeing impressive results in distribution and seasonal commitments."

CAC's retail support programs this season include customized display bins and signage featuring California avocado growers, in-store and online digital advertising, Connected TV/streaming video, digital coupons, sales contests, ad flyers, demos and social media outreach. Customer-specific programs include social media series, newsletter integrations and activations with local influencers.

California avocado consumer advertising continues to support the brand through the summer in targeted markets. In addition to Connected TV/streaming video, digital and out-of-home media will reach target consumers with CAC's Voice of the Grower campaign, an authentic evolution of CAC's marketing efforts that showcases growers talking about their avocados in their own words. Performance of targeted ads via an online shopping delivery service are exceeding the Commission's expectations.

"This year's crop of fresh, responsibly farmed California avocados is showing good sizing with outstanding quality," said Melban. "With about 100 million pounds still to be harvested, now is an excellent time for retailers to promote this locally grown fruit and to support domestic agricultural production."



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Honey Bees Can Detect Viruses in Food



Honey bees (*Apis mellifera*) forage for pollen and nectar on almond flowers. (Photo by Michael Simone-Finstrom, ARS)

Honey bees encounter viruses in their environments, especially when they forage on flowers and other food sources. Being able to detect viruses is important for reducing infection and the spread of disease. Many insects, including honey bees, can detect viruses indirectly with sick nestmates, but it has been unclear if honey bees can directly detect viruses in food sources.

To help beekeepers protect their colonies by reducing viral spread, ARS researchers from the Honey Bee Breeding, Genetics, and Physiology Research Unit in Baton Rouge, LA, studied if honey bees could sense viruses such as deformed wing virus, black queen cell virus, and chronic bee paralysis virus in contaminated food sources.

In an experimental study, the researchers found that when honey bees were presented with the choice between a spiked sugar solution with viruses and a plain sugar solution, the honey bees preferred the virus-spiked solution.

"These findings demonstrate that honey bees can directly detect the presence of viruses in contaminated food sources, which has important implications for pathogen transmission within pollinator communities and disease management strategies aimed at improving honey bee health," said Michael Simone-Finstrom, ARS Research Molecular Biologist.

According to Simone-Finstrom and ARS Research Entomologist Elizabeth Walsh, both co-lead authors of the study, the results highlight the need to control viral infections and spread in bee colonies.

Deformed wing virus (DWV) causes crumpled wings when bees are infected with the virus during development (bee at

center right). DWV is highly transmitted when the parasitic mite *Varroa destructor* feeds on pupae and adult honey bees. A *Varroa* mite can be seen on the back of the bee in the center left. (Photo by Joseph McCarthy, Louisiana State University)

Deformed wing virus (DWV) causes crumpled wings when bees are infected with the virus during development (bee at center left). DWV is highly transmitted when the parasitic mite *Varroa destructor* feeds on pupae and adult honey bees. A *Varroa* mite can be seen on the back of the bee in the center left. (Photo by Joseph McCarthy, Louisiana State University)

One major concern is viral spread from *Varroa* mites, parasitic pests that feed on honey bees. Currently, controlling *Varroa* mite populations is one of the most effective ways to protect honey bee colonies. Beekeepers can consider changing how they feed honey bees to limit outside insects from getting access to their food, according to Simone-Finstrom and Walsh.

"Open feeding scenarios where bees from different colonies and other insects, who may carry viruses, get food from the same source may not be in the honey bees' best interest," said Walsh. "Beekeepers can consider an alternative like an individual colony feeder where only honey bees from one colony have access to the food."

It is unknown what mechanisms cause bees to gravitate towards the contaminated food sources. More research is underway to better understand honey bees' foraging behaviors and how the viral presence affects their behaviors.

"The study's findings will help us with providing data-driven decisions in honey bee management and ecological decisions," said Walsh. – by Jessica Ryan, ARS Office of Communications

The A-peel of Citrus Fruits

As the saying goes, one person's trash – or compost – is another person's treasure. While many people throw away citrus fruit peels because they are usually too bitter to eat raw, this outer layer of the fruit's skin is a rich source of many sought after beneficial compounds and is in demand for companies seeking to use those compounds for health and pharmaceutical products.

Florida citrus farmers and producers have been battling to save their industry for over 20 years from Huanglongbing (HLB). This disease, also known as citrus greening, was first found in 2005 in Florida and is now endemic. It poses a serious threat to the U.S. citrus industry and is now present in Arizona, Texas, and California. Citrus greening infects citrus trees and their fruits, resulting in reduced fruit production and increased bitterness in fruit, which equates to economic losses for farmers and producers.

"One way that ARS is helping citrus farmers is developing citrus varieties and hybrids that show tolerance to citrus greening," said Christina Dorado, Lead Scientist and Chemist at the U.S. Horticultural Research Laboratory's Citrus and Other Subtropical Products Research Unit in Fort Pierce, FL.

"It's important to develop varieties and hybrids that are viable for commercial production. For citrus farmers, it is not just about growing fruits for food or juicing. The citrus peels are valuable too because they are good sources of antioxidants and anti-inflammatory compounds."

In a recent study, Dorado and the U.S. Horticultural Research Laboratory researchers assessed 22 different citrus varieties and new unique hybrids for the presence of these anti-oxidants and anti-inflammatory compounds, also known as their phenolic profile, in the fruit peel. Each citrus variety and hybrid has a phenolic profile that has the potential to be utilized for precision nutrition and health supplement applications.

The key research findings were:

The mandarin varieties had high levels of beneficial flavonoids called polymethoxylated flavones (PMFs), especially nobiletin and tangeretin.

The mandarin x pummelo hybrids contained both PMFs and coumarins, which are largely absent in citrus and have shown potentially beneficial biological actions.

The two trifoliate oranges, Flying Dragon and Gotha Road, showed big differences in their phenolic profiles. Gotha Road had more coumarins, while Flying Dragon had more psoralens, compounds that are structurally related to coumarins.

Hybrids of mandarins with trifoliate orange parents often combined unique compounds from both species, creating new chemical profiles not found in traditional citrus varieties.

While the fruits tested in the study are not available for commercial production yet, the research shows promise that these fruits can be valuable for citrus farmers.

"We found that these hybrids and varieties have a lot of beneficial compounds that are not found in traditional citrus fruits like oranges, limes, lemons, and grapefruits, and so have not been studied as much or at all," said Dorado.

According to Dorado, more research is underway to study the health effects of the compound mixtures of these fruits. – by Jessica Ryan, ARS Office of Communications

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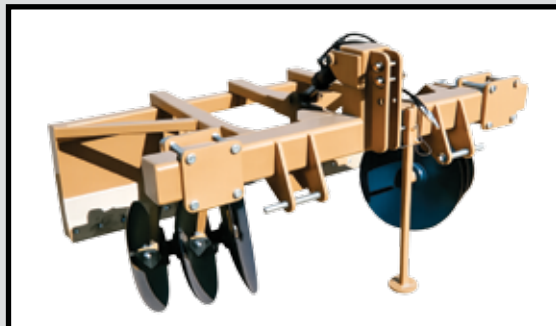
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Building Resilient Agricultural Businesses in a Changing Industry

How strategic leadership, strong brands, and thoughtful planning help organizations navigate uncertainty and build lasting success



By Gillian Christie

Agriculture has always been an industry built on resilience. Farmers, manufacturers, equipment dealers, and agricultural businesses have long adapted to changing weather, shifting markets, and evolving technologies. Today, however, the pace of change is accelerating. Labor shortages, rising operating costs, supply chain disruptions, regulatory changes, and rapid advances in agricultural technology are creating a more complex business environment than ever before.

According to the U.S. Department of Agriculture's Economic Research Service (USDA ERS), labor availability and production costs remain among the most significant challenges affecting agricultural operations, particularly for labor-intensive crops and specialty agriculture. At the same time, growers and agribusinesses continue to make careful investment decisions as they balance profitability with long-term sustainabil-

ity.

While these challenges are significant, they also present an opportunity. Resilience is no longer simply about weathering difficult seasons—it is about building organizations that can adapt, evolve, and continue creating value regardless of changing market conditions. ***Strategy Is the Foundation of Resilience***

The strongest agricultural businesses do not simply react to change—they prepare for it.

The word strategy is derived from the ancient Greek strategos, meaning "to lead." Historically, strategy referred to the careful planning and management of resources to achieve a defined objective despite obstacles or competition. While today's agricultural businesses are not preparing for battle, they are navigating increasingly competitive markets, changing customer expectations, and continuous technological advancement. Success requires the same disciplined thinking: understanding the environment, anticipating change, and making purposeful decisions before challenges arise.

Resilience begins with strategy.

A well-defined strategy provides direction. It helps organizations evaluate opportunities, prioritize investments, allocate resources effectively, and remain focused on long-term objectives rather than short-term reactions. Businesses that simply respond to changing conditions often find themselves following the market. Those guided by strategy are far better positioned to lead it.

At Christie & Co., strategy has always been the starting point of every client engagement. Research, market intelligence, and thoughtful planning come first because communications, branding, and public relations are most effective when they support a clearly defined business strategy. Every message should advance a larger vision for growth.

Investing Beyond Equipment

Agricultural innovation often centers

on machinery, precision technology, automation, and productivity. These investments are critical, but equipment alone does not create resilient businesses.

Long-term success also depends on investing in people, leadership, customer service, employee development, and operational systems. Companies that prioritize education, responsive technical support, and strong dealer relationships frequently build customer loyalty that extends well beyond a single equipment purchase.

Technology may open the door, but people keep it open.

Your Brand Is Your Bridge to Trust

One of the greatest assets an agricultural business can build is its brand.

Branding is often mistaken for logos, advertising, or marketing campaigns. In reality, a brand is the reputation a company earns over time. It reflects every interaction with customers, every promise kept, every product delivered, and every challenge resolved.

In agriculture, trust is earned through consistency.

When growers invest in equipment, technology, or new production methods, they are placing confidence not only in the product but also in the company behind it. A trusted brand reduces uncertainty and gives customers confidence that the organization will continue supporting them long after the initial sale.

Strong brands are built deliberately. They communicate expertise, demonstrate reliability, and consistently deliver value. They educate before they promote and build relationships before expecting transactions.

Over time, that reputation becomes one of a company's greatest competitive advantages.

Leadership Creates Stability

Periods of uncertainty place even greater importance on leadership. Employees, customers, dealers, and busi-

See Building Resilient page 15

USDA Asks Partners to Develop AI Solutions to Accelerate Crop Innovation

The U.S. Department of Agriculture (USDA) is taking steps to speed up progress in plant science by calling on universities and stakeholders to help build new AI tools that can translate the huge amount of germplasm data the agency collects.

Through the Genesis Mission and the Agriculture Advanced Research and Development Authority (AgARDA), USDA is expected to launch an Agricultural National Science & Technology Challenge later this year. The Challenge will ask innovators to create practical solutions that pull together different types of information—like images, field data, and lab results—so scientists can quickly spot important plant and seed traits and develop crops that are more resilient and productive.

"USDA is taking concrete steps to give scientists the modern tools they need to innovate agricultural solutions from the vast plant data that they collect," said REE Under Secretary and USDA Chief Scientist Dr. Scott Hutchins. "When our partners help us to solve agricultural challenges by using AI tools, we'll unlock faster discoveries with germplasm data and grow better crops that strengthen our food system for many future generations."

The Genesis Mission, launched in November 2025, is a national effort coordinated by the White House Office of Science and Technology Policy to leverage artificial intelligence to accelerate scientific discovery. The Mission will bring together America's scientists, top innovative businesses, world-renowned universities; and data repositories, production plants, and national security sites — to use AI tools to solve the nation's most complex science and technological challenges. Challenge teams will have access to the American Science and Security Platform, DOE-built shared infrastructure that will connect datasets, scientific instrumentation, and AI tools to accelerate discovery.

More details on the Challenge are forthcoming. Proposing teams are encouraged to read the full Genesis Mission Executive Order and bring their best ideas to advance America's future in germplasm innovation.

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Building Resilient

continued from page 12

ness partners all look for confidence, consistency, and clear direction.

Strong leaders understand that resilience is built through steady decision-making rather than dramatic reactions. They communicate a compelling vision while remaining flexible enough to adapt as circumstances evolve. They encourage innovation without losing sight of the values that define their organizations.

During more than three decades of working with companies across agriculture, manufacturing, food production, green industries, and emerging technologies, I have found that the organizations best prepared for change share one important characteristic: they never stop learning. They continually evaluate their businesses, listen carefully to their customers, and remain open to new opportunities while staying grounded in the principles that earned their reputation.

Turning Challenges into Opportunities

Every challenge facing agriculture also creates opportunities for growth.

Labor shortages encourage automation and improved efficiency. Supply chain disruptions inspire stronger partnerships and diversified sourcing. Rising production costs accelerate investments in technologies that improve productivity while reducing waste.

The businesses that thrive are those that view change not as an obstacle, but as an opportunity to improve.

According to USDA Economic Research Service research, long-term resilience depends not only on managing risk but also on making strategic investments that strengthen businesses over time. Organizations that evaluate their operations regularly, embrace innovation thoughtfully, and maintain a long-term perspective are often better positioned to capitalize on future opportunities.

Strategy and Communications Work Together

Even the best strategy requires effective communication to succeed.

Customers, employees, dealers, investors, and industry partners all want to understand where a company is headed and why its solutions matter. Clear,

authentic communication transforms strategy into action by aligning people around a common vision.

At Christie & Co., our philosophy has always been simple: communication should never exist merely to promote products. Its purpose is to advance strategy, build meaningful relationships, strengthen reputation, and create lasting value.

When strategy provides direction, communication creates momentum.

Together, they build trust.

Looking Ahead

Agriculture has never stood still, and neither should the businesses that support it.

The future will undoubtedly bring new technologies, evolving customer expectations, economic uncertainty, and changing market dynamics. The organizations that thrive will not necessarily be the largest or the fastest-growing. They will be those that think strategically, invest in their people, build trusted brands, strengthen relationships, and remain adaptable in the face of change.

After more than 33 years of helping innovative companies grow from promising ideas into recognized industry leaders, I have learned that lasting success is rarely built by reacting to change. It is built through thoughtful strategy, authentic leadership, and a reputation earned one relationship at a time.

Resilience is not a destination. It is a mindset. And when resilience is supported by sound strategy, trusted brands, and meaningful communication, agricultural businesses are well positioned not only to navigate change—but to lead it.

About Gillian Christie

Gillian Christie is the Founder and CEO of Christie & Co., a Santa Barbara, California-based branding, public relations, marketing, and advertising agency celebrating more than 33 years of helping ethical companies achieve mainstream success. Guided by the agency's philosophy, From Dream to Mainstream®, Gillian specializes in developing research-based strategies that help organizations build trusted brands, strengthen market leadership, and achieve sustainable growth across agriculture, ag-tech, food and beverage, green industries, and other mission-driven sectors.

Can Winter Grains Prevent Fallowing Fields?



Researchers at UC Davis found that the benefits of planting winter grain crops outweigh the benefits of leaving the land fallow, creating an option for California farmers facing the loss of groundwater. (Maya Shydlovski / UC Davis)

by Trina Kleist

California's San Joaquin Valley produces an enormous share of the nation's fruits, nuts and vegetables. But it takes an unsustainable amount of groundwater to do it. New state rules aimed at reducing groundwater use are expected to force up to 20 percent of the valley's irrigated fields out of production – a blow to farmers and communities.

Now, UC Davis research shows those lands could remain viable if farmers plant winter grain crops. When managed properly, small grains such as wheat, triticale, barley, oats and rye can grow during the cool season with little irrigation, relying mostly on seasonal rain. The strategy would help farmers keep land productive even during dry winters, without threatening groundwater supplies.

Five years of study also show winter grains may help recharge depleted groundwater, even better than taking the land out of production. The research was part of a new report by the Public Policy Institute of California, or PPIC, which examines how farmers can comply with California's Sustainable Groundwater Management Act.

Aerial photo of rectangular crop fields, white pickup and workers on a dirt road. A team led by Mark Lundy in the Department of Plant Sciences compared how well grains such as wheat and triticale grow during the winter when given little to no additional irrigation. (Joshua Hegarty/UC Davis)

A team led by Mark Lundy in the Department of Plant Sciences compared how well grains such as wheat and triticale grow during the winter when given little to no additional irrigation. (Joshua Hegarty/UC Davis)

"We really drilled down into the water use of the winter crops and how that compares to the fallow system," said Mark Lundy, an associate professor of Cooperative Extension in the Department of Plant Sciences and a co-author on the report. "There's not been that direct comparison

made very frequently or rigorously."

Small grains can be planted in the fall when it's cool. They need minimal irrigation to get started, then winter rains take over. If rain is plentiful, farmers can harvest and sell the grain. If not, they can harvest early for animal feed and sell it to nearby dairy and beef operations. During drought, grains offer all the benefits of a winter cover crop, with minimal investment.

Over several years, Lundy's team and others in the department found that winter crops use only slightly more water than fallow land. More importantly, while fallowing land does reduce demand on groundwater, it doesn't actually recharge it – a common misperception among farmers and regulators. Instead, most rainfall is lost to evaporation. In addition, fallowed fields create more dust, attract more pests and weeds, and trap more heat than fields planted with winter crops.

Wide rural field with golden wheat and green crops, people in distance under cloudy sky. During a field day, visitors came to test fields at the University of California Westside Research and Extension Center, in western Fresno County, to see grains growing with different levels of irrigation. (Mark Lundy/UC Davis)

During a field day, visitors came to test fields at the University of California Westside Research and Extension Center, in western Fresno County, to see grains growing with different levels of irrigation. (Mark Lundy/UC Davis)

Winter crops could even help recharge depleted aquifers in wet years. The plants shade the soil and block wind and allow more water to sink in than it would on bare fallow ground.

The PPIC report's authors also called for state-funded incentives and guidance to help farmers make the switch.

"This is an area where many people could win without too much policy effort," Lundy said.



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Could bioeconomy unlock new value from existing resources?



Photo credit: Almond Board of California

Returning almond shells to orchards as a potassium amendment and mulch could generate additional farm revenue while recycling nutrients, improving soil health and reducing waste.

By Ria DeBiase

From drought and groundwater restrictions to labor shortages and changing markets, California farmers have consistently responded to major challenges through innovation. A new special issue of ARE Update explores whether California's emerging bioeconomy could represent the next step in that tradition by creating new value from the state's biological resources while strengthening rural economies and preparing the workforce for new industries.

The bioeconomy is not new, but it is evolving. Historically, California's biological resources have been used primarily to produce food, feed and fiber. Today, Californians are exploring how agricultural byproducts, forest materials and food waste can become feedstocks for renewable energy, new manufacturing industries and other higher-value products. For California, the question is no longer simply how to produce more, but how to create more value from the resources the state already has while helping agriculture adapt to changing environmental and economic conditions.

As UC Berkeley Distinguished Professor David Zilberman explains, "The bioeconomy represents a transformative pathway for addressing 21st-century challenges of climate change, environmental degradation and rural economic decline."

A log grapple picks up 4 logs from a pile in a forest and prepares to stack them on the back of a truck

In 2025, the forestry sector showed the largest growth in bioeconomy-related job postings.

One of the biggest opportunities may lie in California's rural communities. UC Davis professor M. Anne Visser examines how groundwater regulation, labor shortages and climate pressures are reshaping the San Joaquin Valley. Visser notes that complying with the Sustainable Groundwater Management Act (SGMA) alone could lead to up to a million acres of fallowed farmland by 2040. But, rather than framing those changes only as losses, she explores how they could support new regional industries built around California's estimated 54

million metric tons of annual biomass resources – including approximately 10 million metric tons of agricultural byproducts. Successfully rising to these challenges, she argues, will depend on modernizing regulations, investing in regional processing infrastructure, and preparing a workforce capable of supporting new bio-based industries.

To show what the bioeconomy looks like in practice, Zilberman, researcher Sat Darshan S. Khalsa, and UC Davis Distinguished Professor Patrick H. Brown examine how California's almond industry is already creating value through agricultural circularity.

Almond hulls sold as livestock feed fetch roughly \$76 to \$106 per ton, or about \$160 million to \$230 million. The authors identify another opportunity: returning almond shells to orchards as a potassium amendment and mulch. Their analysis suggests that, where transportation costs are low enough and shell amendments are needed, the practice could generate an additional \$21 million to \$31 million in annual value while recycling nutrients, improving soil health and reducing waste.

close up view of a pile of almonds in the shell

Selling almond shells to orchards as a soil amendment could generate an additional \$21 million to \$31 million in annual value.

Preparing California's workforce will be just as important as developing new technologies and markets. Using new workforce data, UC Berkeley assistant professor of Cooperative Extension Alexandra Hill found that bioeconomy-related job postings in California increased 14-fold between 2015 and 2025, with forestry emerging as the state's largest source of bioeconomy-related employment. Nearly half of these positions required no previous experience. Her research identifies the occupations and skills that are becoming increasingly important to California's bioeconomy, reinforcing the need for workforce training through community colleges, universities and industry partnerships as the sector continues to grow.

Together, these studies suggest that California's next wave of innovation may come not from replacing agriculture's traditional strengths, but from building on them. Developing markets for farm and natural resource byproducts, investing in regional infrastructure, expanding workforce training and strengthening partnerships among universities, UC Cooperative Extension, industry and policymakers could help California create new economic opportunities while improving resource use and supporting resilient rural communities.

To learn more about California's growing bioeconomy, read the Special Issue of ARE Update Vol. 29, No. 5, The Bioeconomy and Its Potential to Enhance California Agriculture, online at <https://giannini.ucop.edu/filer/file/1782493834/21694/>.

ARE Update is a bimonthly magazine published by the Giannini Foundation of Agricultural Economics to educate policymakers and agribusiness professionals about new research or analysis of important topics in agricultural and resource economics. Articles are written by Giannini Foundation members, including University of California faculty and Cooperative Extension specialists in agricultural and resource economics, and university graduate students. Learn more about the Giannini Foundation and its publications at <https://giannini.ucop.edu>.

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New Federal Program Announced to Boost Small and Mid-Size Beef Processors



U.S. Secretary of Agriculture Brooke L. Rollins announced the Strengthening Processing for U.S. Ranchers (SPUR) Program that will provide temporary support for eligible beef processing establishments. Under SPUR, the U.S. Department of Agriculture will provide up to \$500 million in payments to eligible entities to support stronger and more stable market opportunities for American ranchers.

"America's ranchers deserve a strong, competitive marketplace that rewards their hard work and preserves opportunity for generations to come," said Secretary Brooke L. Rollins. "Today, historically tight cattle supplies, the Biden administration's anti-cattle focus, consolidation in and foreign ownership of meat packing and the reemergence of New World Screwworm have created extraordinary market conditions that are placing significant pressure on our independent and regional beef processors. Through the Strengthening Processing for U.S. Ranchers (SPUR) Program, USDA is taking targeted action to preserve the independent processing capacity that ranchers rely on, strengthen competition across the American beef supply chain, and support rural communities across the country. This is another important step in our Plan to Fortify the American Beef Industry by strengthening domestically owned processing capacity and ensuring America's cattle producers continue to have strong market opportunities and meet America's historically high beef demand. As we Make America Healthy Again, we are working to ensure American families have continued access to nutritious, high-quality American beef while

promoting greater competition, a more resilient food supply chain, and long-term affordability at the grocery store."

"Small and mid-size beef processors are essential to maintain the diversity of America's food system," said Under Secretary for Food Safety Mindy Brashears. "Supporting this processing capacity helps preserve market options for our United States ranchers, strengthens regional supply chains and ensures American families continue to have access to safe, high-quality beef produced here at home."

"Competitive supply chains help ensure American ranchers have reliable markets for their cattle," said Under Secretary for Farm Production and Conservation Richard Fordyce. "Through the SPUR Program, USDA is bolstering market opportunities for ranchers and supporting a resilient beef industry."

These payments are authorized under the Commodity Credit Corporation Charter Act and are administered by the Farm Service Agency (FSA). Payments are intended to provide financial support to eligible beef processors who have faced increased costs of acquiring cattle for processing due to the abnormally low number of cattle being raised in the U.S. at this time and other conditions currently impacting the cattle market. Additional information, including applications, will be provided to eligible entities using contact information that is currently on file with the USDA Food Safety and Inspection Service.

Entities eligible to receive funding under SPUR must be beef processing establishments under Federal inspection, as well as beef processing establishments inspected under the Talmadge-Aiken Cooperative Inspection Program and the Cooperative Interstate Shipment Program (CIS). Further, eligible entities must be U.S. owned and cannot be nationally dominant in beef processing (or owned by an entity that is). For purposes of SPUR, nationally dominant will be defined as an entity holding a market share greater than or equal to the entity holding the fourth-largest share of the beef processing market.

For decades, the beef processing industry in the U.S. has been heavily concentrated and today just four companies control nearly 85% of the beef processing market, including two foreign owned companies. Ensuring domestic processors can continue operating during this period where the U.S. cattle herd is at a 75-year low is critical to national security and will ensure a strong supply chain once the herd is rebuilt.

This new program also directly supports the USDA Plan to Fortify the American Beef Industry and the USDA Small Processors Action Plan (PDF, 2.3 MB) by ensuring American ranchers have access to regional processing capacity they rely on to support branded and value-added beef programs, such as the Product of USA label that USDA started promoting earlier this year.

Maintaining this regional processing capacity is also a key part of the Make America Healthy Again movement by ensuring access to high-quality protein in alignment with the new Dietary Guidelines for Americans.

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USDA Helps Organic Producers with Certification Costs

Putting Farmers First to Make America Healthy Again

The U.S. Department of Agriculture (USDA) is helping organic producers and handlers cover certification costs as part of the Department's effort to put Farmers First and Make America Healthy Again. USDA's Farm Service Agency (FSA) is accepting applications to help with organic certification costs for the 2025 and 2026 program years through the Organic Certification Cost Share Program (OCCSP), which covers up to 75% of eligible organic certification costs. Producers and handlers must apply by Dec. 31, 2026, for both program years.

"The Trump Administration is focused on putting Farmers First, and this program helps organic producers with their certification costs through the National Organic Program," said FSA Administrator Bill Beam. "This program enables organic producers to access additional markets for their products by removing financial barriers for farmers and processors transitioning to or maintaining organic status, resulting in increased access to healthy foods produced by American farmers."

Cost Share Assistance - OCCSP provides cost share assistance to producers and handlers for the costs of obtaining or maintaining organic certification under the National Organic Program, which is administered by USDA's Agricultural Marketing Service. Producers and handlers are eligible to receive 75% of the costs, up to \$750 for each of the following scopes: crops, wild crops, livestock, processing/handling and state organic program fees.

FSA will make payments as applications are received on a first-come, first-served basis until available funds are depleted.

Eligibility - To be eligible for OCCSP, a producer or handler must have their USDA organic certification for the applicable program year at the time of application and must have paid fees or expenses related to the initial certification or renewal from a certifying agent during the program year. For program year 2025, they must have possessed a USDA organic certification at any time

during the program year.

There are four USDA organic regulation recognized scopes that must be individually inspected and certified: crops, livestock, wild crops, and handling. The scopes must be listed on the producer or handler's organic certificate to be eligible for OCCSP. Eligible costs include:

- Application and administrative fees for USDA organic certification.
- Inspection fees for USDA organic certification, including travel and per diem costs for organic inspectors.
- USDA organic certification costs, including fees necessary to access international markets with which AMS has equivalency agreements or arrangements.
- State organic program fees.
- User and sale assessment fees for USDA organic certification.
- Postage costs for materials related to obtaining or renewing USDA organic certification.

How to Apply - To apply, producers and handlers should contact their local FSA county office. As part of completing the OCCSP application, producers and handlers will need to provide documentation of their organic certification and eligible expenses.

Organic producers and handlers may also apply for OCCSP through participating state agencies.

Opportunity for State Agency Participation - FSA will soon announce a 30-day application period for state agencies to apply through grants.gov to administer OCCSP.

If a state agency chooses to participate in OCCSP, both the state agency and FSA county offices in that state will accept OCCSP applications and make payments to eligible certified operations. However, producers and handlers may not receive OCCSP payments for the same scope through both the state agency and their FSA county office.

More Information - For more information, producers and handlers can visit the OCCSP webpage or contact their local FSA county office.

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Many events take place at wineries, including Domaine Carneros, Frog's Leap Winery, and Silverado Vineyards. This year's series includes a focus on America's 250th anniversary, and how diverse composers have shaped the American musical landscape.

Aug. 22–30: National Park Week. Celebrate the 110th birthday of our national parks as well as America 250 by visiting one of the nine national parks in California. Admission fees are waived on Aug. 25—the day the National Parks Service was founded in 1916—and Aug. 22 is National Junior Ranger Day, with special activities for kids.

SEPTEMBER 2026

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Registration open for Central Coast Organic Agriculture Conference Sept. 15-16



Sheep in the vineyard at Villa Creek Cellars, MAHA Estate Wines.

Photo courtesy of Henri Cherry

California's Central Coast is a leader in organic farming, known for growing berries and leafy vegetables, often on vast acreages. Recognizing this regional commitment to organic practices, the University of California Organic Agriculture Institute has tailored an upcoming regional conference to serve growers in San Luis Obispo, Santa Barbara and Ventura counties.

Registration is open for the Central Coast Organic Agriculture Conference scheduled for Sept 15-16, 2026. This free event will bring together organic farmer perspectives, research, technical assistance and UC Cooperative Extension resources. The conference goal is to facilitate knowledge sharing and community building, ultimately strengthening a local network of organic growers. Spanish interpretation will be available for all programming.

The conference kicks off with farm tours. Attendees will visit a diverse cross-section of local certified organic operations, including a large-scale diversified vegetable grower, a 60-acre organic vineyard and an 80-acre subtropical fruit farm. These tours provide an opportunity to see different approaches to organic management and chat with owners and managers.

"The planning committee did a great job of identifying tour stops that showcase a range of organic operations – in terms of the cropping system, the scale, as well as operational and marketing strategies," said event organizer Lexie Wilson, extension and outreach coordinator with the UC Organic Agriculture Institute (part of the UC Sustainable Agriculture Research and Education Program with UC Agriculture and Natural Resources).

On the second day of the conference, attendees will con-

vene at the Octagon Barn in San Luis Obispo for a series of panel discussions, including one focused on strategies for reaching institutional buyers, like schools or hospitals. Panelists will share tips for accessing those markets, such as selling produce through food hubs.

"Oftentimes, institutions require both larger volumes and a consistent supply of a particular item – working collectively, farmers can meet those demands," Wilson said.

Other topics include invasive pest management and disaster preparedness in the face of climate change and extreme weather, soil health, balancing sustainability goals with food safety and innovative approaches to the Sustainable Groundwater Management Act (SGMA).

"Our organic farming conference is critical in California in the age of SGMA implementation," shared planning committee member and organic farmer Jesse Trace. "The science shows that soil health is synonymous with water conservation. Farms that care for their underlying ecosystem services through composting, cover cropping and hedgerows protect our semi-arid regions' most precious resource: water." The conference will showcase farms in the Central Coast implementing these practices and research on these topics.

Additionally, the event will include one-on-one office hours with organic agriculture resource providers. Experts will be available to answer grower questions and collaboratively work through specific challenges. Ample time for networking will also be provided.

To see the agenda and register, visit bit.ly/4aYEpsY. The registration deadline is Sept. 5.

The event is free of charge thanks to generous funding from the California Department of Food and Agriculture Office of Agricultural Resilience and Sustainability and State Organic Program, and the U.S. Department of Agriculture Agricultural Marketing Service West Southwest Transition to Organic Partnership Program.

The event planning team includes UC Cooperative Extension advisors from San Luis Obispo, Santa Barbara and Ventura counties, as well as the UC Small Farms Network, the Central Coast Soil Hub of the local Resource Conservation District, Community Alliance with Family Farmers and an organic farmer growing in San Luis Obispo.

"We're excited to be hosting this year's conference on the Central Coast," said planning committee member Joshua Kouri, coordinator for the Central Coast Soil Hub. "Peer-to-peer learning opportunities like this are incredibly powerful tools for ensuring our local agricultural community is both environmentally sustainable and economically viable."

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California Wolves Feed Heavily on Cattle, Study Finds

New Research Examines What Wolves Are Eating and How Livestock Respond to Their Presence



This gray wolf was caught on a game camera in Northeastern California. (Tina Saitone / UC Davis)

by Amy Quinton

Two new studies examining gray wolves in California paint a complex picture of life on California's ranching landscapes: wolves eat cattle more than anything else and the presence of the predators causes significant stress among livestock.

In the first study, University of California, Davis, researchers found wolves from the Lassen and Harvey packs in northeastern California were primarily eating cattle. They collected scat samples during the summer months of 2022 and 2023 and found 72% of wolf scat contained cattle DNA. The research was published in PLOS One.

"Whether it's through scavenging or whether it's through depredation, it's a huge component of the wolves' diet," said lead author Tina Saitone, a professor of Cooperative Extension in the UC Davis Agricultural and Resource Economics Department. "Their conservation success is because of livestock producers in the state."

Cattle appeared as the most frequently occurring food item during both summers of the study, present in 86% of samples in 2022 and 55% in 2023. While all 2022 samples were from the Lassen Pack, the 2023 samples included eight from the newly established Harvey Pack.

Wolves are a state and federally recognized endangered species. The first confirmed wolf entered California in 2011, following a nearly 100-year absence. The California Department of Fish and Wildlife estimates the state is now home to nine wolf packs.

Few natural prey

Wolves in California live in landscapes shaped by people.

They have fewer wild ungulate prey options than wolves in other parts of North America. Mule deer are their only significant wild food source, but populations have dropped sharply since the 1970s.

Saitone said the scarcity of wild prey may be one reason wolves are eating cattle instead. Researchers found mule deer in just 45% of the scat samples, significantly less common than cattle.

Keeping wolves away from cattle is difficult on many of these working landscapes.

"Conservatively, we're talking about a million acres in our study area and 10,000 cow-calf pairs," said Saitone. "It's not as simple as putting up an electric fence on a two-acre pasture or putting cattle in the barn at night."

Cattle are stressed

Researchers also examined how living among wolves affects cattle. Their findings suggest the costs of wolf reintroduction extend well beyond animals lost to predation.

A second study, published in *Ecology and Evolution*, measured cortisol levels in tail hair samples collected from beef cattle grazing rangelands in northeastern California — some herds sharing territory with wolf packs, others in areas without wolves. Cortisol, often called the stress hormone, accumulates in hair over time, making it a reliable indicator of chronic stress rather than a momentary response to fright.

Cattle herds living among wolves had cortisol levels 58% higher than those in control herds — a significant physiological difference. This marks one of the first times hair cortisol analysis has been used to study how the reintroduction of predators reshapes livestock physiology in the field.

"What this really confirms is that death or depredation is not the only impact here," said Saitone. "Living among wolves for cattle is a chronically stressful experience, and that could ultimately have production-related impacts in both the short and the long term."

Could it affect reproduction?

Saitone said the findings are just a starting point. Researchers next want to understand whether elevated stress levels translate into lower conception rates. It's a concern long raised by ranchers that has not yet been established through direct biological evidence. When breeding cows fail to conceive, it can directly affect a rancher's bottom line.

"That's their whole purpose," said Saitone. "These are mother cows that are supposed to be generating calves as a marketable product."

Other authors of the PLOS One study include Kenneth W. Tate and Benjamin J. Sacks of UC Davis. Funding came from the Russell L. Rustici Rangeland and Cattle Research Endowment and California Cattle Council.

Christina Nord was corresponding author of the *Ecology and Evolution* study. Other authors include Alexander Pritchard, Rosemary A. Blersch, Brenda McCowan, Jessica J. Vandeleeest and Kenneth W. Tate. Funding came from Western Sustainable Agriculture Research and Education and the Russell L. Rustici Rangeland and Cattle Research Endowment.

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