



HOW AGTECH IS CHANGING FARMING IN CALIFORNIA

A CONVERSATION

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By *Damon Kitney*

It is an unlikely alliance — the world's largest distributor of strawberries, raspberries, blackberries and blueberries working with the biggest technology partners on the planet.

Yet Driscoll's chief executive Kevin Murphy believes artificial intelligence and data analytics can help slash the time it takes his company to identify, test and produce hardier plants, and, more important, fast-track the progress of his fruit to market.

"We're working on a machine that runs across the rows that can identify berries and help us forecast and identify disease," he says of what's called the molecular marking of genetic traits in his crops.

"If you can take a good image of a plant and do it at high speed, then there's lots of benefits in terms of identifying disease, identifying characteristics of the plant and identifying how much of the fruit is ready to be picked. So you can create a forecasting model from that," he says.

It's a cutting-edge example of how agricultural technology — also known as agtech — is evolving from the laboratories of Silicon Valley to the vast farmlands of America's third biggest state, California.

"California is in the prime position for more

food exports to Asia's booming middle classes. Exciting innovations in agtech can increase farm productivity, water efficiency and no-waste crop harvesting," says Pratt Industries Global Chairman, Anthony Pratt.

Yet despite the promise of the opportunities offered by agtech, experts say there are key challenges that must be better understood and managed, including the requirement for new investments in both tech infrastructure and research.

"Artificial intelligence is extremely difficult in agriculture because of the huge amount of variability in environmental conditions across a single field. This requires many sensors, complex algorithms and large real-time data processing — all integrated and working together to

inform decisions and actions,” says Glenda Humiston, University of California vice president for agriculture and natural resources.

“The ability to pull together an array of data — from drones, robots, sensors, genomics — and use this for informed decision-making requires significant improvements in how we manage ‘big data.’” She says there are many “point solutions” being developed by universities, startups and corporate innovators, but few are integrated to provide real-life solutions for farmers.

“Integration will be a key factor in making these technologies affordable and available to most farms. However, few are working on this,” she says. “Many startup technologies for agtech are hitting the market with glossy websites, pitch events and marketing materials that appeal to investors, but the science behind them is dubious. Growing food successfully requires many scientific disciplines. Startups typically don’t have strong farming backgrounds or knowledge of agronomy — especially across the diverse range of specialty crops that are grown in California.”

Labor, and the cost and availability of it, also remains a key issue for California farmers.

Kevin Murphy says almost 60 percent of the costs associated with berries are labor. Their independent growers lose 15 percent of their crops because they simply can’t get the berries picked.

Gary Wishnatzki, the managing partner of Harvest CROO Robotics, which develops robotics for agriculture, states that there is nearly \$1 billion spent annually on labor alone to harvest strawberries in the U.S.

One solution has been to work on adopting technologies that make it easier to pick berries, so that the available labor pool can go beyond the traditional workforce.

“What we’re really trying to do with technology is reduce the amount of labor that we need, or, probably more important, make it easier to pick and harvest in these fields so people can go faster and earn way above a minimum wage while still being very efficient and effective,” Murphy says.

Driscoll’s is now growing strawberries in elevated tabletops using a substrate that requires less water and allows fertilizers and other minerals to be tailored for specific plants instead of traditional soil. The tabletops are elevated up to four feet off the ground, making it easier for manual laborers to harvest the fruit.

“By being able to pick berries standing up, people may be able to pick them faster, and companies will be able to attract workers that would otherwise be turned away from the tough work,” Murphy says. The elevation also allows the trialling of mechanized harvesting technologies.

Driscoll’s is working with startup companies in America and Spain to develop an automatic harvest machine.

Wishnatzki of Harvest CROO Robotics believes that a single robotic strawberry harvesting platform will be able to pick a 25-acre field within three days and has the potential to equal the work of approximately 30 laborers.

In partnership with companies in Australia, Driscoll’s is testing an agricultural robot to pick strawberries. The robotic process uses a visual system to identify when the crop is ready to be picked, then uses a mechanized arm to snip the fruit.

It can be operated 24 hours a day, even benefitting from working in darkness, because the light around the fruit is less diffused at night. In daylight, it becomes harder to identify an exact piece of fruit.

“We’ve spent millions of dollars working and partnering with different companies to work on a machine that we could pick strawberries through an automatic robotic harvester,” Murphy says.

“We’ve been able to prove we can do that. The technology works now. We’re working on how we can commercialize and scale up in a way that makes it viable and efficient in a commercial environment,” he says.

Among industry peers, Driscoll’s seems to be ahead of the curve with its trials.

In a recent survey of 1,300 growers, market research firm Alpha Brown found only 3 percent of growers were currently using harvesting robots on their farms. However, 27 percent were looking at buying one in a bid to allay their soaring labor costs.¹

Yet Murphy says human labor in the field will never be replaced completely, a view backed by Mark Bolda, University of California Cooperative Extension director and strawberry and caneberry farm adviser for Santa Cruz County.

“It’s not realistic to see robots as the full solution for our labor issues, and rather more success will be found in berries by combining robots with the already existing labor of humans,” he says.

“As people know, strawberries and caneberries [raspberries and blackberries] are very soft fruits, and the technology to find them, pick them and put them in a box does not exist — and is in fact barely understood. Lest we forget, the ‘technology’ we pack under the hood to move the human hand around, sense and pick things up has more than a billion years of development, so automated berry picking is not going to leave itself to be solved very easily at all.”

He says the robots of the future will likely be transporting full boxes out of the field, bringing in new ones, monitoring the rate of picking and charting field issues from the sky.

Laura Tourte, University of California Cooperative Extension farm management adviser for Santa Cruz, Monterey and San Benito counties, agrees robotics will help labor become more efficient, supplementing rather than replacing employees.



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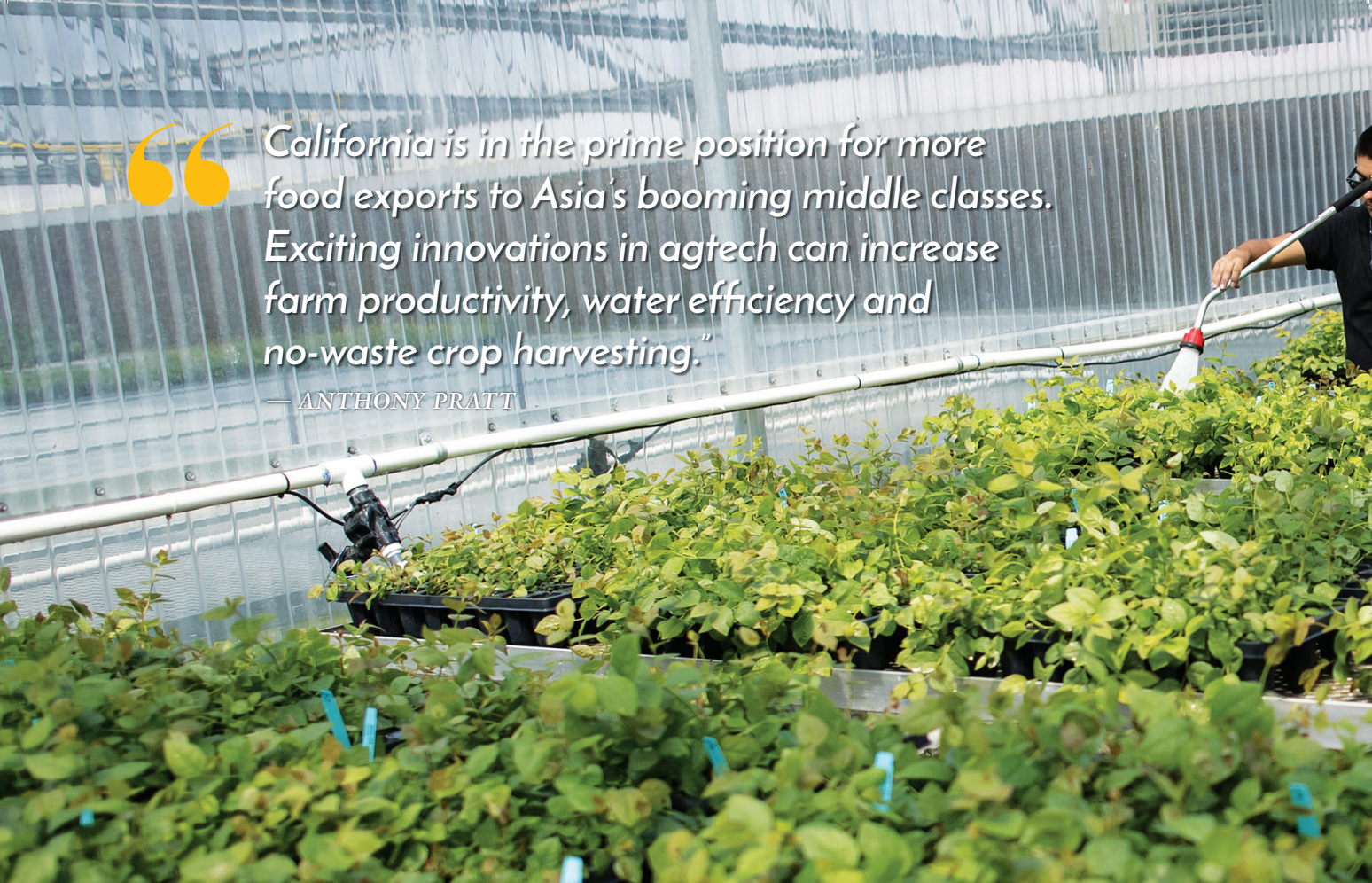
— KEVIN MURPHY





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— ANTHONY PRATT



"Humans bring sensory attributes to agriculture that robotics and mechanization has not — yet — been able to perfect," she says.

Then there are the challenges of regulating the human labor force. Earlier this year, California state legislation changed the overtime eligibility for workers in the agricultural industry.

Over the next four years, starting on January 1, 2019, the Overtime for Agricultural Workers Act will give farm laborers working more than eight hours in one day and 40 hours in a week eligibility to claim overtime. The current law restricts this to laborers working more than 10 hours in a day or six days in a week.²

"The overtime one really worries us, because in agriculture, when the crop is there, you've got to go pick it," Murphy says.

"And so that's going to add cost and complexity, because we can't run that much overtime and still be efficient. So you've got all these costs that are now coming at us for a variety of different reasons. If you have all these inputs and these costs going up and you're not changing your method of production, you're essentially just adding costs," he says.

Inevitably, he fears, this will lead to higher prices for consumers and therefore lower demand for Driscoll's products.

Immigration laws also continue to be big challenges for the California agricultural sector, given much of the state's agricul-

tural workforce is foreign-born and unseasonal.

"Some of them have been here 30 years and have worked on these farms. They're part of our communities. We need to try and create some sort of legal status for these people so they can continue to work in agriculture in a safe and comfortable environment," Murphy says.

The current H-2A or "guest worker" program, which allows U.S. employers that meet specific regulatory requirements to bring foreign nationals to the United States to fill temporary agricultural jobs, also remains problematic.

One constant criticism has been that the inflexible nature of the program makes it difficult to stagger the start times of workers to respond to seasonal peaks or the needs of individual farmers.

Another criticism has been the expense of covering visa and consulate fees, and even more costly, housing and transport for H-2A workers.

"The H-2A program is very complicated to administer, therefore challenging for individual growers to use," Tourte says.

"Arguably, the most challenging issue is the housing requirement," she says. "It should come as no surprise that housing in California is an enormous challenge, not just for agricultural employers, but for all businesses and employers in the state."

There are growing concerns that more California farmers



could move their operations to Mexico if the H-2A reforms stall or make it harder for farmers to harvest their crops.

“Some larger agricultural operations already farm in Mexico and California. There are many reasons, but here are a few: different production seasons to help with year-round supply and expanded operations and costs,” Tourte says. But she stresses this is not an option for smaller and mid-scale farmers.

National Guestworker Alliance CEO Saket Soni says the H-2A program needs to be realigned with basic American values.

For example, workers need to be able to leave one employer for another. “In the current program, workers are tied to one employer, and their legal status is predicated on their continued employment for that employer. Giving workers the ability to switch employers would protect workers who want to leave abusive conditions or want to blow the whistle on labor law violations,” he says.

Soni believes H-2A workers should be allowed to transition to legal residency and eventually to citizenship, “just like their counterparts in the high-tech H-1B visa program.”

“Tech workers are able to switch employers. And they are able to

get on a path to citizenship. These same abilities should be accorded to agricultural workers in the H-2A program,” he says.

Soni is also in favor of reforms allowing workers and their bosses to sign up to be part of an aligned pool, which would allow the same laborers to work for the same employer for consecutive growing seasons.

He says a state-based H-2A “wage board” composed of employer representatives, worker representatives and government representatives could also be assembled to set wages.

Despite California’s many labor challenges, Anthony Pratt believes it is still taking positive steps toward his dream of doubling the value of its food exports to more than \$40 billion annually.

He says technology holds the key to unlocking innovation in farming and value-added processing further along the supply chain.

“Our focus is on value-added food exports,” Pratt says. “Because this is where the huge jobs and investment opportunities lie.”

Damon Kitney is the Victorian Business Editor at The Australian newspaper.

1. “Agricultural Robotic Harvesting Solutions,” Alpha Brown.

2. California State Assembly Bill 1066, the Phase-In Overtime for Agricultural Workers Act of 2016.



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