



THE AUTONOMY RIDDLE

Farm labor won't be programmed away by the promises of intelligent technologies.

Join any gaggle about autonomy, and one person or another will almost certainly posit that intelligent technologies will close agriculture's labor gap. A lofty goal that is, at least in the foreseeable future. More likely, smart technologies will find partnerships with humans. Intelligent, autonomous machines will perform mundane, repetitive, but also necessary, tasks—and with good value. Humans with more freed-up time can rise to greater opportunities in management of their farming enterprises and more.

But, not yet.

Chad Fiechter, assistant professor of ag economics at Purdue University, offered an observation about labor and technology at the 2025 Commodity Classic in Denver. He spoke of a farm-management model comparing the cost of labor with modeled corn and soybean farms deploying large, expensive, autonomous tractors and combines.

“[There are] a lot of assumptions baked into this model,” Fiechter acknowledged. “[But] what we found is that right now, at \$30 an hour in our model, there's never a scenario where autonomy is better than having labor do the work.” Further, he said, “there are probably a few of you who are saying, ‘We probably hit 30 bucks an hour already on labor’ ... and so our hope is to go further and try to figure out where that break[-even] point is. However, the grad student that

I've worked with [has] said, ‘We're not even close yet.’”

> NOT WAITING ON AUTONOMY

Taylor Nelson is a fifth-generation farmer from Jackson, Nebraska. DTN/*Progressive Farmer* first caught up with him at the 2022 CES in Las Vegas. John Deere was displaying its new 8R autonomous tractor paired with a TruSet-enabled chisel plow—the tractor and plow positioned to do tillage work autonomously. Nelson was at the largest technology show in the world to speak inside the Deere building on behalf of Deere about technology on his own Nebraska farm. Here's what he told DTN/*Progressive Farmer* at the time:

“The most stressful time for us is harvest. We're under a strong time crunch. [Autonomous] tillage is a great first step that would allow us to have simultaneous operations at harvest (both harvest and tillage) ... and eliminate the need for additional labor.”

Three years later? “While I did some testing a couple years ago with an autonomous tractor on our farm, I have not heard or seen anymore about it. Since then, we have transitioned away from ‘holding our breath’ waiting on autonomy to help us with [our] seasonal labor shortage to working to hire the right

No longer holding his breath on autonomy, Taylor Nelson (above) focuses today on hiring employees who add high-skill value to the farm.

JOEL REICHENBERGER



JIM PATRICO

people, since it doesn't appear that the technology that would fit our system is ready to advance soon."

Nelson looks for employees skilled in sophisticated farming systems. He recruits hard and wide for them. He looks for employees with the dexterity to tease out all the automations on their monitors, to have solid diagnostic abilities, to troubleshoot independently. "I look for them being dynamic in their ability to add value to the farm. Hopefully, one day, autonomy will allow us to increase the value of the time we all spend working here," he says.

Wages and salaries plus contract labor costs represent 12% of production expenses for all farms, according to USDA. But, labor costs account for 42% of production expenses in greenhouse and nursery operations, and 40% in fruit and tree nut operations. On dairies dependent on immigrant workers, labor costs as a share of income are near 20-year highs. Greenhouses, nurseries, orchards and dairies are enterprises ripe for autonomy.

> TECHNOLOGY WHERE IT COUNTS

There are dairy operations, for example, installing robotic milkers. These are systems that allow cows to milk at will that also collect data on each cow—feed intake, temperatures, daily activity and other interactions of daily life. The robots are direct competition to human employment. For managers, the robots create time for them that can be used more productively outside the barn.

Emily Mullen operates The Mullen Dairy and Creamery, in Okeana, Ohio (see photo, right). She invested \$250,000 in a Lely robotic milker for her 60 milking cows. The robot has the ability to manage twice as many cows, but Mullen has decided not to make the investment to unlock that capacity.

The robot gives her all manner of individual insight into each of her cows by way of transmitters hanging from their necks, so much that her vet bills have

Farm employees need to be proficient in all levels of tech—from mechanicals to microchips.

dropped to near zero. The Lely robotic milker has increased milk output 20%, Mullen says.

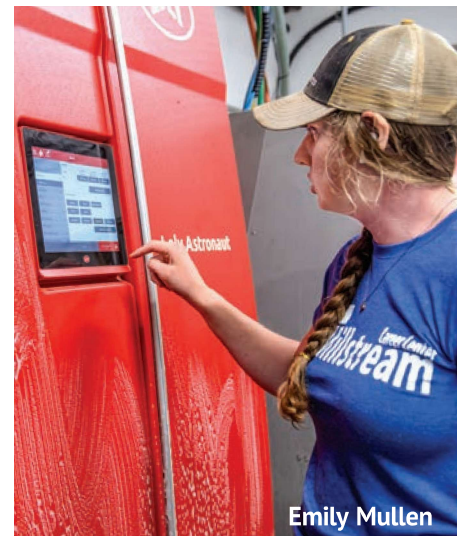
With the Lely robotic milker online, Mullen does not need another dairyman. The robotic milker saves the expense of that salary (and the added management time that comes with an employee).

The robot has bought her crucial time to build other enterprises important to her plans for success. The milk check won't pay for the dairy.

One venture is in the name, the creamery side of the Mullen Dairy and Creamery. The Mullen creamery employs her sister and other family members. Producing 30 flavors of milk for retail customers and local businesses from several thousand pounds of milk per week earns the farm significantly more than what Mullen earns selling raw milk to a processor.

She is building a potentially important relationship with Crumbl Cookies, as well. The popular cookie chain has begun featuring some of her holiday milk flavors, like cotton candy and banana, in addition to the white milk already sold locally in the chain's stores.

"As a small producer," Mullen says, "I've had to diversify. My time has to be more valuable than the six hours a day I was spending in a parlor. Implementing the robotic milker gives me time to look into other business ventures."



JOEL REICHENBERGER

> HIGH TECH FOR THE MUNDANE

Sabanto CEO Craig Rupp, Itasca, Illinois, is an early entrant into the autonomous tractor business. Sabanto sells a retrofit system called Steward that turns existing tractors into autonomous machines. Steward supports mowing, rototilling, rolling, aerating and seeding.

A significant portion of Sabanto's current business is in the sod industry. "They mow every two days," Rupp says. "I've got some farming operations, they're 15,000 acres. That means they are mowing over a million acres a year."

It is this kind of repetitive work for which Rupp believes autonomy is well-suited. "We think autonomy is going to go to those industries that do multiple, mundane field operations," he explains. ▶



“I call them high-frequency, like mowing.”

But, autonomous mowing is not employed at the expense of labor. “[Operators] want to take on more acres, they want to grow their operations. They are doing that not with more labor but with autonomy. But, autonomy isn’t about replacing workers; it’s about empowering them. These operations want to keep their labor resource and redeploy it.”

Sabanto operates between 100 to 200 systems mounted onto mainly utility-sized tractors in about 20 states. The retrofit packages include receivers, sensors, cameras, antennas, vehicle path-finding modules, hydraulic valves and actuators, among other parts.

Monarch’s autonomous MK-V tractor finds a niche in feed pushing, an act of toil normally but one that yields real value.

Sabanto CEO Craig Rupp finds opportunities for his autonomous tractors in high-frequency field operations, such as mowing on sod farms.

> PUSHING FEED, PROFIT

Monarch Tractor, Livermore, California, has identified a niche in the dairy industry for its fully electric, driver-optional, smart MK-V tractor. It is in feed pushing.

Pushing uneaten feed back up to feeding cows is a vital role on a dairy operation. It requires some dexterity but does not require high skill. It is a tractor seat difficult to fill—especially for the night shift.

“We initially started off in the vineyard market, but once the dairy farmer started using it, and we started seeing how many hours they were using our tractor and the savings that they were getting, it became a focus area for us,” says Praveen Penmetsa, CEO and cofounder of Monarch Tractor. “We started talking to our dairy farmers; they all said the same thing, ‘Your tractor doing autonomous feed pushing will be the largest value for it.’”

The MK-V—without noise or exhaust—improves the environment of the dairy and keeps feed in front of milking cows. “The farmers that are using our autonomy feature are starting to see some milk-production increases,” Penmetsa says.

Monarch has customers in China, Europe and the United States.

“We help our customers remove the person from the tractor driving seat so that that person can do other things on the dairy farm,” he adds.

> ON MY OWN? NOT YET

Jared Billadeau farms with his brother and dad in west-central North Dakota. He employs H-2A workers from South Africa and Ukraine on an operation that grows durum, canola, soybeans and corn.

“When I first started hearing [about] autonomy, I thought, ‘Oh, all right, it’s going to be great. It will be down to me and the seeder. But, that’s not going to be the case,’” Billadeau says. “I think autonomy is going to allow farms to grow and become more efficient, but you’re still going to have people. There are other things to do on the farm that is not just running equipment.”

As Sabanto’s Rupp suggests, Billadeau believes that rather than reducing labor, autonomous operations will allow him to move employees to more high-value jobs.

“I’m not going to need computer programmers by any means, but we’ll need the video game culture, [employees] who are able to shut out all the other noise around them and focus on one or two technologies in front of them, and be able to troubleshoot it.”

Nebraska farmer Nelson agrees. He doesn’t see autonomy or intelligent machines replacing employees.

“Farmers don’t go grab the ratchet anymore when they have bolts to tighten. They grab a battery-powered impact wrench,” he says. “In the same way, I don’t see farmers using seat time as the primary indicator of employee time. For them, there will be more efficient ways to do work and high-value tasks to be done.” ///

