

# AI, Automation & The Future of Farming at CNH

AI and automation are poised to reshape farming as we know it, but just what will that look like in the real world?

Techopedia visited **CNH Industrial's Raven Innovation Campus in South Dakota** to find out.

## Key Takeaways

- CNH Industrial uses AI and automation in farming equipment like tractors and sprayers for improved precision and efficiency.
- Farmers use ChatGPT-style interfaces for equipment info and crop planning, saving time.
- AI and automation address labor shortages by filling gaps and allowing farmers to focus on strategic tasks.
- Initial costs for autonomous technology are high but decreasing, making it more accessible to farmers.
- AI reduces physical strain and stress for farmers, improving working conditions and sustainability.

## Advantages & Concerns About AI in Farming

To start, we sat down with **Marc Kermisch, CNH's Chief Digital and Information Officer**. He helms the company's software efforts, so if there's anyone who plays a crucial role in bringing AI to agriculture, it's him.



The future is already here to some degree as far as he's concerned. There's been a high degree of automation in modern tractors thanks to satellite positioning and other technologies that help operators focus on the crops rather than driving. The company's Case IH and New Holland vehicles are effectively "big Internet of Things sensors," Kermisch said.

And while the automotive industry is still talking about software-defined cars as a long-term goal, Kermisch thinks software-defined farming is practically here. Even three years ago, CNH's research work was around 90% mechanical — it's now split about evenly between hardware and software, he said. There's now work underway on a technology stack that's completely software-defined.

Generative AI is already being put to use in farming, too. Farmers already have access to a ChatGPT-style interface that lets them get answers to equipment questions just by asking, rather than sifting through thick manuals or calling technicians.

CNH is also experimenting with ways systems like ChatGPT can provide insights, such as planning the next season or determining the seed-to-yield ratio. Ideally, farmers will spend more time growing their crops than sifting through data.

And before you ask: yes, CNH is aware of the worries surrounding AI. Kermisch argued that his company was solving “highly complex” problems with little room for failure. CNH can’t afford to make mistakes in the way that Amazon, Apple, or Meta might — that would take money away from farmers, the digital chief said.

He further asserted that AI and automation were ultimately addressing practical ethical issues rather than causing them. Automation might lead to job cuts elsewhere, but agriculture is reportedly facing severe labor shortages in an industry where many workers are transient or seasonal. There’s “plenty of opportunity” for autonomous systems to plug those labor gaps, and they also claw back farmer time that could be better spent on planning.

And while Kermisch acknowledged that autonomous farming costs are “significant” right now, he noted that costs were coming down and making the technology more accessible. On a cash crop farm (5,000 acres or more), it could lower expenses and improve yields. Smaller farms could still benefit from some autonomy, such as feed systems and aftermarket upgrade kits.

Don’t, however, expect the company to rush into total software transparency. While CNH has enabled third-party hardware repairability for a while, it’s keeping a lid on software for the time being. There’s a serious concern about liability if code modifications go wrong, Kermisch said, and there hasn’t been much demand to alter the software in the first place.

In the Field: AI & Automation in Action



We also had the opportunity to see some of the company's current and upcoming technologies in action. The most computationally demanding was an autonomous tillage system (shown above) that should go into full-scale testing in 2025, with a finished product entering commercial service in 2026 or 2027.

The tiller vehicle uses a mix of cameras, lidar, and radar to perceive the world around it and till fields in the narrow window of time between the harvest and freezing weather. It can see through dust and snow, detect people and other equipment, and uses real time kinematics (surveying) to set boundaries with extreme accuracy — down to about an inch.

It's trained on millions of real and synthetic images to help it navigate, and Nvidia Jetson hardware handles much of the AI computing responsibilities. There's even a virtual driver of sorts, as an ARM chip simulates an operator's decision-making process.

The beauty of the autonomous tillage system may simply be how uneventful it is. In a demo for Techopedia, the vehicle was always sure of itself. It could complete a



task (such as tilling in a pattern that ensures full coverage) or move to a specific spot without any drama. And if there is drama, the tiller knows when to stop. Sensors can spot a clog or a broken-off shank bolt.



We also saw an existing, highly automated crop sprayer that used AI to improve one of the more challenging tasks in farming. While the base machine can already adjust how spray is used based on factors like speed and turning, an Augmenta machine learning sensor array makes it decidedly smarter. It can stop spraying when it sees an empty field ahead, and self-drive on very precise lines that keep it from running over crops. Radar even corrects the spray for the booms as they wobble.

We had a chance to hop into the cabin, and the contrast between the automated spraying and even partly manual control was clear. When the CNH operator took over many responsibilities, he had to keep his eye on the spraying boom while continuing to drive, guaranteeing that anyone but a well-skilled driver would veer off course. With the AI enabled, he could take his hands off the wheel and (mostly) relax.



There's a host of information in the cockpit, too. A combination of camera data and positioning can show just which areas you've already covered. You can see just which nozzles are spraying and to what degree.

Again, the appeal was precisely how elegantly the AI worked. Unlike in current self-driving cars, which still don't inspire much confidence, there was never the sense that it would run astray even at relatively high speeds — 20MPH while juggling a spray system is much more challenging than you'd think.





The last demo we saw was also for in-use tech. It's a semi-autonomous cart system that syncs a tractor (carrying the cart) with the combine that wants to unload the grains it's collecting.

All the combine operator has to do is alert the cart tractor driver through a single button press. When the tractor drives close enough, it can sync with the combine and drive alongside in just the right position for the auger (a long tube that drops the grain into the cart), no human intervention required. The combine driver can even make the tractor adjust back or forth to drop grain into a specific place in the cart.

The best part may be how simple it is: it only requires a radio on each vehicle. It can work reliably in areas where cellular or Wi-Fi wouldn't, and this keeps costs down. Up to six total vehicles, in various combinations of combines and cart tractors, can work together. That helps when combine drivers want to avoid stopping whenever possible; they can queue up multiple carts to keep the grain flowing.

## Putting the Human Factor Into AI on the Farm



Across all three demos, there was a running theme that AI and automation are going to have the most immediate impact on the humans involved in farming.

Tilling normally requires many passes, so it's a perfect fit for autonomy that can eliminate drudgery. And while Kermisch talked about sustainability in the abstract, that was made more tangible in the field. Automated crop spraying can dramatically reduce water and chemical consumption.

And most importantly, these technologies should put much less strain on farmers and their teams. Basic tasks like looking back at a tiller while holding the steering wheel can cause strain for a driver who might be seated for most of the day; AI could prevent long-term injuries.

The cart automation system, meanwhile, can reduce stress for the combine driver by about 12%, and the tractor operator by 18%.



## The Bottom Line

Yes, competing farm equipment might offer advantages of its own, and CNH is undoubtedly putting its best foot forward. It's too soon to say if the automation is definitively a net positive, or that AI will streamline most farming in the near future.

Some of the gains are immediate, though, and it's safe to say there's no turning back.

*Disclosure: CNH Industrial paid for accommodations and travel. It didn't have editorial control over the feature.*