



Pioneering New Technology

The Smart Farming Revolution

We're not going to ruin your childhood, but your story books totally lied to you about farm life. You won't find Old MacDonald wielding a hoe, surrounded by helpful cows, pigs, and ducks. (In fact, did you know cows, pigs, and ducks don't even associate with one another? It's true.) And, sadly, singing barely figures into a farmer's day though some have been known to rock a karaoke mic.



The good news is real farms are far cooler than that — in fact, they're flat-out amazing. The modern farm is more sci-fi than pastoral, loaded up with cutting-edge tech and smart thinking.

And it's not just for show. Farmers embrace new tools in order to meet the demands of a changing world. With most of the world's suitable farmland already in use, farmers need new ways to produce more food on each acre of land.

Enter “**digital farming**.” Simply put, digital farming means bringing in the techy big guns — satellites! artificial intelligence! robots! — to conserve resources, produce more food, and lower costs.



How farmer Josef Bremer benefits from digital farming technologies
3:26 min

The United Nations estimates that by 2050 we'll need to increase food production by 50% to meet demands. There will be about 2 billion more of us, for one thing, and needs will continue to evolve. With limited land and resources, we'll need new ways to grow efficiently.

Why Digital Farming?

Farmers are going digital for a lot of the same reason you now walk around with a computer/phone/mailbox/library/matchmaker/calendar/map/personal assistant in your pocket. It makes you smarter, allows you to do more, and helps you be better at what you do.



What is life like for a farmer in the digital age? Put yourself in the tractor for a second:

- Rather go to your daughter's basketball game than scout for pests? There's an app for that.
- Rather use less of things like water, fertilizers, and **pesticides** and use them only where they are really needed? There's an app for that too.
- Rather catch up on that new show than steer your tractor? Welcome to the game, automakers — farming already has an app for that too.
- Rather give up your smart phone and go back to life as your grandparents knew it (TVs with antennas)? Wait, how are you reading this?

What is Digital Farming?

Digital farming combines a farmer's expertise in the field with the same technologies you use every day to make your life a little easier. It improves decision-making and creates a more **sustainable** way to grow more food.

A few things it helps farmers to do:



Monitor crop, pest, soil, and weather conditions.



Crunch stacks of data to come to ingenious conclusions.



Put those conclusions into action to give crops *exactly* what they need (and nothing they don't).

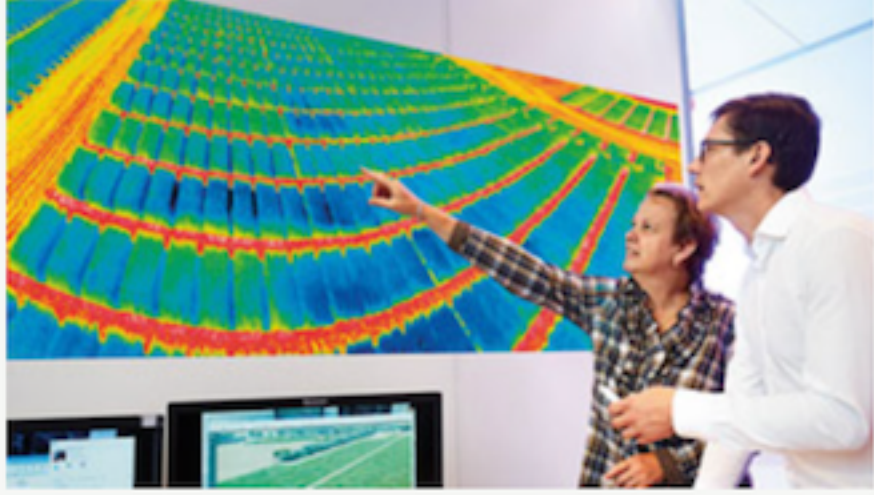
And a few it doesn't:

1. Change the weather to optimal conditions.
2. Download corn software updates.
3. Post wheat growth progress, in emoji form.

For example, imagine you're a farmer waging the age-old battle against weeds. In the past, you or a crew of workers had to head into your fields on foot to seek them out. If you found weeds, you had to physically pull them or, more recently, spray them with a **herbicide**. It was time-consuming and hard work.

Enter smarter farming tools that can tell you exactly which weeds are growing in a field and where (think high-res satellite cameras, roving drones, and sensor-loaded, GPS-enabled tractors). Then you can use automated systems (including self-steering tractors) to deliver just the right amount of pesticide to each area. Engineers are developing **incredibly precise Smart Spraying technology** that will identify specific weeds, determine the optimum method of treatment, and then apply the right herbicides to those weeds, leaving weed-free areas untouched. And it will do it all in fractions of a second, as the herbicide sprayer makes a single pass over the field. This, of course, presents new challenges like what to do with all the time and money you saved, but we're guessing you'd be okay with that.

The result? Farmers use less water, fertilizer, energy, and pesticides, improving productivity and sustainability.



Digital analysts evaluate infrared images of scientific trials conducted in wheat fields.

Looking to the Future

We've only just begun to tap the power of tools that help farmers grow smarter. In the future, these tools will also help connect you with how your food is produced.



New, specialized robots will allow greater automation. For instance, **teams of interconnected robots** could plant seeds and tend fields, all on their own. Other specialized robotic fruit pickers, currently in development, will be able to recognize which fruit is ripe and ready to be picked.

