

10 Technologies Transforming Farming Today and Tomorrow

The paradox of the future is this: The only time the future can be created is now—in the present. Over the past few years, a number of individuals, start-ups and large corporations have been busily creating the future. Here are 10 technologies available today and which are poised to have a significant impact on farming moving forward:

1. **John Deere's ExactShot:** Unveiled at the Consumer Electronic Show in January, [the technology](#) uses a combination of artificial intelligence and high-power cameras [to optimize the amount of fertilizer directed toward individual seeds plants](#). The end result is that farmers can reduce their fertilizer costs by up to 60 percent.
2. **Carbon Robotics LaserWeeder:** Much like Deere's ExactShot, the "LaserWeeder" uses AI and cameras to identify individual weeds but it then uses lasers to zap--and kill--weeds without damaging the surrounding crops. The company reports its technology [can kill 200,000 weeds an hour and offers up to an 80 percent savings in weed control](#). In addition to reducing labor costs, it may allow some farmers to market their crops as organic because they no longer need to apply herbicides. The company reports the typical return-on-investment is 2 to 3 years.
3. **Ask Norm:** This past year can rightly be called "The Year of Artificial Intelligence" and "[Ask Norm](#)"--which is the Farm Business Network's version of ChatGPT--can be thought of as a super-affordable agronomist in a farmer's pocket. The AI powered system can already help farmer's answer such questions as this one: *Given the forecasted weather patterns for the upcoming month in my area, what's the best window for planting soybeans to ensure germination success?* More recently, FBN added a feature called "[AcreVision](#)" which aims to provide farmers a better estimate of the value of their farmland.
4. **SmaxTec's Bolus-Based Health System:** Using a unique combination of sensor technology and artificial intelligence, [SmaxTec's technology](#) helps dairy farmers detect mastitis and ketosis well before those diseases are evident to the human eye. This allows farmers to take preventive action sooner and keeps the animals safer, healthier and more productive.
5. **TraceGenomics' MetaGenomics Sequencing:** Most farmer's have incredibly discerning vision when it comes to detecting problems on their land. It is, however, impossible to see what physically can't be seen, and one of the things that farmers can't see is the abundance of microbial life in the soil. The absence or presence of certain microbes makes a big difference when it comes to the

health of one's soil and Trace Genomics [sequencing tools and technology](#) can help farmers increase their yield by better understanding those things that can't be easily visualized.

6. **StarLink:** Broadband strength and connectivity remains substandard in many parts of rural America. This deficiency has significantly limited the promise of precision agriculture. [Thousands of farmers have already purchased StarLink](#) and are currently using it for enhanced internet connectivity and harnessing the much heralded promise and potential of precision agriculture.
7. **Agro-Photovoltaics:** A number of farmers already employ some form of solar power, but [the trend of agro-photovoltaics](#)—which is defined as placing solar panels atop productive farmland—will likely grow larger as an increasing number of farmers begin to understand how solar power can peacefully coexist with grazing animals as well as some row crops.
8. **Robotics:** Robots have been milking cows for some time now but the number and types of farm tasks robots can handle is growing rapidly. Tevel, an Israeli-based start-up, has created [a robot that can pick a fruit without damaging it](#), works around the clock, and provides detailed data analytics on the crops it has just harvested.
9. **MethSat:** Not all technological advances will necessarily work to the benefit of the farmer. Still, the agricultural sector must be aware of such technologies because they will be the ones who bear the brunt of technology's power. A case-in-point is [the soon-to-be deployed MethaneSat](#). This satellite has a singular job and that is to measure methane—a greenhouse gas 20-80 times more potent than carbon dioxide emissions. This new tool could provide regulators a powerful means by which to hold accountable large methane producers such as dairy farms, cattle ranchers and industrial-sized feedlots.
10. **Smart Irrigation technology.** Weather and drought will remain a concern for farmers, but the growing risk of depleted aquifers and wells, along with climate-related changes, suggests water is only going to become a more precious commodity in the future. Fortunately, advances such as [Hortau's tension probes](#) and [new university-related "crop by drop" advances](#) are providing farmers a more granular level of understanding about where, when and how much water to apply to individual crops. The promise is that someday soon all crops will get the right amount of water, at the right spot, and at the right time.

[Jack Uldrich](#) is a global futurist specializing in agricultural trends. His most recent book is "[A Smarter Farm: How Artificial Intelligence is Revolutionizing Agriculture](#)."