Precision Farming: AI and Automation Are Transforming Agriculture

BY **KAYLA MATTHEWS** — OCTOBER 31, 2019 <u>LEAVE A COMMENT</u>

A robotic "transporter" arm from Iron Ox moves a plant inside an autonomous indoor farm in California. (Photo: Iron Ox)

Technology is transforming our food chain, with some of the most important innovation occurring in the rise of precision farming. Together, artificial intelligence (AI) and automation are revamping the agriculture industry, helping farmers operate efficiently and in new ways.

Today's farm is powered by data, along with a variety of devices and technologies, including sensors, GPS satellites, drones, and robots. This combination of automation and farming may mean to less friction and fewer obstacles for farmers, both for crop-based decisions and interacting with the USDA for permits.

These exciting advancements, however, are not possible without dependable and scalable data centers.

Helping Farmers Know the Best Times to Plant Crops

Educated guesses and experience once guided the timing of planting seasons for agriculture. Those things still come into play, but AI is advancing into the picture, too.

For example, West Kenya has two growing seasons, and corn is the main crop during both. An AI-based project in the region helps some farmers develop new insights into their crops, digging into the available data to extract patterns. The application sends the information to farmers' cellphones, and has helped farmers increase their yields from an [average of six 90-kilogram bags](#) of corn in a year to nine.

This use of AI is ideal for small-scale farmers, of which there are several million in Kenya. This technology provides alerts on planting specifics, such as seed depth and location. The Internet of Things (IoT) also factors into smart farms. Connected sensors [offer details on nutrient levels](#), density and more. Receiving this information means farming professionals can steer clear of many planting failures that may have previously seemed inevitable.

Allowing Researchers to Investigate the Best Ways to Meet Future Needs

AI and farming make an excellent match for addressing needs the agriculture sector may face in the coming years. The University of Arizona is one of the facilities boosting an investment in precision farming.

Researchers from the university made the [2,100-acre Maricopa Agricultural Center](#) its headquarters. There, data and automation combine as scientists apply them to various technologies. The goal is to help farmers figure out how to minimize losses while maximizing profits. Those participating at the facility say they want to solve known agricultural problems.

For example, some parts of Arizona have issues with water irrigation, while others struggle with problems related to contamination. At the University of

Arizona and elsewhere, many people point to precision farming as instrumental in tacking those challenges.

One report sheds more light on the expected impact of precision farming on the agriculture sector. Specifically, it looked at crop-monitoring technologies for a forecast period from 2019-2024. Analysts anticipate a [12.6% combined annual growth rate](#) (CAGR), with global positioning systems (GPS) leading the way.

When deploying automation in agriculture or any other sector, it's essential to track the effectiveness of the technology. Companies often [study three kinds of metrics](#) — activity, efficiency and value.

Better Visibility Into Crop Conditions

For decades, farmers have checked crops manually, scooping soil into their hands or walking between rows of plants to assess which seemed well-watered or dehydrated. Now, planes [equipped with high-resolution cameras](#) take care of those responsibilities, capturing more detailed images that satellites offer.

However, satellites still provide compelling ways to judge crop conditions. Beth Ford, the CEO of Land O' Lakes, recently interviewed on *60 Minutes*. During the TV spot, Ford talked about her [brand's investment into agriculture technology](#), and how it's helping farmers succeed in an industry saddled with economic and weather woes.

Teddy Bekele, the Chief Technology Officer at Land O' Lakes, weighed in during the segment to show how satellite images track crops. Ford mentioned that, besides satellite technology, Land O' Lakes relies on predictive modeling to suggest how many seeds to plant per acre.

The adoption of drone technology is propelling growth in the precision farming market, too. The drones detect [problems ranging from pest invasions](#) or planting mistakes that hinder an enterprise's success. Whether a piloted plane, satellite or drone, the results are images processed with the help of data centers.

Some companies offer dashboards that allow users to collect crop pictures over time and see how they change. Land O' Lakes [has voice recognition technology](#) to help farmers use vocal cues to take action based on what's shown. Data centers are essential in these instances, too.

Aiding Farmers in Redistributing Their Duties

When some people think of automation and farming, they envision massive facilities where crops grow without intervention from humans. In reality, people still help automated farms function, but they fulfill different roles than in the past.

An agri-tech startup called Iron Ox opened an autonomous farm in 2018. It's an indoor environment where a hydroponic vat system enables the growth of roughly [26,000 heads of lettuce each year](#) — along with herbs and leafy greens — within 8,000 square feet.

Although autonomous machines take care of some necessities, such as moving plants around the building, humans plant each seedling and package produce for distribution. The blending of AI and farming is undoubtedly beneficial in many ways, but it doesn't allow agriculture to function without humans.

Autonomous farms collect real-time information and analyze what crops need at any given time. Workers get instant alerts if something goes wrong. Data centers provide infrastructure and reliability necessary for farmers to entrust responsibilities to robots.

Furthering the USDA's Data Center Restructuring

In 2018, the U.S. Department of Agriculture (USDA) announced a substantial revamp of its IT infrastructure. To start, the organization plans to reduce its [total number of data centers](#) from 39 to two. However, there's a link between AI and farming in this decision. The agency will integrate AI into its call centers to speed up the data hand-off process. Additionally, AI will automate the online procedures for loan and permit applications.

Outside of the planned uses for AI, the agency is piloting a centralized platform people from all USDA departments can use to make requests. The tool has already gotten positive feedback. According to one representative, the goal is for employees to have better experiences with the USDA's technology than the tech used at home.

The transition is ongoing, and representatives from the organization initially expected improvements to happen over several years. A high bar exists concerning what must be a vast and reliable system. The USDA's data center

consolidation will mean the two centers must be exceptionally dependable —
both for external customers and employees.