

3 ways Al can help farmers tackle the challenges of modern agriculture

By Joe Hollis 30 Nov 2023

For all the attention on flashy new artificial intelligence tools like ChatGPT, the challenges of regulating AI, and doomsday scenarios of superintelligent machines, AI is a useful tool in many fields. In fact, it has enormous potential to benefit humanity.



Source: Oleksandr Ryzhkov via Freepik

In agriculture, farmers are increasingly using AI-powered tools to tackle challenges that threaten human health, the environment, and food security. Researchers forecast the market for these tools to reach \$12bn by 2032.

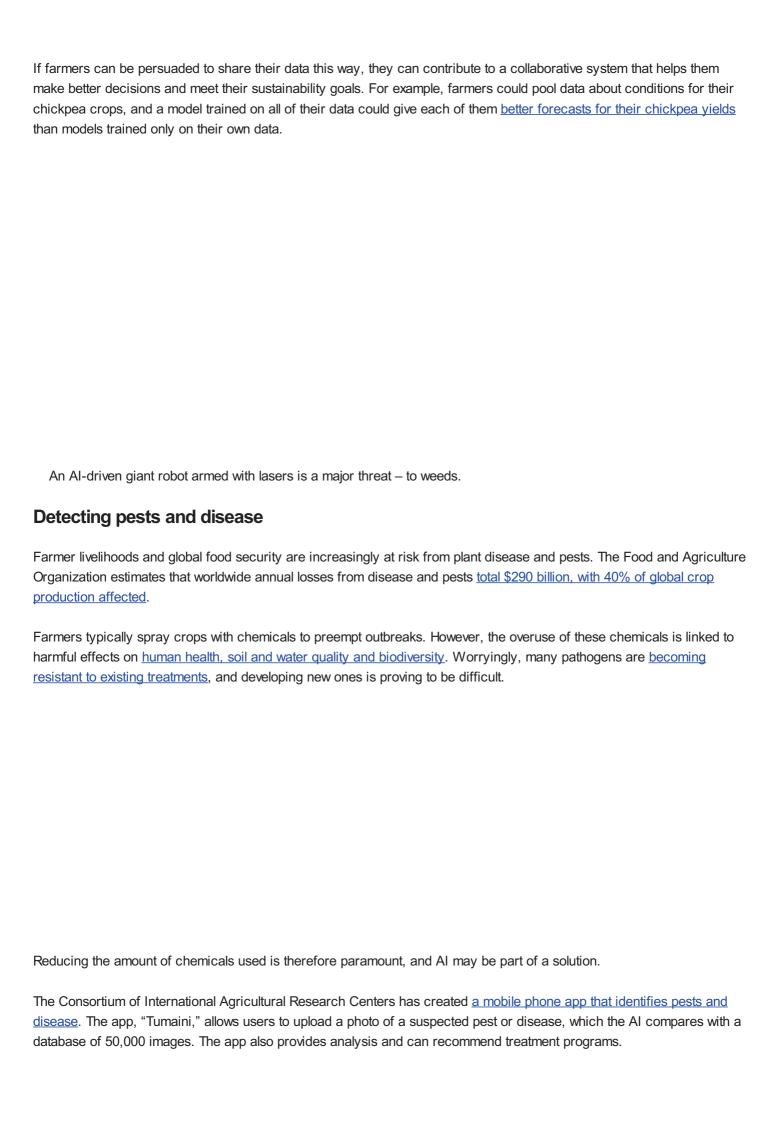
As a researcher <u>studying agricultural and rural policy</u>, I see three promising developments in agricultural AI: federated learning, pest and disease detection and forecasting prices.

Pooling data without sharing it

Robotics, sensors and information technology are increasingly used in agriculture. These tools aim to help farmers improve efficiency and reduce chemical use. In addition, data collected by these tools can be used in software that uses machine learning to improve management systems and decision-making. However, these applications typically require data sharing among stakeholders.

A survey of U.S. farmers found that more than half of respondents said they <u>do not trust federal agencies or private</u> <u>companies with their data</u>. This lack of trust is linked to concerns about sensitive information becoming compromised or being used to <u>manipulate markets and regulations</u>. Machine learning could reduce these concerns.

Federated learning is a technique that trains a machine learning algorithm on data from multiple parties <u>without the parties</u> <u>having to reveal their data to each other</u>. With federated learning, a farmer puts data on a local computer that the algorithm can access rather than sharing the data on a central server. This method <u>increases privacy and reduces the risk of compromise</u>.



If used with farm management tools, apps like this can improve farmers' ability to target their spraying and improve accuracy in deciding how much chemical to use. Ultimately, these efficiencies may reduce pesticide use, lessen the risk of resistance, and prevent spillovers that cause harm to both humans and the environment.

Crystal ball for prices

Market volatility and fluctuating prices affect how farmers invest and decide what to grow. This uncertainty can also <u>prevent</u> <u>farmers from taking risks on new developments</u>.

All can help reduce this uncertainty by <u>forecasting prices</u>. For example, services from companies such as <u>Agtools</u>, <u>Agremo</u> and <u>GeoPard</u> provide Al-powered farm decision tools. These tools allow for real-time analysis of price points and market data and present farmers with data on long-term trends that can help optimize production.

This data allows farmers to react to price changes and allows them to plan more strategically. If farmers' economic resilience improves, it increases the likelihood that they can invest in new opportunities and technologies that benefit both farms and the larger food system.

Al for good

Human innovation has always produced winners and losers. The dangers of AI are apparent, including <u>biased algorithms</u>, <u>data privacy violations</u> and the <u>manipulation of human behavior</u>. However, it is also a technology that has the potential to solve many problems.

These uses for AI in agriculture are a cause for optimism among farmers. If the agriculture industry can promote the utility of these inventions while developing strong and sensible frameworks to minimize harms, AI can help reduce modern agriculture's impact on human health and the environment while helping improve global food security in the 21st century.

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