# AI IN PRACTICE

Technology is reshaping the way we cultivate food, care for our health, and preserve national security

On the ground and in the air, big changes are brewing, powered by the latest technological disruption, artificial intelligence. AI's potential to transform society is vast; here we examine how it is impacting three key sectors—agriculture, medicine, and defense.

AI is revolutionizing these (and many other) fields, from optimizing crop yields and improving precision healthcare to enhancing military capabilities and national security. The following real-life examples from around the world highlight some of the technology's tangible benefits but also raise questions about the ethical considerations, policy lags, and training gaps associated with the integration of AI into critical industries. They attempt to shed light on the boundless possibilities and challenges that lie at the intersection of technology and human progress.

## Growing More with Less

In the battle against hunger, AI can help fewer farmers generate more food

*Robert Horn*

**ARTIFICIAL INTELLIGENCE (AI) IS MAKING** its mark on food and agricultural production chains. The groundbreaking technology is already in use to engineer new varieties of climate-resistant rice; provide data on soil; guide drones that precision-spray fertilizers and pesticides; and sort, inspect, and grade produce. "AI-driven smart agriculture provides tremendous potential for boosting food security and to reduce or even end hunger in many regions of the world," said Channing Arndt, of the Consultative Group on International Agricultural Research, a global research partnership.

Policymakers in Thailand agree. In 2014, they unveiled Thailand 4.0, a 20-year national strategy for advanced development. Among its prior-

Tea plantation in Hangzhou, China: AI-driven smart agriculture provides tremendous potential for boosting food security and to reduce or even end hunger in many regions.

ity sectors are food, agriculture, and digital industries. Those are woven together in government-run Smart Farmer and Young Smart Farmer programs that encourage growers to adopt precision agriculture by connecting with new technologies. These include AI-controlled drones and software for intelligent and targeted spraying to increase yields while protecting the environment and ecosystem.

Food and agriculture have long been sources of strength for Thailand. The Southeast Asian kingdom of 70 million people is the world's 15th largest food exporter and the only net food exporter in Asia. With a projected $44.3 billion in shipments this year, Thailand plays a crucial role in regional and global food security and the campaign to end hunger.

But that campaign, despite impressive gains during the past decade, has recently suffered setbacks. The pandemic, war in Ukraine, and resulting disruptions left an estimated 735 million people (9.2 percent of the global population) undernourished in 2022, according to *The State of Food Security*

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*and Nutrition in the World*, published by the United Nations. Even food-rich Thailand saw hunger rise for the first time in a decade. In response, policymakers in several regions are exploring how digital technologies can make agriculture more productive and food chains more efficient to turn the tide on malnutrition and food scarcity.

## USING AI TO FIGHT HUNGER

Thailand is just one example of how countries are using AI to combat rising hunger, food insecurity, and poverty, which take a toll on economies. Undernourished people need more public assistance and are less productive workers, which can affect per capita income, growth, and sometimes political stability. At the same time, younger farmers are migrating to better-paying jobs in cities, leaving fewer hands to produce an increasing volume of food for a growing global population. Those combined trends could spell crisis, but analysts and policymakers see hope in new technologies, including AI, to help fewer farmers generate more food.

Nurturing the digital ecosystem is foundational in that effort, said Krithpaka Boonfueng, executive director of the National Innovation Agency (NIA). In October, Thailand launched THEOS-2, the first Earth observation satellite jointly designed by Thai and British engineers, which will gather data for smart agriculture. NIA has incubator and accelerator programs that help source private sector investment for agricultural technology start-ups to deliver the data to the field. The Digital Economy Promotion Agency (DEPA), another technology arm of the government, manages the One Community, One Drone program, which has farmers in 500 communities sharing drone services to manage their fields. "Even farmers want technology, but the technology has to be simple enough for them to use," said Preesan Rakwatin, executive vice president of DEPA, which helps match tech businesses with markets and also funds start-ups.

One of those start-ups, Ricult, is already helping farmers in Pakistan, Thailand, and Vietnam. Founded in 2015, Ricult is a dual fintech and agritech firm. Its AI-driven app, with more than 800,000 downloads in Thailand, provides information and tools that help smallholder farmers choose the right crop varieties and precision methods to increase productivity and profitability. Its portal also assists farmers with a perennial pressing problem: access to finance. Meanwhile, Mitr Phol Group, the largest sugar producer in Asia, has partnered with IBM for AI-driven data solutions for farmers, and Chia Tai, one of Thailand's biggest agri-food companies, is using autonomous drones made by XAG of China.

## SMARTER POLICIES

But smart farming is still relatively rare. Ricult cofounder Aukrit Unahalekhaka said that government agencies trying to micromanage while working in insulated teams hinder uptake. It's a problem, he said, throughout the region. "Governments should be creators of policies and facilitators of funding for start-ups, innovators, and farmers. It is much more efficient to let the market work," Unahalekhaka said.

That doesn't always happen. Several governments in Africa, another continent struggling with hunger and food security, have passed restrictive drone regulations, and acquiring a license for one is difficult, according to "Empowering Africa's Food Systems for the Future," a report by the International Food Policy Research Institute (IFPRI). However, countries such as Kenya, Rwanda, Tanzania, and others are devoting resources to building a digital ecosystem and literacy for farmers so that they can access online extension services, weather forecasts, market information, and financing. Obstacles such as connectivity and digital literacy, however, remain. "While the digital revolution holds immense promise for African food systems, addressing these challenges is pivotal for its success," according to IFPRI.

For all the promise, some researchers warn about risks. If the data are bad, AI's results will be bad. And AI can be programmed to increase yields while ignoring negative impacts on the environment. "AI can be fine-tuned to match your goals. It is not perfect," Unahalekhaka said, adding that he hasn't seen farmers misuse AI so far. He is one of many who believe that the benefits outweigh the risks and that results are likely to be positive. That's because of the motivation he believes he shares with others in agricultural technology: "We want to make the world a better place."

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