

They helped to design and build a state-of-the-art smart greenhouse in one of the largest agricultural production areas in China. Now, these same researchers have banded together to take part in a competition to challenge whether their technology can be useful for the average farmer.

Horti-AI is one of four teams in the finals of Pinduoduo's [Smart Agriculture Competition](#), a tomato-growing contest taking place at the company's smart greenhouse base in Yunnan, China. The teams are evaluated on how much tomatoes they can produce, nutrition level, environmental footprint and commercial viability.

"Our solution is characterized by quantitative models, AI-integrated decision-making and cloud-based management," said Kong Jianlei, Associate Professor of Artificial Intelligence at Beijing Technology and Business University and a member of Horti-AI. "The system has proved to be able to help reduce carbon emissions, increase the output and achieve better quality.

Though there is still a long way before agricultural production can become fully automated, Pinduoduo's Smart Agriculture Competition provides an opportunity to deploy such technologies in actual production, giving a sneak peek of agriculture's future, the contestants said.

"Artificial intelligence is not only about technical research and development," said Kong. "We need to establish a nationwide innovation consortium and take this competition as an opportunity to promote and demonstrate (smart greenhouse technology) throughout the country."

Horti-AI can count on their experience operating an 80,000-square meter greenhouse in Shouguang, Shandong province, where they used algorithms and robots to not only control the environment of the facility, but also to inspect, spray mist and harvest tomatoes.

China currently has about 30 million mu of greenhouses nationwide, but most of them are made of thermoplastics, which are less efficient than large-scale glass greenhouses widely used in countries such as Holland. where one square meter of greenhouse can produce over 100 kilograms of tomatoes, according to Zhao Chunjiang, director of National Engineering Research Center for Information Technology in Agriculture.

"At present, many of our resources are in universities and research institutes, and there are

no channels for commercializing them,” said Zhu Qingzhen, a Ph.D. in development of agricultural control systems and head of Horti-AI. “We would like to take advantage of this competition to see if we can make our technical solutions feasible and implement them to serve the construction of ecological agriculture in China.”

The Smart Agriculture Competition is one of Pinduoduo’s initiatives to support agricultural modernization and rural vitalization in China. It is co-organized by China Agricultural University and Zhejiang University, with technical guidance from the Food and Agriculture Organization of the United Nations and Wageningen University & Research.

In the inaugural competition, technology teams competed with traditional growers to see who can achieve the highest yields. The technology teams won by producing 196% more strawberries by weight on average.

Practical growing experience remains an essential part of the system.

According to Zhu, when, for example, the image recognition finds the tomato leaves curled, the machine may decide the plant needs more water and less sun, while the actual reason could be a certain disease. That’s where human expertise can come into play and make final decisions.