'Farmers can get rich from disease-resistant, high-yielding rice'

Written by Nhu Quynh

The world's leading scientists come to Vietnam to discuss rice varieties that help people not have to worry about losing their crops because of waterlogging or pests, and can even get rich thanks to new farming technology.

Information was shared at the seminar "Sustainable agriculture in the new normal", taking place on the morning of December 19 in Hanoi. The event is a meeting place to connect the Vietnamese science and technology community with leading international scientists ahead of the VinFuture Science and Technology Awards.

Speaking at the opening ceremony, Deputy Minister of Science and Technology Bui The Duy highly appreciated the fact that world scientists gathered in Vietnam to discuss practical scientific topics that can create a revolution in the field of science and technology. human life.

According to Deputy Minister Duy, in order to promote the economy and help farmers have a better quality of life in the context of climate change, countries must have new directions, breakthrough new solutions and "only science and technology can help farmers achieve better quality of life". learn new technology to solve".

Deputy Minister Bui The Duy gave the opening speech at the seminar. Photo: *Phuong Linh*

He said that in Vietnam, science, technology and innovation are one of the important driving forces for Vietnam to become one of the top 15 countries in the world in exporting agricultural

products. It is estimated that science and technology contribute over 30% of the added value in the agricultural sector and about 38% of the added value in the production of plant varieties and livestock. Therefore, he hopes that breakthrough initiatives, from the VinFuture Prize and the series of events, can connect the world and Vietnamese scientific communities, promoting science to serve humanity.

According to Professor Pamela Ronald, Department of Plant Pathology and Genomics Center at the University of California, Davis, there are now new varieties with improved traits for high yield and resistance to pests and diseases. In which, the invention of rice varieties carrying the sub1 flood tolerance gene is being cultivated by more than 6 million farmers in India, Bangladesh and Nepal. The project, led by scientist David Mackill and colleagues at the International Rice Research Institute (IRRI), created a rice variety that can withstand flooding for a period of 2 weeks, while another variety can only withstand 3 days.

The researchers used the fundamental discoveries of the rice sub1 gene involved in the regulation of the immune response in rice under submergence and created genetically engineered rice varieties with outstanding submergence tolerance, and at the same time did not affect the growth, yield or quality of rice grains. "Varieties with the sub1 gene have 45% higher yields than usual, when flooding occurs, crops are not worried about losing everything, bringing benefits to farmers," said Prof. Ronald.

Professor Pamela Ronald shared about rice varieties resistant to pests and waterlogging. Photo: *Phuong Linh*

Dr. Van Schepler-Luu, from the International Rice Research Institute (IRRI), suggests developing disease-resistant rice by modifying the genome to interfere with genes in disease-resistant crops. According to her, this technology is applied to improve crop productivity, such as

combining cultivars of the same species to get new improved species, or crossing with two closely related varieties to have new lines or modify genes.

In the future, she said, it will be possible to improve both native varieties such as using radiation, and other forms of chemical and physical variation, and hybridization to transfer beneficial genes from one plant to another. or modify the genome to produce native DNA. According to Van, effective disease resistance models using technology help build networks to predict and adjust farming models accordingly.

Accordingly, "it is necessary to develop regulations that allow GM crops to easily use these high-yielding, resistant crops," she said. Initially, it is possible to transfer small models, households and then expand.

Dr. Van Schepler-Luu shared solutions at the event. Photo: *Phuong Linh*

The future of precision agriculture

In addition to creating rice varieties with good traits, delicious rice, resistant to pests and diseases, waterlogging and high yield, Prof. Josse De Baerdemaeker, KU Leuven, Belgium proposed solutions to apply precision agricultural technology.

He suggests the application of artificial intelligence (AI) in agriculture, which can use sensors that collect data from satellites, unmanned aerial vehicles or mounted in the field to have accurate data.

According to Prof. Josse, the model helps people manage data on soil and plant varieties that are suitable for the local climate, and can be modeled in space and time to have a plan to deal with crises.

Professor Jose De Baerdemaeker spoke at the event. Photo: *Phuong Linh*

Prof. Josse expects people not only to apply new farming methods, but also to become real-time collectors, providers of data from the soil, crop growth, disease, and biodiversity. . From this data it is possible to determine what is good practice and which cultivar should be planted next year. "This is the way to precision smart agriculture," said former President of EurAgEng, European Association of Technical Agriculture.

Experts say that realistic models help people learn and follow. According to Dr. Van, scientists understand and find the ability and tolerance of plants, through adjusting new genomes, predict the possibility of new diseases, thereby transferring farming models to humans. farmers.

And Professor Jennifer Tour Chayes, University of California, Berkeley suggests creating a platform, where AI is the behind factor to collect data. But he emphasized the platform "less code", friendly and easy to use for people to access.

At the event, after listening to suggestions, from the bottom of the hall, a startup asked a question about how to develop an artificial intelligence and IoT model into reality. According to this delegate, genome editing and precision farming (providing enough nutrients and water) is the future of agriculture, but in Vietnam, there is still a lot of rudimentary farming. For practical application, the risk is high because people are cultivating manually. What if there is not yet an advanced enough infrastructure? Want to practice precision agriculture, which is a good signal for solution providers to enter the market.

Answering this question, Prof. Josse De Baerdemaker, Ku Leuven said that technology people need to show people the benefits and how to do it. As for where the money is, the government also needs to have effective agricultural extension activities. However, if the first problem is how to get people to follow it?, he advises there is a specific effective model, people will apply, not

merely introduce technology. "If we can point out those who do it first, have practice and increase in income, then there will certainly be many followers," he said.

Prof. Jose added that farmers in low-income countries can fully access the technology. For example, Belgian farmers whose traditional way of farming is to persuade each other to use the same system of calculation, observation and monitoring. People interact very well, they observe the field and understand that if using pesticides seriously affects the land, they will not use it anymore. "They agree on how to do it in a large area," he suggested.

At the discussion, scientists also shared methods and experiences for Vietnam, including the development of rice varieties with flood tolerance genes that still give high yields. Professor Pamela Ronald said that in addition to the flood tolerance gene, there are also high yield and disease resistance genes, researchers need to combine these genes together to have a new rice variety but still retain the advantages of the native rice variety. . She said that having gone to field experiments in Vietnam and Bangladesh, she will continue to combine data and experts to work together to solve problems.