



Policy will determine path of gene-edited crops



Policy is what's missing when it comes to getting seed and plant breeding innovations into the hands of farmers, said Dr. Kahoula Belhaj Fragniere of the International Seed Federation at the organization's world congress in May

New research suggests gene editing could help agriculture adapt to climate change and reduce food waste, but inconsistent government regulations are slowing farmers' access to new crop varieties

BY LILIAN SCHAER, Ontario Farmer

Lisbon, Portugal - As climate change puts increasing pressure on global food production, researchers say one of agriculture's most promising tools is ready. The question is whether government policy will let farmers use it.

Research presented at the World Seed Congress found climate resilience remains one of the weakest links in global food systems, even as plant breeders are developing crops that can reduce waste, improve nutrient efficiency and better withstand environmental stress. Technology is no longer the limiting factor in adopting those crops. Rather, it's increasingly government policy that determines which countries — and which farmers — gain access first.

"We have the science, we have the tools and we have the innovation," said Dr. Khaoula Belhaj Fragniere, director of innovation, trade and market access with the International Seed Federation (ISF), speaking at the Word Seed Congress in Portugal in May. "The missing piece is policy."

The discussion comes as agriculture faces mounting pressure to produce more food while adapting to more frequent droughts, disease outbreaks and extreme weather. According to the Economist Group's newly launched Resilient Food Systems Index, climate risk responsiveness is the weakest component of food systems worldwide, with an average score of just 56.4 out of 100 across 60 countries. Food availability also ranked well below affordability and food safety.

The report measures resilience using 71 indicators across four areas: affordability, availability, quality and safety, and climate risk responsiveness. Pratima Singh of the Economist Group said food systems are becoming increasingly vulnerable to interconnected shocks, making resilience just as important as productivity.



An estimated 30 to 40 per cent of bananas are lost from farm to kitchen due to bruising and browning during shipping, storage and retail handling; a non-browning banana has been developed by gene editing

The research also highlighted opportunities beyond genetics. About 13 per cent of food is lost between harvest and retail because of limitations in transportation, storage and cold-chain infrastructure, while another 19 per cent is wasted in households. Investments in infrastructure, digital connectivity and supportive public policy are needed alongside innovation if food systems are to become more resilient, Singh noted.

According to Fragniere, more than 2.3 billion people worldwide experience food insecurity, while climate change is already causing trillions of dollars in economic damage and drought accounts for roughly one-third of production losses in the world's most vulnerable regions.

"Innovation is a necessity, not an option," she said, adding that improved crop genetics remain one of agriculture's strongest opportunities to adapt. Gene editing is increasingly being used to address practical production and marketing challenges rather than simply increasing yields. Israeli biotechnology company Tropic recently developed a non-browning banana using gene editing designed to reduce losses throughout the supply chain. Co-founder and Chief Technology Officer Eyal Maori said bananas are especially vulnerable to bruising and browning during shipping, storage and retail handling.

"From farm to kitchen, 30 to 40 per cent of bananas are lost," he said.

The new variety stays fresher longer, reducing waste for retailers and consumers while increasing the value of the crop for growers. Because bananas reproduce asexually, conventional breeding offers limited opportunities to introduce new traits, making gene editing an important tool for crop improvement.

Meanwhile, U.S.-based Pairwise has focused on products that deliver benefits consumers can immediately recognize. Its seedless blackberry was developed not only to improve the eating experience, but also to build public confidence in

gene-editing technology.

"Consumers buy products, not technology," said CEO Tom Adams, adding that focusing on consumer benefits also supports growers because products that people want to buy help improve profitability and keep production economically viable. "If a grower can't make money, it won't be available," he said.

While the science continues to advance, regulation is becoming the biggest obstacle to bringing new varieties to market. Developing Tropic's non-browning banana took more than eight years, with regulatory requirements influencing everything from field trials to commercialization. "The more clarity we have, the better," Maori said.

According to Fragniere, the lack of alignment between countries has become a major challenge for the seed sector. Some countries, like Canada, regulate gene-edited crops based on the characteristics of the finished plant, while others regulate the breeding process itself. Those differences affect where companies can conduct field trials, produce seed and sell new varieties. "When policies aren't aligned, farmers are left without access to the tools they need to adapt," she said.

Portugal is among the countries supporting a science-based regulatory approach in Europe. Paula Cruz Garcia, with Portugal's Directorate-General for Food and Veterinary, said proposed European rules would distinguish between simple gene edits that could also occur naturally or through conventional breeding and more complex modifications requiring additional oversight. These changes, she said, would provide greater certainty for breeders while maintaining consumer safety.

Innovation can help crops better withstand disease, make more efficient use of nutrients and reduce losses from farm to consumer. But realizing those benefits will depend not only on scientific breakthroughs, but also on governments creating policies that allow those innovations to move from the laboratory to the field.