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## **The summer food went weird: searing heat reshapes US food production**

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To say it's been a hot summer would be an understatement. According to Nasa scientists, July was the hottest month ever recorded. Off the coast of Florida, surface ocean temperatures soared over 101F, bleaching coral reefs. In Arizona, Phoenix residents sweated through a record 31 consecutive days above 110F. Even animals that spend much of their time in the sky, like birds, struggled to keep cool in the sweltering heat.

Across much of the country, the food system also struggled. In Texas, farmers reported smaller yields as their corn and cotton crops struggled to survive soaring summer temperatures. In Arizona, beekeepers spotted dead honeybees outside hives. Even underwater, off the coast of Long Island, kelp farmers recorded another year of shrinking yields.

Extreme heat "that used to happen every 100 years, used to be a really rare, unusual disaster event, is now something that would happen every six years" in the United States, said Erin Coughlan de Perez, a professor focused on climate risk management at Tufts University.

Although extreme heatwaves are becoming more common, that doesn't mean every region has become uninhabitable for every crop. Rather, the types of crops that can survive in different regions are changing. As the climate changes, farmers are considering ways to plant or harvest earlier to take advantage of milder temperatures. Some experimental initiatives in the US are looking to develop crops with heat-resistant genes or grow plants that haven't traditionally been eaten as prolifically.

Extreme heat doesn't only pose a risk to crops, but to livestock as well. And even when it isn't fatal, heat stress can affect livestock's milk yield and fertility – and can also harm the people who care for those animals and farms.

Scientists who study the oceans are witnessing that kind of unpredictability underwater as well. According to the National Oceanic and Atmospheric Administration, the ocean absorbs 90% of the excess heat associated with global warming – meaning that heatwaves that happen on land are also happening underwater.

"I would suggest a full basket of approaches," says Coughlan de Perez. While some scientists breed new crops with more heat-resilient genes, farmers can evaluate what to plant when and policymakers can adjust insurance options for farmers trying to weather the heat. Ultimately, she hopes everyone uses models, like the one she and her colleagues designed, "to encourage thoughtful adjustments to our behavior".

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