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Record-breaking temperatures will initiate international food crisis

By Michelle Lee

In the summer of 2003, over 50,000 Europeans died from heat-related illnesses during an incessant heat wave with temperatures 3.6° C higher than normal. But with global warming on the rise, increasing temperatures now pose an even bigger risk, this time on the world's supply of food and crops. Scientists say the record-breaking temperatures will become the norm for summertime temperatures that will trigger multiple crop failures and produce an international food crisis.

The Science

Earlier studies have focused on the effect of droughts on the production of crops. However, the recent study, authored by climate researchers David Battisti and Rosamond Naylor, focused on the effect of rising temperatures on the world's supply of crops. Published in the journal *Science*, the study suggests that with global warming on the rise, unusually hot temperatures will become the new summertime temperatures within 30 to 50 years, and certainly a global phenomenon within 70 to 90 years.

The study also found that a hotter environment will have the same destabilizing effects on crops as droughts. Plants have optimal temperatures for producing seeds. If the environment temperature exceeds the optimal temperature, there will be a reduction in leaf development and the size of kernels, two aspects that are crucial in determining crop yields. The study predicts that the increasing temperatures will wither crops sensitive to heat and cut 20 to 40% of crop yields. Not all crops are in danger; some crops, such as sorghum, millets and teff in Ethiopia have evolved to withstand higher temperatures. However, many heat-sensitive major cereal crops, such as wheat, rice, and corn, are threatened.

What's going to happen?

The study's authors emphasized that the food crisis is by far the largest threat enabled by global warming. Dr. Battisti asserted that global warming's effect on world crops is a larger threat to humanity than rising sea temperatures due to melting ice sheets in Greenland and Antarctica. "This is going to unfold in the next 100 years, whereas the sea-level changes are going to probably, most likely, unfold over the next 300 to 400 years," he argued.

In the past, crop failures induced by abnormally high temperatures have reached global proportions. There is extreme interdependence on the global food system. For example, in 1972, Ukraine experienced an uncharacteristically hot summer that drastically decreased the country's crop yields. The crop failure led to a wheat shortage and triggered the cost of wheat to triple in 2 years. The recently

poor harvests in France due to heat waves were alleviated because the rest of the global food system remained intact. However, the study states that such mitigation will be extremely difficult if many areas simultaneously face crop shortages and cause a world food deficit.

The authors maintain that the looming crop shortages are the strongest argument in favour of taking action against global warming. They say some solutions lie in major investments in improving irrigation and developing plant breeds that can survive in hotter temperatures. However, the process of developing new breeds could take decades to form and implement.

The looming food crisis poses an especially massive risk on the 3 billion people living in tropic and subtropic areas. The study also noted that regions with the most severe decrease in crop yields would be in the tropics and subtropics, where millions are already malnourished. A further reduction in crops would provoke food riots in previously struggling countries such as Bangladesh, Haiti, Egypt and the Philippines. Dr. Battisti himself emphasized the enormous risks the people in affected regions face. "The impacts we will see on yield, combined with a growing population that depends greatly on agriculture for food and income, will demand a profound level of adaptation, which might include moving hundreds of millions of people," he said.

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