



NEWS BULLETIN

Plants and Pollution ENVIS RP-NBRI

Vol. 11, November 2021

Rise in temperature: Climate Change

CSIR-NATIONAL BOTANICAL RESEARCH INSTITUTE, LUCKNOW

Climate change to stir up global agriculture within next decade

Science Daily, 01 November 2021

New computer simulations predict deep changes in growing conditions affecting the productivity of major crops already within the next 10 years if current global warming trends continue.

Maize crop yields are projected to decline by almost a quarter by the end the century, while wheat could potentially see global yield increases of about 17%. Current key breadbasket regions will see severe changes much quicker than previously expected, requiring farmers around the world to adapt to new climate realities now.

"We see that new climate conditions push crop yields outside of their normal range in more and more regions. Human-made greenhouse gas emissions bring higher temperatures, shifts in rainfall patterns, and more carbon dioxide in the air.

This affects crop growth, and we find that the emergence of the climate change signal -- the time when extraordinary years become the norm - will occur within the next decade or soon after in many key breadbasket regions globally." explains lead author Jonas Jägermeyr, a crop modeler and climate scientist at NASA's Goddard Institute for Space Studies (GISS), The Earth Institute at Columbia University in New York City, and at the Potsdam Institute for Climate Impact Research (PIK). "This means that farmers need to adapt much faster, for example by changing planting dates or use different crop varieties, to avoid severe losses, but also to realize gains in higher-latitude regions."

Maize yields down, wheat yields up

By combining a set of new climate projections and various state-of-the-art crop models,

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Heavy rains in Bihar, starting from June, water-logged litchi orchards, killing trees

Down to Earth, 03 November 2021

Large numbers of litchi trees are dying in several orchards of Bihar's Muzaffarpur district due to heavy water-logging after surplus monsoon rains this year. This is going to be a big loss for the litchi farmers of Bihar, who were badly hit by low demand during the novel coronavirus disease (COVID-19) lockdown this year and 2020.

Sanjay Kr Singh, a litchi farmer from Radhanagar in Mushahari block, is worried: "We have no knowledge to deal with this phenomenon. This is the first time that on an average, roughly 15-20 per cent litchi trees have died here. There are fears of more trees dying in the coming days."

He added that more than 3,000 trees had dried out in Mushahari. Besides, hundreds of mango trees have also died in the block.

Another litchi farmer, Mukul Shahi of Kanti block, said nearly 20 per cent of litchi trees had dried out due to heavy waterlogging this time.

"We have never seen such a bad situation. Even if 5-10 trees dry out in an orchard, it is a big loss for a farmer as it will take years for new trees to mature and be ready for harvest. We can only seek help from the officials of the state horticulture department and National Research Centre on Litchi (NRCL) in Muzaffarpur." He said.

Shahi said black ants, insects and fungus had attacked and damaged,.....

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What doesn't kill you makes you stronger: Research shows crops have drought 'memory' to help reduce yield loss

Science Daily, 08 November 2021

According to new research from the University of Illinois, crops that experience drought conditions or extreme temperatures during their early stages of growth and survive are better able to deal with those same conditions later in their growth cycle. This 'memory,' or adaptation by the plant, could help reduce yield loss that year and help researchers prevent future yield loss.

"What we have seen is if the crop survives an early drought, because of that experience they perform better when a drought occurs very close to harvest," said Peng Fu, a postdoctoral researcher at Illinois. "We think the crop responds to the drought and adapts to it, so when it happens again the crops have already planned for the drought and the impact is lessened."

Unlike other drought or climate change research that takes place in a highly controlled environment, this behavior has been observed in corn and soybean fields across Illinois, Indiana, and Iowa. This allows the researchers to look at how crops develop an ability to plan for extreme temperatures and drought, conditions that are only expected to increase in coming years due to climate change.

"Our motivation here is based on the climate change reports and projections we have seen from different agencies that say the Midwest is seeing record heat," said Fu, a member of the Realizing Increased Photosynthetic Efficiency (RIPE) project team who conducted the research. "Since it will continue to happen, we need to develop crop cultivars that can cope with these extreme climates to ensure food security in the U.S. Midwest. Understanding how much climate change,.....

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Bacteria as climate heroes

Science Daily, 17 November 2021

Acetogens are a group of bacteria that can metabolise formate. For example, they form acetic acid -- an important basic chemical. If these bacteria were manipulated to produce ethanol or lactic acid, a comprehensive circular economy for the greenhouse gas CO₂ could be realised. To ensure that the process is sustainable, the CO₂ is extracted directly from the air and converted to formate using renewable energy.

Circular economy for CO₂

"The economy of the future must be carbon neutral," demands Stefan Pflügl. However, since carbon is an important component of many products -- such as fuel or plastics -- the existing CO₂ should be recycled and returned to the cycle. One climate-neutral way to do this is capture CO₂ directly from the air and convert it into formate with the help of renewable energy. This compound of carbon, oxygen and hydrogen can ultimately be a basic building block of the bioeconomy. The advantages of formate are that it is easy to transport and can be used flexibly for the production of chemicals and fuels. These substances can be produced with the help of acetogenic bacteria that feed on carbon compounds and produce acetic acid from them.

Formate recycling by *A. woodii*

In order to use acetogens for the production of raw materials, one needs to understand their metabolism and physiology.....

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