

# Global warming may hit wheat production in long run: IIT-Delhi study

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NEW DELHI: Global increase in carbon dioxide (CO<sub>2</sub>) levels in the atmosphere may lead to reduction in wheat production by the end of this century. However, the effect of CO<sub>2</sub> on wheat production is likely to vary from one region to another, a study conducted by IIT-Delhi has found.

Scientists from IIT-Delhi, in collaboration with scientists from The University of Illinois and Indian Agricultural Research Institute, have developed a new model to study the growth processes of spring wheat, a staple food for millions in India and the world. The model has been used to study how environmental factors and land management practices have affected spring wheat production in India over the last four decades.

Published in the European journal, Earth System Dynamics, the study found out that since the 1980s, the elevated CO<sub>2</sub> levels in the atmosphere have increased wheat production by 22 Mega Tonne (MT), which translates to a 30% rise. But at the same time, rising temperatures have reduced production by 13 MT (18%). These effects vary across the country, thereby affecting production at regional scales.

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“Atmospheric CO<sub>2</sub> and temperature have contrasting effects on the production. More CO<sub>2</sub> in the atmosphere caused the wheat production to go up. This effect is known as CO<sub>2</sub> fertilisation. However, more CO<sub>2</sub> in the atmosphere also caused global warming and the increasing temperatures have had a negative effect on the wheat production,” stated Somnath Baidya Roy of IIT-Delhi’s Centre for Atmospheric Sciences.

He explained that “in nature, there are two-three things happening simultaneously and the ultimate outcome is the net result of multiple things. The strength of our new model is that we can simulate all factors of wheat growth.”

He stated that while so far, the positive effect of increased CO<sub>2</sub> is stronger than the negative effect of warming, some idealised experimental studies on crops in the US have suggested that the CO<sub>2</sub> fertilisation effect is temporary and global warming will cause the production to decrease in the long run.

“If you continue to add CO<sub>2</sub> in the atmosphere, the CO<sub>2</sub> fertilisation will stop at some point. We will see a net negative effect by the end of this century,” the IIT-D scientist added.

Roy stated that “the outcomes of the paper unearthed interesting new aspects of regional variability in wheat production that can be useful for building climate change mitigation policies in the context of food security.”