



Climate Change Affects on Crop Production



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Submission: April 14, 2025; **Published:** May 01, 2025

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Opinion

Climate Change brought on by Global Warming is a major variable in 2025 that will have a profound effect on both yield and quality of all agricultural crops. The basic weather variables temperature and moisture in the last 5 years have become more extreme resulting in freezes or frosts and very high temperatures exceeding 90°F lasting several weeks to months. Regarding moisture, we have experienced extreme floods or extreme droughts. These extremes in temperature and moisture have not only affected crop growth, yield and crop quality but also ability to establish crops in spring and early summer.

The other weather variables that have become more extreme due to climate change are wind, tornados and hurricanes. All of these weather events can cause serious damage to crops or complete crop loss. The extremes in temperature and drought have resulted in major forest fires across the US in the last 5 years.

The indirect effect of extreme weather events in agriculture are delay in planting a crop, soil erosion, loss of nutrients and potential microbial contamination like E. coli. While plant breeding and gene insertion have improved crop yields and quality, there has been no cultivated crop introduced with total resistance to climate change events. The increase in global warming in the last 5 years has also increased higher weed populations, more tolerant plant disease and generally more difficulty in controlling insect populations, especially invasive species.

While we still had some extreme weather events in the 1980's, they never really caused reduction in crop yield or quality. I completed my PhD research in 1981 at the University of Maryland Vegetable Research Farm in Salisbury, MD. My research evaluated

the effect of weather on the quality (pH, soluble solids, color, etc.) of processing tomatoes. Surprisingly, temperature, relative humidity and sunlight had significant affect on processing tomato fruit quality. Recently, scientist have found that apples are less crisp, lettuce more bitter, grapes more acidic because of global warming and unfortunately, the process has only just begun. Tomatoes grown in high temperatures (greater than 90°F) have fewer nutrients and substances that protect against cancer.

Not only does global warming affect the quality and taste of fruit and vegetables, but also where those crops will be grown in the future. Recently, some studies have suggested that wine production may become nonviable in southern Europe and will have to move to northern Europe to be grown successfully. With extremes in water, temperature and wind in the west, many producers in the east are producing fruit and vegetable crops in high tunnels. Growing crops in high tunnels allows the grower to extend the season from 4 months in field production to 8 months in high tunnels.

The other concern with global warming is increases in the gases carbon dioxide and ozone. Carbon dioxide accumulation in the air has resulted in post-harvest quality of potato by increased occurrence of common scab and changes in reducing sugars. Higher ozone levels may cause a reduction in photosynthesis, growth and yield of many crops. Watermelon plants are especially susceptible to ozone injury and at high enough concentrations will kill the plant. Global warming/climate change is causing major problems, especially for vegetable growers and will continue until there is a global plan and mandate to mitigate climate change by reducing carbon emissions.



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DOI: 10.19080/NFSIJ.2025.14.555888

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