Climate Change in Illinois: Agriculture

"Under a higher emissions scenario, climate conditions in Illinois could more closely resemble the drought year of 2012 by the 2050s-2070s."

Illinois' fertile soils and favorable climate make it uniquely situated to be a major agricultural producer. Illinois farmers produce corn and soybeans, livestock, and numerous specialty crops. Yet, the conditions Illinois farmers depend on are already changing. Illinois is now experiencing a climate that is already significantly warmer and wetter than at any time in the last 120 years. Further temperature increases and changing precipitation patterns—wetter winters and springs, drier summers and longer stretches of dry days between more intense rain events—are likely to impact agriculture and increase the challenges farmers face.

Farms on the Frontline

Corn and Soybeans: Heat and water stress are likely to reduce corn yields by mid-century. Although soybean yields are projected to benefit from increased atmospheric carbon dioxide (CO_2) in the near-term, as heat and water stress intensify later in the century, soybean yields are also expected to decline. Some yield losses could be overcome if seed technology and management adaptations are able to mitigate the impact of extreme drought and heat. Farmers may also switch to crops more well-suited to a future climate.

Weeds, pests, and diseases: Weeds, pests, and diseases are expected to increase because of warmer winters, increased spring precipitation, and higher temperatures, and will have significant negative effects on crops and livestock in Illinois. For instance, warmer weather could allow the southern rust fungus to overwinter further north and appear in Illinois earlier in the season, increasing potential yield losses. Resistance to pest and disease control methods could also compound climate change risks and/or increase management costs.

Soil health: Increased precipitation, more intense rain events, and higher temperatures are projected to decrease soil health, due to increased erosion and the loss of soil organic matter, which plays an important role in the fertility and structure of soils.

Livestock: Climate change is expected to increase both the frequency of drought conditions and the magnitude of shortages in surface water supplies during drought conditions, as surface water supplies are already often limited by low streamflow unless augmented by in-channel or off-channel water storage.

Specialty crops: Warming temperatures will shift plant hardiness zones north, making certain varieties of fruits, vegetables, and nuts unable to thrive in Illinois, while expanding the range for others. Adopting new crop varieties, management practices, and machinery may help growers adapt.

Pathways Forward

Farming is very sensitive to climate conditions and will inevitably be impacted by climate change. However, management adaptations and technological advances may alleviate some impacts. Preventing the most extreme impacts to agriculture is strongly dependent upon investments made today in agricultural research and development, reducing greenhouse emissions, and increasing conservation practices to help farmers cope with climate risks.

Farmers can take important steps to reduce their own emissions by improving on-farm energy efficiency, adopting cover crops, and reducing fertilizer use. Farmers can build resiliency to climate change by implementing in-field and edge-of-field measures to improve soil health, increase water retention, and reduce erosion and runoff.

The Nature Conservancy's Contributions

Illinois Sustainable Ag Partnership

TNC is one of thirteen organizations working with farmers through the Illinois Sustainable Ag Partnership (ISAP) to increase the uptake of sustainable agricultural practices that help increase resilience to the impacts of climate change. In-field and edge-of-field conservation practices build resilience to climate change by improving soil health and decreasing agricultural runoff to Illinois' waterways. ISAP works directly with farmers and grower groups to provide technical assistance and build capacity to implement conservation best practices, including cover crops, nutrient reduction, and conservation drainage. To learn more about this work, visit ISAP's website.

Edge of Field Roadmap

In-field soil health and nutrient management practices alone are not enough to protect freshwater resources, especially in a wetter climate with increased runoff from fields. In collaboration with partners, TNC recently launched an Edge of Field (EoF) Roadmap, which provides a blueprint to scale up edge of field practices as part of a whole-systems approach to conservation in agriculture. EoF practices, such as constructed wetlands and riparian buffers, improve the water quality and resiliency of agricultural farmlands. The EoF roadmap introduces nine recommendations that partners can take to advance adoption of EoF practices at multiple scales. Explore the Edge of Field Roadmap on TNC's website.

Natural Climate Solutions

TNC's science shows that efforts to conserve, restore, and sustainably manage land have the potential to reduce net annual emissions by up to 21% in the United States. In Illinois, the biggest, low-cost opportunities for employing natural climate solutions exist in the agricultural sector, where large-scale adoption of cover crops and cropland nutrient management could mitigate nearly 10 metric tons carbon dioxide equivalent (CO_2e) per year for a cost of USD 10 per metric ton CO_2e. Cover crops increase the carbon stored in soils, while improved nitrogen fertilizer management reduces N_2O emissions and the energy emissions associated with fertilizer production.

Food and Agriculture Climate Alliance (FACA)

TNC is a founding member of FACA, an alliance of over 80 organizations representing farmers, ranchers, forest owners, agribusinesses, manufacturers, the food and innovation sector, state governments, sportsmen, and environmental advocates. FACA members are working to define and promote shared climate policy priorities. The alliance has developed policy recommendations for federal lawmakers in six areas: soil health, livestock and dairy, forests and wood products, energy, research, and food loss and waste. To learn more about FACA, please visit their website.

Learn more about climate change in Illinois in the report, An Assessment of the Impacts of Climate Change in Illinois, on our website.

The Nature Conservancy
Illinois