

# Understanding the Costs of Inaction on Climate Change for Iowa Farmers

## The consequences of ignoring climate risks facing corn and soy production

Climate change is already taking a heavy toll on communities across the U.S. – with record-breaking wildfires, rising heat, chronic flooding, and more. The impacts will only grow worse without urgent action. Now, research can show us the potential cost of climate inaction not just 50 years from now when our children and grandchildren will pay the price, but within the next 10 to 20 years.

### CHANGING CROP YIELDS AND REVENUE

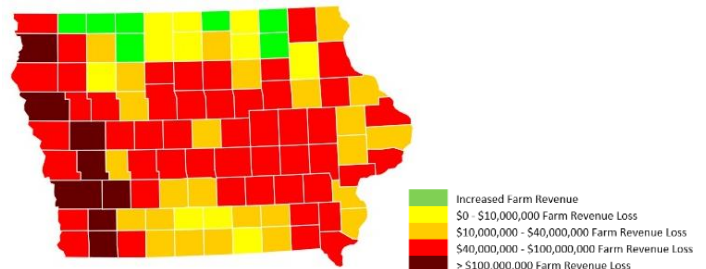
In recent decades, favorable changes in climate and improvements in seed varieties, planting methods, and other agricultural practices have helped increase crop yields in Iowa.<sup>1</sup> However, this trend is unlikely to continue, and if no action is taken on climate change, continued changes in temperature and rainfall could reduce crop yields for corn and soybeans throughout most of Iowa.

A recent report from K-Coe Isom projects average yield changes in corn, silage and soy for each county in Iowa from 2020 to 2039, the data for which stems from a first-of-its-kind study by [Hsiang et al. 2017](#). The report also uses historic data to generate an estimate of gross farm revenues by county to compare projected production and sales to climate change-adjusted production and sales. It also uses input-output modeling of the Iowa economy to simulate the economic effects that would have transpired if average annual reductions occurred in 2019. Some of their key findings include:

- Iowa farmers could see statewide gross farm revenues reduced by as much as \$4.9 billion per decade, corresponding to a loss of 3.6% of Iowa farm revenue from corn, silage and soy sales. Because with climate change agricultural prices are likely to rise, relative to without climate change, the impact to gross

farm revenues from yield impacts will be offset to some degree by higher prices.<sup>2</sup>

### Statewide Loss of Farm Revenue from Climate Change by County



- 92 of Iowa's 99 counties would experience decreases in gross farm revenues. Close to half of Iowa's counties would experience farm revenue losses of more than \$50 million and 8 counties in western Iowa, such as Pottawattamie, are predicted to experience revenue losses of more than \$100 million.
- A farm in central Iowa, used as a case study in the report, would have lost \$50,000 to \$90,00 in revenue per year if projected yield reductions had been in effect over the past five years – a potential loss to the farm of \$360,000. This loss would have reduced working capital, increased farm debt, and made returning to the farm "less desirable" for the next generation, according to the farm owner.
- Because these impacts would reduce capital investment and off-farm spending, yield losses could reduce Iowa's annual economic output by \$367 million to \$733 million, causing the statewide loss of 1,270 to 2,530 jobs, and reduce annual state revenue collections by \$4 million to \$8.3 million.

<sup>1</sup> Butler et al. 2018. Particularly pleasant weather for U.S. maize. *Proceedings of the National Academy of Sciences of the United States of America*. 115(47), 11935-11940.

<sup>2</sup> Moore et al. 2017. New science of climate change impacts on agriculture implies higher social cost of carbon. *Nature Communications*. 8, 1607.

## POLICY RECOMMENDATIONS

### Management Practices

Policies should seek to incentivize management practices that limit greenhouse gas emissions, improve soil health, and build resilience in agriculture.

### Nutrient Management

Policies should support agricultural producers in reducing emissions from nitrogen fertilizers and manure applied to farmers' fields. This could involve preparing and implementing nutrient management plans, assisting in soil sampling, and providing aid in identifying potential nutrient-loss pathways.

### Soil Health and Organic Matter

Policies should incentivize soil health improvement and soil management practices. Conservation tillage practices, such as no-till and strip-till, and cover crops can protect and enhance soil resources. These practices can improve soil health, increase organic matter in upper soil layers, and reduce on-farm fuel use.

### Research

Governments should support research to inform the management of carbon-cycle dynamics through soil amendments, tillage, and the use of perennials; controlling water through drainage, storage, and irrigation; and understanding root structures, water- and nitrogen-use efficiencies, and declining nutritional values of plants.<sup>2</sup>

### Technology and Applied Research

Programs should provide funding for the development of climate-resilient seeds, improvements to nutrient management, and other climate-adaptation technologies. Governments should ensure that research is made readily available to farmers to implement on the ground. State government should consider investing additional funding in its public university system to assist with the creation of practical, publicly available research that farmers can put into practice.

### Incentives

Programs and incentives currently exist that encourage landowners to participate in conservation practices, such as Natural Resource Conservation Service (NRCS) programs. State government should look for opportunities to promote these federally assisted programs and should consider providing cost-share to expand the scope of these programs in the state.

### Farm Bill Conservation Programs and USDA Grants

Many existing Farm Bill programs utilize and incentivize climate-friendly practices, such as conservation tillage and nutrient management. As the federal government explores innovation in this space using existing tools, state and local governments should engage with federal government to expand existing programs and develop new programs to help Iowa farmers.

### Tax Credits

State government should consider providing tax credits to farmers who implement greenhouse gas sequestration and conservation best management practices and should encourage development of federal tax credits to achieve these same goals.

### Carbon Markets

Carbon markets would allow farmers to generate credits by implementing conservation practices while mitigating climate change. Efforts to reduce transaction costs and recent approaches, such as jurisdictional instead of project-based crediting, show promise in increasing participation from potential market investors and agricultural landowners.

### Crop Insurance and Agricultural Lending

Federally subsidized crop insurance is an important shock absorber for farmers, but it is not sufficient to protect farmers or the broader agricultural economy from climate risk over the long-term. State government should advocate for changes to the federal crop insurance program to incorporate the risk reduction benefits of resilient farm management strategies, offering an incentive to farmers who take action to reduce their yield risks. State government should also engage with agricultural lenders to create incentives for Iowa farmers who adopt mitigation or adaptation-friendly practices. Federal regulators should assess the exposure and implications of climate-related risks for the portfolios and balance sheets of the government-sponsored enterprises (GSEs), which includes the Farm Credit System. The GSEs should also adopt and implement strategies to monitor and manage those risks.<sup>3</sup>

### Technical Expertise

Many farmers do not have time to navigate complicated and complex programs and paperwork. State government should consider establishing additional mechanisms to support farmers as they apply for federal assistance and track and report progress.

Learn more at <https://www.edf.org/climate/costofinaction/iowa>

<sup>2</sup> Takle, Eugene S. and William J. Gutowski, Jr. 2020. Iowa's Agriculture is losing is Goldilocks Climate. *Physics Today*. 73, 2, 33.

<sup>3</sup> Climate-Related Market Risk Subcommittee. 2020. Managing Climate Risk in the U.S. Financial System. CFTC, Market Risk Advisory Committee.