



U.S. Senate Committee on Environment and Public Works

"The Environmental Protection Agency's Renewable Fuel Standard Program: Challenges and Opportunities"

Statement for the Hearing Record

National Corn Growers Association

February 16, 2022

On behalf of nearly 40,000 dues-paying corn farmers nationwide and more than 300,000 corn growers who contribute to corn promotion programs in their states, the National Corn Growers Association (NCGA) supports the Renewable Fuel Standard (RFS). The RFS is a successful energy and economic policy for our environment, consumers and for farmers who produce the sustainable primary feedstock for low carbon ethanol. Consistent RFS administration maximizes carbon and pollutant reductions, expands our energy supply to lower consumer costs, and supports rural economic growth.

Agriculture Production and Ethanol

As the largest sector in American agriculture, corn farmers impact hundreds of thousands of jobs, infuse billions of dollars into the economy and care for our most critical resources, all while seeing substantial improvements in production, including improvements that reduce the carbon intensity (CI) of biofuels.

For 2021, USDA projects the U.S. corn crop to total 15.1 billion bushels, valued at \$82.4 billion. With 5.3 billion bushels of the 2021 crop expected to be used for ethanol production, including the more than 1.1 billion bushels of distillers grains co-products returned from ethanol production to animal feeds, ethanol production and demand for low carbon fuel provides an important market for corn growers. Between 2016 and 2021, U.S. corn ending stocks have averaged more than 1.5 billion bushels annually, illustrating availability of additional feedstock to increase renewable fuel production, while continuing to meet and exceed current demands for food, feed, and exports.

Ethanol production facilities and related industries, located in rural communities, support rural jobs and economic growth. Biofuel production has increased annual farm incomes, while only modestly affecting commodity prices. However, the long-run effects of biofuels production and the RFS on food prices are very small at 0.04 percent.

Since Congress expanded the Renewable Fuel Standard in 2007, corn farmers have increased corn production, not by bringing additional land into production, but through higher yields that have resulted in more corn produced on less land and with fewer resources.

- Planted corn acres in 2021, at 93.36 million acres, were just less than planted acres in 2007, the year the RFS was expanded, at 93.5 million acres, yet corn production is forecast to increase by 15.9 percent for 2021 compared to 2007.
- USDA data shows the area planted to principal crops in the United States is contracting, totaling 328.6 million acres in 2000 and totaling 317.2 million acres in 2021. Changes in corn acres come from changes in the mix of crops planted rather than an expansion of total cropland.
- Corn production has increased because crop yields have increased from an average of 150.7 bushels per acre in 2007 to 177 bushels per acres in 2021. With the average yield in 1980 at 91 bushels per acre, productivity growth is a long-term trend; domestic corn production has grown steadily at a 25-year average rate of around 2 percent, or 250 million bushels per year.

Farmers' Sustainability Commitment

U.S. corn farmers have a long history of continuous improvement, constantly looking for and implementing practices and technologies that make them more efficient and environmentally and economically sustainable, as detailed by the 2021 [National Corn Growers Association Sustainability Report](#). **Due to their innovation and technology advancements, corn farmers produce more corn with fewer inputs than ever before, increasing feedstock supply while reducing corn's CI.**

In 2021, [Field to Market](#) released an updated National Indicators Report of science-based measurements of outcomes associated with commodity crop production from 1980 to 2020, finding that:

- Farmers decreased the amount of land required to produce a bushel of corn by 56 percent and reduced greenhouse gas (GHG) emissions per bushel by 52 percent.
- Farmers reduced soil loss by 60 percent per acre, cut irrigation water use by 44 percent, and reduced energy use by 45 percent

According to USDA's 2017 Census of Agriculture data, farmers have increasingly moved to reduced tillage or no-till practices, away from conventional tillage, and are planting more cover crops.

- The 2018 USDA NASS Agricultural Chemical Survey revealed that farmers operate 65 percent of planted corn acres as no-till or minimum-till. These changes in tillage practices help the soil retain nutrients and water, as well as store more carbon in the soil.
- Minimum-till and no-till practices, supported by crop production technologies, also reduce tractor passes through fields, lowering fuel consumption and energy use.
- The 2017 Census shows a 50 percent increase in land planted to cover crops nationally between 2012 to 2017, with increases of more than 100 percent in top corn producing states including Iowa and Illinois.
- According to USDA's Economic Research Service, farmers reported planting 15.4 million acres of cover crops. This farming practice also reduces soil erosion, improves nutrient management, and helps soils hold more carbon.

Looking ahead to 2030, corn farmers, through the National Corn Growers Association and state corn association affiliates, are committed to additional sustainability progress, including:

- Increase land use efficiency by 12 percent
- Reduce soil erosion by 13 percent
- Increase irrigation water use efficiency by 15 percent
- Increase energy use efficiency by 12 percent, and
- Reduce GHG emissions by a further 13 percent.

Environmental Impacts: GHG Emission Reductions

From 2008 through 2020, the RFS resulted in nearly 1 billion metric tons of cumulative GHG savings, significantly exceeding projections, largely due to the reduced carbon intensity of corn ethanol. Today's low carbon ethanol is positioned, with the right policies, to achieve net-zero emissions and

continue to decarbonize transportation. The transportation mix is changing, but low carbon liquid fuels are essential to decarbonize transportation successfully and affordably, and ethanol is available now.

Lifecycle Analysis

NCGA recognizes the Department of Energy's Argonne National Laboratory's Greenhouse gases, Regulated Emissions, and Energy use in Transportation (GREET) as the "gold standard" federal government model for biofuels lifecycle analysis (LCA). GREET's system boundaries include the significant direct activities and indirect effects from the "wells-to-wheels" supply chain for biofuels production, from feedstock production, fuel production and engine combustion, including land use change (LUC) emissions. GREET currently assigns corn ethanol a LUC impact of 7.4 grams of carbon per megajoule.

- [Argonne's published analysis](#) concludes corn ethanol's CI decreased 23 percent from 2005 to 2019 due to increased corn yield, reduced fertilizer intensity and improved ethanol production efficiency, with corn ethanol now between 44 and 52 percent lower in CI than the gasoline it replaces.
- Argonne's analysis is consistent with 2021 research from [Environmental Health and Engineering](#), with contributors from Harvard and Tufts Universities, that corn ethanol today is 46 percent lower in CI than gasoline.
- According to [California Air Resources Board \(CARB\) data](#), the CI of ethanol under the state's Low Carbon Fuel Standard (LCFS) is more than 30 percent lower today than it was in 2011 and at least 40 percent lower than the CI of gasoline.
- [USDA's research and analysis](#) also found that ethanol currently results in 39 to 43 percent fewer GHG emissions than gasoline. Additional improvements on farms and in ethanol production supported by expanding markets for low carbon fuels could result in ethanol with up to 70 percent fewer GHG emissions than gasoline, according to USDA.

Corn-based ethanol can reach net zero emissions with continued on-farm improvements and soil carbon sequestration, along with carbon capture technology and new efficiencies in ethanol production. Corn farmers are proud of our leadership in adopting conservation and best management practices, planting cover crops, reducing tillage, and using GPS and variable rate application system to help reduce inputs and to place inputs where they are needed, which reduces emissions and energy use. Biologicals are another technology that is increasing in use among farmers. In addition to reducing feedstock CI, these production practices protect and enhance both soil and water quality.

Environmental Impacts: Air Quality Improvement

Increased volumes of ethanol in fuel displace the most harmful compounds from gasoline. These aromatic hydrocarbon additives (i.e., benzene, toluene, ethylbenzene, xylene – or BTEX) have high cancer-causing potential. Increasing the ethanol volume in fuel has a positive impact on tailpipe emissions of toxins, including significant reductions in particulates and carbon monoxide. These same aromatic hydrocarbons are also precursors to the formation of secondary organic aerosols (SOA), which in turn are a major contributor to particulate matter emissions (PM 2.5).

- According to EPA's review for the 2020 RFS Anti-backsliding Study, ethanol does not form SOA directly or affect SOA formation.

- However, as EPA states, toluene is a large contributor to SOA. Ethanol's high octane value "greatly reduces the need for other high-octane components including aromatics such as toluene."
- As explained in EPA's Fuel Trends Report: Gasoline 2006-2016, "Ethanol's high octane value has also allowed refiners to significantly reduce the aromatic content of the gasoline, a trend borne out in the data."
- EPA's data shows that aromatics' share of gasoline volume dropped from nearly 25 percent to 19.3 percent, and benzene volume dropped from 0.99 percent to 0.58 percent between 2000 and 2016, the same time as ethanol blending increased from 1 percent to at least 10 percent.

EPA's data demonstrates the air quality and human health benefits of increased ethanol blending in gasoline by replacing harmful aromatics with clean octane from ethanol. Limiting the aromatics content of gasoline and using higher ethanol blends will further reduce risks from SOA formation and exposure to PM 2.5, which causes serious respiratory, cardiovascular, and other health harm, including premature death, according to the American Lung Association.

Petroleum-based aerosol particles represent a significant source of pollution, especially in population-dense urban areas. Lowering the volume of petroleum in the domestic gasoline pool can reduce health issues related to PM and other emission-based pollutants, which can be accomplished by increasing fuel octane with higher ethanol blends and replacing more hydrocarbon aromatics with ethanol.

Corn growers are proud of our contributions and stand ready to help achieve greater emission reductions and cleaner air through use of more renewable, sustainable, affordable ethanol

Sincerely,

Chris Edgington, President
National Corn Growers Association