July 25, 2024

William Hohenstein
Director
Office of Energy and Environmental Policy
Office of the Chief Economist
United States Department of Agriculture
1400 Independence Avenue SW
Washington, DC 20250

Docket ID No. USDA-2024-0003

Submitted via Federal Portal: www.regulations.gov

RE: Procedures for Quantification, Reporting, and Verification of Greenhouse Gas Emissions Associated with the Production of Domestic Agricultural Commodities Used as Biofuel Feedstocks

Dear Director Hohenstein:

On behalf of the members of the American Coalition for Ethanol (ACE), I appreciate the opportunity to comment on the Request for Information from the United States Department of Agriculture (USDA) regarding Procedures for Quantification, Reporting, and Verification of Greenhouse Gas Emissions Associated with the Production of Domestic Agricultural Commodities Used as Biofuel Feedstocks.

ACE is a grassroots advocacy organization, powered by rural Americans from all walks of life who have built an innovative industry that delivers homegrown and low carbon biofuel and food for a growing world. Our nearly 300 members include U.S. ethanol biorefineries, investors in biofuel facilities, farmers, and companies that supply goods and services to the U.S. ethanol industry.

We strongly support USDA requesting information which can lay the foundation for policies to bring economic benefits to rural and farm communities while also combating climate change, and we are grateful to Secretary Vilsack for his leadership in working to create opportunities for biofuel policies to reward biofuel producers and farmers for so-called climate-smart agriculture (CSA) practices.

Scientific evidence increasingly shows that adoption of CSA practices is one of the quickest and most cost-effective areas for greenhouse gas (GHG) emission mitigation. In 2018, the Intergovernmental Panel on Climate Change found that 89% of the world's GHG emission mitigation potential comes from agricultural soil carbon sequestration and exceeds 5 gigatons of CO_2e per year in potential mitigation reductions.[1]

[1] Smith, P., D. Martino, Z. Cai, D. Gwary, H. Janzen, P. Kumar, B. McCarl, S. Ogle, F. O'Mara, C. Rice, B. Scholes, O. Sirotenko, 2007: Agriculture. In Climate Change 2007: Mitigation. Contribution of Working Group III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change [B. Metz, O.R. Davidson, P.R. Bosch, R. Dave, L.A. Meyer (eds)], Cambridge Universit y Press, Cambridge, United Kingdom and New York, NY, USA, available at https://www.ipcc.ch/site/assets/uploads/2018/02/ar4-wg3-chapter8-1.pdf

CSA practices provide significant GHG and soil health benefits but come at an economic cost to farmers. Because of these costs, adoption of these practices remains low across the corn belt. Argonne National Laboratory has found that additional incentives, over and above those currently provided, are needed to increase practice adoption.[2]

Our comments begin by documenting the progress ACE has been making to monetize CSA practices and ensure corn ethanol is part of the climate solution. We also directly respond to the five general topics identified by USDA when the request for information was first announced. Selected priorities from our overall comments are summarized immediately below:

- USDA and other federal agencies should rely on the Department of Energy's Greenhouse Gases, Regulated Emissions, and Energy Use in Technologies (GREET) model to quantify emissions <u>and</u> greenhouse gas (GHG) credits associated with the production of agricultural commodities used as biofuel feedstocks. While no model can fully replicate real-world activities, GREET is considered the global gold standard and represents the best available science.

- GHG credit values for climate-smart agriculture (CSA) practices should routinely be updated by incorporating the best available science and results from real-world activities such as the two USDA-Natural Resource Conservation Service (NRCS) Regional Conservation Partnership Programs (RCPPs) currently being led by ACE. These projects are specifically designed to address the perceived need for more empirical data on the GHG benefits of CSA practices and help improve the accuracy of the GREET model.

- USDA has a long track record of stewarding federal taxpayer funds for commodity and conservation programs, ensuring that participating farmers meet necessary requirements to receive federal funds. If existing USDA protocols are sufficient for verifying distribution of billions of taxpayer dollars for commodity and conservation programs, USDA protocols are equally sufficient for verifying the same CSA practices for federal tax incentives such as 45Z. The Treasury Department should rely on existing USDA assets in the reporting and verification for the 45Z tax credit, and we encourage USDA to directly engage Treasury with respect to its expertise and experience in this area.

<u>**Background – ACE Progress to Ensure Corn Ethanol is Part of the Climate Solution**</u>

The ACE Board of Directors has adopted a resolution to support polices at the state and/or federal level which recognize ethanol is part of the climate and health solution while crediting farmers and ethanol producers for activities which help reduce lifecycle GHG emissions by at least 70% compared to gasoline by 2030 and reach net-zero lifecycle GHG emissions by 2050. We are striving to accomplish this through policy development and real-world validation of lifecycle GHG benefits of climate-smart agriculture (CSA) practices in a scientifically irrefutable manner and at a large scale. Based on this direction, over the past several years we have been leading discussions and projects to showcase how CSA practices and corn ethanol can meaningfully reduce GHG emissions and be part of the climate solution.

Thanks to funding support from USDA's Natural Resource Conservation Service (NRCS), ACE is leading two significant Regional Conservation Partnership Program (RCPP) projects, in collaboration with top land-grant scientists and Sandia National Lab, to validate and improve upon the current predictive model results of climate-smart practice adoption showing meaningful GHG benefits of reduced tillage,

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[2] https://iopscience.iop.org/article/10.1088/1748-9326/ab794e/pdf

cover crops and nutrient management on ethanol's carbon footprint. Our overall goal is to create a scientifically proven, non-proprietary measurement and validation tool that clean fuel regulators, renewable fuel producers and farmers can use to credit these GHG contributions in state and federal clean fuel programs and tax credits.

Specifically, in late 2021, NRCS provided ACE with $7.5 million in RCPP funds to work with a member ethanol company (Dakota Ethanol, LLC) and farmers in the counties surrounding the facility to: (1) incentivize farmer adoption of CSA practices at scale, (2) partner with leading land-grant university scientists and Sandia National Laboratory to collect data to measure, verify and model resulting soil health and GHG benefits, and (3) use this data to help participating farmers access clean fuel markets and take advantage of other opportunities to monetize CSA practices.[3]

Since the launch of this South Dakota-based RCPP, ACE and our partners have successfully executed contracts with farmers in the seven counties surrounding Dakota Ethanol, LLC to adopt CSA practices on nearly 20,000 acres of cropland. Currently our technical team, led by South Dakota State University, is conducting ongoing verification of practices and we are making reimbursement payments to participating farmers. Soon our technical team will begin collecting soil samples and other relevant data to pressure test the agro-ecosystem models.

Based on this progress, earlier this year, NRCS invested an additional $25 million for a larger 10-state RCPP led by ACE.[4] The USDA funding will help hundreds of farmers adopt reduced and no-tillage, nutrient management and cover crops on nearly 100,000 acres across 167 counties surrounding 13 ethanol facilities partnering with ACE to implement the project in Illinois, Indiana, Iowa, Kansas, Minnesota, Missouri, Nebraska, Ohio, South Dakota and Wisconsin. The sites were strategically chosen to provide our project's scientific team with statistically significant data regarding the GHG effect of conservation practices in different soil types and climates.

ACE and our partners will accomplish three important objectives with the 10-state RCPP project.

First, we will incentivize farmers to adopt conservation practices. We have already conducted farmer outreach in seven of the 13 grainsheds via meetings which have been attended by more than 500 farmers who have expressed interest in enrolling at least 25,000 acres per location on average. We currently have sufficient financial assistance for approximately 7,000 acres of CSA practices per location, so initial farmer interest in our project is more than three times available funding. We are planning to execute initial contracts for farmer practices at the beginning of the 2024 fall harvest.

Second, our team of soil scientists and agronomists will monitor, measure and verify how the conservation practices adopted by the farmers reduce GHG emissions from corn production. A statistically relevant number of annual soil samples will be collected throughout to ensure scientific rigor of the project findings. Soil information collected will include bulk density, soil texture, soil water, pH, organic matter carbon, and nitrogen and phosphorus concentration. Information related to farm management will also be requested from farmers taking part in our project. This includes planting and harvest dates, crop yield, nutrient application rates, management history and tillage type. In addition,

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[3] https://ethanol.org/ace-news/usda-announces-investment-in-effort-to-utilize-climate-smart-practices-to-secure-market-access-to-clean-fuel-markets-for-farmers-and-ethanol-producers

[4] https://ethanol.org/ace-news/ace-announces-project-to-unlock-ethanols-access-to-new-markets-and-tax-credits

weather information will be collected each crop year related to temperature, precipitation, wind, and humidity. Each of these factors are necessary to help validate the predictive model carbon results.

The data they collect will be shared with the U.S. Department of Energy (DoE) who will use it to pressure test existing models such as the Greenhouse Gases, Regulated Emissions, and Energy Use in Technologies (GREET) model to address real and perceived 'information gaps' which currently prevent farmers and ethanol producers from adequately monetizing CSA practices. Demonstrating scientific rigor of GHG benefits related to climate-smart farming practices at relevant landscape scale is critical to increase confidence levels in existing models and enable farmers and ethanol producers to monetize the farm-level GHG reductions in regulated low carbon or clean fuel markets.

To that end, the third and final goal of our project is to develop an open-source tool which can be used by all farmers and ethanol producers to meet CSA quantification and verification requirements. While proprietary quantification and verification systems designed by private companies for voluntary markets tend to siphon significant value away from farmers for GHG reductions, our RCPP projects will create a non-proprietary agro-ecosystem tool that can be used by all farmers and ethanol producers to maximize opportunities in regulated clean fuel markets. The ultimate objective of our RCPP projects is to empower ethanol producers and farmers with modeling and calculator tools to earn higher tax credits and premium prices in clean or low carbon fuel markets based on CSA practices.

Scientists and lifecycle modelers indicate crop type, soil type, precipitation and temperature are essential factors used to determine the GHG benefits of CSA practices. These same modelers and market regulators are sometimes reluctant to assign carbon credits for farm-level practices without more locally verified data upon which to validate the GHG benefits. Our 13-grainshed, 10-state project was designed to take into consideration how different crops grown in different soils, with different temperature and precipitation conditions impact the GHG benefits of these agriculture practices. What's more, our project includes an experienced team of scientists from land-grant universities and the U.S. DoE's Sandia National Lab who have developed a proven mechanism to collect data from farmers in the 167 counties and assess the real-world carbon sequestration and reductions in carbon dioxide, methane and nitrous oxide emissions from the climate-smart practices and validate them at a high confidence level required by modelers and market regulators.

ACE has met with the Treasury Department on multiple occasions to discuss implementation of 45Z, and among the priorities we have discussed during those meetings, here are some we want to share directly with USDA because they are relevant to your request for information:

- Allow individual CSA practices and stacking of agriculture practices for 45Z. Do not require the all-or-none "bundled" approach from 40B or prohibit certain practices from qualifying for 45Z
- Since the GREET feedstock carbon intensity (CI) calculator module accounts for feedstock production GHG emissions, rely on it to determine the GHG credit values of CSA practices. Do not arbitrarily cap agriculture practice GHG credit values
- Models and GHG credit values for agriculture practices should routinely be improved/updated by incorporating results and data collected through ACE's RCPP projects with USDA and DoE, because our projects are designed to address the perceived need for more empirical data on the GHG benefits of agriculture practices

We strongly encourage USDA to engage Treasury directly on these topics and leverage our RCPP to help inform more accurate and updated GHG credit values for CSA practices.

american coalition for ethanol

Now that we have documented the progress ACE is making through the USDA-funded RCPP projects to better validate the GHG benefits of CSA practices, we respond to the five topical areas addressed in the request for information below.

1. **Biofuel feedstock crops and practices for consideration in USDA's analysis.**

A common refrain ACE intends to emphasize in these comments is for USDA "not to re-invent the wheel" in developing procedures for quantifying GHG reductions from biofuel feedstocks.

As such, when it comes to which crops and practices USDA should consider, we strongly encourage the department to use the U.S. DoE's Greenhouse gases, Regulated Emissions, and Energy use in Technologies (GREET) model, developed by the scientists at the Argonne National Laboratory.[5] GREET currently estimates nitrous oxide (N_2O) emissions from fertilizer use, contains a module for estimating land use change (LUC) penalties through the Carbon Calculator for Land Use Change from Biofuels (CCLUB), and features a Feedstock-Carbon Intensity Calculator (FD-CIC) module estimating soil carbon emissions and sequestration credits for practices such as conservation tillage and cover crops on corn production.

With nearly 45,000 registered users around the world, GREET is the global gold standard for lifecycle analysis and serves as the basis for the carbon intensity (CI) estimates of all fuels regulated under the California Low Carbon Fuel Standard (LCFS), Oregon Clean Fuels Program and Washington Clean Fuel Standard. What's more, Congress directed the Department of Treasury to utilize the GREET model to determine CI for the §45Z Clean Fuel Production and §45V Clean Hydrogen tax credits within the Inflation Reduction Act. No model can fully replicate real-world activities, but GREET is equipped to represent the best available science on the lifecycle GHG emissions of transportation fuels and technologies because the assumptions and estimates used by Argonne scientists in GREET are under constant review and updates to the model occur annually.

To the question of which crops and practices should qualify, all biofuel feedstock crops and practices that are currently accounted for in GREET in the FD-CIC should be eligible to earn GHG reduction credits (clearly our primary emphasis and interest is in corn as a feedstock crop for ethanol production). Since every point of carbon intensity has value under clean fuel programs and tax credits such as 45Z, exclusion of any GHG reduction factor will result in an incomplete and inaccurate CI score and deny biofuel feedstock producers access to credits that reduce GHGs per unit of energy production while producing feedstocks. GREET and the FD-CIC currently account for all significant GHG feedstock production energy yields and emissions, including feedstock yield, biofuel yield of the feedstock, the amount and types of fuels and energy sources, fertilizers and lime, herbicides, insecticides, and soil GHG emissions (nitrous oxide and carbon dioxide emissions) resulting from the use of nitrogen fertilizers and lime.

We have created a "condensed and active version" of a GREET corn energy production and emissions CI calculator (**Attachment #1**) and encourage USDA staff to use this tool for a better understanding of all the factors taken into consideration by the GREET model. The red cells in the spreadsheet denote the CI of corn production in kilograms of CO_2 per MMBtu. We also provide explanatory notes about the GREET default assumptions and make recommendations for updating the model based on real-world farming practices.

[5] https://greet.es.anl.gov/

GREET and the FD-CIC also account for credit improvements to soil carbon stocks resulting from tillage practices such as, reduced and no-till (strip-till as well), and cover crops, using the DayCent Model developed by the National Resources Ecology Laboratory at Colorado State University.[6] The DayCent model is and has been the model employed to determine U.S. agriculture and land use GHGs for the annual U.S. EPA GHG Inventory. DayCent is also the model used by the USDA's National Resources Conservation Service (NRCS). In 2022, a group of scientists (Moore et al. - *A framework to estimate climate mitigation potential for U.S. cropland using publicly available data*) used DayCent to estimate CO_2 emission reductions from a wide range of cropland management practices. For your convenience, we have attached a condensed summary (**Attachment #2**) of Moore et al. The scientists' tillage results for the "Heartland" region, where the vast majority of U.S. corn is produced, are particularly informative; switching from a reduced-till corn production system to no-till/strip-till results in a 12.8 kilogram/MMBtu GHG credit, while switching from intensive tillage to no-till/strip-till results in a 16 kilogram/MMBtu GHG credit.

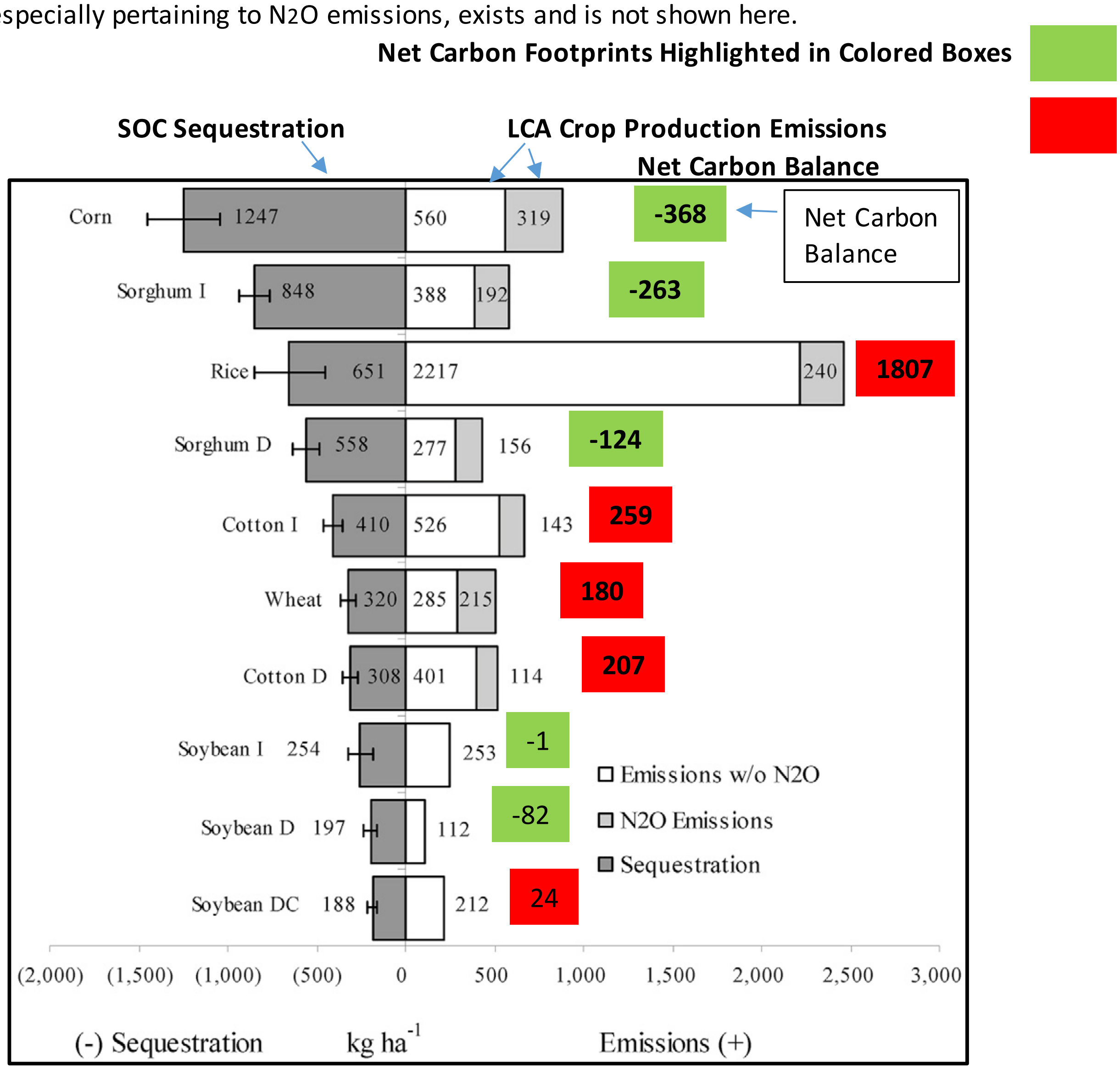
Each biofuel feedstock crop has a unique carbon footprint, not only for the energy and emissions due to production, but also for its effect on soil organic carbon (SOC) stocks. For example, in 2011 Popp et al. modeled the "net" carbon emissions of crops commonly grown in Arkansas.[7] These soil and crop scientists defined net carbon emissions as the all-inclusive lifecycle CO_2 equivalent GHG emissions during crop production plus the effect each crop has on soil carbon stocks. Their peer-reviewed data show that C4 crops such as corn and sorghum can sequester significant amounts of atmospheric carbon in soil that offset some of their production-related lifecycle GHG emissions and when managed well can offset all or more than all of their GHG emissions and are "net" GHG sinks. On the following page is a graphical illustration from Popp et al. of the "net" carbon emissions from several crops:

[6] https://www.nrel.colostate.edu/projects/daycent/

[7] "Estimating Net Carbon Emissions and Agricultural Response to Potential Carbon Offset Policies". http://agris.fao.org/agris-search/search.do?recordID=US201500052566

Figure 1, page 1134

Carbon equivalent emissions and sequestration by crop including variation in C sequestration due to yield, soil, and tillage effects; I = irrigated, D = unirrigated or dryland, DC = double cropped. Error bars on the sequestration side include variation due to yield, soil type, and tillage effects but exclude expected variation in harvest index and root/shoot ratio. Also note that soybean production entailed no N fertilizer application and hence no N_2O emissions. Additional uncertainty, especially pertaining to N_2O emissions, exists and is not shown here.



As Popp et al. show, there are significant differences in the "net" GHG emissions during the production of major crops. Corn is the most GHG-intense crop (other than rice) due to the fertilizer nutrient requirements to produce corn's large mass of grain, residue and root biomass. But corn's large production of root and unharvested residue can result in superior soil carbon sequestration which can offset its production-related GHG emissions. In fact, this research from Popp et al. indicates C4 crops such as corn and sorghum can be net GHG sinks. Crops with C4 atmospheric carbon fixation pathways such as corn and sorghum produce significantly more biomass, calories and protein per unit of land, water and fertilizer nutrients than C3 crops, so it is no surprise that corn and sorghum stand out in terms of "net" lifecycle assessment (LCA) carbon emissions. This research indicates that corn production systems can lead to soil carbon sequestration which offset significant, if not all, soil and production energy GHG emissions.

Nitrous oxide has a very high global warming potential. According to GREET, it's effect on climate change is 273 times that of CO_2, so N_2O emissions have a very large impact on total corn production GHG emissions. The GREET model estimates GHG emissions associated with the manufacturing and on-farm use of nitrogen fertilizer products (and other fertilizers and chemicals). With respect to nitrous oxide, the GREET model estimates nearly one-half of all corn production lifecycle GHG emissions are due to nitrogen-induced N_2O emissions.

In a 2021 update to the GREET model, there is a N_2O reduction credit if 4R (Right rate, Right time, Right placement, and Right form) nitrogen management is used to produce corn. This is a positive development because many farmers already use 4R but the GREET model previously assumed no farmers employed this climate-smart practice.

Not only do nitrogen fertilizers have the potential to significantly impact GHG emissions, but they also represent a major cost of production for biofuel feedstocks such as corn (as evidenced by the geopolitical market shocks and supply chain disruptions stemming from Russia's ongoing invasion of Ukraine). This high cost of adoption is one reason so many farmers have carefully applied nitrogen fertilizers using 4R management and enhanced efficiency fertilizer (EEF) products where they can.

Corn producers who implement the 4Rs begin by determining the Right rate. This is a multi-step process often done in consultation with their agronomist, fertilizer retailer, or university soil and crop scientists. First, a yield goal is determined (based on historical yields) and the nitrogen that will be embedded in the corn grain protein and removed from the field. Many producers also employ global positioning system (GPS) yield monitoring/mapping and precision fertilizer application equipment, which enables them to easily conduct nitrogen rate strip trials to determine the economic optimum rate for each field. Producers also utilize soil sampling/testing to determine nutrient and organic matter levels in their fields. This information is used to calculate an optimum economic fertilizer application rate.

Implementation of other 4R components also help minimize N_2O emissions. The GREET model assumes that 10% of nitrogen fertilizer is lost via ammonia (NH_3) volatilization. Choosing the Right form of nitrogen fertilizer and then injecting or incorporating the fertilizer into soil (Right placement) at application time can greatly reduce losses from ammonia volatilization. Right placement of nitrogen fertilizer (injecting into soil) can also significantly reduce runoff and associated N_2O emissions. Finally, Right timing of nitrogen fertilizer applications can significantly reduce direct N_2O emissions due to nitrification, denitrification, and the indirect N_2O emissions resulting from runoff and leaching losses.

While GREET does consider 4R and EEFs, it does not currently credit for the adoption rate of these CSA practices when calculating a U.S. average CI. In fact, GREET provides a worst-case estimate of nitrous oxide emissions. The scientific data are strong that precision fertilizer management can significantly reduce both direct and indirect N_2O emissions resulting from nitrogen fertilizer losses from fields due to volatilization, runoff and leaching. If 4R management is fully implemented and EEFs are used, N_2O emissions could be reduced by up to 50% relative to currently modeled estimates.

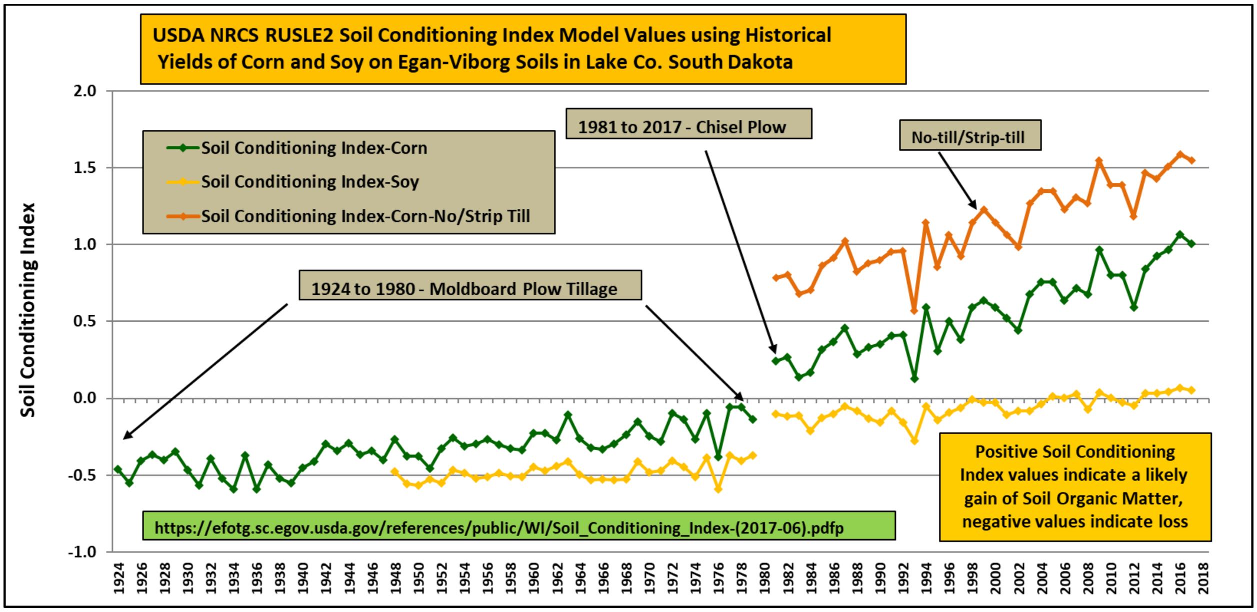
And even though the scientific literature indicates that the precipitation/crop water use balance and crop residue types are crucial factors impacting both direct and indirect nitrous oxide emissions, no consideration of this is accounted for in the GREET and GREET FD-CIC. This is a research need of high priority because nitrous oxide emissions alone are nearly 50% of total cereal grain biofuel feedstock GHGs.

While GREET is indeed the gold standard for lifecycle analysis of GHG emissions, it currently does not account for and credit the use of low carbon fuels and energy during biofuel feedstock production. ACE believes GREET must be updated to account for the use of biodiesel and renewable diesel use in farm machinery used to produce biofuel feedstocks and urges USDA to also account for this because many biofuel feedstock producers use significant amounts of lower carbon biofuels on their farms.

Finally, although ethanol manufacturing is credited for capturing and sequestering the CO_2 in the GREET model, the original CO_2 capture occurs in corn fields via photosynthesis. The corn plant is the only reason that CCS can occur and thus corn should get the bulk of the credit for CCS.

2. **Scientific data, information, and analysis for consideration in quantifying the greenhouse gas emissions outcomes of climate-smart agricultural practices and conventional farming practices**

The reasons and factors for changes in soil carbon stocks have been studied extensively for 7-8 decades. What we have discovered from hundreds of peer-reviewed soil organic carbon (SOC) studies is that extensive tillage to control weeds in cropland and low crop yields (low mass of unharvested residues returned to soil) resulted in extensive losses of SOC during the first half of the past Century. However, over the past several decades, herbicides were developed to control weeds, and this has enabled significant reductions in tillage intensity, and steadily higher crop unharvested residue yields have significantly improved the potential for SOC sequestration in croplands. Soil carbon models such as DayCent, USDA NRCS RUSLE2, and the MSU Cropland GHG Calculator are informed/based on these large bodies of evidence. Below we used the USDA NRCS RUSLE2 model to illustrate the changes in SOC balance factors over the past century in Lake County, South Dakota:



Positive soil conditioning index values indicate a likely gain in SOC, while negative values indicate a loss. This also reinforces the fact that tillage methods have a significant impact on crop-specific SOC.

Another credible crop/soil GHG model USDA can refer to with respect to GHG credits for tillage of specific biofuel feedstocks is the Michigan State University (MSU) Cropland GHG Calculator.[8] The MSU Calculator predicts similar results as DayCent, is much easier to use, and unlike the DayCent model, produces essential biofuel feedstock crop-specific results. We used the MSU Cropland GHG Calculator to estimate CO_2 soil sequestration for Lake County, South Dakota from the three major crops grown in the U.S. Below is a graphical illustration of those results:

[8] http://carboncalculator.kbs.msu.edu/

	Michigan State University Cropland GHG Calculator http//surf.kbs.msu.edu/																			
	(The Effects of Crops, Yield, Tillage Intensity, Soil Characteristics, and Climate on Soil Organic Carbon																			
	SOC sequestration - Mg CO2 per acre per year																			
	(Negative values indicate Soil CO2 sequestration, positive numbers Soil CO2 Emissions)																			
	Lake County, SD				Corn		US Avg. Yields													World Yield Records
Yield	**90**	**100**	**110**	**120**	**130**	**140**	**150**	**160**	**170**	**180**	**190**	**200**	**210**	**220**	**230**	**240**	**250**	**260**	**270**	**616**
No-till	-0.14	-0.19	-0.24	-0.28	-0.33	-0.38	-0.42	-0.47	**-0.52**	-0.56	-0.61	-0.66	-0.70	-0.75	-0.80	-0.84	-0.89	-0.93	-0.98	**-2.62**
Reduced	0.01	-0.02	-0.05	-0.08	-0.11	-0.14	-0.17	-0.20	**-0.23**	-0.26	-0.29	-0.32	-0.35	-0.38	-0.41	-0.44	-0.47	-0.50	-0.53	**-1.56**
Conventional	0.08	0.06	0.03	0.01	-0.01	-0.03	-0.06	-0.08	**-0.10**	-0.13	-0.15	-0.17	-0.19	-0.22	-0.24	-0.26	-0.28	-0.31	-0.33	**-1.09**
						Soybean														
Yield	**26**	**29**	**32**	**35**	**38**	**41**	**44**	**47**	**50**	**53**	**56**	**59**	**62**	**65**	**68**	**71**	**74**	**77**	**80**	**190**
No-till	0.10	0.05	0.05	0.03	0.01	-0.02	-0.04	-0.06	**-0.09**	-0.11	-0.13	-0.16	-0.18	-0.20	-0.23	-0.25	-0.27	-0.30	-0.32	**-1.17**
Reduced	0.18	0.15	0.15	0.14	0.12	0.11	0.09	0.08	**0.06**	0.05	0.03	0.02	0.00	-0.01	-0.03	-0.04	-0.06	-0.07	-0.09	**-0.61**
Conventional	0.21	0.19	0.19	0.18	0.17	0.16	0.15	0.14	**0.13**	0.11	0.10	0.09	0.07	0.07	0.06	0.05	0.04	0.03	0.02	**-0.36**
						Wheat														
Yield	**26**	**29**	**32**	**35**	**38**	**41**	**44**	**47**	**50**	**53**	**56**	**59**	**62**	**65**	**68**	**71**	**74**	**77**	**80**	**250**
No-till	0.07	0.04	0.02	-0.01	-0.03	-0.06	-0.08	-0.10	**-0.13**	-0.15	-0.18	-0.20	-0.22	-0.25	-0.27	-0.30	-0.32	-0.35	-0.37	**-1.74**
Reduced	0.15	0.14	0.12	0.11	0.09	0.07	0.06	0.04	**0.03**	0.01	0.00	-0.02	-0.03	-0.05	-0.06	-0.08	-0.09	-0.11	-0.12	**-0.96**
Conventional	0.19	0.18	0.17	0.15	0.14	0.13	0.12	0.11	**0.10**	0.09	0.08	0.06	0.05	0.04	0.03	0.02	0.01	0.00	-0.01	**-0.61**

It is clear corn sequesters considerably more SOC than other commonly grown crops. Modeling for 45Z or other biofuel market opportunities need to include crop-specific SOC credit values.

Furthermore, because many soil scientists believe corn crops (when residues remain on the field) have the most potential to build/sequester carbon in soil, we have collected 53 peer-reviewed studies on corn crop impacts on soil carbon stocks. We have attached the "Summary of Corn SOC" data from these studies in a separate excel workbook. (**Attachment #3**).

3. **Records, documentation, and data necessary to provide sufficient evidence to verify practice adoption and maintenance**
4. **Systems used to trace feedstocks throughout the biofuel supply chain**
5. **Third-party verification of practice adoption and maintenance**

Our comments conclude by addressing topics articulated above related to recordkeeping, tracing and third-party verification.

We appreciate the need for clear rules surrounding verification and recordkeeping of CSA practice adoption and maintenance for existing and future clean fuel standards and federal tax incentives. USDA is well-equipped to leverage its existing procedures and protocols for reporting and verification of GHG emissions associated with the production of domestic agricultural commodities used as biofuel feedstocks. That is why we believe the Treasury Department should rely on existing USDA assets in the reporting and verification for the 45Z tax credit, and encourage USDA to directly engage Treasury with respect to its expertise and experience in this area.

While USDA, itself, is the expert in understanding how to leverage its various agencies manpower, resources, and systems in this effort, we want to highlight the substantial tools and resources at USDA's disposal.

Leveraging USDA Conservation Compliance Apparatus

Since 1985, USDA has been required to ensure that farmers meet specific conservation requirements on their lands to be eligible for federal farm programs administered by USDA's Farm Service Agency (FSA), Risk Management Agency (RMA) and Natural Resource Conservation Service (NRCS)NRCS. Known as "conservation compliance," Congress wanted to ensure that federal farm programs did not entice farmers to grow crops on highly erodible lands or convert wetlands for agricultural production.

Farmers who fail to abide by these rules are ineligible for federal farm programs including FSA loans and disaster assistance payments, NRCS and FSA conservation benefits, and Federal crop insurance support. Under federal regulation, farmers and affiliated persons must affirmatively attest (form AD-1026) that they will not plant or produce an agricultural commodity on highly erodible land without following an NRCS approved conservation plan or system, plant or produce an agricultural commodity on a converted wetland, or convert a wetland which makes the production of an agricultural commodity possible. Additionally, activities that may affect compliance such as removing fence rows, combining fields, or conducting drainage activities must be pre-approved by USDA to ensure compliance.

USDA's FSA and NRCS are tasked with ensuring eligibility. Leveraging nearly 10,000 staff in state and county offices, NRCS is responsible for making the technical determinations of compliance at the farm level and FSA's staff of nearly 7,000 state and county offices use this information to make program eligibility determinations for the covered programs. In 2020, USDA ensured the eligibility of 1,095,270 recipients of Farm Bill commodity program payments totaling $34.01 billion in federal dollars. The same year, UDSA ensured the eligibility for 2,185,728 crop insurance policies with payouts of $6.3 billion.

USDA staff are well-versed in making eligibility determinations necessary for the distribution of taxpayer-funded Farm Bill programs at a scale commensurate with what would be required under a verification program for 45Z. In fact, in almost all regards, USDA is already working with and certifying compliance of farmers who will delivering climate-smart commodities to participating ethanol companies.

Leveraging NRCS-Specific Conservation Program Apparatus

From 2017 to 2023, USDA's NRCS provided $12.9 billion in conservation payments to U.S. farmers for the voluntary adoption of conservation practices working on average with over 325,000 farmers annually.

One of the largest conservation programs NRCS administers is the Environmental Quality Incentives Program (EQIP), which provides money and technical help to farmers to plan and implement many of the same conservation practices, namely cover crops, reduced-tillage, no-till and nutrient management, which we believe ought to be incorporated into qualifying toward 45Z. Under EQIP, NRCS has developed extensive national practice standards for each approved conservation practice that are then further refined into state-specific practice standards to meet state and local requirements which may be more restrictive than the national criteria.

For example, the national practice standard for what is required of farmers adopting cover crops under EQIP runs seven pages long and includes considerations for wind and water erosion, soil moisture, soil compaction, nutrient use, soil organic matter content, among others. In each state, farmers must meet state-based specifications for seeding rate, seeding date, cover crop varieties, planting and termination methods to meet the environmental outcome. Each of these requirements is evidenced by seed tags, receipts or visual inspection as part of the USDA reimbursement process.

We also strongly believe tillage intensity should be determined and validated by using the USDA NRCS Soil Tillage Intensity Rating (STIR) method.

Farmers understand and accept USDA's system, which is why it should be leveraged for 45Z implementation instead of re-inventing the wheel with a new, expensive, and unreliable system. From 2017 to 2022, NRCS distributed over $5 billion in EQIP incentives in 205 different practice areas. NRCS has specific, state-based environmental standards farmers must meet when implementing the practice. NRCS, or its partners, are responsible for documenting that farmers have complied with the standards yearly prior to USDA authorizing taxpayer funded conservation payments to participating farmers. These practices include the most likely climate-smart practices to be incorporated in 45Z including cover crops, no-till, reduced-till and nutrient management.

<u>Quantifying and Verifying Climate-Smart Practice Adoption for Biofuels Markets</u>

USDA has a long track record of stewarding federal taxpayer funds for commodity and conservation programs ensuring that participating farmers meet necessary requirements to receive federal funds. If these existing USDA protocols are sufficient for verifying distribution of federal funds in commodity and conservation programs, they are equally sufficient for verifying the same practices for federal tax incentives such as 45Z.

USDA's existing systems should be used to report and verify climate-smart practice adoption. NRCS EQIP practice codes should be used as the standard farmers must meet for eligibility for climate-smart designations. Similar documentation requirements as currently used by NRCS to approve distribution of billions in federal conservation payments should be sufficient to meet verification requirements under 45Z or other federal tax incentive programs. There is no need to re-invent the wheel. Instead, state and federal fuel programs should leverage USDA's infrastructure to verify desired sustainability criteria.

In cases where records are necessary, feedstock producers maintain annual records of energy, fertilizer, lime, seed, and pesticide use as they are "deductible expenses" when filing taxes. These records can be easily incorporated into the documentation.

We discourage mandatory on-site verification beyond USDA's existing commodity program, conservation program and crop insurance protocols.

In terms of systems to trace feedstocks through the supply chain, we encourage the use of mass balancing as it is a common-sense and well-known chain-of-custody approach which Treasury has already stipulated under the 40B sustainable aviation fuel (SAF) credit. We also encourage the consideration of book and claim which could encourage greater adoption of CSA practices and enable farmers to benefit from CSA certificates which could be de-coupled from the bushel of corn or other feedstock to be marketed through a regulated registry.

Finally, in addition to encouraging USDA to directly engage Treasury on its expertise and experience in the area of verifying certain farm-level practices, we also encourage you to provide future opportunities to provide more detailed comments to help USDA monetize CSA practices once Treasury has released their proposed rules guiding implementation of 45Z.

Thank you for your time and consideration of these comments.

Sincerely,

Brian Jennings, CEO
American Coalition for Ethanol