NAWG | NATIONAL ASSOCIATION OF WHEAT GROWERS
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William Hohenstein
Director, Office of Energy and Environmental Policy
Office of the Chief Economist
US Department of Agriculture
1400 Independence Avenue, SW
Washington, DC 20250

Submitted Online: Docket No. USDA-2024-0003

Dear Director Hohenstein:

Thank you for the opportunity to respond to the request for information on procedures for quantification, reporting, and verification of greenhouse gas emissions associated with the production of domestic agricultural commodities used as biofuel feedstocks (Docket No. USDA-2024-0003). The National Association of Wheat Growers (NAWG) is a federation of 20 state wheat grower associations and industry partners that works to represent the needs and interests of wheat producers before Congress and federal agencies. Based in Washington, D.C., NAWG is grower-governed and works in areas as diverse as federal farm policy, trade, environmental regulation, agricultural research, and sustainability.

Wheat growers manage their farming operations to protect soil health and maintain viable farming operations that benefit the environment, their communities and provide food for consumers domestically and worldwide. Winter wheat and spring wheat are grown across the country and are part of diverse crop rotations that will vary geographically. Crop rotations are vital for successful farming operations that need to manage the economics of crop inputs, equipment, crop insurance and income from those crops. NAWG members are using more diverse crop rotations and looking to future opportunities that could be Sustainable Aviation Fuel (SAF) markets for their corn, soy, sorghum, or new crops that could fit within their rotation. NAWG encourages USDA to keep in mind while developing this program that growers are not just producing one crop, but managing multiple crops in rotation and may be using cover crops or winter crops in those rotations.

NAWG is pleased to offer the following comments on specific questions from the RFI. We also look forward to continued discussions on these issues.

(1) Which domestic biofuel feedstocks should USDA consider including in its analysis to quantify the GHG emissions associated with climate smart farming practices? USDA is considering corn, soybeans, sorghum, and spring canola as these are the dominant biofuel feedstock crops in the United States. USDA is also considering winter oilseed crops (brassica carinata, camelina, pennycress, and winter canola). Are there other potential biofuel feedstocks, including crops, crop residues and biomaterials, that USDA should analyze?

USDA should include all feedstock options, including crop residues, to cover a broader geographic region and potential farming operations that could participate in a program. Consideration should be given for crops that can be grown in semi-arid regions and areas outside the traditional biofuels Midwest corn/soy belt to allow all farmers to potentially participate in these market opportunities.

(2) Which farming practices should USDA consider including in its analysis to quantify the GHG emissions outcomes for biofuel feedstocks? Practices that can reduce the greenhouse gas emissions associated with specific feedstocks and/or increase soil carbon sequestration may include, but are not limited to: conservation tillage, no-till, planting of cover crops, incorporation of buffer strips, and nitrogen management (*e.g.,* applying fertilizer in the right source, rate, place and time, including using enhanced efficiency fertilizers, biological fertilizers or amendments, or manure). Should practices (and crops) that reduce water consumption be considered, taking into account the energy needed to transport water for irrigation? Should the farming practices under consideration vary by feedstock and/or by location? If so, how and why?

In addition to the practices mentioned in question #2, USDA should include Conservation Crop Rotation and include the benefits of winter crops that provide the same functions as a cover crop. Winter wheat, planted in the fall, provides a living root cover over the winter, sequesters carbon, breaks pest cycles between crops, and provides a durable residue for no-till and conservation tillage systems. In addition to these environmental benefits, winter wheat taken to harvest also provides economic benefits as it allows for a source of income for farmers and feeds the world. USDA programs and policies currently allow winter wheat to be planted as a cover crop, but does not allow harvesting, regardless of the fact that the same environmental benefits are being provided. Studies have even shown that winter wheat taken to harvest sequesters more carbon than a rye cover crop. In a corn-soybean rotation with a cereal rye cover crop planted each fall, the estimated total biomass is 15,628 lb/acre after two years. In a corn-wheat-soy rotation with a rye cover crop seeded after soybean, the estimated total biomass is 18,597 lb/acre. The crop rotation with wheat for grain produced nearly 3,000 more pounds of biomass than without wheat for grain.

USDA must consider the regional production systems and climate that influences whether certain practices can be undertaken. For example, not all growers can plant cover crops, drier climates, or areas with short growing seasons don't have the ability to successfully grow cover crops. There should be a variety of practice options that work for growers and allow growers to make the decisions on which practices work the best for their operation.

If food crops are not included in rotations or recognized as providing equivalent or better environmental benefits than winter cover crops, NAWG expects an impact on wheat production in the U.S. as a result of increased focus on biofuels markets. We hope to continue to work with the Administration to address the potential adverse impacts on food crop production. We have seen substantial shifts in wheat production areas over the last thirty years, dropping from just under 68 million acres harvested in 1994/5 to just under 39 million acres for 2024/25 and while there are multiple factors impacting production shifts, increased market opportunities for biofuel feedstocks are a strong force in the shift away from wheat production.

USDA should also consider a systems approach that includes diverse rotations, each sequestering carbon and providing environmental benefits, but that would also consider the crops being produced in a climate smart manner. Diverse crop rotations that keep the ground covered most of the year could have commodities headed into biofuels markets, food and feed markets depending upon the commodity, but each should be able to retain their "climate smart" production benefits, with their cropping system recognized as climate smart.

(3) For practices identified in question 2, how should these practices be defined? What parameters should USDA specify so that the GHG outcomes (as opposed to other environmental and economic benefits) resulting from the practices can be quantified, reported, and verified?

Wheat farmers are continually altering their cropping systems and management practices to identify the system that makes sense for their geographic location and markets. USDA should continue to update practices and recognize the diversity of crop production in the U.S. USDA should work cooperatively with private market programs on definitions and modeling to ensure that USDA does not become the only viable program option – the federal government actions should not replace private market efforts. Any definitions should allow for producer flexibility at the local or farm level to recognize the unique conditions – soils, climate, rotations, pest and disease pressures during the year, and any disasters beyond the control of the producer. In addition, the multiple benefits of the practices should be considered. Regarding nitrogen or fertilizer management, growers should be able to continue to manage healthy crops and adjust fertilizer use as appropriate for their farming operation and local conditions. Farmers should also continue to have flexibility and choices in types of fertilizer or biologicals applied. Any definitions for the purposes of this program must recognize there will be differences in cropping system needs, impact of localized conditions on the crop and growers must have ability to make management decisions based on the needs of the crop.

(4) For practices identified in question 2, to what extent do variations in practice implementation affect the overall GHG benefits of the practice (*e.g.,* the date at which cover crops are harvested or terminated)? What implementation strategies maximize the GHG benefits of these climate-smart agriculture practices?

Winter wheat provides a living cover longer than a cover crop that may be terminated before planting the following crop. Research shows there is more carbon sequestered from winter wheat taken to harvest compared to a single species rye cover. The specific dates of planting/harvest/termination will depend on localized conditions that are outside the farmer's control – weather and condition of the crop being the most important. GHG benefits should be modeled based on generalized information for different production regions of the country to provide averaged data rather than individual farm specific measurements.

USDA could consider different high/low ranges of benefits. For example, in Maryland[1], the cover crop program includes different levels of financial incentives for different planting dates. Recognizing variability in outcomes, a two-tier system for planting dates or termination dates recognizes improved results with earlier planting and later termination, however early planting/late termination dates don't work for all farmers. This flexibility allows more growers to participate and can account for different levels of benefits. Growers should also be allowed to prove increased outcomes with justification or have a type of appeals process.

(5) What scientific data, information, and analysis should USDA consider when quantifying the greenhouse gas emissions outcomes of climate-smart agricultural practices and conventional farming practices? What additional analysis should USDA prioritize to improve the accuracy and reliability of the GHG estimates? How should USDA account for uncertainty in scientific data? How should USDA analysis be updated over time?

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[1] https://mda.maryland.gov/resource_conservation/pages/cover_crop.aspx

NAWG recommends additional analysis on diverse cropping systems and the GHG estimates of the entire cropping system/rotation. Research should be ongoing to identify additional beneficial rotations and recognize that growers may shift rotations depending on weather conditions and market signals/conditions. Additionally, there could be fallow periods during summer where there is insufficient moisture to support a cover crops.

The entire crop rotation (including cover crops, cash crops, or fallow during summer) must be considered for more appropriate systems-level estimates of carbon sequestration potential or greenhouse gas emissions from wheat fields, since different crops or the presence of a fallow period could potentially change the outcome from a seasonal basis to an annual basis.

(6) Given the degree of geographic variability associated with each practice, on what geographic scale should USDA quantify the GHG net emissions of each practice (*e.g.,* farm-level, county-level, state, regional, national)? What are the pros and cons of each scale? How should differences in local and regional conditions be addressed?

NAWG recommends that the geographic scale should be at the state level of higher. There are local and regional differences, but a lower level of specificity could be cost prohibitive and information/details that might not have a significant impact on the outcomes measured.

(9) How should net greenhouse gas emissions, including soil carbon sequestration, be attributed among crops produced in a rotation, for example crops grown in rotation with one or multiple cover crops?

The consideration of crops in rotation is very important to the discussion of environmental attributes (climate smart/regenerative/sustainable). As stated previously, wheat is typically grown in rotation with other crops with wheat varieties planted in the fall (winter wheat) or spring (spring wheat). Winter wheat (terminated, not harvested) can also be a cover crop under NRCS conservation practice standard 340 (Cover Crops). USDA must thoroughly consider crop rotations and the impact these policies have on food crops that can be planted in the winter can generate a climate-smart practice for biofuel feedstocks, but also a food commodity that is climate-smart. USDA should not put forth policies or recommendations that adversely impact food crop production.

USDA should also consider a systems approach that includes diverse rotations, each sequestering carbon and providing environmental benefits, but that would also be considered as produced in a climate smart manner. Diverse crop rotations that keep the ground covered most of the year could have commodities supplying biofuels markets, food and feed markets depending upon the commodity, but each should be able to retain their "climate smart" production benefits, with their cropping system recognized as climate smart. Wheat may not be destined to a biofuels market, but to a miller, food company, or feed company and that company may want to recognize the climate smart practices of the wheat production. Additionally, the Department of Energy identifies wheat straw as a potential source for cellulosic biofuel production[2] and while not a significant market today, NAWG would encourage USDA to consider how wheat straw might be treated in the future – would a climate smart benefit only be associated with the grain, or both the grain and the wheat straw/residue?

> (12) How should the GHG outcomes of soil management practices that can increase carbon sequestration or reduce carbon dioxide emissions (*e.g.,* no-till, cover crops) be quantified? What empirical data exist to inform the quantification? Over what time scale should practices that sequester soil carbon be implemented to achieve measurable and durable GHG benefits?

NAWG recommends looking broadly at the rotations and regional practices. Some producers in semi-arid regions will include fallow in their rotations because there is not sufficient moisture to allow for growth of another crop. Managing field with no-till and conservation tillage maintains wheat straw/residue on the field and looking at the entire cropping systems includes the benefits of wheat rotations in sequestering carbon. Wagle et al. (2021) measured CO2 fluxes in eight production-scale winter wheat fields during three consecutive growing seasons (2017, 2018, 2019) managed for different purposes (grain only, graze with cattle and grain, and graze-out by cattle) and under different tillage practices (conventional till and no till) near El Reno, Oklahoma. Irrespective of management, wheat fields were large sinks of CO2 during the growing season, with grain only systems sequestering more carbon than graze and grain systems, and with no till systems potentially sequestering more carbon than conventional tilled systems **(Table 1)**. In summary, the net ecosystem CO2 exchange ranged from -1328 to -5,027 lbs C per acre. These potential carbon sequestration values were accompanied by grain yields ranging from 15 bushels per acre (graze plus grain system) to 55 to 80 bushels per acre (grain only system). When carbon removal in the grain was accounted for, the total carbon sink potential of wheat ranged from 998 to 2,825 lb C/acre in graze and grain systems, to 2,772-3,298 lb C/a in grain-only systems.

Table 1. *Seasonal (October to May) cumulative values of net ecosystem CO_2 exchange measured in pounds of carbon per acre during three winter wheat*

[2] https://www.energy.gov/articles/doe-releases-report-outlining-how-america-can-sustainably-produce-more-one-billion-tons

growing seasons (2017, 2018 2019) near El Reno, OK. Data adapted from Wagle et al., 2021. Green cells represent winter wheat grown for grain only purpose, blue cells the crop grown for graze and grain, and yellow cells the crop grown for graze out. Abbreviations: CT, conventional till; NT, no till; n.a., not available (data not measured).

Field	Season					
	2016-17	2016-17	2017-18	2017-18	2018-19	2018-19
	CT	NT	CT	NT	CT	NT
1	-5,027	-4,546	-2,629	-3,378	-4,171	-3,218
2	n.a.	n.a.	-3,824	n.a.	-4,314	n.a.
3	-2,041	-1,586	n.a.	-1,381	n.a.	-2,754
4	-1,346	-2,932	-1,880	-1,328	n.a.	n.a.

(13) For practices that can increase soil carbon sequestration or reduce carbon dioxide emissions, how should the duration and any interruptions of practice (*e.g.,* length of time practice is continued, whether the practice is put in place continually or with interruptions) be considered when assessing the effects on soil carbon sequestration?

There could be times when growers are faced with resistant weeds, pest infestations or natural disasters that are outside a grower's control that result in action in the field that could interrupt conservation practices and rotational systems.

(14) How should the baseline rates of change in soil carbon and uncertainty around the greenhouse gas benefits of these practices be characterized? Does this uncertainty and variability depend on the type or longevity/permanence of the practice?

There are different rates at which the soils, local climate and available moisture facilitate carbon sequestration. Wheat production varies across the U.S. and many growers have been undertaking conservation such as reduced tillage, conservation crop rotation and utilizing the 4 Rs for nutrient stewardship. There must be recognition of these efforts over time and that sequestering carbon does not begin with the participation in a new program. Growers that are located in more arid regions undertake conservation practices but may not be sequestering carbon at the same rate as growers in regions with higher rainfall.

(18) Should on-site audits be used to verify practice adoption and maintenance and if so, to what extent, and on what frequency?

The geographic diversity of US farming operations would make on-site audits of all participants cost prohibitive and very difficult to carry out in a timeline manner. NAWG recommends sampling a subset of participants in any program for verification, similar to existing USDA programs.

> (20) What system(s) should be used to trace feedstocks throughout biofuel feedstock supply chains (*e.g.,* mass balance, book and claim, identity preservation, geolocation of fields where practices are adopted)? What data do these tracking systems need to collect? What are the pros and cons of these traceability systems? How should this information be verified?

NAWG suggests that any supply chain system operate on a mass balance or book and claim type approach, not a system that requires tracing and tracking a specific commodity through the supply chain. We believe that creating an overly burdensome system to segregate commodities would be cost prohibitive and would not substantially impact the final product (biofuel, food, feed).

NAWG also suggests the following sources for more information on wheat systems:

Bajgain, R., Xiao, X., Basara, J., Wagle, P., Zhou, Y., Mahan, H., Gowda, P., McCarthy, H.R., Northup, B., Neel, J. and Steiner, J., 2018. Carbon dioxide and water vapor fluxes in winter wheat and tallgrass prairie in central Oklahoma. Science of the total environment, 644, pp.1511-1524.

Bolinder, M. A., Janzen, H. H., Gregorich, E. G., Angers, D. A., & VandenBygaart, A. J. 2007. An approach for estimating net primary productivity and annual carbon inputs to soil for common agricultural crops in Canada. Agriculture, Ecosystems & Environment, 118: 29-42.

Ma, B. L., and L. M. Dwyer. 2001. Maize kernel moisture, carbon and nitrogen concentrations from silking to physiological maturity. Canadian journal of plant science 81.2 2001: 225-232.

Quinn, D. J., Poffenbarger, H. J., Leuthold, S. J., & Lee, C. D. 2021. Corn response to in-furrow fertilizer and fungicide across rye cover crop termination timings. Agronomy Journal. 113: 3384-3398.

Quinn, D. J., Poffenbarger, H. J., Miguez, F. E., & Lee, C. D. 2023. Corn optimum nitrogen fertilizer rate and application timing when following a rye cover crop. Field Crops Research, 291, 108794.

Ryan, L.P. 2023. Sustainable intensification of crop production: Reviewing current knowledge and investigating opportunities for bread with lower global warming potential. M.S. thesis, Kansas State University, Manhattan KS.

Thank you for the opportunity to provide comments on this request for information.

Sincerely,

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