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Re: Federal Strategy to Advance Measurement and Monitoring Greenhouse Gas Measurement and Monitoring for the Agriculture and Forest Sectors (88 FR 44251, Docket 2023-14158)

Dear Mr. Meyer and Ms. Selman:

On behalf of the Bipartisan Policy Center (BPC), and the work of our Farm and Forest Carbon Solutions Task Force, we are pleased to submit the following comments in response to the Department's Request for Information on the new Federal Strategy to Advance Measurement and Monitoring of Greenhouse Gas Emissions in the Agriculture and Forestry Sectors. The BPC actively fosters bipartisanship by combining the best ideas from both parties to promote health, security, and opportunity for all Americans through informed deliberations by former elected and appointed officials, business and labor leaders, and academics and advocates who represent all sides of the political spectrum.

In February 2022, the Task Force issued a final report reflecting a set of [consensus-based, practical ideas](#) for advancing economic and environmental outcomes for American farmers, ranchers and forest landowners. The Task Force's work was guided by a set of core principles including pursuing strategies that are voluntary and incentive based, that align with the economic and environmental goals of working lands, that are flexible to the needs of diverse production systems and producers, that foster partnerships with the private sector, and that are based on a commitment to delivering measurable results. Their work was also underpinned by a panel of leading scientific experts and technical advisors that provided counsel on the state of scientific understanding with respect to issues of quantification, durability, and effectiveness for natural climate solutions. This shared work of the Task Force and technical advisory panel provide the basis for BPC's response.

BPC welcomes the robust interagency engagement and vision outlined by the new strategy as well as the further commitment to advance sector-specific plans for croplands, grasslands, livestock, and forests. Reducing uncertainty and increasing confidence in the climate benefits of mitigation activities requires a sustained commitment to improving the consistency and integrity of measurement, monitoring, reporting, and verification (MMRV) activities at national, regional, and entity (farm and forest) scales. Enhanced MMRV should be integrated into activities without overwhelming the process with high transaction costs that reduce revenue to producers and would discourage adoption of climate-smart activities and practices. The new strategy outlines an ambitious pathway to augment existing MMRV systems by onboarding new technologies and earth observations; enhancing opportunities for partnerships and responsible data sharing among public, academic, nonprofit, and private sector

entities; advancing critical research and modeling; and expanding associated field testing and parametrization efforts. Importantly, the strategy begins to address key gaps, including the establishment of a new soil carbon monitoring network, enhanced research of *in situ* soil carbon estimates, and the use of new surveys and partnerships to tackle persistent issues such as a lack of data on application rates and timing of nitrogen fertilizer additions to soils.

Based on the work of the BPC's Task Force and technical advisory committee, we wish to share the following responses to key questions raised by the request for information. Throughout our response, we are aiming to underscore several key priorities. The strategy should:

1. Prioritize **long-term** (>20 years) MMRV efforts, to ensure the continuity, consistency, and rigor required to determine baselines, evaluate change, and enable intercomparison of practices, measurement technologies, and models.
2. Incorporate information about variations in specific agriculture, forestry, rangeland, and forest conservation practice standard adoption to assess greenhouse gas (GHG) benefits and additional environmental impacts. **Linking management activities to ecosystem impacts** is essential for estimating their efficacy and long-term environmental, social, and economic effects. For example, nutrient management practices may have significant benefits for GHG reductions in the case of nitrogen fertilizer efficiencies but can have negligible benefits in the case of an adoption of a phosphorous nutrient management plan. There are currently gaps in USDA's capacity to track and distinguish between these efforts for purposes of measuring the GHG emissions and removals benefits of its work.
3. Include a plan for **establishing the data infrastructure** needed to enable data coordination, sharing, transparency, and interoperability—while adhering to best practices for privacy and responsibility. The strategy must leverage the full array of data available across agencies to quantify the effects of land management practices on emissions and sequestration across all landscapes, practices, and production systems.
4. Ensure that data, estimates, and models are used to develop and refine **public-facing technical assistance tools and resources** that can be used to inform decision-making across diverse production types. Increasing access to tools that provide information for a range of crops, landscapes, production types could help increase participation and reduce transaction costs, especially for smaller operations.

Responses to Questions:

As described above, BPC convened an expert technical advisory committee to inform the Task Force about the state of terrestrial carbon cycle science and emissions sources, including limits and opportunities for quantifying natural climate solutions on farms, forests, and rangelands. From these deliberations, they emphasized the following set of recommendations for improving MMRV efforts, which apply to the **General Comments, Croplands, Forestry, and Data & Data Sharing** questions.

Expand data coordination—*there remains a need for enhanced, expanded, coordinated data collection and interoperability across agencies:*

- Within agricultural and forest landscapes, while USDA, including the U.S. Forest Service (USFS) would lead MMRV efforts, information from inventories and networks managed by other agencies—e.g., the AmeriFlux network supported by DOE—should be thoroughly integrated.
- The USDA National Resource Inventory (NRI) and Natural Resources Conservation Service (NRCS) should measure and record soil carbon attributes regularly at existing monitoring sites to enhance the below-ground carbon quantification dataset.
- A national data collection and inventory at the farm scale is needed to allow all modelers access to a common set of data sets, while also protecting producer privacy including personally identifiable information (PII) or confidential business information (CBI).
- USDA should expand its soil sampling as much as possible, while also investing in technologies (e.g., remote sensing), that measure soil carbon across landscapes for more efficient data collection; this dual approach is critical because new technologies and models must be based on real soil carbon data to ensure accurate accounting.
- The number of new measurement sites should exceed the number of existing ecosystem monitoring network sites but should, at the very least, be added to each of these network sites, wherever possible. These networks include, but are not limited to:
 - USDA Long-term Agricultural Research (LTAR) Network
 - NSF Long-term Ecological Research (LTER) Network
 - DOE AmeriFlux Program
 - USDA National Resource Inventory (NRI)
 - USFS Forest Inventory and Analysis (FIA) Program
 - NSF National Ecological Observatory Network (NEON)
- Physical sampling via field measurements of soil carbon should be conducted to depths of at least 30 centimeters and leverage, if possible, spectral estimation of soil carbon.
- Because carbon change in soils occurs slowly and takes years to be detectable, there is value in integrating pool-based approaches with flux-based approaches, which can include in situ measurements and proxies using ecosystem models and remote sensing. Flux approaches provide more continuous and near-real-time information about ecosystem responses to management changes than carbon pools, like soil. However, fluxes alone cannot track lateral transfer of carbon or export through harvest. Therefore, measurements of carbon stocks and fluxes should be coupled and integrated, wherever possible.

Model improvement—*measurements should be used to advance model development and ground-truth new technologies and methods:*

- Models generally represent carbon cycling well, but additional measurements and process improvements are needed, especially for below-ground carbon. We need to build confidence in models because measurement is not possible everywhere, and because model estimates can help reduce the need for expensive, repetitive measurement and monitoring. Furthermore:
 - Specific research considerations for below-ground carbon include the partition between above and below-ground biomass and how this varies with cultivar type.
 - More data are needed in geographic areas where *in situ* data remains limited, such as in much of Alaska and Hawaii.
- Despite an array of resources to support MMRV, including long-term inventories and measurement networks of above- and below-ground carbon and biomass; satellite-based data;

and models and tools that estimate carbon fluxes, storage, and other metrics of environmental change; different methods generate variability in estimates, requiring efforts to reconcile differences where they exist.

- While there have been large volumes of research accumulated over the years, agricultural practices are changing rapidly, causing those data and literature to be out of date. Modelers should consider how to reconcile older datasets with modern agricultural and forest land management activities and leverage current data management best practices.

Ecosystem change—clarity is required for understanding and quantifying ecosystem change:

- While there is abundant literature on ecosystem co-benefits from enhanced carbon sequestration in soils, grasslands, and forests, a common definition of these benefits is not widely agreed upon.
- Indicators of ecosystem co-benefits are often measured alongside soil conservation practices that enhance above- and below-ground biomass and carbon. Many existing observation methods and networks include measurements and estimates of atmospheric chemistry, nutrient density and cycling, soil moisture, biodiversity, chemistry, and composition. Research has been conducted to link soil processes to corresponding environmental changes, although continued investigation is warranted.
- Field experts must inform policy makers appropriately to avoid potential unintended consequences of projects that aim to generate specific types of ecosystem co-benefits.
- No terrestrial carbon sequestration or storage is strictly permanent as it cycles in and out; the more important question is whether practice adoption is permanent.
- Coincident measurements of additional environmental variables can help improve predictions of future GHG emissions and sinks, beyond the current state. There is a need to advance and expand our understanding of the variables—naturally occurring and anthropogenic—that drive changes in emissions and sinks. These factors include:
 - Temperature
 - Hydrology
 - Topography
 - Light (incoming radiation)
 - Precipitation regime
 - Nutrient density
 - Atmospheric chemistry
 - Soil physics and chemistry
 - Plant species and composition
 - Microorganisms
 - Disturbance regime
 - Land management including fertilizer application, nutrition, disturbance management, and harvest
 - Land use history and legacy effects of past practices
- While models generally represent the above drivers well, additional measurements and process improvements are needed to further refine and calibrate them, especially for below-ground carbon cycling. For example, scientists still lack a good understanding of the effect of increasing CO₂ on forest productivity at stand, landscape, and larger scales.
- Due to heterogeneity in the above variables even at local scales, regional averages of emissions and removal factors may be inaccurate representations of current conditions and confound accounting. These factors can be improved by calibrating and refining them using the *in situ* data sets, improved modeling approaches, and remote sensing measurements described in this response.