National Sustainable Agriculture Coalition

October 11, 2013

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Office of the Chief Economist
U.S. Department of Agriculture
Washington, DC 20250

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RE: Comments on Science-Based Methods for Entity-Scale Quantification of Greenhouse Gas Sources and Sinks from Agriculture and Forestry Practices, 78 Fed. Reg. 52898 (August 27, 2013)

On behalf of the National Sustainable Agriculture Coalition (NSAC) and the 40 member organizations we represent,[1] I submit these comments on USDA's draft report containing methods for quantifying entity-scale greenhouse gas (GHG) emissions and removals from the agriculture and forestry sectors. NSAC and our family farm, rural development, and conservation member organizations around the U.S. share a commitment to federal policy reform to advance the sustainability of agriculture, food systems, natural resources, and rural communities.

On April 19, 2011, NSAC submitted comments regarding USDA's notice to develop technical guidelines and scientific methods, 76 Fed. Reg. 9534 (February 18, 2011). Those comments (*attached*) made several recommendations, including the following key items,

[1] Agriculture and Land-Based Training Association - Salinas, CA; Alternative Energy Resources Organization - Helena, MT; California Certified Organic Farmers - Santa Cruz, CA; California FarmLink - Santa Cruz, CA; C.A.S.A. del Llano (Communities Assuring a Sustainable Agriculture) - Hereford, TX; Center for Rural Affairs - Lyons, NE; Clagett Farm/Chesapeake Bay Foundation - Upper Marlboro, MD; Community Alliance with Family Farmers - Davis, CA; Dakota Rural Action - Brookings, SD; Delta Land and Community, Inc. - Almyra, AR; Ecological Farming Association - Soquel, CA; Farmer-Veteran Coalition - Davis, CA; Fay-Penn Economic Development Council - Lemont Furnace, PA; Flats Mentor Farm - Lancaster, MA; Florida Organic Growers - Gainesville, FL; GrassWorks - New Holstein, WI; Hmong National Development, Inc. – St. Paul, MN and Washington, DC; Illinois Stewardship Alliance - Springfield, IL; Institute for Agriculture and Trade Policy - Minneapolis, MN; Iowa Natural Heritage Foundation - Des Moines, IA; Izaak Walton League of America - St. Paul, MN/Gaithersburg, MD; Kansas Rural Center - Whiting, KS; The Kerr Center for Sustainable Agriculture - Poteau, OK; Land Stewardship Project - Minneapolis, MN; Michael Fields Agricultural Institute - East Troy, WI; Michigan Food & Farming Systems (MIFFS) - East Lansing, MI; Michigan Organic Food and Farm Alliance - Lansing, MI; Midwest Organic and Sustainable Education Service - Spring Valley, WI; National Catholic Rural Life Conference - Des Moines, IA; The National Center for Appropriate Technology - Butte, MT; Nebraska Sustainable Agriculture Society - Ceresco, NE; Northeast Organic Dairy Producers Alliance - Deerfield, MA; Northern Plains Sustainable Agriculture Society - LaMoure, ND; Northwest Center for Alternatives to Pesticides - Eugene, OR; Ohio Ecological Food & Farm Association - Columbus, OH; Organic Farming Research Foundation - Santa Cruz, CA; Rural Advancement Foundation International – USA - Pittsboro, NC; Union of Concerned Scientists Food and Environment Program - Cambridge, MA; Virginia Association for Biological Farming - Lexington, VA; Wild Farm Alliance -Watsonville, CA.

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regarding the importance of taking a systems-based approach to GHG emissions mitigation and sequestration.

(1) It is critical that any inventory created include, and even highlight, those systems approaches that present the greatest opportunities for emission reduction and sequestration potential. Low-external input sustainable agriculture production systems, including certified organic production systems, should be included as an agriculture management activity for both cropland and animal agriculture, due to the ability of systems-based approaches to achieve multiple climate benefits without being limited to single practices. (Section 2.1.1)

(2) As a threshold issue, USDA should start by doing a full life cycle analysis for GHGs when comparing livestock and poultry production systems, especially pasture or grassland based systems versus confined animal feeding operations in which animal feed is primarily from grain produced in cultivated cropping systems. By ignoring the feed production side of livestock production, USDA cannot completely or comprehensively measure actual GHG emissions that result from livestock production. (Section 2.2)

(3) In an effort to enhance completeness and comprehensiveness, USDA should include diversification and extensification of production systems in addition to management changes or specific crops. Taking a whole-farm, systems approach is likely to provide greater opportunities for GHG emissions reductions and increased carbon sequestration. The inclusion of integrated cropping and livestock production systems would also enhance completeness and comprehensiveness. (Section 2.1.4)

Not only are these recommendations science-based, but they also fall directly in line with USDA directives to consider sustainable agriculture systems, including organic agriculture, in the Department's climate-related programs, policies, and research.

In particular, in early 2013, USDA issued a report entitled ***Climate Change and Agriculture in the United States: Effects and Adaptation***. A key finding in that report is the role that sustainable agriculture practices and systems can play in the adaptation of agriculture to a rapidly changing climate. The report states:

> Adaptation measures such as . . . diversifying crop rotations, integrating livestock with crop production systems, improving soil quality, minimizing off-farm flow of nutrients and pesticides, and other practices typically associated with sustainable agriculture are actions that may increase the capacity of the agricultural system to minimize the effects of climate change on productivity. For example . . . production practices that enhance the ability of healthy soils to regulate waters resource dynamics at the farm and watershed scales will be particularly critical for the maintenance of crop and livestock productivity under conditions of variable and extreme weather events. Enhancing the resilience of agriculture to climate change through adaptation strategies that promote the development of sustainable agriculture is a common multiple-benefit recommendation for agricultural adaptation. *See* CCPO Technical Bulletin 1935 at 6, Feb. 2013 (*emphasis added*).

In May this year, USDA issued a ***Departmental Guidance on Organic Agriculture, Marketing and Industry***. The guidance provides additional support for the explicit inclusion of organic practices in this report, specifically under sections (F) and (G):

(F) Where it is apparent that a lack of organic-specific data impacts decisions, agencies should collaborate on data collection and analysis through the USDA Organic Working Group;

(G) The Department should include organic production as a component of its studies comparing the effects of different production systems when appropriate (e.g. investigation of climate change adaptation practices). Organic production models may provide alternative solutions to current agricultural challenges, and it is the Agency's responsibility to develop diversity in research and alternatives for all producers. *See* attached guidance (*emphasis added*).

In stark contrast to USDA's own reports and guidance, the draft report makes no mention of the benefits of low-external input agricultural practices or any mention of how the tool will work for diversified farm operations, including sustainable and organic agriculture.

When we discovered that the draft report had apparently disregarded all of our recommendations, we contacted Bill Hohenstein to arrange a meeting to discuss this serious oversight and how the sustainable agriculture community could effectively participate in the development of emissions and sequestration measuring tools. We scheduled a meeting for October 4th and anticipated that the discussion would help determine how to ensure that our earlier and any subsequent comments on this project (including the comments due today on the draft report) were integrated into the scope of the project. And if, for some reason, our comments were not integrated, we expected to receive an explanation why such a significant segment of American agriculture – with proven, multiple climate benefits – was omitted from this report. Unfortunately, the government shutdown meant this meeting had to be postponed.

Without further clarity from USDA regarding how the report will integrate sustainable, systems-based agriculture into its scope, we do not believe we can effectively provide comments on the report as currently drafted. Nevertheless, to further emphasize our original points, we provide the following responses to the questions posed in the Federal Register. We look forward to another opportunity to speak with you and Bill to discuss these issues in detail prior to the finalization of this draft report.

(1) Are sources of GHG emissions or sinks missing? Are there potential inconsistencies in and across the methods?

Yes. The report does not address the sequestration and emissions reduction benefits of low-external input sustainable agriculture production practices, including certified organic agriculture. *See* NSAC 2011 comments regarding Section 2.1 (*attached*). Moreover, by failing to consider emissions from direct machinery fuel consumption and indirect emissions from fertilizer and pesticide production, USDA cannot comprehensively assess actual emissions associated with various cropland production practices. Similarly, by failing to perform a

lifecycle analysis of animal agriculture production systems, the methods fail to account for emissions associated with grain production and miss significant sources of GHG emissions.

(2) Are the proposed methods suitable for estimating GHG emissions while meeting the selection criteria (transparency, consistency, comparability, completeness, accuracy, cost effectiveness, and ease of use)?

No. As mentioned above, not only do the methods lack completeness by failing to consider emissions from direct machinery fuel consumption and indirect emissions from the production of agriculture inputs, but they also lack comparability across agricultural production systems, distorting the lens through which low-external input systems are compared to more conventional agriculture. This practice-based rather than systems-based approach fails to fully capture the potential GHG mitigation and sequestration benefits of diversified agricultural operations. In our view, this is a fatal flaw.

(3) Are new or additional data sources available for calculating emissions factors?

Yes. Without the opportunity to discuss our concerns due to the government shutdown, we can only assume that the omission in this draft report of low-external input and diversified agricultural systems signals that our previous comments were disregarded. Therefore, we direct USDA to our earlier comments (*attached*) regarding USDA-ARS and DAYCENT research comparing organic and conventional agricultural practices.

Furthermore, we ask that you consider providing greater concern for the verification of measurements that feed into the methods and models that are proposed in calculating GHG emissions. For example, on page 1-6 of the draft report you discuss field measurement as:

> [A]ctual measurements that a farmer or landowner would need to take to more accurately estimate the properties of the soil, forest, or farm or to estimate actual emissions. Measuring actual emissions on the land requires special equipment that monitors the flow of gases from the source into the atmosphere. This equipment is not readily available to most entities, so more often field measurements are incorporated into other methods described in this section to create a hybrid approach.

While actual field measurements are of course too difficult and costly to do on every farm in the United States, it would be critical to have field measurements done on several representative systems of production on actual farms to assure that the incorporation of data into the proposed hybrid approaches is adequately verified. More importantly, potentially climate-friendly systems of production, such as sustainable or organic production systems, should be part of such a field measurement effort and included in future studies.

This concern stems from the problem that current process models like DAYCENT are based on highly selective "experimental" input of specific practices that represent current, simple, and "typical" systems of crop production and not from more complex production systems that are often typical of sustainable and organic agriculture systems. For example, on page 3-98, the draft report states the following when referring to estimation of input to process models to estimate N_2O in crop production systems:

> Data were analyzed to derive scaling factors for the following practices: drip irrigation, nitrogen fertilizer placement, nitrification inhibitors, no-till management, and slow-release fertilizers. These practices were selected because experimental results suggested that the practice influenced N_2O emissions, or a previous meta-analysis had been conducted and shown an effect (i.e., no-till management; van Kessel et al., 2012). All practices were found to have a significant effect on N_2O emission with the exception of nitrogen placement.

Choosing only experimental data from a limited set of practices as the input to models predicting the N_2O emissions from cropping systems – as opposed to including other input data from, for instance, certified organic production systems that do not and cannot use these practices – seems to completely ignore these alternative systems as even being relevant of estimation. How sure are the authors of this report that organic production systems that use legume green manuring as the method of fertility, innovative practices of no-till without herbicides, and complex rotations are not likely to reduce GHG emissions if adopted? In other words, process models like DAYCENT may be fairly good at predicting the GHG emissions of typical and simple systems of production, but they fail entirely at the estimation of more complex agricultural systems that may in fact provide improved production methods to lower GHG emissions from crop production.

(4) Are there additional management practices for which the science and data are clear, and which should be addressed in the methods report?

Yes. Again, without the opportunity to discuss our concerns due to the government shutdown, we can only assume that the draft report's failure to recognize low-external input and diversified agricultural systems signals that our earlier comments were disregarded. I again direct USDA again to our 2011 comments (*attached*) that recommend consideration of additional management practices common to sustainable agriculture systems, including certified organic operations, integrated livestock and cropping production systems, grass-finished ruminant production, rotational grazing, and improved forage management.

Additionally, the report should clearly state that movement away from confinement feeding systems and expansion of grass-based finishing systems offers the greatest potential for long-term GHG emissions reduction and carbon sequestration in the livestock sector.

Finally, we stress that, in our view, a practice-only approach is not neutral. Rather, by failing to account for an increasing body of science that points to sustainable, system-based solutions as the most hopeful solutions, it is a missed opportunity to bring that science and knowledge to the farming community.

(5) Are the methods appropriate across a variety of farm and forest entities, as well as applicable to operations of any size?

No. There is no indication that the methods proposed will be able to properly estimate GHG emissions and carbon sequestration from diverse agricultural systems because of the exclusion of low-input and organic production systems. Moreover, the failure to account for

emissions from direct machinery fuel consumption and indirect emissions from fertilizers and pesticides significantly limits the ability to understand farming systems and their emissions. In our view, the applicability of the methods to diversified agricultural systems presents a greater issue than the applicability of the methods to operations of any size.

(6) Are the research gaps clearly identified? Are there additional gaps to note, or new data sources that significantly address any of the listed gaps?

Yes. There are recent peer reviewed research efforts related to sustainable and organic systems of production that seem to be missing or not considered in this draft report. Such a review would be useful to limit the potential for bias in GHG emissions measurements purposed in this draft report.

As one example, a meta-analysis published in 2012 in the Proceedings of the National Academy of Science entitled ***Enhanced top soil carbon stocks under organic farming*** suggests that there are "higher SOC (soil organic carbon) concentrations and stocks in top soils under organic farming" (p.5) as compared to other systems of production. *See* PNAS 2012 109 (44) 18226-18231; published ahead of print October 15, 2012, doi:10.1073/pnas.1209429109. While no one study is ever definitive, the extensive literature referenced in this study alone suggests greater consideration by the authors of this draft report and constitute a clear research gap.

In addition to the PNAS study and the studies referenced our 2011 comments, we include the following as a non-exhaustive sampling of the science supporting the climate benefits of sustainable and organic production systems:

> Davis AS, Hill JD, Chase CA, Johanns AM, Liebman M. 2012. Increasing Cropping System Diversity Balances Productivity, Profitability and Environmental Health. PLoS ONE 7(10): e47149. doi:10.1371/journal.pone.0047149 (Cropping system diversification promotes ecosystem services that can supplement, and eventually displace, synthetic external inputs used to maintain crop productivity. Through a balanced portfolio approach to agricultural sustainability, cropping system performance can be optimized in multiple dimensions, including food and biomass production, profit, energy use, pest management, and environmental impacts.)
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> LaSalle, T. and P. Hepperly. 2008. Regenerative organic farming: a solution to global warming. Report attached. (In a long term (30 year) trial, both organic methods and reduction in tillage enhanced SOC levels. Highest carbon sequestration was under organic management with tillage reduced to the minimum feasible without synthetic herbicides.)
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> Marriott, E.E. and M.M. Wander. 2006. Total and labile soil organic matter in organic and conventional farming systems. Soil Science Society of America Journal 70: 950-959. (Long term rotations that included some perennial sod crops more than offset the effects of more tillage in organic versus conventional farming systems.)

Teasdale, J.R. 2007. No Shortcut in Checking Soil Health. Agricultural Research Magazine 55(6) (July 2007) http://www.ars.usda.gov/is/AR/archive/jul07/soil0707.htm. (After 9 years in different production systems, soil that had been under organic management with some tillage had higher SOC than soil under continuous no-till non-organic. The organic-managed soil also supported higher grain corn yields during three years subsequent to the production systems trial.)

Teasdale, J.R., C.B. Coffman, and R.W. Mangum. 2007. Potential long-term benefits of no-tillage and organic cropping systems for grain production and soil improvement. Agronomy Journal 99:1297-1305. (Refereed journal article covering the same information as the last reference.)

We appreciate the opportunity to comment on the draft report, and look forward to rescheduling our meeting with you and Bill once the shutdown is lifted.

Sincerely,

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