JOHNS HOPKINS
CENTER for A LIVABLE FUTURE

November 1, 2021

Dr. Seth Meyer
Office of the Chief Economist
Room 112-A, Whitten Federal Building (mail stop: 3810)
1400 Independence Avenue SW
Washington, DC 20250

Re: Docket ID USDA-2021-0010

Disclaimer: The opinions expressed herein are our own and do not necessarily reflect the views of The Johns Hopkins University.

Summary:
The Climate-Smart Agriculture and Forestry Partnership Program is a promising approach to leverage agriculture in the fight against climate change. We contend that the following recommendations will help the Climate-Smart Commodity Labeling Initiative to generate the greatest benefit to farm productivity, climate and society. These recommendations are not exhaustive. While described in more detail in the corresponding letter, we would be happy to provide additional information or input. We can be reached by email at bsobel2@jh.edu.

- Funding for the Climate-Smart Agriculture and Forestry Partnership Program's Climate-Smart Labeling initiative should be tied to both market incentives and carbon tax revenue to maximize greenhouse gas mitigation while minimizing emissions.
- Focusing on Labile Soil Organic Matter through lab-on-mobile device, in-field verification will have complimentary impacts to commodity traceability, youth and rural employment, while allowing farmers to layer conservation incentives for greenhouse gas mitigation.
- Eligibility for biofuel feedstocks should be limited to perennials crops, with additional incentive for leguminous, perennial derived feedstock to maximize benefit to the soil and climate.
- Farmer Cooperatives, Land Grant Institutions (especially 1890s and 1994s), Cooperative Extension, minority serving institutions and civil society are well placed to ensure the equitable roll out of this initiative given their history of such engagement.
- Industrial Food Animal Production and operations relying on heavy herbicide use should not be eligible for Climate-Smart Agriculture and Forestry Partnership Program's Climate-Smart Labeling initiative because they have a negative impact on the environment.

Dear Dr. Meyer,

We appreciate the opportunity to comment on the Climate-Smart Agriculture and Forestry Partnership Program (Docket ID USDA-2021-0010). The Johns Hopkins Center for a Livable Future (CLF) is an interdisciplinary research, education and practice-center based within the Department of Environmental Health and Engineering at the Johns Hopkins Bloomberg School of Public Health. CLF applies science and systems thinking to help build healthy, just, equitable, resilient, and sustainable food systems. For more than 25 years, CLF has pursued its mission to understand the interrelationship between public health, agriculture, food systems and the environment --and to address the many problems and challenges found within. Our areas of expertise are wide-ranging and reflect the resources within the Johns Hopkins University. With a

special focus on food animal production, CLF regularly serves as a resource for, and works with, state and local governments, including the City of Baltimore and the State of Maryland. Our work also engages civil society to support grassroots collective learning and advocacy. Our response to the Request for Information is presented in narrative form in the text below. We have also responded specifically to USDA's questions in ANNEX 1.

We recognize that Climate-Smart commodity labeling is a novel and innovative addition to the suite of incentives that can encourage agricultural land stewards to adopt regenerative and/or Climate-Smart agriculture practices that can facilitate downstream benefit for the climate, environment, and society. However, pairing these regenerative/Climate-Smart practices with carbon offsets may be counterproductive. We agree with the National Sustainable Agriculture Coalition's position that carbon offset markets may worsen racial and economic inequality and offer insufficient remuneration for capital-intensive practices. Simply put, methods of measuring agricultural soil's ability to reduce greenhouse gases and sequester carbon is not developed enough for accurate accounting (Paustian et al 2019), nor has offset accounting shown an ability to curb emissions. We suggest, instead of relying on offsets to finance this program, an emissions tax may be a more effective way to leverage financing while simultaneously curbing emissions (Kaufman, World Resources Institute, 2016). The funds leveraged through such a tax could then be used to further incentivize the adoption of practices and support the infrastructure so that America's farmland can lead the way to a Climate-Smart future.

Despite the challenges of accounting for greenhouse gas fluxes, there are important proxies that can be measured which are indicative of soil's ability to reduce greenhouse gases. Labile soil organic matter (LSOM) fractions are a critical intermediary in either soil carbon sequestration or mineralization, soil aggregate formation and stability, microbiome mediated nutrient cycling and soil microbial carbon pumps. LSOM is easily created or destroyed by agriculture practices and is the site of microbiome mediated nutrient cycling. The concentrations of LSOM are an important corollary with terrestrial carbon sequestration.

The soil microbiome is a key component of greenhouse gas mitigation (Scientific American, 2019). Changes in LSOM fractions will help to quantify the influence of land use change and/or adoption/cessation of Climate-Smart practices. Therefore, measurement of LSOM is an important, sensitive indicator for soil carbon flux (Zhang et al, 2020) and should serve as a catch-all for the types of activities included in the Climate-Smart Agriculture and Forestry Partnership Program's Climate-Smart commodity labeling program, while including those who may have adopted the practice before initiation of the program.

Unfortunately, lay conversation and many policy discussions are complicated by the tendency to view soil organic matter (SOM) as a homogenous characteristic. For the Climate-Smart Agriculture and Forestry Partnership Program to affect soil health and climate change, USDA should move away from the focus on bulk carbon, the application of which can lead to productivity losses, and towards LSOM. On-the-ground validation of LSOM may be measured in the field using validated assays (Weil et al, 2009). The need for in-field validation represents an important opportunity for youth and rural employment that could be developed in collaboration with a Civilian Climate Corps. It is not feasible to continuously measure labile SOM fractions in fields across the country. Instead, in field measurement would serve a baseline, then farmers' fields could be remotely sensed, using platforms such as Google EarthEngine and/or Global Land Analysis and Discovery datasets to detect land use change affecting the soil's ability to sequester carbon. Agroforestry, USDA Certified Organic, Permaculture, Agroecology, Conservation Agriculture, Regenerative

Agriculture and many others, despite key differences, all share common principles of promoting Climate-Smart practices. The focus on a Climate-Smart indicator, as opposed to Climate-Smart practice adoption, unites the multitude of agriculture paradigms and Climate-Smart practices to affect real change through common-sense incentives that target the impact rather than solely the nominal adoption of model practices.

Using Climate-Smart commodities as an incentive for land managers to adopt Climate-Smart practices means that the benefit should go back to the land. Supply chain intermediaries, not limited to aggregators, processors, or distributors, should not qualify for Climate-Smart labeling. Product labels for processed or other mixed ingredient foods containing certified Climate-Smart commodities should qualify package labeling (e.g., "made with" or "contains") rather than certifying the entire mixed ingredient product as Climate-Smart. Biofuels considering eligibility for this program should be derived exclusively from perennial crop feedstocks, with additional incentive for those incorporating leguminous perennials that would maximize climate benefits (Jacot et al 2021). Highly aggregated commodities, particularly those that may be mixed with non-Climate-Smart commodities, could still earn credit through a traceability system that tracks the supply of commodities to the farm gate. The lab-on-mobile device platform, which can also perform LSOM analysis, allows a field to be geo-tagged with a unique identifier such as a bar code or QR code. This unique identifier is then incorporated into the Climate-Smart commodities database. Utilizing secured data transfer protocols will ensure that the farmers' data is kept private, while still allowing for the generation and distribution of benefits along the range of supply chain types, from direct market to highly aggregated.

By taking a whole-farm approach to Climate-Smart agriculture, land managers will be able to stack or layer multiple programs (and incentives), such as USDA's Conservation Reserve Program that is administered by the Commodity Credit Corporation and has demonstrated climate benefits (De Stefano & Jacobson 2018). The data driving the distribution of benefits from a Climate-Smart commodity program will also help to improve the Federal Crop Insurance Program Rating Model and allow the model to disaggregate Climate-Smart fields from their neighbor's non-Climate-Smart fields. This is important because the adoption of Climate-Smart practices will make these farms more resilient, in the face of climate change exacerbated weather extremes, thereby reducing the need for payout in the event of adverse conditions during the growing season.

Farmer Cooperatives, Cooperative Extension, Natural Resource Conservation Service, and community-based NGOs are uniquely positioned to support outreach and attainment of Climate-Smart certification because they are already placed in communities throughout the country, are a trusted technical resource for farmers, and can act as a critical conduit for in-field liaison. Further collaboration with Land Grant Institutions and USDA Climate hubs will help to provide the data infrastructure support while streamlining remote validation of Climate-Smart farmer land use. Intentional collaboration with 1890 and 1994 Land Grant Institutions, minority serving institutions, or civil society organizations with proven history of engaging with historically marginalized populations will support the equitable implementation of Climate-Smart commodity labeling.

The Climate-Smart Agriculture and Forestry Partnership Program offers a unique opportunity to support agricultural practices that can sequester greenhouse gases and mitigate climate change. However, Industrial Food Animal Production (IFAP) systems, defined as large numbers of animals of the same species in a confined space with a waste handling system, should not be considered for eligibility in the Climate-Smart Agriculture and Forestry Partnership Program. Additionally, because the performance of Climate-

Smart agriculture is dependent on the soil microbiome, soil applications of antibiotic resistant organisms and genes from IFAP waste handling, biodigester effluent or any other source should be strictly prohibited. A recent study found that commonly used herbicides have also been implicated as a contributor to antimicrobial resistance (Liao et al 2021). Therefore, assays for the detection of antibiotic resistant organisms and genes such as those developed by Rajendran et al (2019), should be conducted in conjunction with the measurement of LSOM to determine eligibility for the Climate-Smart Agriculture and Forestry Partnership Program.

Thank you again for the opportunity to comment. We believe that the Climate-Smart Agriculture and Forestry Partnership Program offers a great opportunity to further incentivize the adoption and impact of Climate-Smart practices as a cornerstone of agriculture's role in the fight against climate change. Ongoing monitoring and evaluation of these efforts will be critical to gauge progress and scale promising aspects of the program. Our recommendations contained herein do not address every aspect of the Climate-Smart Agriculture and Forestry Partnership Program Climate-Smart commodity rollout. Therefore, we would be happy to work with you and provide any additional information to support the success of this important program. Our contact information is indicated below.

Sincerely,

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ANNEX 1: Specific Responses to USDA Questions

3. In order to expand markets, what types of CSAF project activities should be eligible for funding through the Climate-Smart Agriculture and Forestry Partnership Program? Projects should promote the production of Climate-Smart commodities and support adoption of CSAF practices.
a. Activities that develop standardized supply chain accounting for carbon-friendly products; activities that provide supply chain traceability; innovative financing for low-carbon fuel from agricultural feedstocks; or green labeling efforts, among others;

Using Climate-Smart commodities as an incentive for land managers to adopt Climate-Smart practices means that the benefit should go back to the land. Supply chain intermediaries, not limited to aggregators, processors, or distributors, should not qualify for Climate-Smart labeling. Product labels for processed or other mixed ingredient foods containing certified Climate-Smart commodities should qualify package labeling (e.g., "made with" or "contains") rather than certifying the entire mixed ingredient product as Climate-Smart. Biofuels considering eligibility for this program should be derived exclusively from perennial crop feedstocks, with additional incentive for those incorporating leguminous perennials that would maximize climate benefits (Jacot et al 2021). Highly aggregated commodities, particularly those that may be mixed with non-Climate-Smart commodities, could still earn credit through a traceability system that tracks the supply of commodities to the farm gate. The lab-on-mobile device platform, which can also perform LSOM analysis, allows a field to be geo-tagged with a unique identifier such as a bar code or QR code. This unique identifier is then incorporated into the Climate-Smart commodities database. Utilizing secured data transfer protocols will ensure that the farmers' data is kept private, while still allowing for the generation and distribution of benefits along the range of supply chain types, from direct market to highly aggregated.

c. Activities that test and evaluate standardized protocols that define eligible CSAF practices, quantification methodologies, and verification requirements, with an emphasis on minimizing transaction costs and operating at scale;

For the Climate-Smart Agriculture and Forestry Partnership Program to affect soil health and climate change, USDA should move away from the focus on bulk carbon, the application of which can lead to productivity losses, and towards LSOM. On-the-ground validation of LSOM may be measured in the field using validated assays (Weil et al, 2009). The need for in-field validation represents an important opportunity for youth and rural employment that could be developed in collaboration with a Civilian Climate Corps. It is not feasible to continuously measure labile SOM fractions in fields across the country. Instead, in field measurement would serve a baseline, then farmers' fields could be remotely sensed, using platforms such as Google EarthEngine and/or Global Land Analysis and Discovery datasets to detect land use change affecting the soil's ability to sequester carbon. Agroforestry, USDA Certified Organic, Permaculture, Agroecology, Conservation Agriculture, Regenerative Agriculture and many others, despite key differences, all share common principles of promoting Climate-Smart practices. The focus on a Climate-Smart indicator, as opposed to Climate-Smart practice adoption, unites the multitude of agriculture paradigms and Climate-Smart practices to affect real change through common-sense incentives that target the impact rather than solely the nominal adoption of model practices.

e. Activities that generate voluntary carbon offsets through CSAF practices. Within carbon offset markets, the GHG benefit is separated from the commodity and sold as a carbon offset credit. Should the USDA consider hybrid approaches where the GHG benefit could be assigned to a Climate-Smart commodity, or separated and sold as a voluntary carbon offset?

We recognize that Climate-Smart commodity labeling is a novel and innovative addition to the suite of incentives that can encourage agricultural land stewards to adopt regenerative and/or Climate-Smart agriculture practices that can facilitate downstream benefit for the climate, environment, and society. However, pairing these regenerative/Climate-Smart practices with carbon offsets may be counterproductive. We agree with the National Sustainable Agriculture Coalition's position that carbon offset markets may worsen racial and economic inequality and offer insufficient remuneration for capital-intensive practices. Simply put, methods of measuring agricultural soil's ability to reduce greenhouse gases and sequester carbon is not developed enough for accurate accounting (Paustian et al 2019), nor has offset accounting shown an ability to curb emissions. We suggest, instead of relying on offsets to finance this program, an emissions tax may be a more effective way to leverage financing while simultaneously curbing emissions (Kaufman, World Resources Institute, 2016). The funds leveraged through such a tax could then be used to further incentivize the adoption of practices and support the infrastructure so that America's farmland can lead the way to a Climate-Smart future.

6. In order to expand markets, which CSAF practices should be eligible for inclusion?

All practices that result in the generation of Labile Soil Organic Matter should be included. Biofuels considering eligibility for this program should be derived exclusively from perennial crop feedstocks, with additional incentive for those incorporating leguminous perennials that would maximize climate benefits (Jacot et al 2021). Industrial Food Animal Production (IFAP) systems, defined as large numbers of animals of the same species in a confined space with a waste handling system, should not be considered for eligibility in the Climate-Smart Agriculture and Forestry Partnership Program. Additionally, because the performance of Climate-Smart agriculture is dependent on the soil microbiome, soil applications of antibiotic resistant organisms and genes from IFAP waste handling, biodigester effluent or any other source should be strictly prohibited. A recent study found that commonly used herbicides have also been implicated as a contributor to antimicrobial resistance (Liao et al 2021). Therefore, assays for the detection of antibiotic resistant organisms and genes such as those developed by Rajendran et al (2019), should be conducted in conjunction with the measurement of LSOM to determine eligibility for the Climate-Smart Agriculture and Forestry Partnership Program.

a. What systems for quantification and key metrics should be used to assess the benefits of projects funded through the Climate-Smart Agriculture and Forestry Partnership Program? What should the quantification, monitoring, reporting, and verification requirements for projects funded through the Climate-Smart Agriculture and Forestry Partnership Program be?

Unfortunately, lay conversation and many policy discussions are complicated by the tendency to view soil organic matter (SOM) as a homogenous characteristic. For the Climate-Smart Agriculture and Forestry Partnership Program to affect soil health and climate change, USDA should move away from the focus on bulk carbon, the application of which can lead to productivity losses, and towards LSOM. On-the-ground validation of LSOM may be measured in the field using validated assays (Weil et al, 2009). The need for in-field validation represents an important opportunity for youth and rural employment that could be

developed in collaboration with a Civilian Climate Corps. It is not feasible to continuously measure labile SOM fractions in fields across the country. Instead, in field measurement would serve a baseline, then farmers' fields could be remotely sensed, using platforms such as Google EarthEngine and/or Global Land Analysis and Discovery datasets to detect land use change affecting the soil's ability to sequester carbon. Agroforestry, USDA Certified Organic, Permaculture, Agroecology, Conservation Agriculture, Regenerative Agriculture and many others, despite key differences, all share common principles of promoting Climate-Smart practices. The focus on a Climate-Smart indicator, as opposed to Climate-Smart practice adoption, unites the multitude of agriculture paradigms and Climate-Smart practices to affect real change through common-sense incentives that target the impact rather than solely the nominal adoption of model practices.

c. What types of systems should be used or supported to track participation, implementation, and potential benefits generated?

The lab-on-mobile platform for the quantification of Labile Soil Organic Matter allows a field to be geo-tagged with a unique identifier such as a bar code or QR code. This unique identifier is then incorporated into the Climate-Smart commodities data base. Utilizing secured data transfer protocols will ensure that the farmer data is kept secure, while still allowing for the generation and distribution of benefits along the range supply chains, from direct market to highly aggregated.

d. What types of data and metrics should be collected and reported to determine project success and GHG benefits delivered? How should the data and metrics be analyzed to inform future decisions?

For the Climate-Smart Agriculture and Forestry Partnership Program should use quantification of Labile Soil Organic Matter through validated assays to determine project success. More research is needed to provide an accurate accounting of the Soil Microbial Pump mediated carbon sequestration. Farmers' fields will also need to be remotely sensed, using platforms such as Google EarthEngine and/or Global Land Analysis and Discovery datasets to detect land use change affecting the soil's ability to sequester carbon.

7. How should ownership of potential GHG benefits that may be generated be managed?

Using Climate-Smart commodities as an incentive for land managers to adopt Climate-Smart practices means that the benefit should go back to the land. Pairing this program with funds generated through a carbon tax on heavy polluters would disincentivize the generation of greenhouse gases, while simultaneously incentivizing the mitigation by agricultural soils.

8. How can USDA ensure that partnership projects are equitable and strive to include a wide range of landowners and producers?

Farmer Cooperatives and Cooperative Extension are uniquely placed to support outreach and attainment of Climate-Smart certification because they are already placed in communities throughout the country, are a trusted technical resource for farmers, and can act as a critical conduit for in-field liaison. Further collaboration with Land Grant Institutions and USDA Climate hubs will help to provide the data infrastructure support while streamlining remote validation of Climate-Smart farmer land use. Intentional

collaboration with 1890 and 1994 Land Grant Institutions, minority serving institutions, or civil society organizations with proven history of engaging with historically marginalized populations will support the equitable implementation of Climate-Smart commodity labeling.

a. How can the Climate-Smart Agriculture and Forestry Partnership Program include early adopters of CSAF practices?

Measurement of LSOM is an important, sensitive indicator for soil carbon flux (Zhang et al, 2020) and should serve as a catch-all for the types of activities included in the Climate-Smart Agriculture and Forestry Partnership Program's Climate-Smart commodity labeling program, while including those who may have adopted the practice before initiation of the program.

b. How can the Climate-Smart Agriculture and Forestry Partnership Program be designed to ensure that benefits flow to historically underserved producers?

Intentional collaboration with 1890 and 1994 Land Grant Institutions, minority serving institutions, or civil society organizations with proven history of engaging with historically marginalized populations will support the equitable implementation of Climate-Smart commodity labeling and access of benefits by historically underserved producers.

c. How can the Climate-Smart Agriculture and Forestry Partnership Program be designed to ensure that benefits flow to historically underserved communities?

Intentional collaboration with 1890 and 1994 Land Grant Institutions, minority serving institutions, or civil society organizations with proven history of engaging with historically marginalized populations will support the equitable implementation of Climate-Smart commodity labeling and access of benefits by historically underserved communities.