Earthjustice
Alaska Community Action on Toxics * American Society for the Prevention of Cruelty to Animals (ASPCA) * American Sustainable Business Council * As You Saw * Athens County's Future Action Network * Black Belt Justice Center * Center for Food Safety * Clean Air Carolina * Clean Water for North Carolina * CRLA Foundation * Defenders of Wildlife *Farmworker Association of Florida * John Hopkins Center for a Livable Future * Harambee House, Inc. * League of Conservation Voters * Migrant Clinicians Network * North Carolina Environmental Justice Network * Northwest Center for Alternatives to Pesticides * Pesticide Action Network * Rural Coalition * Socially Responsible Agriculture Project * Toxic Free North Carolina * United Plan Savers * Willamette Riverkeeper * Women's Voices for the Earth

April 29, 2021

Secretary Tom Vilsack
U.S. Department of Agriculture
1400 Independence Ave., S.W.
Washington, DC 20250

via regulations.gov

RE: Comments in response to Notice of Request for Public Comment on the Executive Order on Tackling the Climate Crisis at Home and Abroad, 86 Fed. Reg. 14403 (Mar. 16, 2021), Docket No. USDA–2021–0003

Dear Secretary Vilsack:

On behalf of our millions of members and supporters across the country, the undersigned organizations submit these comments in response to the United States Department of Agriculture's (USDA) Notice of Request for Public Comment on the Executive Order on Tackling the Climate Crisis at Home and Abroad, 86 Fed. Reg. 14403 (Mar. 16, 2021), Docket No. USDA-2021-0003. We appreciate the opportunity to offer thoughts and recommendations about how USDA should encourage climate-smart agriculture and forestry practices and shift to renewable energy sources while ensuring its programming and strategies are available to all communities and are implemented equitably.

Agriculture must be part of any solution to the climate crisis. Agriculture is vulnerable to the more extreme and variable weather that climate change is bringing and at the same time contributes substantial quantities of greenhouse gases (GHG) – equivalent to approximately a third of U.S. total GHG emissions when properly calculated to include all climate change impacts related to agriculture.[1] But agriculture also offers a tremendous opportunity to both reduce GHG emissions and sequester and store carbon in soil.

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[1] *See Sources of Greenhouse Gas Emissions*, Greenhouse Emissions, EPA, https://www.epa.gov/ghgemissions/sources-greenhouse-gas-emissions (last updated Apr. 14, 2020). EPA concludes that agriculture's GHG emissions are about 10% of total U.S. GHG emissions; as explained below, this approach significantly understates the correct figure.

Agricultural activities affect the size, changes in, and vulnerability of large stocks of carbon in soils and vegetation. Past and ongoing conversion to cropland and grazing land has resulted in enormous losses of stored carbon, and agricultural activities pose ongoing threats to the magnitude and persistence of the remaining soil carbon stocks.[2] Agricultural practices are also responsible for vast emissions of nitrous oxide and methane – two highly potent GHGs with global warming potentials that far exceed that of carbon dioxide.

It is thus imperative that agriculture play a pivotal role in tackling the climate crisis. Implementation of proven and well-documented climate-smart agricultural practices can increase the amount of carbon removed from the atmosphere, increase the amount of carbon stored in soil, and/or reduce agricultural emissions of carbon dioxide, nitrous oxide, and methane. These practices will also often increase resilience to extreme weather, reduce environmental and public health harms, and, in most cases, over time, improve producer productivity or profitability. Currently, however, these various practices are employed on fewer than ten percent of United States farmland.[3] Thus, USDA should focus on quickly and dramatically scaling up the adoption of these tried-and-true practices, even as we increase research into innovative opportunities.

At the same time, USDA should recognize that many of these agroecological practices are rooted in traditional and ancestral knowledge and have been practiced by Indigenous people and people of color for generations, with great success. These practices harness the power of natural biological systems for plant and animal fertility, resilience, and protection from pests, rather than relying on chemical inputs. Allowing these biological systems to perform as intended can result in higher yields, fewer inputs, less pollution, greater resilience, higher profitability, and fewer GHG emissions, all to the benefit of the producers, their communities, the environment, and the planet.

USDA must also consider that it is not just the climate-smart practices themselves but how they are implemented that matters. Agroecological principles and practices can serve as a foundation for policies that not only protect our climate, air, water, and soil, but that uplift the values of equity, inclusion, and dignity. To achieve this, USDA must promulgate policies that meet the needs of all those who are a part of our food system, including workers and small-scale producers, and that enhance food justice, environmental justice, and economic justice.

At the same time, USDA should take a step back and question some newer practices that have received recent attention as supposed climate-smart solutions such as, for example, biofuels, woody biomass, and methane capture from livestock waste. Not only do many of these practices fail to reduce GHG emissions, but they may in fact exacerbate them, while at the same

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[2] *See* Jonathan Sanderman et al., *The Soil Carbon Debt of 12,000 Years of Human Land Use*, 114 PNAS 9575 (2017); *see also* Jonathan Sanderman et al., Soils Revealed soil carbon futures, Harvard Dataverse, https://dataverse.harvard.edu/dataset.xhtml?persistentId=doi:10.7910/DVN/HA17D3.

[3] For example, less than 5% of harvested croplands include cover crops. *See* U.S. Dep't of Agric., National Agricultural Statistics Service, 2017 Census of Agriculture – Table 47. Land Use Practices by Size of Farm: 2017 and 2012, https://www.nass.usda.gov/Publications/AgCensus/2017/Full_Report/Volume_1,_Chapter_1_US/st99_1_0047_0047.pdf ; *see also* U.S. Dep't of Agric., National Agricultural Statistics Service, 2017 Census of Agriculture – Table 1. Historical Highlights: 2017 and Earlier Census Years, https://www.nass.usda.gov/Publications/AgCensus/2017/Full_Report/Volume_1,_Chapter_1_US/st99_1_0001_0001.pdf.

time causing environmental and public health harms and worsening inequities in the agricultural system.

And USDA should consider not just the supply side, but also the demand side of the food and agricultural systems and the role it can play in addressing the climate crisis. Demand for production of certain agricultural products – including, for example, "renewable" biomass for biofuels and foods with a higher climate footprint – drives sustained or increasing GHG emissions. Reducing demand for such products while incentivizing a shift to those with lower climate change impacts provide powerful tools for addressing the warming planet.

Thus, as USDA determines what practices to include in its toolbox for tackling the climate crisis, it should consider not just methods of reducing GHG emissions, but also the broader environmental and social effects of greater adoption of such practices, both positive and negative. Focusing solely on the climate impacts could overlook multiple harmful externalities of these practices. By focusing on the equities at the heart of these practices, USDA could help increase their adoption and continuation and more effectively address the climate crisis.

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THE TRUE CLIMATE FOOTPRINT OF AGRICULTURE

As USDA considers recommendations for tackling the climate crisis, it is imperative it understands the true climate footprint of the agricultural sector. And it is equally imperative that all stakeholders have an accurate assessment of our food sector's contributions to climate change, so that all can best contribute to sound policy.

The Environmental Protection Agency (EPA) estimates that agriculture is responsible for about 10% of U.S. GHG emissions,[4] but this figure excludes many factors that contribute additional emissions from the sector. First, EPA's analysis uses the 100-year global warming potential for methane, rather than the 20-year impact now recognized as more appropriate by most policymakers.[5] This is critical because a large portion of agriculture's climate footprint is from methane emissions and because agriculture contributes about a third of all U.S. methane emissions. Using the 20-year global warming potential increases agriculture's proportional contribution to U.S. GHG emissions by approximately 3-4%.[6] Second, EPA's figure does not include GHG emissions from on-farm energy or electricity use (together responsible for another about 1%),[7] which EPA includes in other sectors of the Inventory.[8] Third, EPA's approach does not include emissions from annual conversions of land for agricultural purposes, which again are addressed in other sections of the Inventory. With the inclusion of these adjustments, annual on-farm agricultural activities more accurately should be seen to account for about 16% of U.S. GHG emissions. (Note that even these on-farm emissions do not include those relating to fisheries.)

Moreover, while the impact on climate change for most sectors of the economy stems almost entirely from production-related greenhouse gas emissions, with agriculture one must also consider the impact of land use—the continuing yearly impact of prior conversion of natural lands to agriculture. The land footprint of other economic sectors is insignificant in relation to their emissions and therefore is not considered in EPA's GHG Inventory. But agriculture's land footprint is a critical component of its climate impact. The use of land for growing crops or raising livestock means that agricultural land—62% of the continental United States—cannot be used for other purposes, including those that could have a very different climate impact, for example by sequestering or storing carbon in grassland or forest land. This lost sequestration capacity of agricultural land is a very real current climate impact related to agriculture and one unique to this sector, although one not included in EPA's 10% figure.

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[4] *See* EPA, *Inventory of U.S. Greenhouse Gas Emissions and Sinks 1990-2019* (2021), https://www.epa.gov/sites/production/files/2021-04/documents/us-ghg-inventory-2021-main-text.pdf.
[5] *See, e.g.*, François-Marie Bréon et al., *Anthropogenic and Natural Radiative Forcing*, in *Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* 714, Table 8.7 (T.F. Stocker et al., 2014).
[6] Calculated using a global warming potential of 86 instead of 25 based on total U.S. methane emissions identified in the EPA GHG Inventory.
[7] *See* EPA, *Inventory of U.S. Greenhouse Gas Emissions and Sinks 1990-2019* (2021) at 2-36, Table 2-12, https://www.epa.gov/sites/production/files/2021-04/documents/us-ghg-inventory-2021-main-text.pdf.
[8] *Id*. at 2-3, Table 2-1.

Thus, "standard methods for evaluating the effect of land use on greenhouse gas emissions systematically underestimate the opportunity of land to store carbon if it is not used for agriculture."[9] Phrased differently, "typical lifecycle assessments [], which estimate the GHG costs of a food's consumption, only estimate land-use demands in hectares without translating them into carbon costs. Other [life cycle assessments] consider land use carbon costs only if a food is directly produced by clearing new land …."[10] A more accurate and complete approach is to add to the production-related GHG emissions the "quantity of carbon that could be sequestered annually if [that land] were instead devoted to regenerating forest [or grassland]."[11] Adding these climate change impacts to the annual food system emissions would very dramatically increase agriculture's true climate change footprint: "the cumulative potential of carbon dioxide removal on land currently occupied by animal agriculture is comparable in order of magnitude to the past decade of global fossil fuel emissions."[12]

Taking the analysis one step further, EPA's estimation of agriculture's climate footprint does not include emissions from the many processes directly linked to agricultural production. For example, fertilizer manufacturing is driven by agricultural production, but its emissions are not included in what is attributed to the agriculture sector. Similarly, food processing, distribution, preservation (e.g. through refrigeration), and preparation, are all necessary steps to get food from farm to fork. Food processing alone contributes about 2% of U.S. GHG emissions, and other stages of the food system similarly emit large amounts of GHG. And the very significant methane emissions generated by food waste decomposing in landfills contributes an additional about 3% of emissions.[13]

Thus, when correctly calculated to include all agriculture related climate change impacts, including the foregone sequestration potential of agricultural land use, it is clear that the overall impact of agriculture to climate change is equivalent to at least one third of U.S. direct GHG emissions.[14] With this significant an impact on climate change, the U.S. simply cannot reach its climate targets without very significant changes in the agriculture and food sectors. USDA should therefore keep the true climate impact of the agriculture system in mind as it considers approaches for tackling the climate crisis.

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[9] Timothy Searchinger, et al., *Assessing the Efficiency of Changes in Land Use for Mitigating Climate Change*, 564 Nature 249, 249 (2018); *see also*Matthew Hayek et al., *The Carbon Opportunity Cost of Animal-Sourced Food Production On Land*, 4 Nature Sustainability 21 (2021).
[10] Searchinger et al., at 249.
[11] *Id.* at 250.
[12] *Id.*
[13] *See* EPA, *Inventory of U.S. Greenhouse Gas Emissions and Sinks 1990-2019* (2021) at 2-3, Table 2-1, https://www.epa.gov/sites/production/files/2021-04/documents/us-ghg-inventory-2021-main-text.pdf.
[14] This is consistent, for example, with global estimates of food system emissions as up to 29% of global GHG emissions. *See* e.g., Sonja J. Vermeulen et al., *Climate Change and Food Systems. Annual Review of Environment and Resources*, 37 Ann. Rev. Env't & Resources 195 (2012).

I. CLIMATE-SMART AGRICULTURE AND FORESTRY QUESTIONS

A. How should USDA utilize programs, funding and financing capacities, and other authorities, to encourage the voluntary adoption of climate-smart agricultural and forestry practices on working farms, ranches, and forest lands?

USDA notes that both existing policies and programs as well as new strategies are necessary for increasing voluntary adoption of climate-smart practices. We address the first component of this question, "(1) How can USDA leverage existing policies and programs to encourage voluntary adoption of agricultural practices that sequester carbon, reduce greenhouse gas emissions, and ensure resiliency to climate change?" in sections 1,2 and 3 below, and we address the second component of this question, "(2) What new strategies should USDA explore to encourage voluntary adoption of climate-smart agriculture and forestry practices?" in sections 4, 5, and 6.

Leveraging Existing Policies and Programs:

1. USDA should expand and improve the EQIP, the CSP, and the RCPP to increase support for climate-smart practices including agroforestry, advanced nutrient management, conservation crop rotations, and cover crops.

Several climate-smart practices with demonstrated benefits are available to reduce the greenhouse gas footprint of agriculture. We urge USDA to leverage existing programs including the Environmental Quality Incentives Program (EQIP), the Conservation Stewardship Program (CSP), and the Regional Conservation Partnership Program (RCPP) to more effectively promote the adoption of agroforestry practices, advanced nutrient management, conservation crop rotations, and cover crops. As described below, a large body of scientific literature, in addition to traditional knowledge and experience, supports the environmental benefits of these practices, making them excellent candidates for effectively and efficiently increasing carbon sequestration, reducing greenhouse gas emissions, and building climate resiliency. However, due to financial and technical barriers, adoption of some of the most effective climate-smart practices remains low. USDA should focus greater attention on incentivizing adoption of practices with the greatest climate benefits, while also supporting continued research on how to most effectively adopt these practices at scale across the nation. In particular, USDA should increase the adoption of agroforestry practices, advanced nutrient management, diversified cropping rotations, and cover crops through the EQIP, the CSP and the RCPP.

a. Agroforestry.

Agroforestry practices, including alley cropping, silvopasture, and riparian forest buffers, integrate or re-introduce woody vegetation into crop and animal farming systems where the landscape would naturally support such vegetation. Alley cropping systems integrate trees and shrubs into crop production, while silvopasture refers to the integration of trees and shrubs with livestock activities. Riparian forest buffers create zones in which woody vegetation protects waterways from runoff from agricultural activities. These practices often can maintain or increase overall productivity (often while providing an alternate income stream for the producer) and also directly sequester carbon in vegetation, help stabilize carbon stocks in soil, and provide numerous co-benefits for biodiversity, habitat connectivity, and water quality and quantity.[15] See Table 1 (Attached as "Ex. 1"). Agroforestry has a strong potential for reducing the net climate footprint of agriculture — with realistic rates of adoption leading to carbon sequestration rates equal in magnitude to over a third of fossil fuel emissions in the U.S.[16]

Despite their effectiveness, agroforestry practices currently receive only a small and often declining fraction of conservation funding. For example, funding for the National Agroforestry Center has averaged less than $1.5 million per year for the last decade. Furthermore, acreage funded for agroforestry practices was less than 1% of the nearly 13 million acres on active and completed contracts in EQIP in 2019,[17] while less than 300 acres were funded for alley cropping and less than 3,000 acres were funded for silvopasture establishment.[18] USDA should increase support for alley cropping, silvopasture, and riparian forest buffers by increasing the share of EQIP applications funded for these practices when applied in systems that would historically support these types of vegetation in the absence of agricultural activity.

Agroforestry is often at a competitive disadvantage for funding compared to grazing management and other conservation practices. USDA can correct for this imbalance by creating a dedicated EQIP funding pool for agroforestry practices and also by supporting agroforestry transitions through the RCPP. Specialized outreach, longer-term technical assistance, and education efforts are also necessary to facilitate adoption of agroforestry and ensure effective and productive practices following adoption. USDA should coordinate these efforts at Climate Hubs, regional agroforestry centers, the Farm Service Agency, and other venues to help growers access funds and technical assistance for transitions to agroforestry.

b. Improving nutrient management.

Synthetic nitrogen fertilizer application and other agricultural soil management practices account for more than half of greenhouse gas emissions from agriculture. In addition to representing a large proportion of the environmental footprint of agriculture, these emissions are responsible for over three-quarters of all nitrous oxide emissions across sectors in the U.S.[19] Upstream of these emissions, fertilizer manufacturing is also energy-intensive, contributes additional greenhouse gas emissions, and spews health-harming pollution like ammonia that disproportionately impacts environmental justice communities. Reducing nitrous oxide

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[15] *See, e.g.*, Shibu Jose & Sougata Bardhan, *Agroforestry for Biomass Production and Carbon Sequestration: An Overview*, 86 Agroforestry Sys. 105 (2012); *see also* Ranjith P. Udawatta & Shibu Jose, *Agroforestry Strategies to Sequester Carbon in Temperate North America*, 86 Agroforestry Sys. 225 (2012).

[16] *See* Ranjith P. Udawatta & Shibu Jose, *Agroforestry Strategies to Sequester Carbon in Temperate North America*, 86 Agroforestry Sys. 225 (2012).

[17] Based on sum of acres funded for alley cropping, riparian forest buffers, stripcropping, windbreaks, and silvopasture establishment. *See NRCS Conservation Programs Environmental Quality Incentives Program (EQIP)*, U.S. Dep't Agric., https://www.nrcs.usda.gov/Internet/NRCS_RCA/reports/fb08_cp_eqip.html.

[18] *Id.*

[19] *See* EPA, *Inventory of U.S. Greenhouse Gas Emissions and Sinks 1990-2018*, 2-4 (2020), https://www.epa.gov/sites/production/files/2020-04/documents/us-ghg-inventory-2020-main-text.pdf.

emissions from agriculture is particularly urgent as the warming potential of nitrous oxide is 298 times greater than carbon dioxide.[20]

Improving nutrient management practices can greatly reduce the climate footprint of agriculture by reducing nitrous oxide emissions while also preventing nutrient runoff and avoiding air and water pollution from excessive fertilizer use. Recommendations for improving nutrient management, such as those included in the Natural Resources Conservation Service's (NRCS) nutrient management practice standard, help prevent overfertilization and increase crop uptake of nitrogen by optimizing the timing, rate, location, and form of fertilizer applied.[21] These ready-to-go practices also increase crop productivity while lowering input costs. See Table 1. Despite these benefits, acreage funded through EQIP for nutrient management planning declined by 67% between 2009 and 2019.[22] In the previous administration, USDA also weakened the requirements associated with these EQIP contracts by only requiring funded applicants to develop comprehensive nutrient management plans during their contract but no longer requiring them to immediately implement these plans.[23]

USDA should direct resources toward increasing understanding and accelerating the adoption of improved nutrient management strategies and climate-smart practices that reduce fertilizer requirements. This can be more effective than developing new technologies that allow current unsustainable practices, including reliance on chemical inputs, to continue. USDA should recognize the opportunity for climate-smart alternatives to reduce reliance on synthetic fertilizers rather than continuing to invest in new fertilizer technologies as reduced reliance may be a more effective way to reduce the environmental footprint of agriculture. Merely switching to different chemical inputs not only fails to address upstream emissions and pollution that result from fertilizer manufacturing, but also fails to incentivize transitions to systems that build resilience to climate impacts and result in more fertile soil.

There are many known strategies that can reduce the harmful impacts of fertilizer application. These include nutrient management plans that call for the optimization of fertilizer application timing, placement, amount, and method, composting, and returning on-farm generated manure and plant residues to land to recycle nutrients efficiently rather than applying more. Increasing the share of EQIP funds allocated towards improving nutrient management and ensuring funded nutrient management plans are adopted efficiently can help support these transitions.

Relatedly, USDA should invest a larger share of research funding towards improving nutrient management strategies that reduce reliance on synthetic fertilizer inputs. More broadly, USDA should also expand research that increases our capacity to monitor and detect nitrous oxide emissions from agriculture, which represent one of the strongest climate impacts of fertilizer use.

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[20] *Id.* at 1-10, Table 1-3.
[21] *See* Nat. Res. Conservation Serv., Conservation Practice Standard Conservation, *Nutrient Management Code 590* (2012), https://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb1046433.pdf.
[22] *See NRCS Conservation Programs, Environmental Quality Incentives Program (EQIP)*, Nat. Res. Conservation Serv., https://www.nrcs.usda.gov/Internet/NRCS_RCA/reports/fb08_cp_eqip.html.
[23] *See* Environmental Quality Incentives Program, 84 Fed. Reg. at 69,272-01 § 1466.7 (Dec. 17, 2019).

c. Diversified conservation crop rotations and cover crops.

In contrast to dominant monoculture or low-diversity cropping systems, diversified conservation crop rotations and cover crops can help increase soil carbon sequestration by introducing a wider range of types of inputs into soil, maintaining soil cover throughout the year, and minimizing soil disturbance and erosion.[24] By building organic matter, these practices can also reduce the need for synthetic fertilizers, improve water quality, improve water retention and thus reduce the need for water inputs, and mitigate nitrous oxide emissions. In addition, these practices can reduce the vulnerability of crops to pests and pathogens, thereby reducing the need for pesticides that are harmful to pollinators and water quality.[25] Similarly, cover crops significantly increase soil carbon by increasing carbon inputs from plants and reducing erosion. See Table 1.

While cover crop adoption rates have increased in recent years, their total rates of adoption remain low. Less than 5% of harvested croplands include cover crops.[26] There is thus a large opportunity to increase adoption of a practice with widely documented climate and environmental benefits. While EQIP-funded cover crop applications have increased, acreage enrolled in conservation crop rotations has fallen sharply in recent years. USDA should set targets for increasing the adoption of cover crops and conservation crop rotations, substantially increase technical assistance and outreach, and continue to accelerate conservation funding for both suites of practices.

2. USDA should expand the CRP and CRP Grasslands to reduce the climate footprint of agriculture through increasing conservation lands.

Protecting land in conservation programs and expanding enrollment in such programs are among the most effective strategies USDA can employ to reduce the climate footprint of agriculture. In particular, avoiding conversion of grasslands has been identified as the most

[24] *See, e.g.,* Christopher Poeplauab & Axel Dona, *Carbon Sequestration in Agricultural Soils via Cultivation of Cover crops – A Meta-analysis*, 33 Agric., Ecosystems & Env't 200 (2015); Jinshi Jian et al., *A Meta-analysis of Global Cropland Soil Carbon Changes Due to Cover Cropping*, 143 Soil Biology & Biochemistry 107,735 (2020); *see also* R. Lal, *Soil Carbon Sequestration and Aggregation By Cover Cropping*, 70 J. Soil & Water Conservation 329 (2015); C. Tonitto et al., *Replacing Bare Fallows With Cover Crops in Fertilizer-Intensive Cropping Systems: A Meta-analysis of Crop Yield and N Dynamics*, 112 Agric., Ecosystems & Env't 58 (2006); Meagan E. Schipanski, *A Framework for Evaluating Ecosystem Services Provided By Cover Crops in Agroecosystems*, 125 Agric. Sys.12 (2014); Jason P. Kaye & Miguel Quemada, *Using Cover Crops to Mitigate and Adapt to Climate Change. A Review*, 37 Agronomy Sustainable Dev. 4 (2017).

[25] *See* Giovanni Tamburini et al., *Agricultural Diversification Promotes Multiple Ecosystem Services Without Compromising Yield*, 6 Sci. Advances 2020 eaba1715 (2020).

[26] 15,390,674 acres were planted to cover crops (excluding CRP) out of 320,041,858 harvested cropland acres. *See* U.S. Dep't of Agric., National Agricultural Statistics Service, 2017 Census of Agriculture – Table 47. Land Use Practices by Size of Farm: 2017 and 2012, https://www.nass.usda.gov/Publications/AgCensus/2017/Full_Report/Volume_1,_Chapter_1_US/st99_1_0047_0047.pdf ; *see also* U.S. Dep't of Agric., National Agricultural Statistics Service, 2017 Census of Agriculture – Table 1. Historical Highlights: 2017 and Earlier Census Years, https://www.nass.usda.gov/Publications/AgCensus/2017/Full_Report/Volume_1,_Chapter_1_US/st99_1_0001_0001.pdf.

impactful agricultural activity in the U.S. to mitigate climate change.[27] Additionally, preventing conversion of natural lands is critical for protecting biodiversity and allowing wildlife habitat to remain intact.

To avoid the climate and environmental harms associated with land conversion, USDA should commit to zero conversion and degradation of natural habitats, including forested ecosystems and native grasslands such as those found in the Northern Great Plains. One strategy to accomplish this goal is to expand the land protected in the CRP and the CRP Grasslands. The CRP conserves privately owned land, offering yearly rental payments to remove environmentally sensitive land from agricultural production. Once removed from production, land in the CRP is converted to long-term resource-conserving ground cover which plays a critical role in providing habitat for wildlife, increasing soil carbon sequestration, and improving resilience to climate change. USDA should maximize the program's potential to fully capitalize on its opportunities by enrolling more land into the program. Currently, enrollment is well below the program's maximum capacity for 27 million acres.[28] By expanding the CRP and the CRP Grasslands subprogram (which focuses on the conservation of grassland specifically) and including options for permanent easements, USDA can ensure that the climate and environmental benefits of conserved lands remain protected for the long-term.

3. USDA should incentivize climate-smart practices through conservation programs while reducing the share of conservation funding consumed by CAFOs.

With limited funding opportunities, USDA must focus available conservation funding towards practices that lead to a net benefit for climate, while reducing support for ineffective practices. Currently, a large share of conservation funding goes towards CAFOs, which compete for EQIP funding alongside producers employing climate-smart practices. For example, CAFO-related practices, including animal waste storage and animal mortality facilities, accounted for $100 million, or 12%, of 2015 EQIP funding.[29] USDA should decrease the proportion of EQIP-allocated livestock funding that supports CAFOs and instead use this funding to support alternative livestock practices, such as regenerative grazing, which are more likely to reduce agriculture's environmental footprint. USDA should also require CAFOs that receive conservation dollars to implement nutrient management plans effectively and to efficiently implement these plans during their EQIP contracts, rather than allowing them to delay implementation as currently permitted by recent changes to the program. Without stronger safeguards restricting the amount of funding that supports CAFOs, conservation funding further entrenches these polluting facilities and allows them to persist at the expense of incentivizing climate-smart alternatives.

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[27] *See* Joseph E. Fargione et al., *Natural Climate Solutions for the United States*, 4 Sci. Advances eaat1869 (2018).
[28] *See* U.S. Dep't Agric., U.S. Forest Serv., *Current CRP Enrollment*, https://www.fsa.usda.gov/Assets/USDA-FSA-Public/usdafiles/Conservation/PDF/crp_current_enrollment_map.pdf.
[29] *See Final Environmental Cost-Share Rule Fails to Incorporate Sustainability Recommendations*, Nat'l Sustainable Agric. Coal. Blog (May 12, 2016), https://sustainableagriculture.net/blog/eqip-final-rule/.

New Strategies:

4. **USDA should establish clear and accountable climate and conservation benchmarks for cutting U.S. agriculture's environmental footprint in half by 2030.**

USDA should establish a target for a 50% reduction in net GHG emissions from agriculture by 2030 relative to 2010 levels. This benchmark – which is critical to mitigating climate change and is consistent with President Biden's recent commitment to reducing overall U.S. GHG emissions – is achievable through increasing the adoption of ready-to-go climate-smart practices. Within this climate goal, USDA should identify targets and reductions necessary to meet these targets for specific GHGs and agricultural sources, including reductions in methane emissions from livestock and manure management and reductions in nitrous oxide emissions associated with crop production. USDA should also establish clear zero conversion targets as well as targets for increasing land enrolled in conservation programs.

5. **USDA should revise crop insurance policies to reduce barriers to climate-smart practice adoption.**

The USDA Risk Management Agency (RMA) should amend its crop insurance policies to incentivize adoption of climate-smart practices, including supporting in the next Farm Bill a nationwide expansion of the successful Sodsaver provision currently active in six states.[30] There is ample evidence demonstrating the risk-reducing impact of many conservation practices. In fact, many of these practices have been in use by traditional societies and Black, Indigenous, and People of Color (BIPOC) farmers for generations. Yet they remain underutilized. These practices have proven to be risk-reducing and the data already allows for "actuarially sound" policies to be developed. To the extent more data could help accelerate policy development, USDA should immediately conduct the research and collect data needed to develop new insurance products that reward farmers for implementing these practices.

Currently, many of the Federal Crop Insurance Program (FCIP)'s insurance products rely on a 10-year "Actual Production History" (APH) for each insured crop to set premium rates. This 10-year records requirement poses a barrier to farmers without 10 years of history and makes it much harder for farmers to try innovative conservation practices such as alley cropping. It also impedes the adoption of diverse cropping systems, because it can take decades to collect all the data needed for more favorable rates. The problem compounds with each additional crop in rotation. Yet research shows that rotations of three or more crops can provide risk and climate mitigation, and biodiversity benefits, and planting multiple crops in rotation is a recognized conservation practice that benefits the climate, soil health, and yields. Thus, RMA should issue a Request for Proposals (RFP) to collect proposals for how to provide a "trend-yield adjustment" for producers utilizing crop rotations and other diverse cropping systems. This adjustment method could be similar to the current policy that allows row crop producers (e.g., producers of corn and soy) to purchase increases in their APH or it could be more appropriately tailored to operations with 3 or more crop rotations.

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[30] The Sodsaver program protects native grasslands by reducing crop insurance premium subsidies by 50 percentage points on land tilled from native prairie. In other words, it penalizes farmers that convert native grassland for agricultural purposes.

RMA should also establish a watershed-scale pilot program to award a per-acre premium discount in high-priority watersheds to farmers implementing conservation practices. Section 1508(d)(3) of the Federal Crop Insurance Act authorizes premium discounts for "a producer of an agricultural commodity who has a good… production experience relative to other producers of an agricultural commodity in the same area."[31] Given that cover crops not only reduce risk but also are "good" in that they reduce risk and mitigate climate impacts, offering a discount for cover crops fits within the RMA mandate. Iowa and Illinois currently offer similar programs by providing funding for additional per acre subsidies for farmers who use cover crops, using Section 508(c)(8), which allows states to pay insurance providers such subsidies to reduce the portion of the premium paid by the producer.[32] Those programs have proven to be popular and have demonstrated RMA's capacity to administer innovative programs. RMA should build on the success of those programs to expand crop insurance-based discounts for conservation practices with its own budget and authority. Throughout the pilot, RMA should collect and analyze data about any changes in risk because of the conservation practices incentivized. Following the results of the pilot, USDA should direct RMA to reduce premiums nationwide for farmers who demonstrate reduced risk through use of conservation practices like cover crops.

6. USDA should recognize reductions in reliance on pesticides as a climate-smart practice and increase research, education, outreach, and incentives for adopting reduced pesticide practices.

Pesticide use by its very nature kills beneficial as well as harmful life in soil and thus often impairs soil health and fertility. Healthy, productive, fertile soil depends on the presence of billions of soil microorganisms, including bacteria and fungi. Pesticides, however, can alter the composition, diversity, and functioning of soil organisms. They often impact soil communities that play a major role in carbon sequestration in plants and the soil.[33] This in turn can affect productivity and the resilience of the land, as well as require increased use of inputs, such as fertilizers, with significant climate change impacts. We thus urge USDA explicitly to include improved (or reduced) pesticide use and integrated pest management as a key climate-smart strategy. Given that pesticide production itself emits GHGs, reduced pesticide use will have magnified climate change benefits.

One way for USDA to accelerate adoption of reduced pesticide practices is to increase support for organic agriculture. USDA defines organic farming as a form of agriculture that uses methods designed to "support the cycling of on-farm resources, promote ecological balance, and

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[31] 7 U.S.C. § 1508(d)(3).
[32] *Id*. § 1508(c)(8).
[33] *See* Ram Swaroop Meena, *Impact of Agrochemicals on Soil Microbiota and Management: A Review,* 9 Land (2020); *see also* V.K. Nathan et al., *Pesticide Application Inhibit the Microbial Carbonic Anhydrase–mediated Carbon Sequestration in a Soil Microcosm*, 27 Env't Sci. & Pollution Rsch. 4468 (2020); Carsten Suhr Jacobsen & Mathis Hjort Hjelmsø, *Agricultural Soils, Pesticides and Microbial Diversity*, 27 Current Opinion in Biotechnology 15 (2014).

conserve biodiversity."[34] Organic farming methods enhance production by supporting natural soil fertility and biological activity, and prohibit the use of synthetic pesticides or fertilizers.[35] It encourages many of the other climate-smart practices USDA recognizes and that are discussed above. Its primary climate benefits are reduced nitrous oxide emissions, lower energy requirements, and increased soil carbon sequestration.[36] (Often organic farming can obtain equivalent yields to conventional farming,[37] or come close in certain contexts,[38] but in other circumstances there may be lower per-acre yields, emphasizing the need for additional research into this approach.) In addition, organic agriculture increases crop resilience to weather shocks (and, of course, reduces dietary exposure to pesticides).

In addition, USDA can expand its existing support for integrated pest management (IPM). USDA, largely through the NRCS, already supports research and outreach on IPM. If seen as an important climate-smart practice, USDA could expand these activities as part of a climate plan. Given the profoundly inequitable harms from pesticides – that fall heavily on farmworkers, a majority of whom are low income and persons of color – such expanded efforts would also support the administration's racial justice executive order.

7. USDA should use its procurement power to advance food production that has lower GHG emissions.

USDA is responsible for the purchase of billions of dollars of food each year. There is thus a tremendous opportunity for USDA to use its purchasing power to influence the climate footprint of food production. USDA should work with stakeholders, including state and local governments, to incorporate a preference for healthy and sustainably produced food in its procurement evaluation process, favoring contracts offering more nutritious and climate-smart choices. Such a preference could have a big impact on shifting food production from emissions-

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[34] *See Introduction to Organic Practices*, U.S. Dep't Agric., https://www.ams.usda.gov/publications/content/introduction-organic-practices.

[35] Certified organic products in the United States, for example, must be "produced and handled without the use of synthetic chemicals." 7 U.S.C. § 6504(1).

[36] *See* Tiziano Gomiero et al., *Environmental Impact of Different Agricultural Management Practices: Conventional vs. Organic Agriculture*, 30 Critical Revs. Plant Sci. 95 (2011) (summarizing research indicating that organic farming increases soil carbon levels and reduces energy requirements); *see also* Søren Petersen et al., *Nitrous Oxide Emissions From Organic and Conventional Crops in Five European Countries*, 112 Agric., Ecosystems & Env't 200 (2006) (finding that nitrous oxide emissions from conventional crop rotations were higher than those in organic crop rotations in four out of five countries); *Contra* Hanna Tuomisto et al., *Does Organic Farming Reduce Environmental Impacts? A Meta-analysis of European Research*, 15 J. Env't Mgmt. 309, 313 (2015) (concluding that nitrous oxide emissions are 31% lower in organic systems per unit of field area, but 8% higher per unit of product).

[37] *See* Rodale Inst., *The Farming System Trial: Celebrating 30 Years*, 4, 9–10 (2012).

[38] *See* Verena Seufert et al., *Comparing the Yields of Organic and Conventional Agriculture*, 485 Nat. 229, 231 (2012) (demonstrating that organic agriculture nearly matches conventional yields in certain environments); *see also* Lauren Ponisio et al., *Diversification Practices Reduce Organic to Conventional Yield Gap*, 282 Proc. B Royal Soc'y 1, 4 (2014) (finding that diversified organic systems were much closer to conventional yields than organic monocultures).

intensive foods (i.e., those that emit large quantities of GHGs across the lifecycle of production) to more nutritious and climate-smart ones.

One of the most climate-smart ways USDA can leverage its procurement power is to incentivize a shift away from the consumption of animal products.[39] In the United States, meat and dairy production—including emissions related to production of their feed (which is about half of U.S. crop production), grazing, enteric fermentation, and manure—account for almost 80% of agriculture's greenhouse gas emissions.[40] Both enteric fermentation and some manure-related emissions release methane, which has approximately 84 times the warming potential of carbon dioxide on 20-year timescales.[41] These methane emissions from animal agriculture account for 37% of U.S. methane emissions across all sectors.[42] Research demonstrates that a significant reduction in demand for (and thus production of) meat and dairy would have enormous climate benefits.[43] Specifically, it would reduce methane emissions from cattle, nitrous oxide emission from animal feed production, and deforestation and grassland conversion for pasture and animal feed production.[44]

In addition to these direct emissions, the use of over a billion acres of land for animal agriculture poses an opportunity cost for carbon sequestration that would occur on this land in the absence of these activities. For example, grazing occupies approximately 800 million acres of land – most of which is for cattle grazing – and approximately 150 million acres of cropland are used to produce animal feed. Every acre of land used for beef production is land that is not being used to store or sequester carbon (in the form of uncultivated grassland or forest, for example).

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[39] *See* Matthew Hayek et al., *The Carbon Opportunity Cost of Animal-Sourced Food Production On Land*, 4 Nature Sustainability 21 (2021).

[40] These sources were responsible for 421.8 MMT CO_2 eq. or 78% of agricultural emissions in 2017. *See* EPA, *Inventory of U.S. Greenhouse Gas Emissions and Sinks 1990-2018*, 2-4 (2020), https://www.epa.gov/sites/production/files/2020-04/documents/us-ghg-inventory-2020-main-text.pdf at 5-2, Table 5-1.

[41] *Id.*

[42] *Id.*

[43] *See* Dietary Guidelines Advisory Committee, U.S. Dep't Agric., *Scientific Report of the 2015 Dietary Guidelines Advisory Committee* 291 (2015), https://health.gov/sites/default/files/2019-09/Scientific-Report-of-the-2015-Dietary-Guidelines-Advisory-Committee.pdf (One study found that "a diet with 50 percent reduced total meat and dairy replaced by fruit, vegetables, and cereals contributed the most to estimated reduced risk of total mortality and also had the largest potential positive environmental impact."); *see also* EAT-*Lancet* Comm'n, *Food Planet Health* 12 (2019), https://eatforum.org/content/uploads/2019/01/EAT-Lancet_Commission_Summary_Report.pdf (Transformation to healthy diets by 2050, which will have both health and environmental benefits, will require "a greater than 50% reduction in global consumption of less healthy foods such as added sugars and red meat."); Intergovernmental Panel on Climate Change, *Global Warming of 1.5°C: An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty* 327 (2018), https://www.ipcc.ch/site/assets/uploads/sites/2/2019/06/SR15_Full_Report_Low_Res.pdf ("Dietary shifts could contribute one-fifth of the mitigation needed to hold warming below 2°C[.]").

[44] *Id*.

This loss of carbon storage potential, or carbon opportunity cost (discussed in more detail below, see section II.A.2.b.iii), from animal agriculture has a tremendous climate impact. Indeed, factoring this lost potential into the calculation of agriculture's climate change impact increases that impact by at least 3 to 4 times the amount EPA calculates, putting agriculture on par with or even exceeding the climate impact of the power sector.[45] Thus, incentivizing a shift away from meat consumption is essential to tackling the climate crisis, and USDA's procurement power provides a ready-made tool to accomplish this.

B. How can partners and stakeholders, including State, local and Tribal governments and the private sector, work with USDA in advancing climate-smart agricultural and forestry practices?

1. State, local, and Tribal governments should use their purchasing power to favor food that has a smaller carbon footprint.

Just as USDA should use its procurement power to incentivize the purchase of food that has a smaller carbon footprint, so too should state, local, and Tribal governments consider the climate impacts of their purchasing decisions. They should amend their procurement policies to allow them to consider GHG emissions as a factor when evaluating contracts and to favor those contracts for food provision that offer the lowest climate footprint.

C. How can USDA help support emerging markets for carbon and greenhouse gases where agriculture and forestry can supply carbon benefits?

1. USDA should not grant validity to offset programs that allow polluters to continue to release fossil fuel emissions.

USDA must ensure that any role it chooses to play in emerging markets for carbon and greenhouse gases does not support the use of offsets to allow for fossil fuel emissions to persist. This concern is particularly important in the context of compliance offset markets that allow fossil fuel polluters to circumvent their responsibility to curb direct emissions based on the false premise that fossil fuel emissions can be offset by uncertain and impermanent carbon gains elsewhere. Directly reducing gross fossil fuel emissions is critical to achieving climate targets as well as environmental justice goals, as pollution hotspots disproportionately burden low-income communities and communities of color. USDA should not support misleading accounting that allows avoidable ongoing fossil fuel emissions to persist on the basis of offsets.

USDA should take heed from the failures of past offset market-based approaches to regulating pollution. Historically, environmental justice communities have not benefited from offset market-based policies though they are the most burdened by pollution-generating facilities. For example, California's cap-and-trade policy represents an offset market scheme that has exacerbated environmental injustice. An analysis of the program found that (1) regulated facilities were disproportionately sited in environmental justice neighborhoods, (2) most of the regulated facilities increased emissions of both GHGs and co-pollutants during the time period studied, and (3) neighborhoods that experienced increases in both annual average GHGs

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[45] *See* Matthew Hayck et al., *The Carbon Opportunity Cost of Animal-Sourced Food Production on Land,* 4 Nature Sustainability 21 (2021).

and annual average co-pollutants were more likely to be environmental justice neighborhoods.[46] The use of offsets allowed regulated facilities to keep polluting (and degrading local air quality) by funding projects largely out-of-state that provided no benefit to frontline communities. To avoid replicating these harms, USDA must incorporate considerations of non-GHG co-pollutants and address local environmental impacts to environmental justice communities in any actions it takes to engage in emerging markets.

Though USDA should not condone the use of offsets that allow the private sector to continue polluting and burdening vulnerable communities, it should recognize the unique opportunity markets afford industry to offset their past emissions by paying farmers to store carbon. Such an approach provides farmers with additional revenue while incentivizing them to adopt practices that pull more carbon out of the atmosphere.

2. **USDA should recognize that measurement and verification challenges pose a major obstacle to payments per ton of carbon.**

In contrast to the practice-based incentive programs that USDA has optimized through programs like EQIP, markets typically require more precise determinations of emission reductions or soil organic carbon changes over time – at least in the near term – to be credible and effective. Even with extensive sampling, detecting small changes in soil organic carbon over time and disentangling these changes from other sources of variation is challenging. Furthermore, these measurements alone are insufficient for characterizing permanence, additionality, and other critical components of soil health outside of carbon storage. Some programs seek to substitute direct sampling of soil with cheaper and less time-consuming approaches including remote sensing, modeling, and surrogate measurements. These additional approaches are highly attractive to private actors in markets due to their reduced costs of implementation, yet they currently lack the accuracy and precision needed in a market context to substitute for direct measurements.[47] USDA must recognize that these measurement and verification challenges pose a barrier to confidence in market schemes that rely exclusively or heavily on payments per unit carbon, and USDA should be careful not to grant validity to private actors who do not meet rigorous standards for quantification and measurement if the Department chooses to play a role in emerging markets.

3. **USDA should ensure any actions it takes related to emerging markets account for barriers to early-adopters and small-scale farms.**

Offset markets have a history of excluding or ignoring concerns raised by environmental justice groups. USDA must address this pattern of exclusion in any role it chooses to play in emerging markets. Many community and environmental justice groups were largely excluded from earlier discussions leading to trading schemes nationally (e.g. Waxman-Markey), regionally (e.g. the Regional Greenhouse Gas Initiative), in states (e.g. California's Assembly Bill 32), and locally (e.g., Revitalizing the Economy of Coal Communities by Leveraging Local Activities and Investing More Act of 2019 (RECLAIM)). It is critical to include community and environmental

[46] *See* Lara Cushing et al., *Carbon trading, Co-pollutants, and Environmental Equity: Evidence from California's Cap-and-Trade Program (2011–2015)*, PLOS Medicine (2018).
[47] *See* Sharon Billings et al., *Soil Organic Carbon is Not Just for Soil Scientists: Measurement Recommendations for Diverse Practitioners,* 31 Ecol Appl. e02290 (2021).

justice groups early in discussions about any incentive or trading schemes and ensure that their concerns are heard and addressed.

Any actions USDA takes to engage in markets must directly confront racial equity. There are about 2 million farms, 400 million acres of cropland and 800 million acres of pasture and rangeland in the U.S.[48] Due to a history of discriminatory and exploitative practices – including systemic denial of farm loans and other assistance to BIPOC producers by USDA—the vast majority of this land is owned by white farmers and ranchers. Discriminatory practices and policies continue to plague the agricultural sector. For example, over 99% of the 2019 tariff bailout – the single largest farm subsidy – went to white farmers.[49]

With this problematic history in mind, USDA must ensure that any actions to engage in market schemes benefit and be accessible to small and historically disadvantaged producers. Based on their history with other emission "market" schemes, many community groups fear that the programs will primarily benefit large, commodity producers and thus further accelerate consolidation of agriculture. They also fear that the intermediary brokers will garner much of the benefit. Any system that pays producers to adopt climate-smart practices should be available to all producers and must not become another mechanism through which the bigger and white establishments reap the benefits while smaller farms and BIPOC-owned and other historically excluded operations are left out.

If USDA does engage with emerging markets, it should at a minimum include carveouts with dedicated funding for historically-excluded producers (see comment III.a.1 below). USDA must also recognize and address the fact that some of the most expensive climate mitigation strategies available (such as those that address large emission sources at CAFOs) only benefit the largest producers without necessarily building climate resiliency and have the potential to further entrench unsustainable operations that disproportionately harm communities of color (see, e.g., comment II.C. below). Additionally, USDA must ensure that producers who have been using sustainable practices for years are not excluded from receiving benefits simply because their soil is already carbon rich or because they have already implemented strategies for reducing emissions.

4. USDA should adopt a holistic approach to soil health rather than exclusively focusing on carbon storage.

Many agroecological practices supported by existing NRCS programs address a broad range of ecosystem services alongside carbon sequestration. For example, in addition to increasing soil organic carbon, cover crops can also reduce the need for fertilizer through increased nutrient availability (thus reducing nitrous oxide emissions from fertilizer application and carbon dioxide emissions from fertilizer manufacture), reduce nitrogen leaching, and reduce

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[48] U.S. Dep't of Agric., National Agricultural Statistics Service, 2017 Census of Agriculture – Table 1. Historical Highlights: 2017 and Earlier Census Years, https://www.nass.usda.gov/Publications/AgCensus/2017/Full_Report/Volume_1,_Chapter_1_US/st99_1_0001_0001.pdf.

[49] *See* Nathan Rosenberg & Bryce Wilson Stucki, *USDA Gave Almost 100 Percent of Trump's Trade War Bailout to White Farmers*, The Counter, July 29, 2019, https://thecounter.org/usda-trump-trade-war-bailout-white-farmers-race/.

vulnerability to erosion and drought.[50] By contrast, offset market schemes often focus exclusively on carbon sequestration and storage. By doing so, these schemes reflect a narrow view of soil functions.

Carbon storage is only one of the many ecological functions of soils. Commodifying continual increases in soil carbon everywhere independent of considerations of other ecosystem processes — as is sometimes proposed in offset market schemes — is neither realistic nor necessarily beneficial for soil fertility, biodiversity, plant productivity, GHG emissions, or other ecosystem functions. While soil erosion and degradation should be addressed, those are not adequate surrogates for a broad climate solution and any such ecological justifications should be examined carefully. Instead, in any actions USDA takes to engage in markets, the Department should quantify and consider co-benefits and important interconnections between carbon cycling and nutrient cycling. By incentivizing practices that address a coordinated suite of ecosystem services through existing and expanded incentive programs, USDA can promote multiple benefits and reduce the likelihood of outcomes that increase carbon sequestration and storage while negatively impacting other processes. USDA should bring a similar holistic lens in any actions it chooses to take to engage in emerging markets.

5. **USDA should prioritize efforts to support climate-smart practices with co-benefits through existing and expanded conservation programs (see A above).**

As described above in our response to question A, USDA has an immediate opportunity to increase carbon sequestration and reduce greenhouse gas emissions through the expansion and improvement of existing conservation programs such as the EQIP, the CSP and the RCPP. These established programs already provide payments to farmers for the adoption of several agroecological practices that help sequester carbon and reduce greenhouse gas emissions. Existing tools developed by NRCS, including the COMET-Planner, allow for general estimates of the climate impacts of practices currently supported through these programs. USDA should prioritize improving these existing programs to reduce barriers to the adoption of these practices, and increase funding for the most impactful climate-smart practices including agroforestry, improved nutrient management, and diversified cropping rotations. Integrating climate as an explicit goal of these programs can help these payments support practices with the largest impact on climate, while also promoting co-benefits to water quality and biodiversity.

D. What data, tools, and research are needed for USDA to effectively carry out climate-smart agriculture and forestry strategies?

1. **To promote adoption of the climate-smart practices described above, USDA should expand funding for research on implementation and outcomes of climate-smart practices.**

Federal funding for agroecological research has fallen sharply while the need for climate-smart systems and practices has become increasingly necessary. Agroecological research accounts for only 10% of research funded by USDA's Research, Extension and Economics (REE) subagency, with less than 1% of funds supporting agroforestry research and

[50] *See supra note* 24, 25 and Table 1

less than 3% supporting research on complex crop rotations.[51] Although scientific research strongly supports the climate and environmental benefits of these practices (see Table 1), USDA should increase funding for research on improving the efficacy of these practices and building resources for the most effective, context-specific applications of them. Ensuring these transitions lead to verifiable and long-term improvements will also require expanded research on measuring outcomes following practice adoption.

2. USDA should increase outreach and technical assistance related to climate-smart practices— facilitated through regional agroforestry centers, the Cooperative Extension System, Climate Hubs, and long-term agroecological research sites.

Alongside expanded research, USDA should also reduce technical barriers to the adoption of agroecological practices by tailoring extension, technical assistance, and outreach programs to the most effective climate-smart approaches, such as diversified cropping systems (including agroforestry and silvopasture, where ecologically appropriate) and agroecology. For example, by integrating or retaining woody perennials into land used for production, agroforestry offers the highest sequestration potential among climate-smart practices on a per-acre basis and provides multiple benefits for farmers and rural communities. Yet there are few agricultural consultants or extension officials in the United States with the training and expertise necessary to help farmers plan for and implement agroforestry practices, and fewer than one-third of state extension systems have agroforestry programs.[52] Likewise, farmers interested in adopting these practices have few public sources of technical assistance or support. USDA should expand opportunities for support through regional agroforestry centers, the cooperative extension system, climate hubs, and long-term agroecological research sites with a focus on facilitating transitions to climate-smart practices.

a. Regional agroforestry centers.

Building on the success of extension, technical assistance, and outreach efforts conducted by the National Agroforestry Center in Lincoln, Nebraska and The Center for Agroforestry at the University of Missouri, USDA should coordinate efforts among sub-agencies including REE, NRCS, and the United States Forest Service (USFS) to establish regional agroforestry centers in each of the 12 major ecoregions of the United States. These regional agroforestry centers could help implement agroforestry plans while also helping to develop new markets for agroforesters. These centers should work closely with, and provide resources to, 1890 Land-Grant Institutions (historically black universities) and Tribal land-grant institutions to ensure the communities they serve benefit from agroforestry's financial and environmental impacts. And they should incorporate a variety of diversified cropping systems into their work so that farmers and ranchers can learn about and have access to tools related to practices that are most ecologically appropriate for their geography.

[51] *See* Marcia S. DeLonge et al., *Investing in the Transition to Sustainable Agriculture*, 55 Env't Sci. & Pol'y. 266 (2016).
[52] *See* Michael Jacobson & Shiba Kar, *Extent of Agroforestry Extension Programs in the United States*, 51 J. Extension v51 (2013).

b. Cooperative Extension System.

USDA's Cooperative Extension System (CES) works to connect agricultural research with those that can put this research to work. The USDA agency responsible for CES has one of the worst civil rights records in the federal government. It has been the subject of numerous investigations, lawsuits, and congressional hearings. While the agency, reorganized as the National Institute of Food and Agriculture (NIFA) in 2009, has made improvements in recent years, CES still lacks staff diversity and too often fails to meet the needs of underserved populations, particularly farmworkers and farmers of color. USDA should ensure that 1890 Land-Grant Institutions and 1994 Tribal colleges and universities receive substantially more extension funding. And it should expand efforts throughout the CES to meet the needs of historically underserved and marginalized communities by hiring more extension agents from communities of color and providing additional training, outreach, and other opportunities to put new agricultural research to work. This should include concerted attention to and provision for language and cultural sensitivity to ensure accessibility and inclusion, and to begin to establish the trust in CES that has been eroded over so many years for BIPOC farmers, farmworkers, and aspiring farmers.

c. Climate Hubs.

USDA's Climate Hubs, located in ten regional locations across the country, work to develop and deliver "science-based, region-specific information and technologies, with USDA agencies and partners, to agricultural and natural resource managers that enable climate-informed decision-making, and to provide access and assistance to implement those decisions."[53] Created by USDA in 2013, the goal of the Climate Hubs is to help farmers, ranchers, forest landowners, resource managers, and rural communities plan for and manage weather events caused by climate change. Climate Hubs provide a mechanism to align research, data, technical assistance, and outreach with regional needs and effectively work towards climate goals. Despite the important potential Climate Hubs have for offering region-specific outreach and technical assistance on climate-smart agriculture, the previous administration reduced their funding and staffing. USDA should reverse this shortage and broaden and expand the Climate Hub program, while ensuring that the Hubs plan to engage the communities where they are located.

d. Long-term agroecological research sites.

Long-term site-based research networks such as the National Science Foundation's Long-Term Ecological Research (LTER) Network have been productive for coordinating ecological research efforts and sharing data across regions. USDA should emulate this system and create its own research initiative to develop long-term data on agricultural systems. This approach can help build continuous research related to agroecological practices in the context of climate change adaptation and mitigation at experimental and observational sites across the nation. Long-term field studies are particularly important for characterizing the lifecycle of environmental effects associated with shifting agricultural practices and optimizing conservation programs accordingly. These networks also facilitate collaborations across sectors and play a key role in outreach and education.

[53] *About Us*, Climate Hubs U.S. Dep't Agric., https://www.climatehubs.usda.gov/about.

3. **USDA should increase Research Funding for 1890 Land-Grant Institutions and Tribal Colleges to Better Understand Climate Impacts and Solutions for Historically Underserved Communities.**

USDA should direct a dramatic increase in climate adaptation and mitigation funding towards historically Black land-grant universities (known as 1890 Institutions) and Tribal colleges to (1) assess the impact of climate change on communities of color, and (2) provide solutions that help historically underserved communities not only mitigate and adapt to climate impacts, but to prosper economically. If there are states unwilling or unable to match federal funds for 1890 Institutions or Tribal institutions, USDA should ensure that these institutions receive equitable total funding. That funding should allow 1890 Institutions and Tribal Colleges to conduct the research that they deem most relevant, appropriate, and critical to their communities, and should not be contingent upon particular USDA-construed priorities, as these institutions are best able to incorporate historical and cultural knowledge into immediate agricultural needs to best serve their communities.

E. How can USDA encourage the voluntary adoption of climate-smart agricultural and forestry practices in an efficient way, where the benefits accrue to producers?

1. **Increase research and development and farmer pilots on high productivity practices that are climate-smart.**

Many agroecological practices not only benefit climate and the environment, but also provide benefits to producers in terms of farm productivity and resilience. USDA should work with producers through on-field pilots, such as the Soil Health Demonstration Trial program, to increase the amount of carbon sequestered in the soil, improve soil health, and build climate resilience while also improving farm productivity and increasing farmer profits. See responses below in section III for detailed comments on how USDA can ensure benefits more equitably accrue to producers.

II. BIOFUELS, WOOD AND OTHER BIOPRODUCTS, AND RENEWABLE ENERGY QUESTIONS

1. **USDA's framing of the questions in topic 2 is flawed.**

In looking at biofuels, wood and other bioproducts, and renewable energy, including biogas from livestock, USDA frames the questions as though encouraging production and use of these products is decidedly a good thing. Indeed, USDA assumes that greater adoption of these practices will provide climate-smart solutions for the agricultural sector. USDA's assumptions are misplaced.

Rather, as discussed below, expanding use of biomass for biofuels, use of wood products, and production of biogas from livestock may in fact lead to increased greenhouse gas emissions thereby contributing to the climate problem rather than offering a sound solution for it. Collectively, these practices also raise grave environmental concerns, including air and water pollution, and cause environmental justice harms for the communities that bear the brunt of such pollution. They also lead to an alarming loss of biodiversity, and harm to threatened and endangered species. And they also have opportunity costs associated with their use of land, including lost opportunities to store and sequester carbon, exacerbating their climate impact.

Thus, rather than assuming these practices will benefit the climate and rural communities, USDA instead should ask the critical and more objective question of whether biofuels, wood products, and biogas are, in fact, energy sources that should be encouraged based on a host of climate and environmental considerations, and whether increased production of these sources of energy will serve the goals of the climate Executive Order. Once the question is properly framed, it will become clear that encouraging these practices is not the answer, as they do not provide the panacea that many assume they do. It is therefore essential that USDA ensure there are climate and environmental protections in place if, despite the climate, environmental, and public health harms associated with these practices, USDA encourages them as climate-smart solutions for agriculture.

A. How should USDA utilize programs, funding and financing capacities, and other authorities to encourage greater use of biofuels for transportation, sustainable bioproducts (including wood products), and renewable energy?

1. Greater Use of Biofuels Must Not Lead to Land Conversion.

As USDA considers whether and how to use its programs, funding, and other authorities to encourage greater use of biofuels, it must first understand the full extent of the climate and environmental consequences that result from the production of renewable biomass, in particular corn for ethanol and soy for biodiesel. Only then will it be able to ensure that incentivizing use of biofuels does not cause climate or environmental harm.

a. The Renewable Fuel Standard Program Provides an Example of Expanding Use of Biomass.

In an effort to increase the production of renewable fuels and thus decrease greenhouse gas (GHG) emissions from the transportation sector, Congress passed the Energy Independence and Security Act (EISA), Pub. L. No. 110-140, § 202(a)(1), 121 Stat. 1492 (2007). Included within EISA was a new Renewable Fuel Standard (RFS) which, among other things, increased the volume of biofuel required for a fuel to qualify as renewable, set GHG emissions standards, and restricted the type of land that could be used to produce renewable biomass to satisfy the standard.[54] Under the RFS, renewable biomass consists of crop-based biomass, which Congress defined as "[p]lanted crops and crop residue harvested from agricultural land cleared or cultivated at any time prior to December 19, 2007, that is either actively managed or fallow, and nonforested."[55] Congress designed these requirements to prevent land that was not in cultivation at the time of EISA's passage from being converted to grow renewable biomass, thereby protecting such land from tillage that would release tremendous amounts of stored carbon into the atmosphere and cause climate and environmental harm.

Despite the carefully crafted definition of crop-based biomass included in EISA, when EPA promulgated regulations to implement the statute, it ignored the restrictions on land

[54] *See* 42 U.S.C. §§7545(o)(1)(A), 7545(o)(1)(I)(i).
[55] *Id*. § 7545(o)(I)(i).

conversion. Instead, EPA adopted an approach under which it assumes – without verification – that land used for renewable biomass production qualifies under EISA as long as the aggregate amount of land used for agricultural production does not exceed a baseline level of 402 million acres.[56] Accordingly, EPA does not look at individual parcels of land or require evidence that land used to produce renewable biomass for biofuel was not converted for this purpose.

b. Increased Production of Biofuel from Biomass Grown on Converted Land Harms Climate and the Environment.

Under EPA's aggregate compliance approach, the RFS program has led to millions of acres of converted land, which in turn has caused severe climate and environmental harm. By encouraging increased use of biofuels in transportation, the RFS program incentivizes increased production of renewable biomass, which, absent restrictions on what type of land can be used to grow such feedstocks, leads to increased land conversion. This in turn results in increased GHG emissions and environmental harms, thereby undermining the climate and environmental goals of EISA.

i. Increased production of renewable biomass leads to increased land conversion.

Increased use of renewable fuel must necessarily be accompanied by increased production of renewable biomass to make that fuel. This biomass primarily takes the form of corn for ethanol and soy for biodiesel. The progression of the RFS program illustrates this nexus: as volumes of renewable fuel requirements have steadily increased over time, so too has cultivation of corn and soy.[57] Between 2007 (when EISA was passed) and 2016, planted corn increased by nearly 10 million acres, while planted soybeans increased by roughly 7-13 million acres.[58]

To satisfy the need for increased acres to grow renewable biomass, farmers have converted millions of acres of land that previously was not in cultivation. According to EPA, there has been "an increase in actively managed cropland by roughly 4-7.8 million acres" since implementation of the RFS program.[59] "These changes are reported to be coming mostly from lands that were formerly in grassland for 20 or more years, and going to corn, soy, and wheat,"[60] and "[t]here is strong correlational evidence that biofuels are responsible for some of this observed land use change."[61] Indeed, "[t]he first crop planted on converted land was dominated by corn (27%)," with soybeans close behind (20%).[62].

Thus, using EPA's RFS program as an example, should USDA use its policies, funding, and other authorities to encourage greater adoption of biofuels for transportation, it will trigger

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[56] *See* Regulation of Fuels and Fuel Additives: Changes to Renewable Fuel Standard Program, 75 Fed. Reg. 14,670, 14,701-03, Mar. 26, 2010.
[57] *See* EPA, *Biofuels and the Environment: Second Triennial Report to Congress* Agency (2018) ("Triennial Report")(Attached as "Ex. 2") at 11.
[58] *Id*.
[59] *Id*. at 37 (emphasis added).
[60] *Id*. at 38.
[61] *Id*. at 44.
[62] *Id*. at 34

increased production of renewable biomass. Unless USDA imposes certain restrictions on what land can be used for renewable biomass production, this in turn will lead to increasing levels of land conversion to grow the necessary feedstock. This has often led to pressure on small scale farmers with small acreage who are unable to compete to sell their parcels of farmland to large growers intent on capitalizing on the demand for biofuels, offering cheap land prices to largely Black farmers so they can buy and then convert that land into corn and soy for biofuels.

ii. Land Conversion Leads to Increased GHG Emissions and Environmental Harms.

Under the RFS program, land conversion caused by increased production of renewable biomass has had – and will continue to have – a devastating impact on climate, the environment, and threatened and endangered species and their habitat. Uncultivated land serves as a critical source of carbon storage. Conversion of this land to produce crops exposes the stored carbon to decomposition, creating a tremendous quantity of carbon dioxide that is released into the atmosphere.[63] For example, in the four-year period between 2008 and 2012 (shortly after the RFS program went into effect), conversion of land to produce renewable biomass released an estimated 94 to 186 teragrams of CO2-equivalent, equivalent to the annual emission of 34 coal-fired power plants or 28 million cars on the road.[64] Avoiding land conversion from grasslands to cropland allows ecosystems to continue to capture and store carbon while avoiding the release of this stored carbon into the atmosphere – a reason why EISA defined qualifying land for renewable biomass production as that which already was in cultivation.

In addition to CO2, land conversion also releases vast quantities of nitrous oxide ("N2O"), a GHG that is approximately 300 times more potent than CO2. [65] Newly cultivated cropland – in particular, land used to grow corn – requires increased nitrogen fertilization, only 40-50% of which is absorbed by the crops. The excess nitrogen either runs off with surface water, leaches into ground water, or is converted by microorganisms into N2O which is then released into the atmosphere.[66]

And the harms from land conversion do not stop with climate. Expansion of biomass production and the land conversion it causes have a deleterious impact on ecosystem health and biodiversity.[67] Given that so much land is already in agricultural production, expansion of biomass cultivation is "occurring in ecologically sensitive areas," leading to "the loss of habitat and landscape simplification" that harms wildlife.[68] Land conversion resulting from biomass production leads to a host of environmental harms, including negative impacts on water and soil quality, the loss of native grassland, landscape simplification, harmful algal blooms as seen in lake Erie, hypoxia as seen in the Gulf of Mexico, increases in erosion, loss of soil nutrients and soil organic matter (including carbon), and increased nutrient and pesticide use affecting surface

[63] *See* Decl. of Dr. Tyler Lark, ("Lark Decl.")(Attached as "Ex.3"), ¶ 36.
[64] *Id*.
[65] *See* EPA, *Inventory of U.S. Greenhouse Gas Emissions and Sinks 1990-2018*, 2-4 (2020), https://www.epa.gov/sites/production/files/2020-04/documents/us-ghg-inventory-2020-main-text.pdf at 1-10, Table 1-3.
[66] *See* Triennial Report at 70.
[67] *Id.* at xii.
[68] *Id*.

and groundwater, as well as ecosystem health and both terrestrial and aquatic biodiversity.[69] It "harms the habitats of numerous animals and fish," including those of listed and endangered species.[70] And these harms are only likely to increase in frequency and severity as climate change leads to more natural disasters like flooding and droughts.

iii. Land Conversion has carbon opportunity costs that USDA must consider.

Given that land is a fixed commodity – 62% of which is used for agriculture in the continental United States – USDA must consider the tradeoffs involved in using land for biomass production rather than having it used for some other purpose. Specifically, if an acre of land is being used to produce renewable biomass, it is not being used to store or sequester carbon (in the form of uncultivated grassland or forest, for example), nor is it being used to produce crops used to feed people. Land for those purposes must therefore come from other sources. These other sources may not be as efficient in storing or sequestering carbon or growing food crops, which could lead to inefficient land use that reduces the global capacity to address climate change and feed the growing population.[71] Decreases in productivity run the risk of driving increased production elsewhere to meet the unmet demand, and that increased production elsewhere would run the risk of harmful environmental impacts that reduce the environmental benefits of biofuels.

The loss of carbon sequestration and storage potential is a critical climate impact of agriculture but one that is rarely considered. Factoring this lost potential into the calculation of agriculture's climate change impact increases that impact by at least 3 to 4 times the amount EPA calculates, putting agriculture on par with or even exceeding the climate impact of the power sector.[72]

Therefore, when encouraging greater use of biofuels, USDA must take into account the carbon opportunity cost, or COC, of displacing what might otherwise be climate mitigating uses of the land. This can be calculated by one of two methods:

> In the first method, the 'carbon loss' method, the COC is equal to the global carbon loss from plants and soils generated by producing each crop to date (the numerator), divided by the global production (the denominator), and is expressed as kilograms of CO2e per kilogram of crop. . . . The COCs of bioenergy feed by-products equal the COCs of the crops that they displace.
>
> The second method is the 'carbon gain' method, in which we estimate the quantity of carbon that could be sequestered annually if the average productive capacity of land used to produce a

[69] *Id*. at xi-xiii, 14, 17–18; *see also* Lark Decl. ¶¶ 10–35.
[70] *Am. Fuel & Petrochemical Mfrs. v. EPA*, 937 F.3d 559, 593 (D.C. Cir. 2019).
[71] *See* Timothy Searchinger et al., *Assessing the Efficiency of Changes in Land Use for Mitigating Climate Change*, 564 Nature 249, 249 (2018);
[72] *See* Matthew Hayck et al., *The Carbon Opportunity Cost of Animal-Sourced Food Production on Land,* 4 Nature Sustainability 21 (2021).

> kilogram of each food globally were instead devoted to regenerating forest.[73]

COC is systematically excluded when evaluating the climate impact of land use, leading to an underestimation of agriculture's contribution to climate change. Considering the COC associated with renewable biomass production for biofuels – in particular the tremendous land conversion associated with such production – it is far from obvious that encouraging greater biofuel use offers a climate smart solution. USDA must therefore analyze not only the climate, environmental, and public health harms associated with land conversion for biomass production, but also the carbon efficiency and COC of using land for this purpose.

c. Any effort to encourage the use of biofuels must ensure it does not lead to land conversion.

In light of the harmful climate and environmental effects of land conversion associated with increased production of renewable biomass as evidenced in the RFS program, as well as the carbon opportunity cost related to the lost carbon storage and sequestration potential of this land use, USDA must act carefully if it is going to encourage increased use of biofuels in transportation (as this question assumes it will). It must do what EPA has failed to do under the RFS program: ensure that any increased use of biofuels does not lead to the conversion of previously uncultivated land for production of the necessary feedstocks. In particular, it must put in place necessary protections to restrict the land used to grow renewable biomass to what was in cultivation at the time of EISA's passage. Otherwise, it risks undermining the climate benefits of biofuels by allowing increased emission of both CO2 and N2O from the turning of the soil and the increased application of fertilizer necessary to cultivate this land. And it also risks the host of environmental harms associated with land conversion.

USDA already has tools in place to protect against such land conversion. Under the Sodsaver provision of its conservation compliance requirements, it disincentivizes producers from growing crops on native sod and untilled grassland. If a producer fails to comply with the Sodsaver requirement, it risks becoming ineligible for certain USDA farm program benefits. USDA should ensure that any growth of renewable biomass for use in biofuel complies with the Sodsaver provision and thus is not produced on previously uncultivated land.

2. USDA Must Not Expand the Use of Woody Biomass.

Like biofuels, burning trees is not a climate smart solution. Rather, wood burning emits more carbon pollution per unit of energy than burning coal while removing a critical carbon sink (trees). It is in no way a carbon neutral strategy. Several organizations are submitting detailed comments focused on expanding the use of woody biomass and therefore, we will focus the response to this question on other energy sources. However, we request that USDA take a hard look at the climate impacts of burning woody biomass rather than assuming it to be a beneficial strategy.

[73] Searchinger et al., at 250.

3. USDA Should Incentivize the Use of Renewable Energy.

Putting biofuels and woody biomass aside, USDA should encourage the use of renewable energy in agriculture, particularly in the form of solar and wind energy. Integrating these renewable energy sources into the production of crops and livestock can reduce GHG emissions and energy costs while increasing crop production, reducing water loss, and helping to build resilient food-production and energy-generation systems. On-farm energy and electricity contribute approximately one percent of total U.S. GHG emissions, and thus expanding on-farm renewable energy use could help lower the agriculture sector's climate footprint.

To help incentivize greater use of renewable energy on farms, USDA should increase research into the effectiveness of dual-use energy systems, as well as education, outreach, and technical assistance efforts to assist farmers with integrating renewable energy projects on land used for crop or livestock production. It should carve out a percentage of grants and loans under the REAP program for renewable energy installations as well as technical assistance aimed at assessing farmers' potential for integrating such systems.

B. How can USDA support adoption and production of other renewable energy technologies in rural America, such as renewable natural gas from livestock, biomass power, solar, and wind?

1. USDA Must Consider the Risks from Monetizing the Production of Methane from Livestock.

Just as USDA must be wary of relying on increased biofuels and woody biomass as false solutions to the climate crisis, so too must it carefully consider the risks of turning to biogas as a GHG reduction strategy. While the idea of capturing methane emissions from livestock and transforming them into a usable energy source sounds good in theory and has gotten a lot of attention recently, a closer examination of the industrial system driving this proposed solution reveals that it is not the magic formula it is held out to be. Far from resolving the climate problems created by industrial livestock facilities, biodigesters run the risk of increasing GHG emissions while perpetuating or even exacerbating grave environmental and public health harms, harms that disproportionately burden already vulnerable communities. Thus, USDA should take a more skeptical view of biodigesters.

a. Manure from animal feeding operations contributes to the climate crisis while harming the environment and public health.

Concentrated animal feeding operations (CAFOs) are industrial livestock facilities that house thousands – and sometimes millions – of animals in confined spaces while they reach a size sufficient for slaughter for food. These facilities generate billions of tons of manure each year, and storage and application of this manure are poorly regulated. Much is stored in a liquified form in open pits called lagoons where the anaerobic conditions accelerate the emission of methane, a harmful GHG that has a warming potential that is approximately 84 times more powerful than CO_2 on a 20-year timescale. Methane emissions from manure represent approximately 10% of total methane emissions in the United States.[74]

Manure from livestock facilities also emits vast quantities of N_2O, a potent GHG that traps heat 298 times more effectively than CO_2. While methane emissions result from anaerobic conditions, N_2O emissions are highest under aerobic conditions, such as when manure is spread on fields as fertilizer beyond agronomic rates, which it often is. Mitigating the climate impacts of manure requires consideration of both methane and nitrous oxide, as a change in the emissions of one gas may inadvertently lead to an increase in the emissions of the other.

In addition to generating GHG emissions that contribute to the climate crisis, these industrial operations also cause grave environmental and public health harms. Unlike human waste, animal waste can be discharged into the environment without any treatment, and that is precisely what occurs. This leads to contamination of groundwater with nitrates, pathogens, antibiotics, and runoff of excess nutrients into surface waterways. And it also results in noxious odors and emissions of toxic air pollutants like hydrogen sulfide and particulate matter. These environmental and public health harms are concentrated in vulnerable communities where CAFOs have proliferated.

The proliferation of CAFOs also comes with a carbon opportunity cost: land used for animal agriculture is land that is not being used for carbon storage and sequestration. A group of scholars calculated that "the cumulative potential of carbon dioxide removal on land currently occupied by animal agriculture is comparable in order of magnitude to the past decade of global fossil fuel emissions."[75]

b. Biodigesters Provide an Insufficient Solution to CAFO Methane Emissions, and Do Nothing to Address the Environmental and Public Health Harms of CAFOs.

In light of the panoply of harms caused by industrial livestock facilities, strategies that solely focus on mitigating their GHG emissions – such as biodigesters for methane capture and biogas production – are insufficient, as they do nothing to resolve the grave environmental and public health harms from CAFOs and in fact might exacerbate them. And they may have the perverse effect of increasing GHG emissions as well.

As an initial matter, it is misleading to consider the billions of tons of manure produced by CAFOs as a "renewable" source of energy. Storing waste from thousands (or millions) of animals in liquified form in uncovered lagoons where it decomposes and releases vast quantities of methane is not a necessary component of livestock production. Rather, this is a problem of industrial animal agriculture's own making, exacerbated by a lack of oversight that has allowed CAFOs to store and apply manure largely unregulated and in ways that cause high levels of

[74] *See* EPA, *Inventory of U.S. Greenhouse Gas Emissions and Sinks 1990-2018*, 2-4 (2020), https://www.epa.gov/sites/production/files/2020-04/documents/us-ghg-inventory-2020-main-text.pdf.
[75] Matthew Hayek et al., *The Carbon Opportunity Cost of Animal-Sourced Food Production On Land*, 4 Nature Sustainability 21 (2021).

methane emissions. Thus, rather than "renewable," the enormous amounts of methane produced by industrial livestock facilities are avoidable.

Putting that aside, transforming liquified manure into biogas is a false solution to the climate problem. Rather than decreasing GHG emissions, biodigestion of methane may instead lead to increased GHG emissions, as well as increased environmental and public health harms. By making methane profitable, digesters might incentivize greater production of it, leading to increased herd size which in turn will increase enteric emissions of methane – emissions that are not captured by biodigesters. Digesters also do not address emissions of other GHGs from livestock, such as nitrous oxide, which only stand to increase as production of biogas incentivizes greater herd size. Digesters can also leak substantial amounts of methane which could increase – rather than reduce – overall methane emissions from CAFOs.[76]

Also problematic, greater herd size will also increase all the pollution and health risks that go along with greater manure production and that disproportionately harm vulnerable communities. This includes noxious odors, toxic air emissions such as hydrogen sulfide and particulate matter, and surface and groundwater contamination, all affecting the communities surrounding these industrial facilities. Digesters do nothing to ameliorate these harms, and making methane production profitable may in fact exacerbate a problem that some consider the greatest form of environmental racism in the nation.

Finally, not only do digesters risk increased climate, environmental, and health harms, but they also are a highly inefficient and ineffective way to produce energy. They are very expensive (for example, a digester for a dairy farm with 900 cows in NY costs $1.7 million), and biogas provides only a very small fraction of what is needed to satisfy transportation and building energy demand. Moreover, to use biogas as an energy source, it must go through an internal combustion process that emits criteria pollutants including particulate matter and nitrogen oxides, thereby further contributing to the climate, environmental, and health harms caused by CAFOs.

c. USDA Should Support Regulation of Methane Emissions and Storage and Application of Manure, and Should Incentivize Reductions of Manure Production and Concentration.

Rather than encouraging a false solution to the climate crisis and supporting costly and ineffective biodigesters that may increase GHG emissions and environmental and health harms, USDA should instead require CAFOs to adopt a suite of practices to reduce the production and concentration of manure and to improve its storage and application. Currently, clean air and water regulations largely exempt CAFOs and those that apply are inadequate. Though EPA (not USDA) is responsible for overall regulation of pollution from these facilities, USDA can and should look for ways to support efforts that reduce the quantity of manure that requires treatment, storage, and/or application, as that is the only way to truly reduce GHG emissions from livestock production. Alternatively, USDA should focus on efforts that mitigate emissions

[76] *See* Mathieu Dumont et al., *Methane Emissions in Biogas Production*, in *The Biogas Handbook Science, Production and Applications* (Arthur Wellinger et al., 2013); *see also* Thomas K. Flesch, *Fugitive Methane Emissions from an Agricultural Biodigester*, 35 Biomass & Bioenergy 3927 (2011).

at earlier stages of manure production and management and across its lifecycle.[77] There are several different strategies that can accomplish this.

First, USDA should focus on strategies to reduce the concentration of animal feeding operations. For example, it should impose size limitations on these industrial facilities to avoid the concentration of massive amounts of manure that lead to significant GHG emissions and that harm the surrounding communities. Similarly, it should explore ways to incentivize a shift away from dietary demand for meat and dairy, which in turn would reduce demand for massive industrial livestock facilities. It should consider how it can use its procurement power to accomplish this. And it should incentivize and provide technical assistance to support the implementation of rotational and prescribed grazing and silvopasture. Such incentives should include support for producers transitioning from industrial livestock systems to grazing-based systems, additional funding from USDA programs such as EQIP for grazing systems rather than CAFOs, and prioritization in programs such as CSP and EWIP for silvopasture practices.

Second, USDA should use existing programs to encourage CAFOs to reduce their methane emissions, for example by making receipt of USDA funding contingent upon meeting certain targets. USDA should also work with EPA and share data and information necessary to set methane emissions limits for CAFOs under the Clean Air Act. Such limits would require CAFOs to adopt effective systems and practices to significantly decrease their generation of methane.

Third, USDA should increase research and development into ways to optimize animal feed to reduce the nitrogen content in manure and alter the balance of nitrogen in urine versus feces, which would affect nitrous oxide emissions.[78] Likewise, it should increase research and development to explore feed and feed additives that can reduce methane emissions from both enteric fermentation and manure.

Fourth, USDA should require industrial livestock operations to adopt non-digester manure management strategies that avoid the creation of conditions that lead to increased GHG emissions, and restrict practices that lead to more intensified emissions. For example, USDA should require more effective storage practices that avoid anaerobic digestion such as limiting storage time and temperature, ensuring storage occurs in sealed, covered, lined conditions, aerating stored manure, and requiring operators to flare methane emissions from the storage units.[79] It should also restrict the use of manure application practices such as spreading separated solids and exposing them to aerobic conditions that increase N2O emissions. USDA should also promote manure application practices that maximize plant uptake and stabilization of manure applied as fertilizer to reduce nitrous oxide emissions and prevent runoff of excess nitrogen. And USDA should encourage greater research and development related to additives that can be applied to manure to slow the release of inorganic nitrogen.

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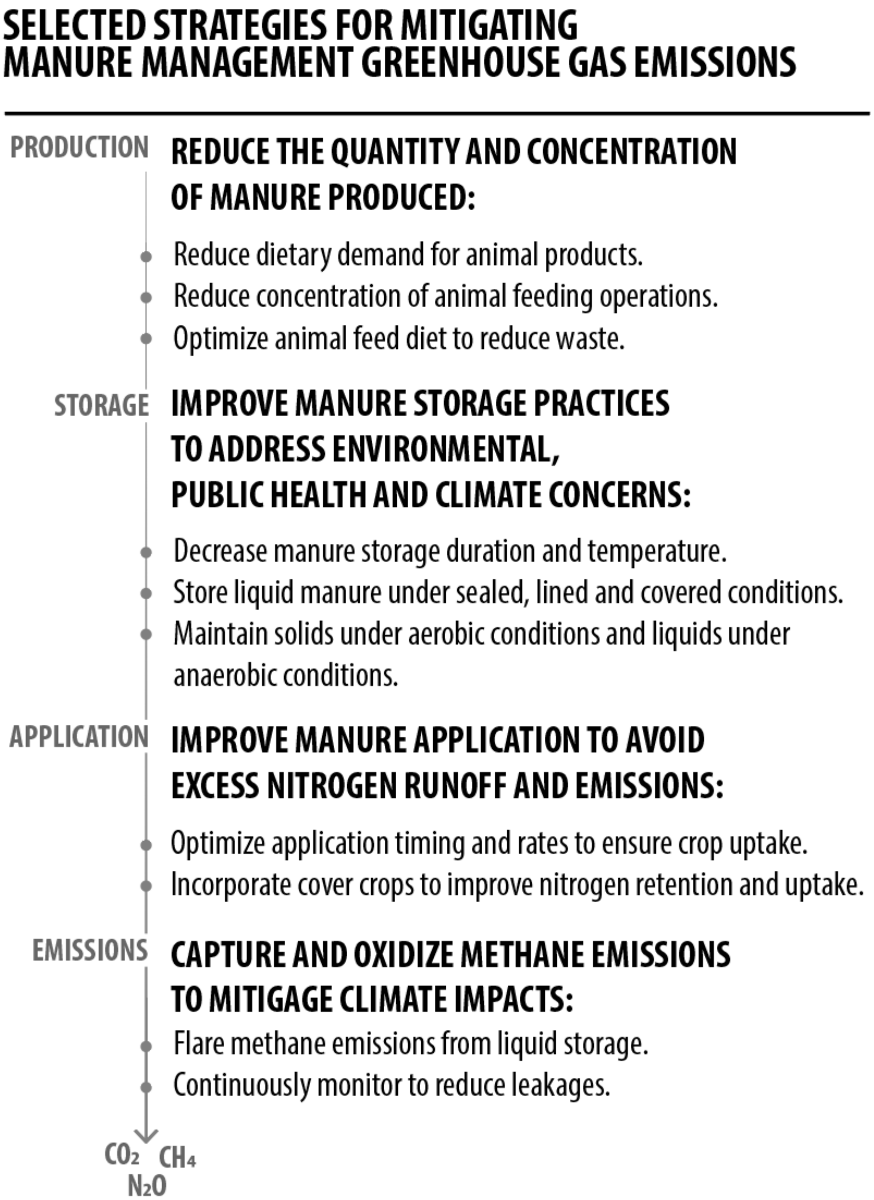
[77] *See* F. Montes et al., *Mitigation of Methane and Nitrous Oxide Emissions from Animal Operations: A Review of Manure Management Mitigation Options*, 91 Am. Soc'y . Animal Sci. 5070 (2013); *see also* P.J. Gerber et al., *Technical Options for the Mitigation of Direct Methane and Nitrous Oxide Emissions from Livestock: A Review*, 7 Animal 220 (2013).

[78] *Id.*

[79] Methane flaring is 15 times less expensive than anaerobic digesters.



2. Adoption of Biomass Power Must Not Lead to Land Conversion to Produce Renewable Biomass.

As discussed above, should USDA incentivize the adoption of biomass power as a climate-smart strategy, it must ensure that land used to grow the biomass for these purposes does not lead to increased land conversion and the associate climate, environmental, and public health harms that result from it.

3. USDA should support expansion of wind and solar energy.

Farmland offers great potential for the siting of renewable energy such as wind turbines and solar panels. As mentioned above, on-farm energy and electricity contribute about one percent of total U.S. GHG emissions, so encouraging renewable energy use on farms could have a palpable climate benefit. The co-location of solar panels and crop production benefits both: it can help build a resilient food-production system by reducing temperature fluctuations and increasing water retention and crop yields, and a resilient energy-generation system by improving the efficiency of solar arrays.

Accordingly, USDA should incentivize the development of wind turbines and solar panels by carving out funding for grants to support these installations. It should prioritize projects on marginal land that has less opportunity to sequester carbon. It should provide technical assistance to producers interested in developing renewable energy projects to educate on best practices, and legal assistance to negotiate fair leases.

III. ENVIRONMENTAL JUSTICE AND DISADVANTAGED COMMUNITIES QUESTIONS

A. How can USDA ensure that programs, funding and financing capacities, and other authorities used to advance climate-smart agriculture and forestry practices are available to all landowners, producers, and communities?

1. USDA should establish set-asides for BIPOC farmers.

One important mechanism to ensure that program benefits are available to BIPOC and other disadvantaged farmers is to include specific set-asides for these groups in all programs. USDA should mandate that 40% of program benefits go to BIPOC farmers. This is consistent with the Justice40 initiative created by President Biden's Executive Order on Tackling the Climate Crisis at Home and Abroad.

It is furthermore important to acknowledge that Black, Indigenous, Hispanic, Asian, beginning, young, women, and other disadvantaged farmers are all separate groups facing unique barriers to participation and therefore require separate consideration in USDA programs. Accordingly, USDA should provide separate set-asides for each of these groups, and should include specific targets for each set-aside.

In addition to carving out set-asides targeting historically disadvantaged groups, USDA should also increase its understanding of what groups are benefiting from USDA programs and who is being excluded. USDA should collect and analyze this data on a granular level, broken down by race, ethnicity, and gender, and should release this data annually to share its results and ensure transparency.

As part of this process, USDA should conduct an outreach initiative to learn from BIPOC farmers and ranchers what they deem most important to them to enable them to implement climate-smart agricultural practices. Too often, USDA has told farmers what they should do and/or plant. To begin to repair the damage of years of discrimination and distrust, USDA should listen to and learn from the communities, farmers, ranchers, and aspiring farmers to better understand what climate-smart practices they may already be using and to support the expansion of those techniques.

2. **USDA should expand key programs.**

USDA should expand existing programs and offices that offer support and outreach to disadvantaged farmers and communities, and should incorporate climate mitigation goals into these programs. Specifically, USDA should expand the Beginning Farmer and Rancher Development Program and the Outreach and Assistance for Socially Disadvantaged Farmers and Ranchers and Veteran Farmers and Ranchers Programs. These programs should include race-specific set-asides and should also prioritize 1890 Institutions, Tribal Institutions, and Hispanic-serving institutions for partnerships. To maximize the effectiveness and success of these programs, USDA should engage with socially disadvantaged farmers and ranchers in a meaningful process to determine how it can strengthen these programs and offices.

In addition, USDA should allow people who were formerly incarcerated to be eligible for all USDA programs and benefits. And it should expand program eligibility to allow unincorporated BIPOC farmers to participate.

3. **USDA should assist farmworkers in becoming farm owners.**

Farmworkers play an essential role in our food and agricultural system and have generational knowledge of agricultural practices that access to land would afford them the opportunity to implement. Yet farmworkers remain subject to low wages and poor working conditions, and face multiple barriers to becoming farm and business owners themselves. USDA should provide resources and pathways for undocumented and migrant workers to make that transition, and should consult with farmworkers directly to determine policies to achieve this.

4. **USDA should reduce barriers to program participation for disadvantaged farmers.**

Overly burdensome application processes and documentation requirements can deter BIPOC farmers from participating in and benefiting from USDA programs and funding opportunities. USDA should simplify application requirements for independent BIPOC producers and provide increased staff support for navigating the application process. USDA should provide support for BIPOC producers predominantly in the form of grants with no matching requirements, and should make payments upfront rather than through reimbursement. In evaluating proposals, USDA should recognize traditional best management practices and ecological knowledge and extend full program access to tribal agencies. And USDA should work directly with disadvantaged communities to determine additional barriers to participation and eliminate them.

5. **USDA should support community gardens and urban agriculture.**

USDA should recognize the important role that urban agriculture plays in climate resilience and provide support for community gardens and urban farms. The New York City Council Committee on Economic Development has recognized that community gardens, as public greenspaces, are "important tool[s] . . . in the fight against climate change and the myriad of public health concerns that follow rising temperatures."[80] Community gardens' soil, porous pavements, and other permeable surfaces allow rainwater to percolate into the ground rather than running off. In fact, New York City's community gardens divert approximately 165 million gallons of water each year.[81] Community gardens help to alleviate negative consequences of climate change, including flooding and extreme summer heat. Many cities experience particularly high temperatures as a result of the "urban heat island effect," a phenomenon in which metropolitan areas become significantly warmer than surrounding, less developed areas because the built environment, including concrete, pavement, buildings, and other dark or impervious surfaces, retains heat much more readily than areas with tree cover and vegetation.[82] As climate change brings hotter summers, the urban heat island effect will only worsen, leading to higher incidences of heat-related illnesses and death.[83] Urban vegetation, such as that found in community gardens, helps to counteract the urban heat island effect and provide relief from high temperatures by creating shade and supporting evapotranspiration, a process through which water moves from a plant's roots to its leaves and evaporates, producing a cooling effect.[84] Given the many climate and other environmental benefits stemming from community gardens and urban agriculture, USDA should increase funding and support for these programs.

6. USDA should recognize traditional and ancestral knowledge of agricultural practices.

USDA should recognize the importance of traditional and ancestral knowledge and methods of agricultural practices as well as culturally appropriate foods. It should ensure that when working with farmers and ranchers using traditional methods, it provides technical assistance appropriate for such practices. USDA should additionally recognize when traditional conservation practices are substantively equivalent to NRCS Conservation Practice Standards and therefore eligible for funding from federal programs.

B. How can USDA provide technical assistance, outreach, and other assistance necessary to ensure that all producers, landowners, and communities can participate in USDA programs, funding, and other authorities related to climate-smart agriculture and forestry practices?

1. USDA should provide assistance throughout the application process and should ensure linguistic and cultural competency.

As a first step in increasing access to USDA climate-smart programs, USDA should ensure that all producers, landowners, and communities receive the assistance necessary to navigate the application process. See supra, III.A.4. This includes providing technical assistance

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[80] Int. No. 1652-2019, N.Y.C. Council, (follow "Attachments" link for "12. Committee Report 2/25/2020").
[81] *See* Mara Gittleman et al., *Estimating Stormwater Runoff for Community Gardens in New York City*, 20 Urb. Ecosystems 129, 137 (2017).
[82] *See* Ashley Gregor, *Toward a Legal Standard of Tolerable Heat*, 44 Colum. J. Envtl. L. 479, 542 (2019).
[83] *See id*. at 484.
[84] *See* City of N.Y., *Cool Neighborhoods NYC* 7 (2017), https://www1.nyc.gov/assets/orr/pdf/Cool_Neighborhoods_NYC_Report.pdf.

and outreach by diverse service providers with linguistic and cultural competency. Services should be provided in multiple languages and in a range of formats to suit a diverse range of producers and communities, including a combination of in-person and online, written and spoken, services and information. Partnering with community-based organizations and local community leaders who have earned the trust of these farmers and ranchers provides an in-road into effective outreach to these communities.

2. USDA should employ BIPOC experts.

Another way to provide effective outreach and support BIPOC producers is for USDA to fund BIPOC farmers (including migrant and refugee farmers and farmworkers) to lead trainings and provide technical assistance in their own communities. USDA should help BIPOC farmers connect and learn from each other. USDA should also fund trainings on issues unique and salient to BIPOC communities, including on navigating a racist food system, addressing BIPOC trauma, and incorporating BIPOC history. When possible, these trainings should be credit-bearing in partnership with land grant universities.

3. USDA should provide resources BIPOC farmers need to succeed.

USDA should meaningfully involve BIPOC and other socially disadvantaged farmers in design and implementation across the programs it oversees, including any new programs USDA rolls out as part of its climate-smart agenda. Socially disadvantaged farmers may need additional resources to succeed and access a fair share of USDA support when competing with larger, well-resourced agribusinesses and their contractors. USDA should thus actively reach out to determine what resources socially disadvantaged farmers need to engage fully in these programs. As a starting point, USDA should provide support and funding for completing baseline soil health assessments, access to equipment, non-GMO seed, and access to affordable land.

C. How can USDA ensure that programs, funding and financing capabilities, and other authorities related to climate-smart agriculture and forestry practices are implemented equitably?

1. USDA should end discriminatory practices.

USDA must do more to remedy its legacy of civil rights violations and racism that persists to this day. USDA should cease giving local Farm Service Agency county committees unfettered control over program implementation. These local committees have been a source of discrimination against poor farmers and farmers of color, and USDA's lack of oversight has allowed this discrimination to continue. Rural and majority-white areas can be hostile towards BIPOC individuals and USDA must acknowledge this reality and take steps to ensure that BIPOC people living in these areas are still able to equitably access USDA services.

USDA should transform its civil rights offices. It should remove top staff who have overseen periods of discriminatory program implementation. It should hire new staff give specific incentives to enforce civil rights violations and provide remedies. Staff performance reviews should consider their success at doing so.

USDA should create a task force with representation chosen by civil rights organizations, Black farmers, and local chapters of unions that represent department employees to evaluate the USDA Office of the Assistant Secretary of Civil Rights, provide oversight, and issue recommendations.

2. USDA should encourage adoption of practices that protect farmworkers.

In order for equitable implementation of USDA's programs and policies, they must be fully protective of the health and well-being of farmworkers. In particular, USDA must leverage its resources and authority to protect farmworkers from heat stress. Farmworkers are already at increased threat of heat stress, dying of heat-related causes at 20 times the rate of workers in all other civilian occupations.[85] This threat is only going to increase as the impacts of climate change come to bear. At minimum, USDA should encourage agricultural employers (for example, by making program participation contingent on this) to maintain a heat illness plan that describes the employer's procedures for the prevention of heat illness, including appropriate training, access to water and shade, the provision of breaks, and the protocols for emergency response. This plan must be provided in writing in English and, to the extent necessary for workers who are not fluent in English, in a language common to a significant portion of workers, and should be posted at a conspicuous location at the worksite and provided to employees prior to the commencement of labor or services. For a reference on current regulations, USDA can look at the California Heat Illness Standard as a reference point, a regulation that farmworkers fought for and won, and that even the California Farm Bureau endorses.

3. USDA should learn from past failed market-based policies and instead pursue policies that are truly equitable and inclusive.

USDA should take heed from the failures of past market-based approaches to regulating pollution. Historically, environmental justice communities have not benefited from market-based policies though they are the most burdened by pollution-generating facilities. Equitable climate policies will take into account non-GHG co-pollutants and address local environmental impacts to environmental justice communities.

For example, one study of California's cap-and-trade policy found that (1) regulated facilities were disproportionately sited in environmental justice neighborhoods, (2) most of the regulated facilities increased emissions of both GHGs and co-pollutants during the time period studied, and (3) neighborhoods that experienced increases in both annual average GHGs and annual average co-pollutants were more likely to be environmental justice neighborhoods.[86] The use of offsets allowed regulated facilities to keep polluting (and degrading local air quality) by funding projects largely out-of-state that provided no benefit to frontline communities. The study authors noted, "[t]he quantity of offsets allowed thus far under the program is worrisome because

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[85] *See* Ctr. for Disease Control & Prevention, *Heat Related Deaths among Crop Workers—United States, 1992–2006*, 57 Morbidity & Mortality Weekly Rep. 649 (2008).
[86] *See* Lara Cushing et al., *Carbon trading, Co-pollutants, and Environmental Equity: Evidence from California's Cap-and-Trade Program (2011–2015)*, PLOS Medicine (2018).

the validity of GHG emission reductions claimed under offset projects is controversial given the challenge of verifying if they are truly additional and would not have occurred in the absence of the cap-and-trade program. Offset credits included in our analysis were primarily generated from forestry projects outside the state that do not offer the same benefits as localized co-pollutant emission reductions."[87]

Thus, to ensure that policies are implemented equitably, USDA should examine who stands to benefit and who stands to be harmed from a given policy. A policy that fails to provide benefits to those most impacted by the harm sought to be addressed cannot be considered equitable.

4. USDA should reject policies, like biomass, that disproportionately burden environmental justice communities.

Biomass is responsible for pollution that disproportionately impacts communities of color, and as such, USDA cannot promote biomass use as an "equitable" policy. Facilities that process wood into chips and pellets are responsible for significant amounts of health-harming air pollution, including particulate matter, nitrogen oxides, carbon monoxide, and volatile organic compounds, as well as harmful greenhouse gases.[88] An analysis by the Dogwood alliance found these facilities are twice as likely to be sited in environmental justice communities.[89] USDA must reject biomass as an unjust and dirty fuel source.

Respectfully submitted,

Earthjustice
Alaska Community Action on Toxics
American Society for the Prevention of Cruelty to Animals (ASPCA)
American Sustainable Business Council
As You Sow
Athens County's Future Action Network
Black Belt Justice Center
Center for Food Safety
Clean Air Carolina
Clean Water for North Carolina
CRLA Foundation
Defenders of Wildlife
Farmworker Association of Florida
John Hopkins Center for a Livable Future
Harambee House, Inc.

[87] *Id.* at 16.
[88] *See* Env't Integrity Project, *Dirty Deception: How the Wood Biomass Industry Skirts the Clean Air Act* 6 (2018), https://www.environmentalintegrity.org/wp-content/uploads/2017/02/Biomass-Report.pdf.
[89] *See* Dogwood All., *The Wood Pellet Industry Is an Environmental Injustice* (2018), https://www.dogwoodalliance.org/wp-content/uploads/2018/10/Wood-Pellet-Environmental-Justice-Fact-Sheet.pdf.

League of Conservation Voters
Migrant Clinicians Network
North Carolina Environmental Justice Network
Northwest Center for Alternatives to Pesticides
Pesticide Action Network
Rural Coalition
Socially Responsible Agriculture Project
Toxic Free North Carolina
United Plant Savers
Willamette Riverkeeper
Women’s Voices for the Earth