U.S. Department of Agriculture

Notice of request for public comment on the executive order on tackling the climate crisis at home

Re: Docket No. USDA-2021-0003-0001

April 29, 2021

The Institute for Agriculture and Trade Policy (IATP) thanks the USDA for seeking input on the climate crisis, the most critical challenge of our time. IATP is a 35-year-old non-profit 501(c)3 organization based in Minneapolis, Minnesota. IATP works to ensure fair and sustainable food, farm and trade systems. For more than a decade, we have advocated for policies at the intersection of climate, agriculture and trade policy that reduce greenhouse gas (GHG) emissions while supporting and empowering farmers and rural communities to build resilience in the face of climate change.

IATP has worked on the ground with Minnesota rural communities to develop local climate action plans. We have advocated at the national level to integrate climate goals within the Farm Bill and financial regulation. We have pushed for reforms in United States trade policy to enable climate action. IATP has been an advocate at United Nations agencies, including the Committee on World Food Security, to advance agroecology as a solution to food security and climate challenges. And IATP has actively attended most of the United Nations Framework Convention on Climate Change (UNFCCC) Conference of the Parties over the last decade.

Major disruptions to our food system from the COVID-19 crisis and recent trade fights have made clear the fragility of our agriculture economy. These disruptions come on the heels of seven straight years of low prices (although prices have risen somewhat in recent months), often below the cost of production, and rising debt and farm bankruptcies. A series of antitrust and price-fixing investigations reveal a marketplace that is controlled by a handful of global companies to the detriment of farmers and consumers.

Farmers and rural residents are already on the front lines of the climate crisis. Extreme weather events have repeatedly damaged farms over the last 10 years — from the devastating drought of 2012, to a series of significant hurricanes hitting coastal farmers in the southeast, to major flooding in the Midwest and now emerging drought conditions hitting Western states. The climate science tells us that these types of events will strike with more frequency and severity, creating enormous challenges for farmers and anyone working within a natural resource-based economy.

Those in the margins, especially communities of color, are affected disproportionately by climate change.[1] Thus, climate policies need to reflect these socioeconomic as well as agroclimatic challenges and provide a path forward that reduces emissions, strengthens resilience and spurs a just transition towards a more equitable economy.

Though the USDA seeks public comment on how to encourage the voluntary adoption of climate-smart agricultural and forestry practices, the USDA does not clearly define what it means by “climate smart.” As we have pointed out in comments to USAID previously, “climate smart” is associated primarily with reductionist and technology-centered approaches.[2] We suggest USDA drop its use of the term and instead adopt more appropriate terms such as “climate resilient” to mean approaches that address the

whole ecosystems, with focus on agroecological approaches as well as community and environmental resilience.

Below are IATP's recommendations for how the USDA can improve existing programs, launch new initiatives, avoid getting side-tracked by carbon market schemes and ensure equity throughout its actions responding to the climate crisis.

Q1 – 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?

A. Leverage existing programs

Expanding and improving existing conservation programs is the most immediate, farmer-friendly approach toward building climate resilience in U.S. agriculture. Farmers are familiar with these programs, and regularly over-subscribe. Demand for conservation on 13.8 million acres is denied regularly every year because of lack of funds. The suite of conservation programs, from supporting practices to whole farm plans, offer opportunities for farmers to take immediate action. These programs prioritize practices that provide climate mitigation and adaptation benefits, like incorporating cover crops, perennial crops and managed grazing of perennial pasture. They place an emphasis on building soil health, which has stacking benefits not only for climate resilience but also by increasing organic matter, improving soil fertility, reducing erosion, and improving water quality and infiltration.

Conservation programs should also be viewed as tools to help farmers access higher value markets, such as those that pay premium prices, but also are better for the climate. Such premium, climate-friendly markets, include certified organic, grass-fed, animal welfare and those focused on local food systems. Conservation programs can serve as an on-ramp for farmers interested in making changes to their operations to access these higher value markets.[3]

An important starting point for USDA would be to establish Climate Mitigation and Resilience as a Resource Concern throughout Natural Resource Conservation Service (NRCS) conservation programs, a nationwide Priority Resource Concern for the Conservation Stewardship Program (CSP), a top priority throughout USDA intramural (ARS) and extramural (NIFA) research programs, and an actuarial factor in RMA crop insurance programs. Beyond this step, we highlight a few more specific reforms.

Expand and improve the Conservation Stewardship Program (CSP)

CSP is the largest conservation program in the U.S. It is a voluntary working lands program that encourages producers to address natural resource concerns through conservation activities. From a climate perspective, CSP's strengths are: (1) its whole-farm approach ensures that the net greenhouse gas footprint of the entire farm or ranch, not just a small part, is considered in determining climate-related incentives; (2) it provides rewards for both existing and new conservation practices, ensuring that "early adopters" are rewarded; (3) it is accessible for farmers of all sizes and types, making it potentially valuable for smaller-scale, beginning farmers and Black, Indigenous, Latinx and other farmers of color (suggestions on expanding access below); and (4) it was designed to foster continuous improvement in conservation systems, which will be needed for farmers as they respond to the climate crisis.

CSP's whole farm approach supports systems that boost soil health, which improves a farm's ability to withstand droughts and floods, reduces the need for synthetic inputs and results in carbon sequestration. Practices supported by CSP include planting cover crops, diversifying crop rotations, decreasing tillage and implementing management-intensive rotational grazing. These practices must be incentivized to reduce agriculture's ecological footprint — including on the climate, water and biodiversity — and to make producers more resilient in the face of climate disruptions.

The USDA could strengthen CSP by restoring organic enhancements (organic systems have proven climate benefits) and addressing the low payment rates for certain climate-resilient practices under CSP, such as cover crops, resource conserving crop rotations and advanced grazing management. Additionally, farmers who implement conservation practices and enhancements in line with NRCS standards should not conflict with RMA rules as a result. Conservation is a key element of risk management and RMA rules and policies should incorporate this understanding.

The 2014 and 2018 Farm Bills cut CSP funding nearly in half, greatly restricting both farmer access and environmental improvement. Currently, farmer demand for the program far exceeds the supply of funds, and interest in conservation programs has been steadily growing. USDA should explore administrative strategies (such as through the Commodity Credit Corporation) to increase resources for the CSP program to make it accessible to more farmers, with special focus on historically disadvantaged communities and other farmers of color.

Reform the Environmental Quality Incentives Program (EQIP) to stop subsidizing CAFOs

We must transition away from investing public resources in the damaging Concentrated Animal Feeding Operation (CAFO) system of animal production and instead invest in more climate-friendly livestock production systems. CAFOs rely on often below-cost of production feedgrains produced on large-scale row crop operations that use highly emitting synthetic fertilizers and pesticides. CAFOs liquefy animal waste and store it in manure lagoons that generate large amounts of methane.[4] They also produce more waste than the surrounding cropland can support as fertilizer. The excess manure is often overapplied to surrounding cropland, which can result in substantial nitrous oxide emissions.[5] CAFOs are driving the overproduction of meat and dairy, which in turn is contributing to low prices and the loss of small and medium size independent producers.

EQIP was designed to provide cost-share and incentive payments to farmers to address natural resource concerns on their farms, and it has been used by hundreds of thousands of farmers nationwide to make environmental improvements that benefit the land, family farm operations and their communities. Unfortunately, the 2002 Farm Bill revised EQIP to allow CAFOs to access the program's funding. We must invest all EQIP funding as the program originally intended: to support small and mid-sized family farm operations as they implement conservation practices. USDA should reallocate the 50% of EQIP funding for livestock production to support more sustainable pasture-based livestock, dairy and poultry operations by providing technical assistance, outreach and more robust payments to producers seeking to initiate, improve or transition to grass-based operations. Advanced grazing systems, particularly management intensive rotational grazing, can reduce water pollution[6], reduce the amount of methane produced by each animal[7] and can sequester carbon.[8] [9]

Reform the EQIP and CSP programs to include a wider range of practices informed by traditional ecological knowledge and indigenous agriculture knowledge

Here, we support comments submitted to USDA by the Rural Coalition, which state: "These should include support for practices as well as new uses of the conservation reserve program that promote the continuous planting, saving, selecting and sorting of seeds over decades to assure they adapt to changing conditions. Set asides should be expanded to include tribal run projects and projects developed by traditional communities focused on increasing the ability of seeds and breeds to adapt to changing conditions. At the same time, USDA should consult with Tribal government and BIPOC communities to institute essential measures to protect the rights of tribal and other communities to retain control of these seeds and breeds."

Reform FSA loans to stop backing new and expanding CAFOs

Many CAFOs around the country would not exist without Farm Service Agency (FSA) guaranteed loan support. Loans supporting CAFOs have come at the expense of support for independent farmers and ranchers who are protecting rural waterways, air and the climate. USDA should explore approaches to limit or prohibit issuance of any direct or guaranteed farm ownership or operating loans for the construction or expansion of a specialized hog or poultry production facility, as well as the issuance of direct or guaranteed loans to foreign-owned or controlled CAFO operations.

In addition, providing a full accounting of possible environmental risks, including potential climate, water and air impacts, should be a minimum standard before any public resources are invested in a project. In August 2016, FSA quietly announced it would no longer require an environmental review under the National Environmental Protection Act (NEPA) prior to the approval of loans for mid-sized CAFOs. Nor would neighboring farmers, rural residents or local government officials have notice that such an operation was being built until construction had begun. The agency gave no reasoned justification for the decision despite the increase in methane emissions and multiple harms to adjacent neighbors. The Agency's ruling is currently the subject of a legal challenge.[10] At a minimum, USDA should require a full environmental review under NEPA, including implications for the climate, for any FSA loans for new or expanding mid-sized CAFOs.

Expand the Conservation Reserve Program

U.S. agriculture has a commodity crop overproduction problem, which routinely drives prices down for farmers and has pushed production onto marginal farmland. The Conservation Reserve Program (CRP) is an important tool for protecting biodiversity, wildlife, water quality, soil health and the climate. Under the Farm Bill, CRP is capped at 25 million acres nationwide (increasing to 27 million in 2023), but it currently only has 20 million acres enrolled. That is the lowest number of acres enrolled since 1988.[11]

We support the April 21 action by USDA to increase payments and incentives for farmers with a goal to enroll 4 million new acres in CRP and ultimate meet the cap set in the most recent Farm Bill.[12] We urge USDA to advocate through Congress to dramatically expand that cap in the next Farm Bill.

We also strongly encourage the Farm Service Agency (FSA) to expand the role of CRP, including its Grasslands Initiative, to explicitly support climate goals. FSA could support highly effective climate-mitigating practices, such as forested riparian buffers and improved range and pasture, by using the Clean Lakes, Estuaries, and Rivers (CLEAR) initiative, the Conservation Reserve Enhancement Programs (CREP), and the Grasslands Initiative to their full and complete potential. USDA could also create and pilot a new agroforestry initiative within CRP to encourage transition to perennial production systems.

Strengthen competition rules and enforcement

There is evidence that excess corporate control over the U.S. food and agriculture system hurts our ability to respond to the climate crisis. University of Missouri Rural Sociologist Mary Hendrickson finds,[13] "Our highly concentrated global food system has resulted from horizontal and vertical integration in food system sectors and globalization of agricultural and food markets. This system constrains farmers (and others) in making choices that can fend off likely ecological and social disruptions while limiting their ability to accommodate change. It has eliminated smaller farms and businesses that provided a redundancy of role and function, resulting in few fail-safe mechanisms for the food system. A focus on efficiency, standardization, and specialization has decreased the diversity of scale, form, and organization across the food system."

The agriculture sector is among the most concentrated of all economic sectors, with a handful of often global corporations controlling most aspects of the industry. Only a few firms control almost all the supplies farmers buy such as seeds, fertilizer and farm equipment, raising prices and reducing their choices. Recent seed and fertilizer company mergers threaten to further raise operating costs for farmers. At the same time, farmers sell into very concentrated markets where four firms often control the market, pushing down prices farmers receive for crops and livestock. For example, the top four firms control 86% of corn processing, 85% of cattle slaughter, 71% of pork packing and 79% of soybean crushing.[14]

The limits of concentrated markets played out in the summer of 2019 when farmers experienced shortages in seeds for cover crops following the extreme Midwest flooding that limited the planting of conventional crops.[15] A recent analysis of 89 studies found that perennials and cover crops improve the ability of soils to soak up extreme rainfalls, which is critical to withstanding floods and droughts.[16] Small grain breeders and independent seed companies are trying to fill this gap left by the three global seed companies that dominate the U.S. agriculture markets – Bayer/Monsanto, Dow/DuPont and Syngenta/ChemChina. In addition to limiting seed variety options, the lack of competition in the U.S. seed market has led to higher seed prices for farmers.[17]

We encourage the USDA to assess the impact corporate consolidation and a loss of competition has on farmers, workers, consumers, rural communities and the climate, and consider actions that can restore competition that supports climate resilience in our food system. Some immediate actions the USDA should take include:

- Immediately reinstating the Grain Inspection Packers and Stockyards Administration (GIPSA) as a stand-alone agency within USDA. A restored GIPSA must also act to enforce and improve regulations on meat and poultry companies' conduct.

- Immediately withdrawing the 2020 version of the Farmer Fair Practices Rules. Use the 2016 version of the Farmer Fair Practices Rules as the starting point for a new rulemaking process (based on the 2008 Farm Bill).
- Closing loopholes in the regulations for *voluntary* country of origin labels to require that meat displaying a U.S. label actually comes from animals that were born, raised and slaughtered in the U.S. and working with Congress to reinstate *mandatory* country of origin labeling for meat and expand it to include dairy products.

B. <u>What new strategies should USDA explore?</u>

<u>Incorporate climate risk in insurance and farm credit programs</u>

USDA backed farm lending currently does not consider climate-related risk. Crop and livestock insurance policies could be written, according to federal standards, to reduce premiums and increase indemnification payouts for farmers and ranchers complying with practices applied to reduce these sources of GHG emissions, and to those adopting climate-resilient practices such as crop diversification that reduce climate-related risks. According to the EPA greenhouse gas inventory for agricultural (not food system) emissions, GHG mitigating crop and livestock insurance would target the following principal causes: urea (nitrogen) fertilization; liming (applying lime to soil to reduce the acidity that inhibits fertilizer nutrient uptake); enteric fermentation (livestock digestion emissions); manure management; agricultural soil management; and rice cultivation.

Crop and livestock insurance policies could be written according to federal standards to adapt to climate change, e.g., according to USDA's regionally specific "Adaptation Resources." Farmers and ranchers complying with USDA approved adaptation practices and strategies would qualify for insurance premium reductions on a whole farm or per practice per acreage basis.

USDA's Risk Management Agency already offers Whole Farm Revenue Protection (WFRP) policies with increasing premium discounts for planting up to seven crops. Crop diversification and rotation have climate adaptive benefits. WFRP follows traditional risk management principles by pooling risks to protect up to 85% of historic revenue by insuring across risks, instead of insuring against just one risk.

Although certain cover crops are insurable, there is not yet a federal premium discount to foster widespread continuous cover crop adoption, nor are other good agricultural practices yet insurable. To the contrary, government backed crop insurance offers premium discounts for repeated planting of monocrops, e.g., "corn on corn", that have a documented history of increasing GHG emissions.

Current crop insurance is either revenue and/or yield focused. RMA or independent development of actuarial tables of nitrogen use efficiency (NUE) for certain soil types in certain growing regions would be a measurement that insurance agencies could use to develop climate-resilient insurance policies and premiums. A NUE-related premium discount could make it economically rational for a farmer to accept reduced yield from more efficient NUE in exchange for long-term sustainable yields without large expenses for repeated use of synthetic nitrogen fertilizers to "shock" nutrient depleted soil.

The RMA helps ranchers locate RMA approved private insurance agents who will insure against adjusted gross revenue loss by means of policies that indemnify policy holders for 70-100% of the livestock cash price if it falls below the projected price, e.g., for beef cattle, at the end of the policy period. The indemnification formula includes head and weight of cattle with a cap on herd size. But that formula includes no incentives concerning husbandry practices, mitigation of GHG emissions or adaptation to

climate change, e.g., by paddock and rotational grazing, to increase the amount of the indemnification for loss and/or reduce the insurance premium.

An RMA regulation to support climate-resilient grazing would require RMA approved private insurers to issue policies that pay higher rates of indemnification for loss of Managed Intensive Grazing livestock grazed on carbon sequestering pastures than paid for livestock feeding on nitrous oxide releasing corn.

Other U.S. financial regulators, such as the regional banks of the Federal Reserve System and the Commodity Futures Trading Commission, are beginning to calculate climate change as a systemic financial risk. The Farm Credit Administration (FCA) should contract for research to inform the development of rules for the Farm Credit Service (FCS) to incorporate climate resilience criteria into their lending and bond issuance requirements. The FCA has a statutory obligation to ensure the stability of federal agricultural finance, just as the Fed has a statutory responsibility to ensure the stability of the entire financial system. Climate change is a systemic risk to that stability. USDA agricultural finance and USDA guaranteed agricultural finance must not be left behind in taking measures to shore up that stability.

C. How can USDA help support emerging markets for carbon?

IATP believes the USDA should not use public dollars and resources to support carbon emissions offset market initiatives that have failed to effectively respond to the climate crisis. As a matter of science, the short-term sequestration of biogenic carbon cannot offset the climate impacts of long-term geological carbon emissions.[18] Corporate purchase of offset credits to make net zero claims has not impressed investors who demand capital investment plans to directly reduce corporate climate financial risks.[19] Carbon markets create risks for farmers and effectively shut out many farmers, particularly those of smaller-scale.[20] Carbon markets worldwide and in the U.S. have failed to directly reduce GHG emissions,[21] [22] in some cases, have also failed to bring in revenue,[23] and in others, have been linked to increasing emissions.[24] Loopholes due to the non-regulation of these markets, including the use of offsets, have allowed harmful air pollution to continue, often in environmental justice communities who already suffer disproportionately from air pollution.[25]

USDA Secretary Vilsack has proposed to establish a carbon bank funded by public dollars through the Commodity Credit Corporation to purchase and potentially sell agriculture-based carbon offset credits. Enrolled farmer would receive acreage-based payments for following certain good agricultural practices to sequester emissions in soil. While carbon markets have routinely failed when fully implemented,[26] the idea of a USDA-created carbon bank to support an agriculture offset market, without a regulatory cap on emissions, is additional flaw that led to significant losses for farmers when tried previously under the collapsed Chicago Climate Exchange.[27]

Carbon offset schemes contribute to environmental injustices, particularly for communities of color.[28] Carbon offset schemes allow geographically-concentrated sites of pollution to continue as polluters purchase offsets, rather than reduce emissions. Power plants do not only emit greenhouse gases, but they also release co-pollutants such as sulfur dioxide, nitrogen oxides, mercury and fine particulate matter. These co-pollutants have enormous public health impacts, ranging from cardiovascular and respiratory problems to premature death.[29] Because most power plants and polluting entities are situated in or near low-income communities and communities of color, the increased pollution in certain locations will harm those communities disproportionately.[30]

There are also numerous fundamental problems with trying to create a reliable and precise soil carbon credit. Soil carbon storage is extremely impermanent; any carbon sequestered in the soil can be released with a change in land management practices. The science and measurement tools are not advanced enough to precisely quantify the amount of greenhouse gas emissions sequestered over time.[31] Land-based sources of carbon sequestration, including forestry, have been routinely over-estimated for their sequestration potential by governments.[32] Establishing a price for offsets by buying and selling a contract consistent with integrity principles, including "permanent," "quantifiable" and "additional," perpetuates a myth that agriculture can sequester fossil carbon quickly and definitively.

There are also new risks for farmers involved in these markets. The price for the offset must be high and sustained enough to incentivize farmers to change their land management practices, which can require expensive new equipment, inputs and knowledge. Yet, carbon credit prices have been far too low historically to fairly incentivize such large-scale land management changes.[33] Through agriculture offset programs, farmers are locked into long-term contracts where they must supply extensive on-farm data (often to multinational project developers who can profit off that data). Farmers who have been practicing sustainable, agroecological practices for decades are not eligible, since offset credits can only apply to new (additional) carbon sequestration. It is clear this system of offsets best fits large-scale commodity growers, and effectively closes out most smaller-scale and beginning farmers, including Black, Indigenous, Latinx and other people of color farmers who are already underserved by USDA programs and Commodity Credit Corporation payments.

Finally, with regard to the creation of a USDA carbon bank, we do not believe the Department has the legal authority to create a carbon market. The CCC Charter Act provides no authority for the agency to create such a market or bank. *See* 15 U.S.C.A. § 714 *et seq*. We believe if USDA were to move forward with creating a carbon market as proposed, the agency would be in violation of the Administrative Procedure Act.

2. (c) 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?

IATP opposes public investment in methane digesters that produce biogas or what we call "factory farm gas," as a solution to the climate crisis. Emissions related to manure management have risen 66% since 1990 and the majority of this increase is due to the shift toward larger dairy cattle and swine CAFOs.[34] Expensive methane digesters are increasingly touted as a way to reduce emissions on large-scale CAFOs; the USDA, U.S. Environmental Protection Agency (EPA) and U.S. Department of Energy have all endorsed biogas to reduce total methane emissions.[35] However, methane digesters do not take into account the full lifecycle analysis of CAFOs (including feed-related emissions) or their other negative impacts including water pollution, air pollution, loss of independent producers and the environmental justice implications for surrounding communities. Public resources should not prop up the highly-polluting CAFO system; instead, that public money should be invested in a transition toward scale-appropriate, well-managed, pasture-based grazing systems.

The biogas produced from methane digesters should not count as clean energy or as a polluter offset. Burning biogas releases carbon dioxide and other pollutants including smog-forming nitrogen oxides, ammonia and hydrogen sulfide.[36] Large-scale biogas projects also require a buildout of natural gas infrastructure including more pipelines. There is growing evidence, including from a new United Nations

report,[37] that natural gas fracking is a major contributor to potent methane emissions. Climate-washing natural gas, through biogas produced in large-scale CAFOs, compounds a host of environmental problems.

Public resources through EQIP and EPA's AgStar program are currently supporting investments in methane digesters. Instead of using public dollars and resources for expensive methane digesters, investments should be made to transition toward a truly renewable energy system, particularly through wind and solar.

4 (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?

IATP strongly endorses the comments submitted by the Rural Coalition, which details numerous steps the USDA can take to ensure greater equity within its many programs. As the Rural Coalition comments detail, the historical and structural racism within the USDA has shaped many farm programs and their implementation. The USDA cannot repeat or reinforce these inequities as it responds to the climate crisis, and deeper community engagement will be essential to achieve this.

For the USDA and a Biden administration committed to environmental justice, it is not only a question of whether programs are accessible, it is important also to consider the harm some programs do to environmental justice communities. Several of the points made earlier in this comment about existing and proposed USDA programs are directly relevant to environmental justice communities.

- *EQIP and environmental justice.* The EQIP program continues to subsidize large-scale CAFOs to handle the enormous amount of manure those operations produce. Many of those CAFOs are causing a host of human health problems in rural communities of color, from Black and Indigenous communities in North Carolina to Latinx communities in California.
- *FSA guaranteed loans and environmental justice.* FSA guaranteed loans have similarly financed large-scale CAFOs when they couldn't qualify for market-based financing. The continued USDA backing of large-scale CAFOs effects environmental justice communities around the country.
- *Carbon bank and environmental justice.* Carbon offsets that would be purchased, and potentially sold, under a proposed USDA carbon bank would allow polluters to pay to continue polluting. Much of the nation's pollution is embedded in environmental justice communities.
- *Methane digesters and environmental justice.* These digesters are being used by large-scale dairy and hog operations. Many of these operations are located in environmental justice communities. The digesters do not eliminate many of the non-climate pollutants, including airborne particulate matter and water pollution.

We thank the USDA for considering this comment and welcome any questions. We look forward to the USDA's actions in response to these public comments.

[1] Gardiner, B. Unequal Impact: The Deep Links Between Racism and Climate Change. Yale Environment 360. June 9, 2020. https://e360.yale.edu/features/unequal-impact-the-deep-links-between-inequality-and-climate-change

[2] Institute for Agriculture and Trade Policy. Letter to USAID. September 15, 2015. https://www.iatp.org/sites/default/files/IATP%20Comment%20on%20Climate%20Smart%20Agriculture%20in%20Feed%20the%20Future%20%20Sept%2016%202015.pdf

[3] Lilliston, B. Missing the Mark(et): Farm Bill Reforms for Higher Value Markets. Institute for Agriculture and Trade Policy. May 30, 2018. https://www.iatp.org/documents/missing-market

[4] Hribar, C. National Association of Local Boards of Health. 2010. Understanding Concentrated Animal Feeding Operations and Their Impact on Communities. https://www.cdc.gov/nceh/ehs/docs/understanding_cafos_nalboh.pdf?fbclid=IwAR3DK7qlkmPsTg6D8CGoDnrLQfjOvvkekIP34AHQvD47ugqTR9RvwDOmqpU

[5] U.S. EPA. 2019. Draft Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2017. Chapter 5 Agriculture, and Chapter 6 Land Use, Land Use Change, and Forestry. Full Report available at: https://www.epa.gov/ghgemissions/draft-inventory-usgreenhouse-gas-emissions-and-sinks-1990-2017

[6] Beetz, A., and L. Rinehart. 2010. Rotational Grazing. National Center for Appropriate Technology, ATTRA bulletin, 12 pp. https://attra.ncat.org

[7] Ominski, K. H., D.A. Boadi, K. M. Wittenberg, D.L. Fulawka & J.A. Basarab. 2001. Estimates of Enteric Methane Emissions from Cattle in Canada Using the IPCC Tier-2 Methodology. Canadian Journal of Animal Science 87, 459–467.

[8] Machmuller, M. B., M. G. Kramer, T. K. Cyle, N. Hill, D. Hancock, and A. Thompson. 2015. Emerging land use practices rapidly increase soil organic matter. Nature Communications, 6, 6995. doi:10.1038/ncomms7995

[9] Teague, W. R., S. Apfelbaum, R. Lal, U. P. Kreuter, J. Rowntree, C.A. Davies, R. Conser, M. Rasmussen, J. Hatfield, T. Wang, R Wang, and P. Byck. 2016. The role of ruminants in reducing agriculture's carbon footprint in North America. Journal of Soil and Water Conservation, 71(2), 156-164.

[10] Lilliston, B. Factory Farms Slip Environmental Review. Institute for Agriculture and Trade Policy. December 6, 2018. https://www.iatp.org/blog/factory-farms-slip-environmental-review-loans

[11] Abbott, C. Conservation Reserve Shrinks to Smallest Size Since 1988. Successful Farming. October 22, 2020. https://www.agriculture.com/news/business/conservation-reserve-shrinks-to-smallest-size-since-1988#:~:text=Lawmakers%20decided%20as%20part%20of,for%2010%20years%20or%20longer

[12] U.S. Department of Agriculture. USDA Expands and Renews Conservation Reserve Program in Effort Boost Enrollment and Address Climate Change. April 21, 2021. https://www.usda.gov/media/press-releases/2021/04/21/usda-expands-and-renews-conservation-reserve-program-effort-boost

[13] Hendrickson, Mary. Resilience in a Concentrated and Consolidated Food System." Journal of Environmental Studies and Sciences, Springer; Association of Environmental Studies and Sciences, vol. 5(3), pages 418-431, September 2015. https://ideas.repec.org/a/spr/jenvss/v5y2015i3p418-431.html

[14] Hendrickson, Mary. Howard, Phillip. Constance, Douglas. Power, Food and Agriculture: Implications for Farmers, Consumers and Communities. Division of Applied Social Sciences Working Paper, University of Missouri College of Agriculture, Food & Natural Resource, The Bichler and Nitzan Archives, Toronto, Ontario. 2017. https://www.econstor.eu/bitstream/10419/171171/1/20171101_hendrickson_howard_constance_power_food_and_agriculture.pdf

[15] Queck-Matzie, Terri. Short Supply of Seed for Cover Crops. Successful Farming. October 28, 2019. https://www.agriculture.com/crops/cover-crops/short-supply-of-seed-for-cover-crops

[16] Basche AD, DeLonge MS (2019) Comparing infiltration rates in soils managed with conventional and alternative farming methods: A meta-analysis. PLoS ONE 14(9): e0215702. https://doi.org/10.1371/journal.pone.0215702

[17] Torshizi, Mohammad and Clapp, Jennifer, Price Effects of Common Ownership in the Seed Sector (April 22, 2019). Available at SSRN: https://ssrn.com/abstract=3338485 or http://dx.doi.org/10.2139/ssrn.3338485

[18] Friends of the Earth International. Chasing Carbon Unicorns: The Deception of Carbon Markets and Net Zero. February 2021. https://twn.my/title2/chasing_carbon_unicorn/FoEI%20carbon%20unicorn%20report%20ENG%20lr.pdf

[19] Hodgson, C. Powerful Investor Group Finds Net Zero Pledges Distant and Hallow. Financial Times. March 22, 2021 https://www.ft.com/content/12fd1c09-61fb-444e-a9cc-0b50fe0ea411

[20] Ritter, T. Institute for Agriculture and Trade Policy. 2017. Don't Believe the Carbon Market Hype: Why states should not pursue carbon markets and what they can do instead. Minneapolis, MN. https://www.iatp.org/sites/default/files/2017-06/2017_06_28_CarbonMarkets_TR.pdf

[21] Legrand, Marc. "The Regional Greenhouse Gas Initiative: Winners and Losers." Columbia Journal of Environmental Law, April 24, 2013. Accessed May 26, 2017. http://www.columbiaenvironmentallaw.org/the-regional-greenhouse-gas-initiative-winners-and-losers-2/

[22] Andrew, Brian. "Market failure, government failure and externalities in climate change mitigation: The case for a carbon tax." Public Administration and Development 28, no. 5 (December 2008): 393-401. doi:10.1002/pad.517.

[23] Brown, Ross. "May 2016 Cap-and-Trade Auction Update." California Economy & Taxes. May 26, 2016. Accessed May 26, 2017. http://www.lao.ca.gov/LAOEconTax/Article/Detail/193

[24] Temple, J. Song, L. The Climate Solution Actually Adding Millions of Tons of Co2 into the Atmosphere. MIT Technology Review. April 29, 2021. https://www.technologyreview.com/2021/04/29/1017811/california-climate-policy-carbon-credits-cause-co2-pollution

[25] Tessum, C. et. al. PM2.5 Polluters Disproportionately and Systematically Affect People of Color in the United States. Science Advances. V.7 n. 18. April 28, 2021. https://advances.sciencemag.org/content/7/18/eabf4491

[26] Green, J. Does Carbon Pricing Reduce Emissions? A Review of Ex-Post Analysis. Environmental Research Letters. March 24, 2021. https://iopscience.iop.org/article/10.1088/1748-9326/abdae9/meta

[27] Gronewold, N. Chicago Climate Exchange Closes Nation's First Cap and Trade System But Keeps an Eye on the Future. New York Times. January 3, 2011. https://archive.nytimes.com/www.nytimes.com/cwire/2011/01/03/03climatewire-chicago-climate-exchange-closes-but-keeps-ey-78598.html?pagewanted=print

[28] Gilbertson, T. Climate Justice Alliance. 2017. Carbon Pricing: A Critical Perspective for Community Resistance.

[29] Driscoll, Charles T., Jonathan J. Buonocore, Jonathan I. Levy, Kathleen F. Lambert, Dallas Burtraw, Stephen B. Reid, Habibollah Fakhraei, and Joel Schwartz. "US power plant carbon standards and clean air and health co-benefits." Nature Climate Change 5, no. 6 (2015): 535-40. doi:10.1038/nclimate2598

[30] Cushing, Lara, Madeline Wander, Rachel Morello-Frosch, Manuel Pastor, Allen Zhu, and James Sadd. 2016. A Preliminary Environmental Equity Assessment of California's Cap-and-Trade Program. Report. Program for Environmental and Regional Equity, University of Southern California Dornsife.

[31] Olson, Kenneth R., Mahdi M. Al-Kaisi, Rattan Lal, and Birl Lowery. "Experimental Consideration, Treatments, and Methods in Determining Soil Organic Carbon Sequestration Rates." Soil Science Society of America Journal 78, no. 2 (September 24, 2013): 348-60. doi:10.2136/sssaj2013.09.0412

[32] Grassi, G. et. al. Critical Adjustment for Land Mitigation Pathways for Assessing Countries Climate Progress. Nature Climate Change. April 26, 2021. https://www.nature.com/articles/s41558-021-01033-6

[33] Sharma, Shefali, and Steve Suppan. Elusive Promises of the Kenya Agricultural Carbon Project. Report. Institute for Agriculture and Trade Policy, 2011.

[34] U.S. EPA. 2019. Draft Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2017. Chapter 5 Agriculture, and Chapter 6 Land Use, Land Use Change, and Forestry. Full Report available at: https://www.epa.gov/ghgemissions/draft-inventory-usgreenhouse-gas-emissions-and-sinks-1990-2017

[35] U.S. Department of Agriculture, U.S. Department of Energy (DOE) and U.S. Environmental Protection Agency (EPA). 2015. Biogas Opportunities Roadmap Progress Report.

[36] Kuo, Jeff. California State University, Fullerton. 2015. Air Quality Issues Related to Using Biogas from Anaerobic Digestion of Food Waste. Prepared for California Energy Commission. CEC-500-2015-037.

[37] Tabuchi, H. Halting the Vast Release of Methane is Critical for Climate, UN Says. New York Times. April 24, 2021. https://www.nytimes.com/2021/04/24/climate/methane-leaks-united-nations.html?action=click&module=Top%20Stories&pgtype=Homepage