Climate & Conservation

FBLE

FARM BILL LAW ENTERPRISE

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Farm Bill on the Horizon

Two years in, the COVID-19 pandemic has shown just how critical it is for the United States to invest in a robust, diverse, and well-integrated food system. The country faced a formidable challenge in striving to help people meet their nutritional needs, connecting agricultural producers to markets, creating safe environments for our food system's essential workforce to continue feeding the country, and providing local options for securing food. In many cases, Congressional action to increase funding for farm bill programs and authorize new initiatives and flexibilities staved off some of the most devastating potential impacts, proving that increased investment in the country's agricultural and food system reverberates through the economy and strengthens our country's resilience to crises. The next farm bill, anticipated in 2023, offers the opportunity to solidify these lessons through legislation.

The pandemic and other events—increasingly destructive natural disasters, trade disputes— that have transpired since the last farm bill passed in 2018 have also underscored the need to regard the food and agriculture sector as a public good. Doing so means aligning federal investments through the farm bill with sound public policy that considers the long-term needs of society. The climate crisis at our doorstep requires that public dollars support programs and policies designed to mitigate and adapt to this reality rather than exacerbate the food system's contribution to the problem. Advancing racial justice requires centering equity in farm bill programs and agricultural governance and regarding food system workers as a core constituency in food system policy. And, strengthening our nation's food system requires supporting the growth of local and regional food systems equipped to meet the nutritional needs of the community, while providing economically stable, decentralized business opportunities for existing and new producers. Public funds that flow through farm bill programs should be dedicated to creating and reinforcing a food system that upholds and furthers these collective goals.

The Recommendations contained in this Report are an early attempt to infuse policy ideas into the next farm bill conversation. Although we discussed and vetted these ideas among our Farm Bill Law Enterprise members and many other stakeholders in order to write the Reports in this series, we know that many more organizations, stakeholders, and communities will have thoughts, constructive critique, and perspectives to offer that should ultimately shape the policies enacted in the farm bill. We offer these ideas as a starting point to generate further discussion and are eager to collaborate with other stakeholders to further develop and refine these ideas and set priorities for the coming farm bill cycle.

The Farm Bill Law Enterprise

FBLE is a national partnership of law school programs working toward a farm bill that reflects the long-term needs of our society, including economic opportunity and stability; public health and nutrition; climate change mitigation and adaptation; public resources stewardship; and racial and socioeconomic justice. We strive to advance justice and equity in accomplishing each of these goals. We accomplish our mission through joint research, analysis, and advocacy and by drawing on the experience of our members, collaboratively building deeper knowledge, and equipping the next generation of legal practitioners to engage with the farm bill.

- ***Economic Opportunity and Stability***, including equitable access to capital, scale-appropriate risk management, market stability, a viable livelihood for diverse production systems and diverse producers, expanded worker-ownership, and a vibrant agricultural sector.
- ***Public Health and Nutrition***, including a robust and secure food supply that meets the present and future nutritional needs of all communities, improves population-level health, reduces inequalities, and prioritizes production of healthful foods.
- ***Climate Change Mitigation and Adaptation***, including the transformation of agriculture into a net sink through reduced emissions and the use of soil and biomass as a carbon sink, as well as support for farmers adapting to climate impacts such as drought, extreme weather events, and changing growing seasons.
- ***Public Resources Stewardship***, including agricultural practices that increase biodiversity and soil stability and fertility, while promoting public health and environmental justice by preserving community resources such as safe drinking water and clean air.
- ***Racial and Socioeconomic Justice***, including labor rights, diverse and equitable opportunities in agriculture, robust competition that creates space for small and mid-size, new, and innovative participants and checks concentrated power, equitable distribution of agriculture's costs and benefits, and fair contracts and labor practices.

This Report belongs to a collection of reports based on the collaborative research of FBLE members. The subjects of these reports include **Climate & Conservation**, **Equity in Agricultural Production & Governance**, **Farm Viability**, **Farmworkers**, and **Food Access & Nutrition**. Each report will be available on our website, www.FarmBillLaw.org, along with background materials, an active blog, and timely resources for tracking the 2023 Farm Bill's progress through Congress.

FBLE is comprised of members from the following law school programs: Drake University Law School, Agricultural Law Center; Duke Law School, Environmental Law and Policy Clinic; Harvard Law School, Emmett Environmental Law and Policy Clinic; Harvard Law School, Food Law and Policy Clinic; Harvard Law School, Health Law and Policy Clinic; Pace University Elisabeth Haub School of Law, Food Law Initiative and Food and Beverage Law Clinic; UCLA School of Law, Resnick Center for Food Law and Policy; University of Maryland Francis King Carey School of Law, Environmental Law Program; and Vermont Law School, Center for Agriculture and Food Systems. The Recommendations in this Report series do not necessarily reflect the views of each individual member or their institutions.

Table of Contents

EXECUTIVE SUMMARY

The agricultural industry currently faces a multitude of challenges, from rising input costs to extreme weather and climate volatility. Add to this the growing consensus that farming and ranching can play a significant role in mitigating climate change and it becomes clear that producers are being asked to do more than just meet society's immediate food and fiber needs. While many conventional agricultural practices contribute to greenhouse gas emissions—such as nitrous oxide from fertilizer application and methane from livestock production—and pollute our air and waterways, many farms are and many more can transition to more sustainable practices and can, instead of contributing to climate change, actually mitigate it. Congress can champion this transition by supporting producers with adoption incentives, investing in research and innovation, leveraging the sequestration potential of our nation's forests, and curtailing public support for harmful agricultural practices. This Report recommends various ways Congress should further these objectives in the 2023 Farm Bill through conservation, crop insurance, forestry, and research and development programs administered by the U.S. Department of Agriculture.

Goal I

Maximize the Climate & Conservation Impact of Existing USDA Programs

Conservation is a central pillar of the farm bill and a central objective of various USDA programs. Public dollars support conservation through working lands programs, land retirement programs, technical assistance to producers, and several innovative crop insurance offerings. Despite their potential role in mitigating climate change, these programs currently fall short. In the next farm bill, Congress should leverage these programs to amplify their potential to help mitigate climate change while further strengthening their role in conserving our country's vital natural resources.

Priority for the Next Farm Bill

Use Working Lands Programs to Advance Climate-Friendly Agriculture

Working lands programs provide financial (cost-share) and technical assistance to producers adopting conservation practices on land in production. The two main programs are the Environmental Quality Incentives Program (EQIP) and the Conservation Stewardship Program (CSP). The 2018 Farm Bill shifted investments away from CSP and toward EQIP. However, CSP's comprehensive approach to addressing conservation holistically warrant making it the foundation for a new Climate Change Mitigation Program that focuses on whole-farm carbon sequestration efforts. This revamped program should receive increased funding and offer greater incentives to make the program attractive. Congress should further maximize the working lands programs' role in climate change mitigation by better targeting EQIP dollars at climate-friendly practices and increasing the range of, and incentives to adopt, perennial agricultural practices in each program.

Additional Recommendations

- Invest in conservation technical assistance
- Reduce conservation program support for CAFOs
- Promote equity in working lands programs
- Make the Conservation Reserve Program a stronger tool for climate change mitigation
- Expand the Agricultural Conservation Easements Program – Agricultural Land Easements
- Use crop insurance subsidies to incentivize environmental stewardship practices
- Increase support for diverse production systems through Whole-Farm Revenue Protection

Goal II

Promote Carbon Sequestration and Wildfire Resilience in Forests

Forests are crucial in promoting carbon sequestration. From their benefits as living organisms to their potential as durable building materials that store carbon, forests are a vital resource when managed properly. Many organizations that are interested in offsetting their carbon footprint often turn to forestry programs as a reliable, cost-efficient offset. The developing markets for environmental resources like carbon offsets and new wood products like cross laminated timber rely on healthy, sustainably managed forests. Despite their critical role in the environment, many forests, both public and private, are threatened by wildfires due to increasingly dry conditions and poor forest management. As such, the 2023 Farm Bill provides an important opportunity to protect forests and facilitate carbon sequestration.

Priority for the Next Farm Bill

Protect the Ability of Forests to Sequester Carbon

Forest carbon sequestration is an essential tool to mitigate climate change. While forests are crucial in providing substantial environmental benefits, much of U.S. land with the potential to restore forests for carbon sequestration is on private land. Fortunately, the Forest Legacy Program (FLP) provides a mechanism for protecting this private land through conservation easements or land purchases. Congress should make carbon sequestration a central tenet of the FLP moving forward and an explicit goal of other forestry programs administered by the U.S. Forest Service. Increased funding to acquire Community Forests and assistance for producers to participate in carbon markets will also strengthen the role of forests in climate change mitigation.

Additional Recommendations

- Focus Wood Innovations program on the development of durable wood products and stop funding wood energy systems
- Increase resilience of forests to wildfires and other threats

Goal III

Develop and Invest in Strategies to Increase Carbon Sequestration in Agriculture

Carbon sequestration, which refers to the process by which carbon dioxide is captured from the atmosphere and stored, reduces the effects of greenhouse gas emissions and helps mitigate climate change. Because forests, grasslands, perennial vegetation, and soils act as carbon sinks that remove carbon dioxide from the atmosphere, our nation's producers can help mitigate climate change by implementing practices that promote carbon sequestration and reduce emissions.

Priority for the Next Farm Bill

Support the Widespread Adoption of Perennial Agricultural Practices

Perennial agriculture, which refers to the production of crops that live for several years, can play a substantial role in greatly reducing agriculture's impact on climate change, while also providing additional environmental and social benefits. Despite this potential, existing farm bill programs are primarily designed to serve annual crops and largely fail to contemplate the long-term investment required for perennial systems. Congress should spearhead a system-level shift by directing USDA to develop a Department-wide strategy to support the transition of U.S. agriculture away from being an annual crop-based system to one in which perennial agriculture is prevalent. Congress and USDA should further prioritize perennial agriculture in USDA's research and development activities and better tailor federal crop insurance to support perennial producers.

Additional Recommendations

- Support the development and dissemination of information needed for a robust, reliable market in agricultural carbon offsets
- Institutionalize USDA's climate hubs and broaden their impact
- Preserve, expand, and improve the Livestock Indemnity Program

Goal IV

Reform Conservation Compliance to Secure Public Investments

The farm bill provides substantial direct and indirect support, including direct payments and premium subsidies for crop insurance, to our nation's agricultural producers. Federal financial investment in these producers is substantial, amounting to a projected $69.45 billion over 2019-23 from the 2018 Farm Bill and even more through ad hoc federal assistance. To maintain eligibility for these programs, producers must comply with certain conservation standards. However, current "conservation compliance" requirements fall short in safeguarding the country's natural resources, both in their scope and in enforcement. Congress should reform these standards and their administration to safeguard taxpayers' investment in the long term health and viability of our shared environment.

Priority for the Next Farm Bill

Use Conservation Compliance to Promote Climate-Friendly Farming on All Farms Receiving Government Support

Millions of acres of agricultural land are enrolled in commodity support and crop insurance programs, with producers receiving billions of dollars of public funding to support their operations. This public investment in these businesses should be used to spur fast and widespread adoption of sustainable practices on farms. Congress should expand conservation compliance to require climate-friendly practices on all farms receiving government support.

Specifically, Congress should require that all farmers receiving taxpayer support implement several practices that aim to advance natural resource conservation or climate change mitigation. Eligible practices would be identified by USDA's Natural Resources Conservation Service for their potential to achieve these goals and ultimately selected by producers for adoption. Alternatively, the requirement could be practice agnostic and require a positive soil conditioning index (SCI) score.

Additional Recommendations

- Reform highly erodible land standards to better protect the nation's soils
- Strengthen wetland protections and protect watersheds
- Improve conservation compliance enforcement
- Bring transparency to conservation compliance

Introduction

The 2023 Farm Bill has the potential to reduce the agricultural industry's contribution to climate change while also promoting the long-term sustainability and viability of the agricultural sector and U.S. food system.

Conservation has been a subject of the farm bill since its inception, and farmers and ranchers have long been interested in implementing conservation measures on their land. Farmers engage in conservation as an investment in the long-term economic viability of their operation, protecting and securing land and resources to support production in the future. For many, the motivation derives from a deeper sense of responsibility as a steward of the land, as many also see value in increased wildlife and sporting opportunities. Regardless of the driver, conservation is an integral part of agriculture and necessary to ensure society can feed and clothe a growing population.

Agriculture in the United States has its origins with Indigenous groups for whom conservation was foundational to their interaction with the land and broader ecosystem. Using resources provided by the Earth was a symbiotic relationship that required taking care of the Earth in exchange for food to nourish the body.[1] After years of immigration, the introduction of new agricultural methods, and industrialization of the agricultural sector, this relationship changed and shifted to a system focused on feeding a growing population, both at home and abroad. The notion of planting "fence row to fence row" took hold and producers were encouraged to "get big or get out."[2] Today, production for many farmers and ranchers is about maximizing yield to maximize revenue in an industry where breaking even, for many, is a successful year.

This focus on maximizing production has exacerbated environmental degradation and put much of the agricultural industry at odds with society's interest in preserving the long-term viability of the nation's food supply and conserving natural resources for current and future generations. As discussed in greater detail below, conventional agricultural practices are quickening climate change, depleting and contaminating shared resources, and causing harm to neighboring communities. Fortunately, the farm bill presents an opportunity to encourage conservation on productive agricultural and forest lands, transition lands out of production or into more sustainable agricultural systems, and invest in making agriculture and forestry tools in mitigating and adapting to the climate crisis. Before turning to the Recommendations for the 2023 Farm Bill, the remaining parts of this Introduction examine the environmental impacts of agriculture, the industry's relationship with climate change, and the role of forests.

The Environmental Impact of Agriculture

Conventional agricultural practices cause harm to the environment by exacerbating climate change and impairing our air, soil, and water.

First, the agricultural industry contributes to climate change through emissions of greenhouse gases. Namely, agricultural practices such as the production and use of nitrogen-based fertilizers, the combustion of fossil fuels, and livestock enteric fermentation all result in the emission of large quantities of greenhouse gases, including the emission of methane and nitrous oxide.[3] Such practices resulted in agriculture and forestry together accounting for an estimated 10.5 % of U.S. greenhouse gas emissions in 2018.[4] Without significant change, agriculture will continue to have a negative impact on the environment.

A 2020 Report by the Intergovernmental Panel on Climate Change (IPCC), which is an intergovernmental body of the United Nations, found that "[e]missions from agricultural production are projected to increase."[5] Consequently, conservation- and climate-based improvements to agricultural practices are critically important to the immediate and long-term wellbeing of our planet.

Agricultural emissions—including the release of odors, chemical discharges, and greenhouse gases—contribute to climate change but also cause severe negative health consequences.[6] For example, exposure to particulate pollution can result in difficulty breathing, respiratory symptoms, aggravated asthma, and even premature death. Exposure to such particulates is not rare—the Environmental Protection Agency found that "[t]ens of millions of Americans live in areas that exceed the national health standards for particulates."[7]

Agricultural practices also play a significant role in determining the quality of our water. Clean water is critical for providing safe drinking water and protecting aquatic life. However, water quality can be impaired in the course of agricultural activity. For example, activities such as the application of pesticides, over-application of nitrogen-based fertilizers, or the spreading of animal waste can pollute nearby bodies of water. Because water pollution can cause severe environmental and health consequences—including death and disease from waterborne pathogens and other long-term disruptions to normal human functioning[8]—policies and programs aimed at increasing water quality standards are critical in mitigating the impact of agricultural activity on our nation's waterways.[9]

Not only do agricultural practices directly contribute to the quality of our water, but growing food and fiber requires a significant amount of water. Specifically,

agriculture accounts for approximately 80% of consumptive water use in the United States[10] and over 90% of consumptive use in many Western states.[11] Water is used in a wide range of agricultural practices, from growing crops to sustaining livestock.[12] This intensive use of water is becoming increasingly unsustainable, especially as the climate warms and precipitation becomes more erratic. For instance, in February 2022, the federal government announced that it would not be delivering water to California farmers through the federally run Central Valley Project, citing the extreme water shortages resulting from dry conditions.[13] This announcement was "devastating to the agricultural economy and the people who depend on it" and also the fourth time in the last decade the federal government was unable to deliver water to farmers in the valley through its system of locks, dams, and canals.[14]

Finally, high-quality soil is central to the long-term sustainability of agriculture and an important aspect in determining the nutrient content of foods. Soil quality ensures efficient crop production by "enhancing nutrient cycling."[15] Furthermore, soil quality has a substantial impact on the cleanliness, health, and overall quality of both water and air. High-quality soil serves to (1) clean water by "transforming harmful substances and chemicals to nontoxic forms, cycling nutrients, and partitioning rainfall to keep sediments and chemicals out of lakes and streams" and (2) clean air by "keeping dust particles out of the air and cycling other gases."[16] Finally, not only does soil quality impact the environment, it also impacts nutrient density. A recent study found that farming practices affect the nutrient density of crops, particularly the micronutrients and phytochemicals that play a role in preventing chronic diseases in humans.[17] Soil quality must be optimized to promote sustainability and the nutrient density of our foods.

While conventional agricultural practices cause a wide range of harms, the agricultural industry can protect our soil, water, and air by shifting towards more sustainable practices. Many producers already integrate such conservation measures in their operations and many are committing to climate-friendly practices and systems that have the potential to mitigate climate change if implemented on a broader level. Through the various programs addressed in Recommendations below, the farm bill can encourage more widespread adoption of these measures and support producers in being good stewards of the land and natural resources while making a living.

Disproportionate Impact of Agricultural Practices on Neighboring Communities

The environmental and health harms produced by the agricultural industry are disproportionately borne by neighboring communities, which may include those living near farms, those upwind, and those downstream. For example, waste sprayed on fields contaminates groundwater with nitrogen and pathogens. Further, environmental air quality assessments inside livestock buildings have found unhealthful quantities of "hydrogen sulfide, ammonia, inhalable particulate matter, and endotoxin."[18] These environmental harms create substantial health complications for those living in proximity to the farms. For instance, excessive respiratory symptoms have been documented in those living near large CAFOs, as compared to those living near smaller-scale farming operations.[19] Further, a case study conducted near a livestock processing facility in Nebraska found "excessive diagnoses of respiratory and digestive disturbances" among those living nearby.[20] The negative externalities imposed by agricultural production on neighboring communities

is not just limited to physical health harms. Residents have been found to report increased levels of mood disorders, including anxiety and depression, which can be caused by exposure to "malodorous compounds."[21] In addition, the neighbors of large-scale CAFO operations are disproportionately likely to be people of color and low-income individuals. This means that those with the least amount of political capital are the most likely to be negatively impacted by the agricultural practices taking place around them.

The Agricultural Industry's Stake in Implementing Sustainable Practices

While certain agricultural practices exacerbate climate change, like methane from cattle production or nitrous oxide from fertilizer, the agricultural industry nonetheless has an incentive to develop more sustainable practices due to the particularly adverse impact of climate change on the industry. Specifically, the agricultural industry is exposed to risks associated with extreme weather.[22] Alterations in rainfall and the increased prevalence of climate disasters like droughts, wildfires, and high temperatures will directly impact farmers and agricultural productivity.[23] USDA has found that, without improvements to agricultural practices that "keep pace with growing weather stresses," crop yields will likely decline in coming years.[24] These declines will have a direct impact on producers' well-being, reducing both their revenue and impacting their ability to grow the crops with which they are familiar. Thankfully, many producers are choosing to adapt, adding practices that, among other things, better retain moisture in the soil and choosing crops that require less water. Beyond climate change, sustainable practices also better secure the future health and organic matter content of soils, as well as the purity and availability of the country's fresh water resources. Further uptake of good stewardship practices is critical as all producers have a personal stake in the long-term impacts of climate change and the potential benefits that conservation- and climate-related measures can provide to their own operations and to the sector more broadly.

Agriculture and Forest Management as Climate Solutions

Not only can the 2023 Farm Bill counteract the harm of certain agricultural practices on the environment, but the bill can ensure that agriculture is a part of the climate solution moving forward. Further, through the bill's Forestry Title, which authorizes a variety of programs overseen by the U.S. Forest Service, an agency of USDA, Congress can better manage the nation's forests to be part of the climate solution as well.

In 2022, the IPCC found that the agricultural industry is unique in its ability to mitigate climate change through reductions of greenhouse gas emissions and through enhanced removals of atmospheric carbon.[25] Agricultural crops remove carbon from the atmosphere during photosynthesis, where they capture carbon and turn it into biomass that is stored in foliage, roots, and soil.[26] Carbon sequestration is maximized when soil remains minimally disturbed or undisturbed, whereas frequent tillage releases the carbon back into the atmosphere.[27] Large, minimally disturbed grasslands are often referred to as carbon sinks due to their long-term carbon sequestration potential. Currently, agriculture in the United States is a net emitter of greenhouse gases, meaning it emits more carbon dioxide and other greenhouse gases (i.e., methane and nitrous oxide) than it sequesters.[28] Perennial agricultural practices, however, hold tremendous potential in changing that. Perennial crops are those that last for multiple

years, as opposed to annual crops like corn and soybeans that are planted each year. Perennial practices increase resilience by, among other things, sequestering more carbon and maintaining soil quality. Other conservation practices that reduce tillage—like no-till farming—can also change agriculture's climate footprint.

Like agricultural crops, properly managed forests can also be an effective tool to sequester carbon. Trees and other vegetation in a forest sequester carbon by capturing carbon dioxide from the atmosphere and transforming it into biomass using photosynthesis.[29] Sequestered carbon is then stored in various forms of biomass (i.e., trees, shrubs, deadwood, forest litter) and the soil.[30] When biomass is burned, either in wildfires or as energy, carbon is released into the atmosphere.[31] When trees are harvested and turned into products like cross-laminated timber or biochar, the carbon remains sequestered.[32] Although much of the existing forestland in the United States with the potential to sequester carbon is privately owned, government forestry programs can be leveraged to better support carbon sequestration on both public and privately owned lands. Improving forest health and wildfire resilience, and increasing options for perennial agricultural practices that incorporate trees, should be integral aims for mitigating climate change through the next farm bill.

REGENERATIVE AGRICULTURE

Many of the practices and principles discussed in this Report align with the philosophy of "regenerative agriculture." While the term lacks a clear consensus or legal definition, it generally connotes an approach to farming that works with and generates positive benefits for the surrounding ecosystem. It has been described in terms of particular processes (e.g., reduced tillage) or projected outcomes (e.g., improved soil health), or a combination of the two.[33] In many cases, regenerative agriculture reflects Indigenous land stewardship practices and stands in contrast to the conventional agricultural practices that are widespread today.[34] Although this Report refrains from using the term frequently, and instead aims to use specific process and outcome language as appropriate, the Recommendations herein offer potential pathways for advancing regenerative agriculture in the United States and should be read as contributions to that dialogue.

The Farm Bill's Role in Environmental Conservation

In the United States, agriculture has the potential to be carbon negative, meaning it sequesters more carbon than it emits. Congress can accomplish this through the farm bill—the most important piece of environmental legislation for agriculture. Other environmental laws, such as the Clean Air Act and the Clean Water Act include exemptions for most agricultural activity, making the farm bill the most important legislation contemplating agriculture, private forests, and the environment. While the farm bill could create new climate and conservation programs, refining the existing programs provides an opportunity to reach net zero. These existing programs take several forms and include producers' voluntary participation in a couple different ways. First, to participate in some farm bill program, such as the commodity programs authorized under Title I (see list of 2018 Farm Bill titles below), producers must meet the conservation compliance requirements—a set of minimum conservation practices that protect wetlands and native sod. Other programs, such as the working lands programs described below (see Goal I), allow producers

to opt into cost share agreements where the federal government offsets the cost of program participation in exchange for implementing certain conservation practices. Others, such as the Forest Legacy Program and the Agricultural Conservation Easement Program, allow landowners to sell development rights to their property to keep it in agriculture and forestry in perpetuity. Each of these programs, and others, are discussed in further detail below and provide pathways for improving environmental outcomes.

To shift the agricultural industry's impact on the changing climate and promote conservation, this Report highlights measures that Congress should enact in the 2023 Farm Bill. Goal I identifies opportunities to maximize the role of existing USDA conservation programs to improve environmental outcomes. Goal II recommends further promoting carbon sequestration and wildfire resilience in the nation's forests. Goal III then outlines new strategies for increasing carbon sequestration in the agricultural sector. Finally, Goal IV recommends reforms to the conservation compliance standard, ensuring that public dollars are invested in operations that practice agriculture consistent with the long-term needs of society.

Titles of the Agriculture Improvement Act of 2018 (2018 Farm Bill)

I. Commodities
II. Conservation
III. Trade
IV. Nutrition
V. Credit
VI. Rural Development
VII. Research, Extension, & Related Matters
VIII. Forestry
IX. Energy
X. Horticulture
XI. Crop Insurance
XII. Miscellaneous

Farm Bill Titles Implicated in This Report:

- Conservation (II)
- Research, Extension, & Related Matters (VII)
- Forestry (VIII)
- Crop Insurance (XI)

GOAL I

Maximize the Climate & Conservation Impacts of Existing USDA Programs

Conservation—a central pillar of the farm bill—has been the direct or secondary target of various congressionally authorized programs over the past several decades. Investments in conservation programs primarily flow to the working lands programs and to land retirement programs, which—as discussed in detail below—offset the cost of adopting certain conservation practices (working lands) or pay producers to take land out of production (land retirement). An additional program supports agricultural conservation easements, which protects land for agricultural use and keeps it out of development. Federal crop insurance has also played a role in promoting or hindering sustainable farming practices through the types of policies offered, its requirements to adhere to certain farming practices, and incentive schemes to encourage uptake of certain practices. Additionally, through its Conservation Technical Assistance, USDA provides expertise and support to farmers planning and implementing conservation practices.

Despite their potential role in mitigating climate change, each of these programs currently falls short. The working lands programs fail to appropriately prioritize widespread adoption of climate-friendly practices and continue to subsidize livestock management practices that exacerbate climate change and pollute air, water, and soils. While land retirement programs, according to USDA, currently "mitigate more than 12 million metric tons of carbon dioxide equivalent,"[35] these benefits are squandered when contracts expire and land goes back into production. Promising tools like agricultural easements, technical assistance, and whole-farm insurance policies that support diversified farms lack the investment necessary to effect meaningful change in the industry.

The next farm bill should seek to maximize the conservation and carbon sequestration potential of these programs by (1) using working-lands programs to advance climate-friendly agriculture, (2) investing in conservation technical assistance, (3) reducing conservation program support for concentrated animal feeding operations (CAFOs), (4) promoting equity in working lands programs, (5) making land retirement programs a stronger climate change mitigation tool, (6) expanding USDA's agricultural easement program, and (7) leveraging crop insurance to incentivize environmental stewardship practices and support crop diversification.

RECOMMENDATION

Use Working Lands Programs to Advance Climate-Friendly Agriculture

While taking land out of production is one conservation strategy with significant environmental benefit, there is a limit to how

much land can be removed from production and still meet the food and fiber needs of a growing population. Moreover, market dynamics often impact the amount of land producers are willing to take out of production at any given point in time, so land-idling programs like the Conservation Reserve Program (discussed below) have little appeal when crop prices rise. This dynamic highlights the need for effective working lands programs that advance conservation and climate-friendly agriculture.

Current working lands programs include the Environmental Quality Incentives Program (EQIP) and the Conservation Stewardship Program (CSP). EQIP and CSP are voluntary programs that provide financial and technical assistance to producers to support the adoption of conservation practices on lands in production. Through EQIP, interested producers apply to the Natural Resources Conservation Service (NRCS) to receive a contract for their intended conservation practice(s).[36] NRCS, with input from relevant state and local groups, develops and applies ranking and evaluation metrics to select cost-effective proposals that align with national, state, and local priorities.[37] NRCS maintains a list of practices eligible for payment—which vary by state and are drawn from NRCS's national list of conservation practices—and sets payment rates, which are primarily based on actual costs and/or foregone income.[38] Similarly, CSP also pays farmers to adopt NRCS conservation practices, enhancements, and/or bundles on working lands, with five-year stewardship contracts centered on a conservation plan that applies to the full farming operation.

Cost-share payments can be, and have been, used to incentivize uptake of climate-friendly practices. While the current administration has committed to significant investments in climate-friendly agriculture,[39] Congress should build on these investments by further refining CSP and EQIP to more powerfully and clearly mitigate climate change.

LEGISLATIVE OPPORTUNITY

Make the Conservation Stewardship Program a Climate Change Mitigation Program

As described above, the farm bill's financial support for conservation measures on working lands primarily flows through EQIP and CSP.[40] Both programs offer support for practices that promote climate resilience and carbon sequestration.[41] Although CSP and EQIP are similar, there are a few key differences. CSP's focus is more comprehensive, seeking to provide assistance across an entire operation for its various resource concerns, whereas EQIP focuses on individual conservation practices.[42] This often results in CSP providing more tangible benefits to the farming community because it addresses multiple resource concerns on farms at once, requires participants to address priority concerns, and requires continually advancing efforts to stay in the program.[43] For example, producers might start with more targeted conservation practices through EQIP and then ramp up to CSP to support more whole-farm, long-term conservation practices.[44] Although coordination between the two programs has recently increased, there is no "automatic graduation" from EQIP to CSP.[45]

CSP also goes further than EQIP by encouraging "enhancements and bundles," in addition to support for individual practices.[46] Enhancements provide options to amplify the conservation impact of existing efforts, while bundles give producers the opportunity to incorporate multiple practices and different types of conservation goals to increase the overall environmental return.[47] Each bundle has three or more required enhancements, grouped according to land use and agency initiatives.[48] These predetermined and laid out

bundles allow farmers to learn about practices that provide synergistic benefits,[49] as well as receive higher levels of financial assistance. [50] By having the bundle benefits laid out, farmers can make a greater conservation impact and improve their chances of being given a CSP contract. The bundles also grant flexibility for the farmers, as they can pick and choose which programs they would like to implement on their land.[51] In addition to enhancements and bundles, the CSP contract length is five years,[52] compared to EQIP contracts that typically last one to three years.[53] The five-year contract length gives producers additional assistance throughout the period of implementing new practices, which can lead to more permanent changes than EQIP contracts, and longer term, the potential to greater contribute to climate change mitigation.

CSP's whole-farm approach should make it Congress's model for introducing a Climate Change Mitigation Program. Congress already recognized the role CSP can play in supporting proliferation of climate-friendly practices by authorizing supplemental payment rates for such measures. For example, producers who adopt or continue resource-conserving crop rotations[54] —which contribute to soil health, increase biomass in the soil, and reduce soil erosion,[55] thereby helping to sequester carbon and decrease greenhouse gas emissions—can receive 150% of the annual payment rate (the rate USDA sets and pays producers based on the conservation activities' costs and benefits). Supplemental payments are also available for cover crop activities (125%) and advanced grazing management (150%).[56]

Several changes to the existing CSP program would enhance its effectiveness, increase transparency, and help shift agriculture to net

zero. The program is currently oversubscribed, which indicates its popularity and the desire of producers to use more conservation practices in their operations. However, USDA provides producers with little insight about how they choose which applications to participate and many view the application process as a "black box." Congress should streamline the program by limiting eligible practices to those that mitigate climate change, which USDA has already identified.[57] Program participants should then be chosen based on a score calculated to determine how well their application will mitigate climate change. The more practices a producer implements, or the more impactful practices they choose, increase their likelihood of receiving a contract to participate. By streamlining the program and increasing transparency about selection criteria, producers can focus on choosing the practices that will improve their score, and therefore their likelihood of receiving a contract. Moreover, by focusing the program on climate change mitigation, Congress will move U.S. agriculture closer to net zero.

LEGISLATIVE OPPORTUNITY

Prioritize CSP by increasing the program's mandatory funding

To maximize CSP's impact as a revamped program focused on mitigating climate change, Congress must reverse its recent trend of making cuts to the program.[58] Funding allocations in the 2018 Farm Bill reflect a serious undervaluation of CSP's importance in advancing climate change adaptation and mitigation. The 2018 Farm Bill capped funding on total CSP spending (with annual budget increases)[59] and effectively halved the program's budget between 2018 ($1.4 billion in spending) and 2019 (cap of $700 million).[60] Over the next ten years, the program is anticipated to invest approximately $12.4 billion less than what it would have had it been reenacted without change.[61] The 2018 Farm Bill focused conservation dollars on EQIP, expanding the program as it disinvested in CSP.[62] But, as articulated above, CSP's comprehensive approach and revamped focus on mitigating climate change offers significant advantages in addressing climate resilience. The Union of Concerned Scientists estimates that the per-dollar return on investment for CSP ranges from $1.83 to $3.95 in tangible environmental benefits such as decreased soil erosion, improved water quality, increased wildlife habitats, and biodiversity.[63] Yet, only a quarter of CSP applications were awarded contracts in 2019 and 2020.[64] Increasing demand for the program among farmers,[65] compounded by the program's utility in advancing climate change mitigation, demand significant reinvestment in a revamped program.

Congress should regard this expansion of CSP funding as an investment that supports producers in transitioning away from farming methods that overplant and strain resources. Direct and indirect support for producers through commodity programs and crop insurance put farmers on a "vicious cycle of overproduction" by encouraging farmers to continue expanding and leasing more and more acres.[66] This expansion intensifies water use as more acreage is irrigated and causes monocultures to proliferate. By increasing the availability and economic appeal of CSP contracts, the program could support farmers' livelihoods in a way that encourages sustainable management, rather than overproduction.[67] This transition, in turn, will promote nationwide resilience to changing climate conditions and more self-sufficiency in agriculture.[68]

Several components of CSP prevent the program from providing producers with the support needed to spur such wide-spread change. For one, support is effectively capped at $40,000 per year,[69] an amount that may neither reflect the environmental value of the contract nor provide sufficient economic

incentive for landowners to implement change. Furthermore, CSP offers just 10% of the amount a producer would receive under EQIP for implementing a conservation practice (rather than enhancement or bundle),[70] thus diminishing the perceived economic benefit of the program relative to EQIP. These payments may be doubly insufficient relative to cost under the current scheme; stakeholders have expressed that EQIP's reimbursement rates fall short of the actual costs of these projects[71] and USDA's Office of Inspector General found in 2019 that EQIP's payment schedules frequently did not reflect the producer's cost to implement various practices.[72]

To best leverage CSP's potential in mitigating climate change, Congress must direct additional funds to the program and increase its economic appeal. In the next farm bill, Congress should:

- Significantly increase mandatory funding for CSP starting at $2 billion annually;
- Raise the monetary cap on producer contracts to increase the economic appeal of CSP participation; and
- Increase, or direct USDA to increase, the CSP payment rate for conservation practices to more closely align with rates offered under EQIP (i.e. 85% of EQIP payment rate).

CSP as a Tool to Promote Biodiversity and Climate Change Resilience

Through its enhancements and bundles, CSP can promote biodiversity and smart water use on the nation's agricultural land—practices that will, in turn, increase resilience to climate change. In 2021, a limited number of CSP enhancements expressly aligned with the objective of promoting biodiversity (e.g., "Multi-species cover crops to improve soil health and increase soil organic matter").[73] These enhancements do not directly target biodiversity as its own end, but rather, as a means of improving soil health or creating beneficial habitats for animals. CSP could instead offer enhancement options, which could also be coupled with complementary practices in bundles as appropriate, directly aimed at increasing biodiversity and climate resilience. For instance, many perennial and organic agricultural practices promote biodiversity; examples include silvopasture, alley cropping, multi-story cropping, and riparian buffers, all of which already have an associated NRCS standard.

As another strategy, CSP could offer enhancements or bundles that incentivize the adoption of regionally appropriate production systems, such as planting drought resistant systems in arid areas.[74] Plants experience stress when they do not receive sufficient water and stressed plants typically stop growing.[75] Drought resistant systems, however, have been successfully engineered to include crops that decouple stress resilience from halted growth so that these plants continue to grow in drought conditions and produce high yields.[76] Conventional crop breeding methods have also been used to introduce increased drought tolerance.[77] Increasing the stress resilience of these systems should maintain or increase crop yields even under challenging growing conditions.[78] Farmers, especially those in water scarce regions, could therefore protect their yield and reduce their water consumption by adopting drought resistant systems. Currently, almost none of CSP's enhancements (over 200 offered) are designed to incentivize the planting of drought resistant crops.[79] The addition would allow USDA to provide producers with the technical and financial assistance needed to adopt these systems, including drought resistant crops, as part of a strategy to increase biodiversity and resilience on their land.

CSP can also be an important tool in promoting sustainable water management practices in a way that does not inadvertently encourage expansion of irrigated crops and increased water usage.[80] Irrigation practices are a common target of working lands programs' funding—they received 17% of EQIP funding in FY2016[81]—but have been shown to increase water depletion despite their conservation objectives.[82] Congress can leverage CSP's bundle option to couple funds supporting irrigation technology, such as groundwater recharge, with complementary water conserving practices (or enhancements) and, importantly, an enforceable commitment to reducing an operation's total water usage.

CSP's holistic approach to promoting land stewardship makes it a nimble and ready tool for advancing adaptations to climate change. Although this Report advocates for revamping CSP to focus primarily on climate change mitigation strategies, the program's potential for supporting producers in fortifying their operations merits recognition. As Congress works with USDA to revamp the program, bundles and enhancements that encourage increased biodiversity, drought-resistant systems, and sustainable water management practices can continue to complement approaches that center climate change mitigation as the key objective.

LEGISLATIVE OPPORTUNITY

Prioritize EQIP funding for climate-friendly practices

To maximize EQIP's climate benefits, Congress should direct NRCS to build on its current pilot and prioritize applications for funding based on the carbon sequestration benefits they provide.[83] In fiscal year 2021, NRCS piloted support for "climate-smart" practices through EQIP, setting the stage for such a system.[84] Additionally, Congress should also direct NRCS to conduct an in-depth environmental review of each of the near-200 funded conservation practices and defund the practices that do not further environmental objectives. EQIP dollars are scarce—approximately 75% of eligible participants are turned away from the program,[85] and there is evidence that the current allocation of funds fails to optimize environmental benefits.[86] A recent study found that less than one third—and perhaps significantly less—of EQIP dollars fund practices with the greatest potential "to improve soil health [by reducing soil disturbance and increasing agrobiodiversity], transition to ecologically-based management [to conserve soil, water, energy, and biological resources], and expand adaptive strategy [to confer agroecosystem resilience]."[87] Poorly targeted subsidies diminish conservation gains and environmental benefits, all while diverting funds from smaller operations that seek to implement sustainable management practices.[88] Congress must ensure EQIP actually furthers the United States' environmental and climate mitigation goals. Providing contract opportunities for more producers, reducing CAFO subsidies, and limiting EQIP's range of conservation practices to those with meaningful environmental and climate change benefits will together strengthen the program's impact.

LEGISLATIVE OPPORTUNITY

Leverage both working lands programs to support perennial practices

A principal way EQIP and CSP could promote carbon sequestration and climate change mitigation is by more robustly supporting perennial agriculture, including agroforestry (see pages 35-36, describing the climate benefits of perennial agriculture in greater detail). Doing so would entail ensuring that perennial practices are eligible for cost-sharing under the two programs and that those practices are sufficiently incentivized and available across the country. Currently, NRCS's national list of conservation practices includes several agroforestry practices, such as alley cropping and silvopasture, but does not provide standards for the full suite of perennial practices with conservation benefits, although the recent addition of perennial grains as a CSP enhancement is a step in the right direction.[89] Furthermore, these practices may or may not be among the practices that states choose to adopt for producers in their region. For example, the Massachusetts NRCS Field Office Technical Guide includes silvopasture as a supported practice but not alley cropping,[90] and the state of Nebraska does not have standards for either practice.[91] And, despite the proven benefits of these two practices, very little EQIP and CSP funding has been devoted to them over the last several years.[92] As part of increasing programmatic support for perennial practices, it will be necessary to increase staff training about the benefits of these practices and enhance producer outreach to ensure these practices are not just available, but actually implemented.

One state's leadership in targeting support for agroforestry may offer a model for supporting perennial agriculture through working lands programs more broadly. In 2017, Missouri's NRCS office established a dedicated pool of EQIP funding for "Agroforestry and Woody Crop

Establishment."[93] Missouri NRCS identified six core practices —alley cropping, multi-story cropping, riparian forest buffers, silvopasture, tree/shrub establishment, and windbreak/shelterbelt establishment— eligible for funding and targeted support.[94] The office set aside 1% of its general EQIP allocation to support this effort.[95] While this funding pool has provided unique opportunities for Missouri landowners—who may also benefit from the knowledge and regional expertise of the Center for Agroforestry at the University of Missouri—some challenges to its efficacy include the program's limited budget and limited producer awareness of conservation programs.[96] Lessons learned from this initiative can provide helpful guidance in implementing similar programs nationwide.

Encouraging perennial agriculture in working lands programs is a matter of both clearly defining eligible practices and offering sufficient incentives to promote uptake. The next farm bill should direct USDA, through NRCS and in consultation with experts in perennial agriculture and agroforestry, to identify perennial practices that should be eligible for EQIP and CSP dollars due to the climate change mitigation and conservation benefits offered. NRCS should work with all states to ensure that these new practices, along with current perennial practices on the national list, are implemented in that region (i.e., in their Field Office Technical Guide lists). In recognition of the outsized benefits they offer, Congress should also increase the cost-share available through EQIP to support such practices and offer producers a payment of up to 90% of costs rather than 75%. In CSP, Congress could set payment rates at 125% or 150% of the annual payment rate, as it has for cover crops and advanced grazing management.

In addition to providing incentives, Congress should earmark a portion of EQIP funding to support perennial agricultural practices. Half of EQIP's funding is already set aside for practices relating to livestock production, and another 10% is set aside for practices benefiting wildlife habitat. The livestock production set-aside should target sustainable livestock management practices consistent with perennial agriculture, particularly silvopasture, rather than concentrated animal feeding operations (discussed further below). In addition, Congress should earmark 5–10% of funds for other practices that fall within the perennial agriculture suite. NRCS State Offices could administer these funds by establishing a dedicated program similar to the agroforestry funding pool in Missouri, coupled with expanded staff capacity to provide technical assistance and education on perennial agriculture.

RECOMMENDATION

Invest in Conservation Technical Assistance

Many practices advancing climate change mitigation and resilience—such as perennial practices, crop diversification, water use reduction, and other climate-friendly practices—will require technical support from NRCS staff and other agricultural experts to encourage uptake and effective implementation. Farmers report that NRCS staff are critical to successful implementation of conservation practices on their land.[97] However, stakeholders have expressed that many of the NRCS offices are understaffed and of the staff members NRCS offices do have, many of them lack on-farm experience.[98] Staff have said that they find explaining the CSP program difficult, often resulting in more confusion by both parties.[99] These staff have also seen a significant rise in their responsibilities without a commensurate investment in increasing staff capacity.[100] In FY2019 alone, NRCS administered over forty-one thousand EQIP contracts[101] and over five thousand active CSP contracts.[102] While

some technical assistance is secured through mandatory funding for EQIP and CSP, that assistance is only provided in tandem with a financial assistance contract; this means NRCS support for conservation planning, education, and practice implementation before or after a contract all depends on funds directed to its Conservation Technical Assistance Program (CTA) that are appropriated annually and are entirely discretionary.[103] Stretching capacity even further, technical assistance providers are also tasked with helping producers meet conservation compliance requirements,[104] discussed further below.

LEGISLATIVE OPPORTUNITY

Provide robust, baseline mandatory funding for technical assistance

From a peak level in 2004, inflation adjusted funding for Conservation Operations (CO), and subsequently technical assistance, generally declined through 2020.[105] This means "[t]otal, actual, permanent positions at NRCS that are funded by CO have generally declined," a staffing problem magnified by the "growing number of unfilled positions at the agency."[106] While the Biden Administration requested additional funds to support its climate change priorities for FY2022,[107] the discretionary nature of this essential funding jeopardizes the long-term success of the program and the stability of a critical workforce. Furthermore, to support broad-scale agricultural adaptation to climate change, additional funding is needed to increase staffing and broaden NRCS's in-house expertise on innovative practices, including those that support perennial agriculture. Moreover, USDA has historically failed to provide adequate services to socially disadvantaged producers, a systemic inequity that must be remedied by providing NRCS staff with additional training on culturally competent outreach and service. As this expansion (i.e., hiring, training) takes place, the increased funding could also be used to contract third-party experts and service providers to address producers' conservation and climate change-related needs. To provide this stable funding, Congress should incorporate more NRCS technical assistance activities into the working lands programs, and increase mandatory funding to reflect the demand for and importance of these services.

RECOMMENDATION

Reduce Conservation Program Support for CAFOs

Over the last several decades, the livestock and poultry industries have increasingly concentrated animals at large, confined operations. The largest 5.7% of CAFOs house 89% of all livestock in the United States.[108] Under EPA regulations, an animal feeding operation is "a lot or facility (other than an aquatic animal production facility)" where "animals (other than aquatic animals) have been, are, or will be stabled or confined and fed or maintained for a total of 45 days or more in any 12-month period" in a space that does not support crops, vegetation or forage growth.[109] CAFOs are animal feeding operations of a certain size (e.g., 1,000 cattle, 10,000 swine weighing less than 55 pounds, 55,000 turkeys) or that contribute significantly to U.S. water pollution, or both.[110]

CAFOs are notoriously harmful to the environment. Animals raised in CAFOs produce 3 to 20 times more manure than people, yet no sewage treatment infrastructure exists for their waste.[111] Manure handling systems release greenhouse gases, pollute the air, emit odors, and attract insects.[112] Direct emissions from livestock production operations—typically, CAFOs[113]—amount to nearly half of agriculture's total contribution to U.S. greenhouse gas emissions.[114] Livestock operations emit both methane and nitrous oxide, which are 25 and 298 times more potent as greenhouse gases than carbon dioxide, respectively.[115] Manure management is the fourth largest methane emitter of all U.S. sources, while enteric fermentation (animal digestion) is the first.[116] Together they comprise over 36% of methane emissions from all anthropogenic activities in the United States.[117] These numbers do not even account for emissions released in the production of animal feed, to which approximately half of U.S. cropland is devoted.[118] Beyond greenhouse gas emissions, waste from CAFOs contaminates water systems, including groundwater that many rural communities rely on for drinking water and surface water that becomes inhospitable to aquatic life (i.e., dead zones).[119] Their presence further threatens human health by serving as a breeding ground for pathogens and by encouraging non-therapeutic use of antibiotics in animals, thus supporting increases in antibiotic-resistant microbes and, in turn, diminishing the efficacy of antibiotics in fighting disease.[120]

Neighboring communities experience CAFO externalities even more acutely. Many CAFOs use a "lagoon and sprayfield" model in which they store animal waste in ponds and then spray it on nearby land to dispose of it—polluting the air, water, soil and causing health problems for neighbors. CAFOs emit air pollutants like ammonia, hydrogen sulfide, and organic dust that can cause or worsen respiratory symptoms (i.e., asthma) and other health conditions.[121]

The Clean Air Act requires that CAFOs control their emissions. However, there is little to no enforcement. Out of the estimated 21,465 livestock operations that are subject to permit requirements, only 6,629 have been issued permitting.[122] Furthermore, proximity to a CAFO typically lowers neighboring property value. Not to mention, the smell is particularly off putting. Some neighbors also complain about improper disposal of animal carcasses.[123] CAFOs are disproportionately sited in marginalized communities that are primarily low-income and comprised of people of color;[124] their continuing operation thus raises critical environmental justice and equity concerns. A recent survey found that 80% of U.S. residents were concerned with CAFO externalities (e.g., air and water pollution, worker safety, and health problems) and the majority of respondents supported greater oversight.[125]

Despite the harmful effects of these facilities, USDA subsidizes their operations through EQIP. Though animal waste management facilities at large confined livestock operations were initially barred from the program at the time of its inception,[126] CAFOs became eligible for EQIP dollars in the 2002 Farm Bill.[127] Congress sets aside 50% of EQIP funding for livestock production,[128] down from 60% prior to the 2018 Farm Bill. In 2016, about $113 million went to CAFOs (11% of total EQIP dollars), primarily supporting waste management.[129] In 2019, EQIP spent $48.3 million on waste storage facilities, $9.4 million on animal mortality facilities, and $7.3 million on waste transfer,[130] thereby supporting the continuing or expanded operation of CAFOs.

LEGISLATIVE OPPORTUNITY
Reduce subsidies for CAFOs

Congress should reduce EQIP eligibility for CAFOs. The decision to make CAFOs eligible for EQIP was the result of a focused lobbying

effort to give agribusiness interests a way to offset the cost of meeting their regulatory requirements,[131] and that change allowed producers to avoid costs they would otherwise be legally mandated to pay.[132] EQIP cost-sharing payments contribute to the expansion of CAFOs, which offsets conservation gains and environmental benefits while diverting funds from smaller operations that seek to implement sustainable management practices.[133] This is an issue because CAFOs crowd out other applicants, like livestock grazing operations, that produce fewer environmental harms and could use cost-share funds to further improve their land management practices. Given the huge contribution these operations make to U.S. greenhouse gas emissions, pollutants emitted, and their impact on neighboring communities, public dollars should not be spent subsidizing their further expansion and operation.

Cutting subsidies for large CAFOs poses significant political challenges given the strength of the meat industry lobby. Rather than an outright ban, a gradual reduction would avoid a sudden shock to industry and allow time to plan for compliance with existing regulations. To assist with this transition, Congress should provide NRCS leeway to approve voluntary CAFO conservation and sustainability projects, while denying funding for projects that would be required under the Clean Water Act and other regulations. This would increase the impact of EQIP funds by limiting public subsidies to projects that were not already required by law, improving additionality of the program overall. Congress could begin this process by restoring the prohibition on EQIP funds for new or expanding CAFOs, followed by reducing the total amount of funds allocated for CAFOs on a per-project and overall basis, and finally by restoring large CAFO ineligibility included in the original program by requiring CAFOs to commit to transitioning to perennially based systems, like silvopasture, if they want to access EQIP funds.

LEGISLATIVE OPPORTUNITY

Restore the comprehensive nutrient management requirement

CAFO operators applying for EQIP funding must develop and implement a comprehensive nutrient management plan (CNMP) to be eligible for funding.[134] A CNMP "identifies conservation practices and management activities that, when implemented as part of a conservation system, will manage sufficient quantities of manure, waste water, or organic by-products associated with a waste management facility."[135] Prior to 2018, the EQIP statute required "development and implementation" of such a plan; the 2018 Farm Bill amended the section to require "progressive implementation" instead.[136] Running away with this amendment, USDA issued a final rule in 2020 that only requires participants to develop a CNMP during their EQIP contract period, with no obligation to implement or progressively implement that plan.[137] These changes mean that CAFOs can use public dollars to subsidize their operations and meet regulatory requirements they are already obligated by law to satisfy without making any progress on nutrient management and lessening their negative environmental impact. Congress should reinstate the CNMP implementation requirement to ensure that public funds going to environmentally harmful operations at least catalyze change toward environmentally responsible management.

RECOMMENDATION

Promote Equity in Working Lands Programs

Various systemic inequities keep farmers of color from fully benefitting from farm bill conservation programs.[138] In 2019, approximately 10% of EQIP contracts went to

"socially disadvantaged farmers and ranchers" (SDFRs) (4,214 of 41,471)[139] while just 6.5% of CSP contracts went to such producers (374 of 5,692).[140] For purposes of conservation programs, SDFR refers to a farmer or rancher who is a member of "a group whose members have been subjected to racial or ethnic prejudice[.]"[141] Farmers of color, who have been systemically denied the resources and benefits of USDA programs (see FBLE's **Equity in Agricultural Production & Governance** Report), may not have the initial capital to take full advantage of NRCS's conservation programs and, furthermore, may be reticent to work with an agency with such a strong history of overt and covert discrimination against farmers of color.[142]

The farm bill has sought to address these challenges in the working lands programs in a few ways. First, five percent of funding appropriated for EQIP and CSP is set aside to assist SDFRs.[143] Additionally, SDFRs (among other select groups of farmers) receive a higher cost-share arrangement in EQIP (90% of costs, up from 75% for standard contracts) and can receive 50% of the payment in advance.[144] Funding for outreach to connect farmers of color to USDA resources and program benefits—including conservation programs—is another critical tool and is administered through the Outreach and Assistance to Socially Disadvantaged and Veteran Farmers and Ranchers Program (known as Section 2501, now housed under the Farming Opportunities Training and Outreach Program). Alongside these existing set-asides and programs, Congress could use additional mechanisms in the next farm bill to promote equity in working lands programs.

LEGISLATIVE OPPORTUNITY

Cap EQIP funding to make more funding available to smaller producers

When EQIP began, Congress limited producer payments to $50,000 for any multiyear contract.[145] Today, however, a producer may receive up to $450,000 for EQIP contracts during FY2019–2023.[146] In FY2019, only 27.7% of EQIP applications were funded (41,471 of 149,574 applications, though only 49,443 applications were deemed valid), showing that demand for the program exceeds available funding.[147] The higher funding cap—and continued eligibility of large CAFOs—risks disproportionately targeting resources toward large industrial producers and leaving less funding on the table for smaller and historically underserved producers, including SDFRs. For conservation purposes, it is more effective to channel funding to smaller producers. Smaller farms tend to plant a more diverse range of crops and "readily lend themselves to potential [pest management] approaches such as intercropping, under-

sowing, or cultivar mixtures... which are often difficult to implement on a large[r] scale."[148] Congress should target funding toward such producers by capping the amount available to farmers above a certain income level or size threshold.

ADMINISTRATIVE OPPORTUNITY

Bridge the gap between non-operating landowners & land tenants

As of 2014, nearly 40% of farmland in the contiguous 48 states was rented, with over half of cropland rented and just over a quarter of pastureland.[149] Of rented farmland, 80% "is owned by non-operator land[owners] [(NOLs)], those that own land used in agricultural production but are not actively involved in farming," though a fair portion of those are retired farmers.[150] While their involvement in farming decisions can vary by individual and practice, NOLs often exercise control over farm management decisions related to conservation.[151] However, NOLs without a farming background may lack the environmental or agricultural knowledge to understand the benefits of conservation practices. On the flip-side, tenant farmers on short-term leases may not have an economic incentive to implement conservation practices that will promote the long-term sustainability of the operation.[152] Specialized outreach to these groups, and potentially compensation, is necessary to ensure conservation programs reach all lands that can benefit and support tenant farmers as they do owner-operators.[153] NRCS and the FOTO Program (Section 2501 and the Beginning Farmers and Ranchers Development Program) should collaborate to increase their outreach activities and funding for projects targeting NOLs and tenant farmers in implementing strong conservation systems and practices on their farmland.

RECOMMENDATION

Make the Conservation Reserve Program a Stronger Tool for Climate Change Mitigation

Unlike EQIP and CSP, CRP is a land retirement program, meaning a producer takes land out of production and devotes it solely to conservation. Producers enrolled in CRP receive rental payments to remove environmentally sensitive lands from production and plant species, such as trees and perennial grasses, that improve environmental health for a period of between 10 and 15 years.[154] To determine which producers to contract with, USDA's Farm Service Agency (FSA) considers the potential environmental benefits, including: "wildlife habitat benefits resulting from covers on contract acres; water quality benefits from reduced erosion, runoff and leaching; on-farm benefits from reduced erosion; benefits that will likely endure beyond the contract period; [and] air quality benefits from reduced wind erosion and cost."[155]

Additionally, taking land out of production helps soil sequestration, which increases carbon storage and decreases overall greenhouse gas emissions, as long as that land stays out of production. Recognizing the climate change mitigation potential of CRP, USDA announced in April 2021 that it would open CRP enrollment "with higher payment rates, new incentives, and a more targeted focus on the program's role in climate change mitigation."[156]

As previously discussed, current market prices may influence a producer's decision to enter the program, but regardless of the producer's intent, CRP remains a useful conservation program. Its long-term benefit, however, is limited by the short-term nature of CRP contracts. While 10–15 years of conservation

efforts are helpful in the short-term, the carbon sequestration potential of land is often lost when it reenters production. Focusing on longer-term conservation benefits, like those obtained through long-term easements and increasing opportunities for agroforestry on CRP lands, would dramatically improve the program.

LEGISLATIVE OPPORTUNITY

Transition CRP toward permanent conservation easements

Congress should reform CRP to encourage longer-term participation. Currently, most conservation benefits are lost at the end of the contract's 10-15 year duration because farmers are free to put their land back into production or farmers may not qualify for new CRP practices.[157] If crop prices rise, farmers have less economic incentive to re-enroll their land in the program at the expiration of their contract.[158] Between 2006 and 2014, sixteen million acres of CRP acres re-entered annual crop production.[159] Congress should transition the program away from 10-15 year CRP contracts toward permanent conservation easements, especially on the most environmentally sensitive and marginal acres. Permanent conservation easements would significantly reduce greenhouse gas emissions and maximize carbon storage through increased sequestration in soils and biomass. Congress could implement this recommendation by creating a separate acreage cap for permanent conservation easements (i.e., not in direct competition for general CRP acres) and providing mandatory funding for those easements, either within or separate from CRP. As the program moves toward permanent easements, Congress should decouple the Transition Incentives Program—which offers two years additional CRP rental payments to farmers whose CRP contracts are expiring to "rent or sell their land to underserved producers who commit to using" certain sustainable practices[160]—from CRP so that the benefits of both programs can be realized.

LEGISLATIVE OPPORTUNITY

Increase the number of acres entering CRP through continuous enrollment

Congress should increase the number of acres entering CRP through continuous enrollment, which focuses on environmentally sensitive land and high-impact practices. Continuous CRP now accounts for approximately 36% of total CRP acres,[161] including land enrolled in the Conservation Reserve Enhancement Program and the Farmable Wetlands Program, special initiatives within CRP.[162] In contrast to general CRP signup, continuous enrollees are not subject to a competitive process but instead must meet eligibility requirements tied to priority natural resource concerns and land sensitivity.[163] Because participation is contingent on implementing practices chosen through an adaptive management approach, continuous enrollment programs can help maximize the impact of CRP spending.[164] Congress should reward the success of continuous enrollment by employing a more targeted and less invasive approach to conserving farm lands by setting aside up to half of CRP acres for continuous enrollment.

LEGISLATIVE OPPORTUNITY

Support pathways to agroforestry through CRP

CRP's conservation and climate change mitigation objectives dovetail well with agroforestry. CRP already encourages farmers to plant trees on their land during their contract period. However, producers interested in making the transition to perennial agriculture will find aspects of CRP discouraging. For instance, the program does not permit producers to harvest from trees or perennial grasses on CRP acres,[165] thus decreasing

the practical and economic incentive of transitioning. Similarly, the program's tree density requirement prevents using the land for activities like silvopasture during the contract period.[166] These density requirements make it unnecessarily challenging for producers to return expiring CRP land to production systems that integrate trees; producers would need to raze and plow the unwanted trees to establish an agriculturally productive system, releasing stored carbon and causing environmental disruptions.[167]

As described in more detail below, agroforestry systems, in particular, offer many of the climate change mitigation and other environmental benefits that CRP seeks to achieve. Similarly, many grassland acres in CRP use grasses that are the same species of perennial grain crops; using these grain varieties would help achieve similar goals on land that is not suited to agroforestry, such as arid lands. Reforming CRP to offer a pathway to perennial agriculture will increase the program's impact: land taken out of production will meet the program's climate and conservation objectives, and producers interested in transitioning to perennial agriculture but concerned about the economic viability of such a farming system will have a stable on-ramp through CRP rental payments. CRP can thus play a vital role in transitioning U.S. agriculture to revolve around perennial systems.

The next farm bill should reform CRP to expressly support transitioning cropland to agroforestry and modify other aspects of the program to make such transitions more economically viable for producers. Congress should amend CRP's authorizing statute to include cropland that will be devoted to agroforestry systems that advance conservation (as determined by USDA) as eligible CRP acres.[168] Further, Congress should direct USDA to amend aspects of the program to support transitioning producers. Specifically, USDA should reduce tree density requirements for producers committed to implementing agroforestry to better reflect their long-term tree-planting needs; allow tree-harvesting on CRP acres, with an appropriate reduction to rental payments; and consult with the National Agroforestry Center and other agroforestry experts to determine additional mechanisms for incentivizing agroforestry uptake without compromising CRP's conservation objectives.

To promote agroforestry and other perennial practices among new and diverse farmers, Congress should also direct additional funding to farmers participating in the CRP-Transition Incentives Program (TIP) who transition their land to agroforestry or other perennial practices in returning it to production. CRP TIP is a program that provides additional rental payments to landowners whose CRP contract is expiring in exchange for a commitment to sell or rent land to a beginning or socially disadvantaged farmer.[169]

RECOMMENDATION

Expand the Agricultural Conservation Easements Program – Agricultural Land Easements (ACEP-ALE)

Unlike short-term CRP contracts, agricultural easements provide environmental benefits

in perpetuity. ACEP-ALE provides financial assistance to Tribes, States, local governments, and land trusts for purchasing agricultural land easements that protect the agricultural use and conservation values of eligible land.[170] Assistance may be up to 50% of the easement's fair market value, and up to 75% for certain lands of environmental significance.[171] In exchange for keeping their land in agricultural production rather than converting it to development, producers who participate in an easement program receive a payment for their development rights. Applications are ranked at the state level using both national and state-level criteria to prioritize eligible parcels. Although states may not modify the ranking criteria, they may choose how they weigh those criteria. States also have discretion to modify application questions associated with state criteria.[172] ACEP-ALE ranking criteria generally favor proposals applying the conservation easement to a greater portion of the overall parcel, proposals for parcels surrounded by areas zoned for agricultural use and in close proximity to other protected lands, and those for parcels in counties with population growth and density greater than overall state trends, where agricultural land is likely at a higher risk of being converted to non-agricultural uses.

While the ACEP-ALE program has proven to be popular, funding is limited as is technical assistance to ensure that producers who participate in the program have access to the conservations tools necessary to maximize the benefit of the easement. Further, ACEP-ALE ranking criteria do not include criteria specifically designed to increase opportunities for historically underserved farmers and ranchers. Congress should fortify the program in the next farm bill; ACEP-ALE is a critical tool in helping to conserve farmland while also promoting future agricultural viability and supporting the next generation of farmers in finding affordable farmland.[173]

LEGISLATIVE OPPORTUNITY

Expand funding for ACEP-ALE and prioritize ACEP-ALE lands for additional assistance

Between 2001 and 2016, 11 million acres of farmland were converted to urban and low-density residential uses.[174] Once paved over or converted, the ability of these lands to sequester significant amounts of carbon is severely limited. Farmland enrolled in ACEP-ALE is permanently preserved for agricultural use, thereby protecting the sequestration potential of these lands. However, the program is consistently oversubscribed.[175] According to the American Farmland Trust, the program is popular because the sale of an agricultural conservation easement serves not just to protect land, but also enables a farmer, rancher, or landowner to reinvest in their operation, reduce debt, fund retirement, or transfer the land to the next generation of producers.[176]

To protect vulnerable farmland and facilitate soil carbon sequestration on protected agricultural land, Congress should:

- Substantially expand funding for ACEP-ALE. ACEP is currently funded at $450 million per year, which is almost $250 million less than the funding level for the pre-2014 programs that were consolidated into ACEP.[177] It also receives significantly less funding than CRP, even though most CRP projects are temporary measures while ACEP-ALE protects enrolled lands in perpetuity. Congress should expand funding to at least $600 million per year;
- Prioritize these lands for other conservation technical assistance. Because these lands will remain as farmland in perpetuity, there is an opportunity to maximize their carbon sequestration potential. Congress should direct USDA to prioritize these lands

for technical and financial assistance to adopt carbon sequestration practices by requiring the development and implementation of a conservation plan at 10-year intervals; and

- Direct NRCS to modify national and state ALE ranking criteria to prioritize applications from historically underserved producers.[178]

RECOMMENDATION

Use Crop Insurance Subsidies to Incentivize Environmental Stewardship Practices

Federal crop insurance subsidies incentivize farmers to take on greater risk.[179] Because farmers purchase premiums at a reduced rate, they can grow higher-risk crops, seek higher returns, and plant on greater acreage with more certain revenue. While the program successfully protects farmers from unpredictable losses, it also operates as a kind of moral hazard: agricultural producers become insulated from the effects that lead farmers to hedge their bets and plan more cautiously.[180] The incentive to take on greater risk can sometimes lead to negative environmental practices, where farmers grow resource-intensive crops on difficult-to-grow, marginal land, with the knowledge that they will be compensated in the likely event that the crops fail.[181] These decisions can lead to erosion and a depletion of nutrients that could reduce the long-term viability of the soil.[182]

In 2018, FBLE recommended that the farm bill should invest in pilot programs to connect insurance subsidies and soil health.[183] A number of infrequently used regenerative practices such as no-tillage or conservation tillage systems, cover cropping, diversified crop rotations, and agroforestry, may help farms prevent soil erosion, retain soil moisture, better resist droughts, and increase the sequestering of carbon.[184] Because these practices can enhance the long-term productivity of the land, they may reduce indemnity payments to farmers because of crop failure.[185] Although some uncertainties remain about the exact efficacy of these practices, piloting innovative approaches can lay a path for more widespread adoption through premium adjustments.[186]

One recent success connects premium subsidies to the planting of cover crops. Cover crops have considerable environmental benefits. They decrease the breakdown of soil,[187] which increases soil organic matter and helps plant growth.[188] Cover crops also store nutrients from manure and other on-farm inputs until the following years' crop can use them, they reduce nitrogen losses to the environment, and may reduce the use of purchased nitrogen fertilizer that is produced using fossil fuels.[189]

Programs that incentivize the planting of cover crops have already proven to be popular. In 2017, Iowa started implementing a program offering a $5-per-acre discount on a farmer's crop insurance premiums for the acres on which they planted cover crops.[190] Of the farms that participated in the program, the total cover crop acreage increased over its two-year period, and after planting cover crops, farmers estimated that they had higher corn and soybean yields.[191] Similar programs have additionally been implemented in Illinois[192] and Indiana.[193]

As part of its pandemic relief program for farmers, USDA's Risk Management Agency (RMA, which manages USDA's crop insurance offerings) introduced the Pandemic Cover Crop Program (PCCP) countrywide, which, like the program in Iowa, offered a $5-per-acre premium discount on land planted with cover crops such as grasses, legumes, and broadleaves.[194] This program ran for the 2021 planting year and helped producers realize more profits from their land.[195] Programs like

PCCP and the state pilots offer encouraging examples of ways to leverage crop insurance to promote sustainable agriculture. However, there remain challenges to large-scale implementation. Prior to the 2018 Farm Bill, indemnity claims would be denied if farmers deviated from USDA guidelines regarding cover crops, which disincentivized planting.[196] Many farmers remain unaware of the changes and have continued to avoid planting cover crops. Coordinated outreach alongside the development of these programs will be necessary to ensure its success.[197] Congress should continue supporting these arrangements and encourage further innovation in the next farm bill.

LEGISLATIVE OPPORTUNITY

Establish a program similar to the Pandemic Cover Crop Program

Although the PCCP emerged out of emergency funding, Congress should take advantage of the next farm bill to establish a similar program and make it a permanent feature of federal crop insurance. Reducing insurance premiums is a highly efficient method of incentivizing farmers to engage in positive ecological practices, which often have the added benefit of contributing to a long-term risk reduction of crop failure.[198] In addition, because farmers are already required to report on crop acreage, compliance would be easy to verify.[199] To streamline this reporting, however, additional funding to USDA RMA to incorporate cover crops in the Acreage Crop Reporting Streamlining Initiative would make enrollment in the program even easier.[200] And, as the cost and planning associated with planting a new type of crop may disincentivize farmers wary of the program, it remains critical to ensure that funding is guaranteed for all valid applicants. Congress should thus allocate mandatory funding for the program.

LEGISLATIVE OPPORTUNITY

Establish a program to incorporate compost

Similar to cover crops, compost use has a number of plant health and environmental benefits. It can be used on annual crops, perennials, orchards, vineyards, and grasslands to improve soil properties, provide nutrients in a stable organic form, and increases in plant growth and health.[201] Further, compost increases water retention capability and improves drought resilience.[202] Compost can also be used to increase carbon sequestration (i.e., long-term storage of carbon in soils and vegetation).[203] In fact, studies and literature reviews by the Marin Carbon Project and its partners found that a one-time application of a quarter inch of compost can double the soil's carbon sequestration potential (approximately one ton of carbon per hectare).[204] Finally, given rising fertilizer costs,[205] compost and cover crops may be a cost-effective alternative to fertilizer.

USDA should incentivize farmers to use compost products in their fields by providing a premium subsidy for compost application. This will encourage farmers to reap the environmental benefits associated with composting and will increase financial viability of the burgeoning composting industry.

LEGISLATIVE OPPORTUNITY

Provide funding for pilot programs

Besides cover crops and compost, several other environmental practices like no-till farming[206] and diversified crop rotations[207] are also beneficial to soil health. These practices can and should be incentivized through crop insurance premium reductions. Congress should authorize funding for pilot programs providing premium discounts for these and other environmentally beneficial practices in the next farm bill.

RECOMMENDATION

Increase Support for Diverse Production Systems Through Whole-Farm Revenue Protection

Diversified production systems improve resilience by using a variety of crops to reduce vulnerability to risk (e.g., pests, disease).[208] Such systems can also boost environmental sustainability by using the biology of different crops and livestock to reduce erosion, promote nutrient cycling, improve soil fertility, and reduce the need for inputs that can be ecologically damaging, like pesticides and fertilizers.[209] These practices have been shown to improve environmental outcomes without reducing crop yields,[210] thereby making diversification worthy of further policy support.

Producers operating diversified farms have struggled to access adequate insurance products to manage risk. Crop insurance policies are most readily available for single crops, meaning producers with diversified farms would need to apply for coverage separately for each crop they plant or when integrating livestock, which can be logistically difficult given the paperwork involved.[211] In some cases, applying for each crop can even be impossible because policy offerings are determined on a county-by-county basis.[212] If coverage for a particular crop is not offered for farmers in a particular county, that portion of the harvest would go uninsured without a whole-farm insurance option.[213]

Whole-farm insurance policies, currently available through Whole-Farm Revenue Protection (WFRP), provide an option for diversified operations. Under whole-farm policies, farms can purchase subsidized insurance for their total farm revenue regardless of what they produce or whether they straddle county lines.[214] Enrolled producers can receive a 56% to 85% federal subsidy on their premium rate, based on the coverage level purchased.[215] To encourage diversification, WFRP reserves its highest coverage levels (80% and 85%) for operations that derive substantial income from at least three crops or animals.[216]

Despite its promise, WFRP is currently underutilized. Challenges with recordkeeping and paperwork requirements hinder uptake. Lack of knowledge, enthusiasm, and incentives to sell policies on the part of insurance agents contributes to the issue as well. (As described in more detail in FBLE's **Farm Viability** Report, Approved Insurance Providers (AIPs) sell and service crop insurance policies through a private-public partnership between RMA, the Federal Crop Insurance Corporation (FCIC), and the AIPs. Insurance agents work for the AIPs directly.) Recent procedural improvements—implemented in response to a Congressional directive in the 2018 Farm Bill—have been a promising start, but more is needed to encourage enrollment and transitions to WFRP from traditional, single-crop policies. Going forward, WFRP should be the primary insurance option for producers as WFRP allows for and encourages crop diversification, thereby promoting climate resilience and increasing an operation's climate change mitigation potential and overall sustainability.

LEGISLATIVE OPPORTUNITY

Expand diversification incentives within WFRP

The next farm bill should require that WFRP adopt much more ambitious incentives for diversification. The current iteration of WFRP provides an ideal platform for paying participants who diversify production and thus reduce vulnerability to risk, and Congress should embrace this incentive structure to further encourage meaningful on-farm diversification and conservation practices. Specifically, Congress should require RMA to

recognize finer gradations of diversification in setting coverage and subsidy rates under WFRP. At present, farms with three or more species have access to coverage levels of 80 and 85%.[217] Rather than this binary "whole-farm" subsidy rate, a diversification subsidy should be meaningfully stepped up with each additional crop or with the adoption of more beneficial crop rotations. These reforms would recognize and reward true diversification and incorporate scientific research to understand the interactions of various crop and animal rotations that complement one another, reduce external inputs, and build soil productivity over time. The details should reside with RMA, with consultation from NRCS to categorize and rank crop systems. By making the diversification incentive more robust, WFRP could pilot innovative concepts to better align federal insurance subsidies with more favorable environmental outcomes.

LEGISLATIVE OPPORTUNITY

Further streamline WFRP to reduce burdensome paperwork and recordkeeping

Paperwork and recordkeeping prevent broader participation in WFRP.[218] Farmers must produce extensive revenue histories in order to sign up, and then submit multiple interim reports throughout the growing season.[219] For small farms this additional recordkeeping can be prohibitive. The 2018 Farm Bill directed FCIC to review application burdens on agents and producers in order to increase the effectiveness and accessibility of WFRP;[220] it specifically directed FCIC to consider reducing paperwork for producers and agents.[221] Since then, RMA has modified the WFRP reporting requirements to allow insurance applicants to report two or more crops under a single commodity code,[222] and now accommodates one year of missing historical revenue records.[223] While these modification are steps in the right direction, the paperwork required still presents a significant barrier for WFRP applicants.[224] For instance, RMA has not implemented Congress's suggestion to allow time-stamped photograph records to verify production history.[225] Beyond merely calling for further review of burdensome requirements, Congress should direct that Schedule F (Form 1040), Profit or Loss from Farming of the Internal Revenue Service be sufficient to establish historical revenue records.[226] In addition, Congress should direct that AIPs only request verifiable tax records in the instance where a farmers' tax form is not sufficient to support the application.

LEGISLATIVE OPPORTUNITY

Direct RMA to review and change the AIP compensation structure for WFRP

A frequently noted challenge to access to and uptake of WFRP is the dearth of crop insurance agents knowledgeable of and interested in or willing to sell such policies.[227] This challenge is likely due—at least in part—to the time and resources it takes to put a WFRP policy together relative to the financial incentive.[228] USDA provides AIPs a subsidy to support administrative and operating expenses (an A&O subsidy) at a rate of 12% or 20.1% of the premium value of issued policies (percentage varying by policy type),[229] regardless of the time and resources an agent spends administering the policy. Compared to the more common crop insurance policies, WFRP policies are smaller but more complex, thus offering a smaller payout for more work.[230] In order to overcome this barrier and incentivize more sales, Congress should direct RMA to review the compensation structure for WFRP and increase the A&O subsidy on WFRP policies—or recalibrate the subsidy across policies so that WFRP's is relatively higher—to an amount that will incentivize increased sales. It should also waive in this instance or remove altogether the budget neutrality requirement for the Standard Reinsurance Agreement (which sets forth the contract terms between FCIC and the AIPs) so that RMA has flexibility to implement this

directive, including by making any necessary adjustments to the A&O reimbursement cap so that the new incentives will be meaningfully effective.

LEGISLATIVE OPPORTUNITY

Increase education and outreach about WFRP

WFRP is still a relatively new and unfamiliar program to many farmers and crop insurance agents. Broader familiarity with the program will be critical to scaling it up. The 2018 Farm Bill allocated $10 million annually for RMA's Agricultural Risk Management Education Partnerships (ARME), a grant program that supports education and technical assistance to producers on farm viability and risk mitigation.[231] At least half of the funding is earmarked for the education of producers whom FCIC determines are underserved by the federal crop insurance program.[232] Congress could leverage this existing program by introducing education about WFRP as a new focus area, or could separately provide RMA with increased funding specifically to conduct outreach and education about WFRP. If Congress funds educational activities with RMA directly, it should direct RMA to offer educational resources to crop insurance agents as well.

ADMINISTRATIVE OPPORTUNITY

Direct AIPs to inform farmers about WFRP and offer WFRP policies

As noted above, agents' lack of knowledge and interest has hindered producer uptake of WFRP. Nevertheless, all AIPs are technically required to "offer WFRP to all persons."[233] To reduce any ambiguity in this directive and increase uptake, RMA should require AIPs to expressly offer and inform all persons seeking federal crop insurance about WFRP and should promote this policy so its directive to AIPs and agents is clear.

GOAL II

Promote Carbon Sequestration and Wildfire Resilience in Forests

Forests have tremendous potential to sequester carbon in a cost-effective manner, but the growing prevalence of wildfires is threatening the use of forests as a climate change mitigation tool. In order to preserve forests and the many environmental benefits they confer, the 2023 Farm Bill should amend several existing forestry programs, increase measurement and monitoring of practices that mitigate climate change, make carbon sequestration an explicit goal of forestry programs, and scale up fuel reduction and reforestation. By doing so, Congress will provide USDA and the Forest Service the tools necessary to ensure forests continue to play an important role in mitigating climate change.

RECOMMENDATION

Protect the Ability of Forests to Sequester Carbon

Forest sequestration is another readily available, cost-effective mechanism to draw down carbon from the atmosphere.[234] By preventing the conversion of forests to other uses, society can protect these carbon sinks and preserve their ability to continue sequestering carbon. Reforestation offers the potential for even greater carbon sequestration; one study identified 51.6 million hectares (Mha) of total carbon sequestration opportunity through reforestation in the United States, primarily located in the Southeast and Midwest.[235] The United States government itself manages a large amount of land with forest carbon sequestration potential, but ultimately "the vast majority of potential to restore trees to the landscape is on nonfederal lands, predominantly under private ownership."[236] Several farm bill programs can support the sequestration of carbon in these privately owned forests.

Foremost of these, the Forest Legacy Program (FLP) "is a conservation program administered by the U.S. Forest Service in partnership with State agencies to encourage the protection of privately owned forest lands through conservation easements or land purchases."[237] Under the program, private landowners may sell property outright or may retain ownership and sell their development rights through conservation easements. Although the federal government can acquire interests in land under the FLP, it operates primarily through the "State grant option," under which USDA provides "grants to States for acquisition and allows States to hold the title to the lands or interests in lands acquired with those funds."[238]

The FLP was created by the 1990 Farm Bill as an amendment to the Cooperative Forestry Assistance Act of 1978.[239] It directed the Secretary of Agriculture to:

> establish a program, to be known as the Forest Legacy Program, in cooperation with appropriate State, regional, and other units of government for the purposes of ascertaining and protecting environmentally important forest areas that are *threatened by conversion to nonforest uses* and, through the use of conservation easements and other mechanisms, for promoting forest land protection and other conservation opportunities. Such purposes shall also include the protection of important scenic, cultural, fish, wildlife, and recreational resources, riparian areas, and other ecological values.[240]

FLP's statutory authorization from the 1990 Farm Bill "continues indefinitely."[241]

The program accepts both conservation easements, which permanently limit property uses to promote land conservation, and full fee property sales and donations. Each year, FLP projects are selected through a joint federal-state process. Project proponents first bring their proposals to the states, which review and rank them according to the criteria identified in their State Forest Action Plans.[242] All proposals are then subject to a National Panel Review, which evaluates projects based on three national core criteria and consistency with program requirements.[243] Currently, neither the federal minimum requirements for State Forest Action Plans nor the national core criteria for evaluation of projects explicitly include carbon sequestration as a criterion for selecting projects.

Once a project is selected, landowners must manage their land according to a Forest Stewardship Management Plan (also known as a "Multi-Resource Management Plan") and the terms of the conservation easement.[244] The recent update to the National Implementation Guidelines now suggests that Forest Stewardship Plans consider carbon sequestration and climate resilience.[245] As noted above, however, this requirement relates only to the management of a project and not to the project selection process.

As a program that is intended to protect forests from conversion to non-forest uses and that can be used to encourage reforestation, the FLP has the potential to promote terrestrial carbon sequestration. USDA recently recognized the value of the FLP in supporting forest carbon sequestration under its recently released *Climate Smart Agriculture and Forestry Strategy: 90-day Progress Report*.[246] However, it has yet to provide details on how it might adapt the program to further these goals. The next farm bill can build on this momentum by adapting its forest programs to focus on carbon sequestration as a key objective.

LEGISLATIVE OPPORTUNITY

Make carbon sequestration a central tenet of the FLP

The FLP, as currently designed and implemented, does not fulfill its promise to promote carbon sequestration. First, it does not prioritize carbon sequestration in project selection (although it does allow projects to consider carbon sequestration in their Forest Stewardship Plans). Second, it is not clear that the FLP actually prioritizes projects that face genuine threats of forest conversion; many are located in remote industrial holdings. Third, USDA does not currently track FLP's effectiveness in sequestering carbon, nor is there any other publicly available analysis of this issue.[247] Congress should direct USDA to:

- **Make carbon sequestration a central goal of FLP project selection** by explicitly incorporating it into the national core criteria and into the required elements for State Forest Action Plans. As a growing number of states commit to achieving "net zero" GHG emissions by

midcentury[248] and are looking to carbon sequestration to help reach those goals, increasing the FLP's focus on carbon sequestration opportunities is in line with local and regional goals to sequester carbon or boost forest-related industries.

- **Ensure that FLP funds go to protecting lands actually threatened by conversion to non-forest uses**. States often incorporate state-specific conversion threats into their selection criteria, but do not appear to measure or publish information on whether those criteria successfully prioritize threatened land. Concerns have been raised for years that the FLP, by relying on a willing seller model, does not in fact prioritize lands threatened by conversion.[249] USDA should therefore fill this information gap and, if it determines that the FLP is being used to protect lands not genuinely threatened, adjust the national core criteria to place greater emphasis on this factor.
- **Require that a minimum percentage of FLP funds go to reforestation projects**, which can offer greater carbon sequestration benefits than projects that protect mature forests.
- **Measure and publish information on the carbon sequestration impacts of the FLP**. This assessment should evaluate what land is protected, who the landowners are, how the land is managed, the level of carbon stocking, and whether the conservation easement's land management and land use terms are conducive to sequestering carbon and/or protecting existing carbon storage.
- **Conduct research and fund pilot projects on easement terms and forest management practices that will maximize carbon sequestration, including on working lands**. For example, Apple's conservation of Reed Forest in Maine encourages sequestration through an initial "rest period" to promote forest regrowth and then limits subsequent harvest to a set proportion of annual growth.[250] In some regions, the use of a "rest period" might also support sequestration via harvesting for durable wood products, rather than for paper and pulp. More generally, FLP easement terms and management plans should ensure sufficient stocking levels and avoid forest degradation.[251]
- Engage in stakeholder outreach to identify projects that have the greatest carbon sequestration benefits and **provide increased technical support for the implementation of forest management practices that maximize carbon sequestration**.

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LEGISLATIVE OPPORTUNITY

Make carbon sequestration an explicit goal of forestry programs

The U.S. Forest Service also administers programs to acquire forests, such as the Community Forest Program (CFP), which provides local governments, tribal governments, and qualified nonprofit entities with funding—up to 50% of the costs of acquisition—to acquire title to community forests.[252] Other programs provide technical assistance to family and disadvantaged forest owners to maintain sustainable forests via the Forest Stewardship Program[253] and the Sustainable Forestry African American Land Retention Program.[254] Promisingly, USDA explicitly incorporated carbon sequestration and adaptation into the design of these programs as part of its recently released *Climate Smart Agriculture and Forestry Strategy*.[255] Congress should institutionalize these efforts by establishing carbon sequestration and climate resilience as permanent and explicit statutory goals of these programs.

LEGISLATIVE OPPORTUNITY

Provide assistance for forest owners to participate in carbon markets

As discussed in more detail further in this Report (see pages 39-46), project development, monitoring, and third-party verification costs for carbon projects are high, which has traditionally meant that most project revenues accrue to project developers and third-party verifiers rather than to project owners themselves (i.e., forest owners). High fixed costs have also meant that projects must reach a certain minimum acreage to be viable. Congress should provide financial support for forest owners seeking to participate in these markets (for example, by passing the Rural Forests Markets Act[256] or similar legislation) and direct USDA to provide technical support to family forest owners, with an emphasis on socially disadvantaged forest owners.

LEGISLATIVE OPPORTUNITY

Increase funding for acquisition of community forests

Community Forests provide a range of benefits, including carbon sequestration and the opportunity to manage forests in high-risk areas for increased wildfire resilience.[257] Since its inception in 2012, $19.5 million in CFP funding has successfully leveraged an additional $38.2 million in external funding and could be used to attract further funding for protecting Community Forests.[258] Congress should increase funding to Tribes, local governments, and non-profit entities for the acquisition of forests under the CFP.

RECOMMENDATION

Focus Wood Innovations Program on the Development of Durable Wood Products and Stop Funding Wood Energy Systems

The U.S. Forest Service's Wood Innovations Grants Program supports research into developing wood products and wood energy markets.[259] Grants and agreements under the program are designed to reduce "the risk of catastrophic wildfires, disease, and infestations

by retaining or expanding markets for excess biomass and low-value logs removed during forest management activities."[260] The program focuses on supporting development and use of mass timber through innovative projects, like Carbon12 in Portland, Oregon,[261] and sustainable technologies such as biochar, which is created by burning biomass via pyrolysis and can be used as a soil amendment.[262] The Forest Service also provides grants via the Community Wood Grant Program to install thermally led community wood energy systems or to build innovative wood product manufacturing facilities.[263]

The development of new markets for mass timber and other sustainable technologies, such as biochar, can help decarbonize the nation's building stock and improve forest health. More specifically, the use of mass timber has the potential to reduce the embodied carbon in our building stock by reducing the use of carbon-intensive materials, such as concrete and steel, while also storing carbon.[264] Finding new, economically valuable uses for low-value logs and excess biomass through products, such as biochar or other carbon removal efforts,[265] can help defray the significant investments required to reduce the risk of catastrophic wildfires in our nation's forests, while supporting rural livelihoods.[266] Care should be taken, however, to ensure that the development of new markets for timber products does not lead to overharvest and subsequent ecosystem disruption.

LEGISLATIVE OPPORTUNITY

Expand funding for the Wood Innovations Grant Program

Congress should increase funding for the Wood Innovations Grant program, and provide additional funding for marketing, research, and development in this area. This approach is consistent with efforts already underway at USDA to further support new markets for wood products via its *Climate-Smart Agriculture and Forestry Strategy*.[267]

LEGISLATIVE OPPORTUNITY

Establish a tax credit for use of low-carbon materials such as mass timber in construction

As proposed by the Food and Agriculture Climate Alliance[268] and the Forest Working Group,[269] Congress should also establish a tax credit for real estate developers to use low-carbon construction materials, such as mass timber, to further incentivize the market for wood products and help reduce the embodied carbon in our building stock. Such a credit should be contingent upon demonstrating the timber was sustainably harvested.

LEGISLATIVE OPPORTUNITY

Eliminate support for wood energy

Finally, Congress should eliminate support for wood energy under the previously described programs. Wood energy has questionable climate benefits and can result in significant local air pollution.[270]

RECOMMENDATION

Increase Resilience of Forests to Wildfires and Other Threats

Drought and warmer temperatures combined with fuel build up have led to catastrophic wildfires in the Western United States over the past several years.[271] In 2020 alone, more than 10 million acres of forest burned due to wildfires, 70% of which was on federal land.[272] This is the most acreage burned on federal land since the "Great Burn" of 1910, which initiated a federal policy of fire exclusion and substantially contributed to the fuel build up plaguing our forests today.[273]

These fires have resulted in loss of life, significant damage to affected communities and ecosystems, dangerously poor air quality and associated health impacts to vulnerable populations, as well as significant greenhouse gas emissions.[274] In California alone, the Air Resources Board preliminarily estimates that the 2020 Wildfire Season resulted in 112 million metric tons of $CO2_e$ emissions—the equivalent of placing more than 24 million cars on the road.[275] Thus, failure to address wildfire and other threats to our forests has the potential to undermine all forest-related sequestration efforts and even undo progress achieved in other sectors to reduce GHG emissions.[276]

Traditionally, naturally occurring, low-intensity wildfires have played an important role in reducing fuel build up and supporting the ecological health in many of our nation's forests. Over the past century, a federal policy of fire exclusion—which sought to eliminate fires on the landscape—has resulted in the buildup of surface fuels, e.g., dead trees and branches, and increased tree density.[277] The increased level and availability of surface fuels causes wildfires to ignite more quickly and burn with greater intensity, leading them to spread more rapidly than in the past.[278] Additionally, increases in the density of small trees can create a "ladder" that allows surface fires to spread from the forest floor to the tree canopy and become a high-intensity crown fire.[279] Finally, over time, reductions in the frequency of fire have allowed new species to be introduced in our forests that are not well adapted to fire and burn more easily once ignited.[280]

LEGISLATIVE OPPORTUNITY

Expand funding for and scale up fuel reduction, prioritizing reduction of high-risk fuel loads

To reduce the risk of catastrophic wildfire, the U.S. Forest Service reduced hazardous fuels on 2.65 million acres in FY2020.[281] However, to adequately address the scope of the problem, it estimates that it must aggressively scale up fuel reduction in our National Forests by 2 to 4 times the current rate over the next 20 years.[282] Moreover, treatment is not always focused on reducing the highest risk fuel loads. In order to effectively mitigate risk, Congress should:

- Direct USDA to work with State, Federal, Tribal, and local partners to identify and prioritize reduction of high-risk fuel loads in and around communities;
- Significantly increase the funding and scale of fuel reduction through a range of treatments, including pre-commercial thinning and sustainable timber harvest, while ensuring that such efforts comply with the National Environmental Policy Act and otherwise are not used merely to provide a means of evading environmental review for commercial harvest;
- Where appropriate, work with State, Tribal, and local partners to re-introduce the use of prescribed and managed natural burns to maintain forest health and prevent fuel build up. Smoke associated with these burns and the risk of spreading to other areas may limit the extent to which this tool can be used in and around communities, although there are successful examples of these approaches being used in Indian Country;[283] and
- Require that State and Federal forest planning is aligned with these efforts and that USDA is coordinating with local private sector partners to ensure there is sufficient processing and manufacturing capacity to use recovered materials.

As discussed above, supporting markets for new products, like mass timber, is also important to help defray the costs of these efforts by using some of the recovered trees or biomass for wood products.

LEGISLATIVE OPPORTUNITY

Scale up reforestation efforts and authorize a new Civilian Climate Corps to support this work

USDA must take advantage of the opportunity presented by wildfires and other natural events (e.g., pests) to pursue reforestation. Previously, the U.S. Forest Service has relied on natural regeneration to revitalize forests following a wildfire.[284] However, according to a recent analysis, the severity of recent wildfires combined with prolonged drought has meant that often there are not enough mature trees to reseed and as a result they fail to regenerate.[285] Without reforestation, many of these burned areas are transitioning to other types of vegetation, such as grasslands, further jeopardizing the forest-related benefits that many communities rely on. The U.S. Forest Service estimates that the current reforestation backlog in areas impacted by wildfire is approximately 1.3 million acres.[286] As noted previously, recently published research estimates that there are up to 133 million acres across the country with the potential to be reforested.[287] However, additional funding and labor are needed to replant seedlings and to expand necessary capacity at nurseries.[288]

In 1980, Congress created the Reforestation Trust Fund to provide funding for reforestation and timber stand improvement efforts.[289] It provides a maximum of $30 million per year, derived from tariffs imposed on imported timber and wood products. This cap has not been increased since 1980.[290]

Supporting reforestation following catastrophic wildfires is a complex undertaking that involves coordination from a variety of different stakeholders. One current proposal to help bolster this effort is the creation of a Civilian Climate Corps that would work, in part, to improve forest health.[291] This program—modeled on the New Deal-era Civilian Conservation Corps—would employ thousands of young people to maintain public lands and enhance their climate resiliency. Reforestation efforts could be a key component of this work.

Congress should support reforestation by:

- Passing the REPLANT Act, which would remove the current cap on the Reforestation Trust Fund and direct all wood product tariffs to the fund (an estimated $123 million per year);[292]
- Providing grant funding to States, Tribes, local governments, and non-profits to accelerate tree planting, such as the Reforest America Grant Program proposed as part of the Climate Stewardship Act;[293]
- Directing USDA to make loans and loan guarantees available to nurseries to expand capacity or to establish new nurseries. Recent research estimates that existing tree nursery capacity is inadequate to address reforestation needs over the coming decades.[294] The paper concludes that 3 billion seedlings would be needed each year between 2022 and 2040 to reforest 64 million acres, compared to the existing nursery capacity of 1.3 billion;[295] and
- Authorizing and funding President Biden's proposed Civilian Climate Corps to address fuel reduction, support the replanting effort, and help expand capacity at nurseries.[296]

GOAL III

Develop and Invest in Strategies to Increase Carbon Sequestration in Agriculture

The agricultural industry can become a part of the climate solution by increasing carbon sequestration, which refers to the process by which lands remove carbon dioxide from the earth's atmosphere.[297] USDA plays an important role in identifying and developing beneficial agricultural practices, and communicating that information to farmers. From research conducted internally by USDA researchers (intramural research) and research conducted externally with USDA grant support (extramural research), USDA has the resources to identify the practices that will effectively sequester carbon for long periods. The Cooperative Extension System—through which experts at universities and local offices provide research-based information and educational services to local producers and other constituents—and USDA program employees then play an important role in communicating this information to producers. Congress should support the following policies to ensure that the natural abilities of our nation's lands and forests are being leveraged to mitigate climate change.

RECOMMENDATION

Support the Wide Adoption of Perennial Agricultural Practices

Perennial agriculture, which refers to the production of crops that are harvested multiple times and live for several seasons, offers a means of drastically reducing global greenhouse gas emissions while providing additional environmental and societal benefits. The suite of perennial crops and practices includes perennial forage crops, used in pasture and grazing systems; tree crops integrated into agroforestry, which includes alley cropping, silvopasture, forest farming, and multi-story cropping; perennial fruits and vegetables; emerging perennial grain crops;[298] and perennial legumes.[299] Perennial crops like nuts can provide the same staple calories that annual grains such as wheat and corn currently provide. Many of these farming methods have been long practiced by Black and Indigenous farmers in the United States and around the world, and thus have long, proven traditions of success.[300]

Perennial agriculture systems offer significant environmental and climate change mitigation benefits compared to the annual-crop systems that dominate U.S. agriculture today. While all perennial-crop based systems offer carbon sequestration benefits due to reduced tillage, adding trees and other perennial plants to crop systems can increase carbon sequestration by 5-10 times or more.[301] These various crops and practices offer carbon sequestration

through biomass (both above ground—e.g., woody trees—and below—e.g., more robust root systems) and soil organic carbon. Carbon sequestration through above-ground biomass is particularly advantageous because—compared to soil carbon, which is difficult to measure—it is more easily quantifiable and thus its benefits are verifiable.[302] Broad adoption of agroforestry practices across the temperate United States holds the potential to offset one-third of the country's current emissions from burning fossil fuels.[303] Perennial agriculture systems—particularly those that incorporate a diverse range of crops—are more resilient to variable and extreme climate conditions.[304] This is especially true when perennial crops are regionally appropriate and adapted to meet the conditions of that regional climate, such as adopting more drought resilient perennial crops in parts of the drought-ridden Western United States.

Beyond its positive role in climate change, perennial agriculture offers many ecosystem services. Perennial crops generally have deeper roots and longer growing seasons and therefore capture and retain more rainfall,[305] reduce erosion,[306] demand less fertilizer and herbicide,[307] require less tillage,[308] decrease nutrient and chemical runoff,[309] and contribute to more diverse and supportive habitats for insects and wildlife.[310]

Unfortunately, the benefits perennial agriculture can offer are under-realized due, in part, to the lack of support for perennial practices and crops in farm bill programs. The myriad ways Congress and USDA support the agriculture sector—through direct payment and lending programs, crop insurance, conservation programs, market development, and research leadership—primarily benefit annual agriculture production. These programs developed and expanded over the past century alongside the conventional agricultural practices that dominate the sector and largely respond to the needs of these conventional producers. While USDA has taken steps towards integrating certain perennial practices in its programs, the transformative potential of perennial agriculture in achieving the vision of a more regenerative agricultural system that ensures the long term viability of the country's food supply and environmental assets has not been fully appreciated in policy conversations. The next farm bill provides an opportunity to broaden federal support for perennial agricultural systems and shift the sector toward the promise these practices hold. (An additional Opportunity for supporting perennial agriculture in USDA's working lands programs is detailed on pages 13-14, above).

LEGISLATIVE OPPORTUNITY

Direct USDA to develop an interagency perennial agriculture transition strategy

Congress should direct USDA to develop a department-wide strategy to support the transition of U.S. agriculture from a predominantly annual crop-based system to one centered on perennial agriculture systems. A department-wide strategy should identify opportunities within existing policies and programs, as well as pilot or develop new programs, to better support perennial crops and practices and increase implementation of perennial agriculture systems across the country. Agencies that should be engaged in development and implementation of the strategy include the National Institute of Food and Agriculture (NIFA), the Economic Research Service (ERS), the Agriculture Marketing Service (AMS), the Farm Service Agency (FSA), the Agricultural Research Service (ARS), the Forest Service, the Natural Resource Conservation Service (NRCS), and the Risk Management Agency (RMA). Congress should establish an office or position at USDA—potentially in the Office of the Chief Scientist—to coordinate the department's strategic planning and research agenda on perennial crops and perennial

agriculture systems. Such an agenda should include all aspects of transitioning to a system centered on perennial agriculture, including crop development, market development, processing and distribution planning, and other necessary investments to ensure farmers who switch to perennial systems do not face any unnecessary barriers.

LEGISLATIVE OPPORTUNITY

Prioritize perennial agriculture in USDA's research and development activities

Lack of dedicated research funding impedes the development and adoption of perennial agriculture.[311] Lack of funding is a major barrier to research and innovation in perennial crops, such as improvements in perennial grains and the development of perennial legumes and tree crops.[312] Just as public funds were instrumental in driving the rapid development of annual crops, government investment in perennial agronomic research is necessary for the expansion of perennial agriculture.[313] While existing general purpose competitive grant programs have provided some support—for example, in 2020, a large research project on Kernza (a relative of wheat) received a 5-year, $10 million grant from NIFA Agriculture Food and Research Initiative (AFRI)[314]—more targeted funding is needed to speed the process of getting these crops fully developed, onto farms, and into developed markets.[315] This is particularly critical for perennial grain crops, which hold great potential for productivity and scale, but are just starting to emerge from the research and development (R&D) pipeline into commercial production. With additional support from USDA, there is also potential for new perennial grains to be identified and commercialized. Moreover, additional research should build on emerging research identifying differences between near surface soil carbon and deeper, more stable soil carbon,[316] and the perennial systems that lead to each.

Congress should establish new funding to support perennial agriculture R&D at USDA. Increased funding could support USDA's own research projects to develop innovative crops and practices under the ARS (USDA's principal in-house scientific research agency) as well as research on the economic and social conditions critical to development of perennial agriculture systems and markets through USDA's ERS. New funds should also be deployed to expand USDA's external grant offerings, such as those administered by NIFA—including the Agriculture and Food Research Initiative (AFRI), Organic Transitions (ORG), and the Organic Agriculture Research and Extension Initiative (OREI)—and

the Sustainable Agriculture Research and Education (SARE) program, to support new and on-going perennial agriculture research projects by organizations and universities.

Finally, Congress should direct the Foundation for Food and Agriculture Research (FFAR) to incorporate perennial agriculture into its funding priorities, with clear guidelines that such research should be ecologically sustainable and publicly available to all producers. The "third leg of [USDA's research] stool," FFAR is a Congressionally created, public-private partnership that "leverag[es] public dollars to mobilize private investment."[317] Congress appropriated funds for FFAR in the 2014 ($200 million) and 2018 ($185 million) Farm Bills, which may only be spent to the extent FFAR secures an equal amount of matching funds from a non-federal source.[318] With a goal of investing between $100–150 million annually into agricultural research over the next 10 years—comprised of a $50 million annual investment from Congress plus private funds raised[319]—FFAR represents another critical opportunity to invest in perennial agriculture R&D. Supporting perennial agriculture would align with many of the goals already set forth in FFAR's 2019 Strategic Plan, such as increasing environmental resilience and supporting conscientious stewardship of natural resources.[320] Congress should add perennial agriculture research to the statutory purpose of FFAR and, by way of FFAR's mandate to consult with USDA in the implementation of its programs, direct USDA to encourage FFAR to fund projects that advance USDA's perennial agriculture R&D goals and transition strategy.

LEGISLATIVE OPPORTUNITY

Invest in expansion of the National Agroforestry Center

Congress should target new funding to increase the impact of the National Agroforestry Center (NAC). As the self-identified "only [USDA] unit dedicated to agroforestry," NAC represents USDA's principal effort to influence, coordinate, and conduct research on agroforestry, as well as provide educational materials and resources to support producers and other USDA staff.[321] Based in Lincoln, Nebraska, NAC has just one office and a limited staff and budget. It does not currently offer any external grant opportunities.

Congress should leverage this existing structure to expand USDA's agroforestry support by establishing additional, regional agroforestry research centers around the country. Each center should be equipped with the resources necessary to develop region-specific R&D strategies and administer regional grant programs to support localized agroforestry projects. Once established, these centers would provide outreach and education to producers in the region and work with USDA's other research and technical assistance arms to provide agroforestry training and expertise.

LEGISLATIVE OPPORTUNITY

Reform federal crop insurance programs to support perennial agriculture

Federal crop insurance policies have been designed with annual crops in mind, with a focus on losses tied to annual yields rather than the multi-year lifespan of perennial crops.[322] While perennial crop producers may also insure the replacement value of the crop (e.g., replanting the tree itself), policies fail to account for either the lifetime productivity of that crop or the investment needed to raise and maintain that crop leading up to and across harvest years.[323] Perennial agriculture systems are also more likely to incorporate diverse crops, meaning that single-crop policies—the industry standard—are doubly ill-suited to producers' needs. WFRP policies offer diversified farms an attractive option, providing a single insurance policy for the whole farm's revenue up to $8.5 million.[324] Use of WFRP is still challenging for perennial producers, however, because coverage

is based on a farm's historic, annual revenue, thus excluding producers whose crops are not yet producing annual yields.[325] In addition, the program has complex technical requirements that reduce the ability of perennial practices to qualify for support.[326] Finally, under any policy, producers must follow "good farming practices" (GFP) in order to be fully indemnified for their crop losses.[327] Although USDA's GFP handbook now recognizes NRCS Conservation Practices as compliant with GFP,[328] the GFP standards in general continue to reflect regional practices developed to promote yields in conventional and/or annual crop systems. Moreover, the GFP determination requires that the adoption of NRCS approved conservation practices not impact yield,[329] which encourages producers to continue farming in ecologically damaging ways and limits uptake of beneficial conservation measures.

GFP determinations are made by region-specific agricultural experts who may not have expertise on perennial agricultural practices and thus may be unable to accurately assess the suitability of the producers' practices for making indemnification decisions.[330] The lack of predictable and easily accessible crop insurance makes the transition to perennial agriculture more risky and less attractive, thus deterring individual farmers from implementing such systems and hindering broad uptake.

To encourage uptake of perennial agricultural practices and crops, Congress should direct USDA RMA, through the Federal Crop Insurance Corporation (FCIC), to review and recommend changes to crop insurance policies (standard and WFRP) to better account for the actual loss perennial producers experience (e.g., multi-year loss), including loss occurring before crops reach maturity. This process should also include review and revision of overly burdensome WFRP requirements to streamline applications and documentation to make the program more accessible (see pages 25-27, above).

Congress should also direct RMA to remove the requirement that NRCS conservation measures not impact yield to qualify as a GFP. Finally, RMA should actively recruit regional experts on agroforestry and other perennial practices to leverage their expertise in making GFP decisions and ensure that producers transitioning to perennial agriculture do not increase their risk of receiving an adverse indemnification decision for adopting ecologically beneficial practices.

RECOMMENDATION

Support the Development and Dissemination of Information Needed for a Robust, Reliable Market in Agricultural Carbon Offsets

Entities that are either required or want to reduce their GHG emissions, but cannot entirely do so cost-effectively on their own, turn to carbon markets to buy credits. There are two types of markets: the "compliance market" that operates for entities required by law to reduce their emissions and the "voluntary market" that operates for entities and individuals that are not required to reduce their emissions but want to or have committed to the public that they will do so. Typically, in both markets, one carbon credit represents one metric ton of carbon dioxide equivalent (CO_2e) that is either sequestered from the atmosphere or whose emissions are avoided.[331] For many years, some agricultural practices that are believed to sequester carbon in either soil or biomass have been eligible to generate carbon credits for sale in both the compliance and voluntary markets. In a compliance market, a government entity mandates a "cap" on GHG emissions for a specific set of emissions sources. The government entity issues or sells emissions "allowances"[332] that the emitting source may either use to emit at their own location or trade their allowance to another emitter. For

trades, the regulated source sells an allowance to a second regulated source that needs to emit more than its allowance cap authorizes. Compliance markets often also allow regulated entities to offset some of their emissions. The California State Compliance Market is the only compliance market in the United States with active trading of offsets; it allows regulated entities to purchase offsets to cover up to 4% of their compliance obligations—at least half of which must directly benefit California.[333]

In the voluntary market, for-profit or non-profit entities, such as Google or private universities, voluntarily commit to reduce their emissions. In addition to taking actions to reduce or eliminate emissions associated with their operations (through, for example, installing solar panels, increasing their energy efficiency, or switching their vehicle fleet to electric vehicles), they often purchase carbon credits on the voluntary market to offset a portion of their emissions. Today, voluntary market carbon credits are typically transacted "over-the-counter," meaning the transaction occurs directly between a project developer or seller and buyer or through a broker, rather than through a centralized market exchange. Demand for carbon credits in the voluntary market is increasing due to the acceleration of corporate commitments to become carbon-neutral or carbon-negative over the coming years. This trend, together with the launch of the United Nation's Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA),[334] is expected to drive increased demand for carbon credits in the voluntary market over the coming decade.[335]

Carbon Credit Criteria

Every carbon credit, regardless of the type of project or market, must typically meet five criteria for legitimacy:[336]

1. **Real**: Offsets must represent real reductions in GHG emissions or a drawdown of atmospheric carbon, and not just shift emissions to other locations. "Leakage" refers to when, despite the offset project, total emissions do not decline because the activity causing the GHG emissions has shifted outside the project area. In the case of agriculture projects, there is a risk that reductions in yield in the project area, due to the adoption of new practices, will be compensated by increases in cultivation or farming elsewhere or an increase in the sale of products with a higher emissions profile, resulting in the same level of emissions as occurred before the offset project.
2. **Additional**: An offset must represent additional emissions reductions above and beyond what would have happened "anyway" in a business-as-usual scenario. Project proponents must demonstrate that the emissions reductions or atmospheric drawdown would not have happened without the revenues from the credits. If a law requires the reduction or a financial arrangement makes the project cost-effective regardless of the offset revenues, then the project is not additional. Most newly developed protocols for agriculture differ in the extent to which they allow "stacking" of payments from Farm Bill programs and ecosystem services programs.[337] While "stacking" is likely important for making carbon projects attractive to producers and ensuring conservation dollars are spent in the areas of greatest need (i.e. public and private interests both recognize the need), the receipt of multiple forms of payment for carbon sequestering activity could undermine the argument that the projects would not have happened without the revenue from the credits. Additionality requirements typically only credit the adoption of new regenerative practices, which can leave out early adopters of credit generating farming practices.[338] To overcome this negative outcome, some carbon markets have adopted a limited "look back" time frame to allow producers to generate credits for practices they have recently adopted.[339]
3. **Permanent**: Emissions must be permanently eliminated or, in the case of sequestration, the carbon must be sequestered for a significant period of time; in an agricultural project, sometimes up to 100 years.[340] The potential release of soil carbon due to tilling or other soil disturbance presents risks to permanence that must be addressed in the project structure. Most experts agree that permanence requirements present one of the greatest challenges both to the viability of carbon projects in agriculture[341] and to producers' willingness to participate in such projects.[342]
4. **Quantifiable/Verifiable**: Emissions reductions from the project must be reliably calculated and verified over time.[343] The absence of a comprehensive system for monitoring soil carbon or a soil carbon sequestration database has created challenges for reliably calculating and verifying increases in soil carbon sequestration due to carbon project activities; issues which are discussed further below.
5. **Enforceable**: Emissions reductions must be backed by a legal instrument that establishes clear ownership and liability in the event of a reversal (or soil carbon release) for land covered by the project.[344]

To ensure the development of legitimate carbon credits, projects for the voluntary market are developed based on protocols that are maintained by third-party standards organizations, which translate the criteria, set forth in the preceding text box, into specific requirements. Each protocol includes details like which practices are eligible for crediting, what monitoring requirements the developer must follow, and how carbon emissions reductions or sequestration will be measured (including formulas for calculating additionality and leakage). To have a project certified under one of these standards, the project developer must also have their project independently verified by an individual who checks that all the protocol requirements were followed, and all relevant calculations are accurate.[345]

The most common standards for U.S.-based voluntary carbon projects include the Climate Action Reserve ("CAR"),[346] the American Carbon Registry ("ACR"),[347] and the Verified Carbon Standard ("Verra").[348] Indigo Ag[349] is a start-up that supports development of projects through CAR and Verra. Separately, there are new entrants in this area that are working to develop their own standards and approaches specific to agriculture. Some of these new entrants operating in the United States include Nori,[350] the Soil and Water Outcomes Fund,[351] BCarbon,[352] and the Ecosystem Market Consortium ("ESMC").[353] These organizations vary from one another in how much they pay producers per carbon credit; how their fee structure deducts from the final carbon credit payment; what methodologies they support; whether they allow "stacking" or co-benefit calculations (whether they pay for carbon sequestration alone, or whether they also pay for other environmental or social benefits); and whether they allow projects to use third-party project financing.[354]

Key Challenges for a Robust Market in Agricultural Carbon Offsets

Agricultural carbon offsets have the potential to produce significant benefits for both producers and the global climate. They can provide an additional source of income for producers who engage in sustainable farming practices and—according to some estimates—they can promote the sequestration of significant amounts of carbon in soil or biomass. However, there remain significant challenges.

Most fundamentally, currently, standards organizations have created protocols for a very limited number of agricultural practices. Existing protocols recognize projects related to no-till agriculture, compost additions, nitrogen management practices, avoided conversion of grasslands, and whole farm approaches that provide credit for bundling these practices.[355] Today's protocols appear best adapted to commodity crop systems, although groups like ESMC have stated an intention to expand their protocols to cover multiple regions and additional crop systems, such as fruit and nut crops. Additionally, BCarbon measures increases in below-ground carbon but is practice-agnostic, so could be applied in almost any context.[356]

In addition, farmers hoping to supplement their income by selling carbon credits face several challenges. First, project development, monitoring, and third-party verification costs are high, which has traditionally meant that most project revenues accrue to project developers and third-party verifiers rather than to project owners themselves (i.e., producers). High fixed costs have also meant that projects must reach a certain minimum acreage to be viable. This raises equity concerns because

large-scale producers are more likely to be able to participate than small or mid-sized ones. This further drives up land prices, increases the wealth of the largest landowners and operators, and may create more consolidation.

Second, some of the practices with the best-established and most substantial carbon sequestration benefits, such as alley cropping, have large up-front costs. The sale of offsets may therefore not provide a sufficient incentive for farmers to transition to these practices. In addition, some versions of a carbon bank, such as a reverse auction mechanism, would result in these practices being less competitive than others with lower up-front costs in the market.

Third, because most transactions take place over the counter rather than on an exchange, it is time consuming and expensive to sell credits, there is little price transparency, and there are no mechanisms in place to ensure that project owners will be able to sell their credits at a certain minimum price—all of which will likely be significant deterrents to producers who often face thin or negative margins. (While demand for carbon credits is currently strong, historically global prices have been extremely volatile.[357])

Fourth, most of the existing protocols are focused on commodity crops and, to some extent, livestock. As a result, farmers growing non-commodity or specialty crops are typically unable to participate in carbon markets. The existing limited scope, without expansion, likely will not incentivize more complex, systems-level change necessary to see a significant impact on climate change mitigation, such as highly diversified crop-livestock integration and complex mixes of deep-rooted perennials.

Finally, it is difficult to see how producers will meet permanence requirements, which, in the case of soil carbon sequestration, would obligate them to avoid disturbing or tilling the soil for 50 years or more.[358] Some degree of permanence requires shifts to systems such as perennial crops, diversified minimum tillage systems that break up soil hardpans with crops like tillage radishes rather than mechanical means, and permanent living cover systems like resource-conserving crop rotations, all of which require time in years and effective technical assistance to implement effectively. Moreover, permanence is especially challenging for farmers who do not own the land they farm on and who must secure that commitment from the landowner.[359] This further disadvantages those who are already marginalized in agriculture, as they are more likely to rent land and are therefore unable to easily participate in or benefit from programs like carbon markets.

Any efforts by USDA in this area must also recognize that considerable uncertainties remain regarding the magnitude of the actual carbon sequestration benefits of different farming practices—particularly at greater soil depths and over longer periods of time.[360] Some research suggests, even in undisturbed soil, a number of natural changes in soil chemistry, temperature, microbe community, and other changes can reduce or eliminate increased carbon soil stocks.[361] Moreover, there are currently significant challenges for cost-effective monitoring and verification of outcomes on individual farms. As a result, as noted by a recent analysis by (carbon)plan, many protocols rely heavily on modeling to simulate carbon sequestration rather than actual soil sampling—thus leading to inaccurate projections of carbon benefits.[362]

Opportunities for USDA to Support Agricultural Carbon Markets

USDA has a role to play in supporting emerging agricultural carbon markets based on the

principles and challenges outlined above. Given the noted uncertainties, particularly concerning inaccuracies in projecting carbon benefits, Congress should direct USDA to act cautiously through research and technical support; otherwise, it risks shifting the burden of sequestration from polluters to producers while encouraging investment of large sums of money on carbon sequestration that is not real or permanent. USDA's robust research infrastructure, relationship with producers, and interest in protecting and promoting the viability of U.S. farms in an equitable manner position the Department as an important partner as more and more farmers look for opportunities to benefit from carbon markets.

LEGISLATIVE OPPORTUNITY

Provide information and technical support to farmers

Congress should mandate that USDA provide information and technical support to farmers to make it easier for them to participate in voluntary carbon markets. Such efforts could be particularly useful for small and socially disadvantaged producers; Congress should consider mandating that USDA tailor and target the information for these groups. For example, USDA could provide price forecasting of the carbon market with information specific to American farmers and agricultural carbon credit projects to support greater price transparency and predictability, like its current efforts around commodity prices. It could also provide informational materials on carbon markets, the range of existing standards and programs available for different climate-smart farming practices, and a list of technical assistance providers and third-party verifiers that have been reviewed and approved by USDA. Additionally, USDA could ensure that agricultural extension and land grant institutions are able to advise farmers on the adoption of underlying practices and the programs available to support them in transitioning to these new practices.

The Growing Climate Solutions Act, which passed the Senate by a vote of 92-8 on June 24, 2021, focuses on similar types of technical support as well as carbon credit verification standards, and third-party verifier certification.[363] Depending on whether the Growing Climate Solutions Act is enacted and what technical support, if any, it provides in its final form, the farm bill should ensure there is sufficient technical support available to agricultural producers and forest landowners to navigate the carbon market. This support should come from accessible, third-parties who are not transacting in credits to ensure the avoidance of conflicts of interest, and should focus on small/mid-sized and socially disadvantaged producers.

LEGISLATIVE OPPORTUNITY

Support the development of data and technologies needed to improve and lower the cost of soil carbon monitoring and verification

As part of its *Climate-Smart Agriculture and Forestry Strategy*, USDA recently committed to support research and data collection on quantifying and verifying carbon benefits.[364] Congress should institutionalize these efforts to fill knowledge and data gaps necessary for credible markets in offsets based on carbon sequestration practices in agriculture by funding the establishment of a formal program. This USDA-led program should:

- Support the development of new technologies and data products related to soil carbon monitoring that reduce project monitoring and development costs, and increase the integrity of carbon projects. These efforts should include working with partners to develop a publicly accessible, national

soil carbon database that is regularly updated and can be used to support soil carbon sequestration measurement and verification;

- Track implementation of different climate-smart farming practices in parallel with soil carbon collection measurements, so that the benefits of different practices can be better quantified;
- Support research into the quantification of long-term (50-100 years) sequestration benefits of different farming practices, including long-term rotations and highly diversified operations;
- Support research that increases the number of practices protocols can cover in all systems, with a preference for the practices and systems being used by the most innovative and advanced diversified operations;
- Pilot new approaches, particularly for monitoring and verification, that reduce barriers to carbon market participation by small and socially disadvantaged producers, including the potential for aggregation by multiple small farms looking to participate; and
- Make appropriately anonymized data on the GHG reduction of agricultural practices publicly available to spur further innovation and refinement of existing practices.

LEGISLATIVE OPPORTUNITY

Create a national soil monitoring system

Currently, the National Agricultural Statistics Service ("NASS") collects some data on planting decisions, yields, and inventories. For example, the crop-estimating program collects data "on farmers' planting intentions, estimates of acreage actually planted and expected to be harvested, and forecasts of yield and production during the growing season. After the crops have been harvested, estimates of harvested acreage, yield, and production are made."[365] However, there is no mechanism in place to monitor soil quality. Congress should direct USDA to create a national soil monitoring system, which would track a set of sites that will conduct periodic and holistic assessments of soil attributes and monitoring changes over time.[366] This system can be incorporated into NRCS's existing National Resources Inventory, which has monitored land use and cropping system change since 1982. Such a system would provide important baseline data on soil carbon levels and could also help track the effectiveness of different farming practices in sequestering carbon in the soil. USDA could provide additional support through its regional labs by testing producer-submitted soil samples and adding results to the database.

LEGISLATIVE OPPORTUNITY

Support the measurement of nitrous oxide emissions and farm practices that reduce those emissions

Many carbon protocols also provide credits for reduction practices, such as reductions in fertilizer use, that reduce nitrous oxide emissions. Nitrous oxide is a powerful greenhouse gas, with a global warming potential approximately 300 times that of carbon dioxide. The agriculture sector is the largest source of nitrous oxide emissions in the United States and is responsible for about 80% of total United States nitrous oxide emissions.[367] The primary agricultural sources of nitrous oxide emissions are soil management—particularly the addition of nitrogen fertilizers (75%)—and manure management, which produces nitrous oxide emissions when the nitrogen in livestock manure and urine breaks down, in addition to the potent greenhouse gas, methane.[368] Yet, soil management-related emissions can be difficult to track. For one thing, nitrous oxide emissions

tend to be episodic rather than steady; periodic air sampling can therefore miss pulses of emissions.[369] For example, one study found that emissions were two orders of magnitude greater in the weeks immediately after the application of fertilizer than in the rest of the year.[370] In addition, atmospheric concentrations of nitrous oxide are very low compared to carbon dioxide, making them difficult to detect through many common analytical techniques.[371] However, given the warming potential of nitrous oxide relative to carbon dioxide, even "low" concentrations make significant contributions to climate change.

A variety of technologies are being developed that could allow the continuous monitoring of nitrous oxide emissions on farms.[372] Congress should provide funding for the study of continuous monitoring technologies to identify best practices that can be used to incorporate nitrous oxide monitoring from farms into the nationwide monitoring system for emissions.

RECOMMENDATION

Institutionalize USDA's Climate Hubs and Broaden Their Impact

USDA's Climate Hubs are a compelling model for regionally specific leadership on research and education on climate adaptation and resilience. Established under the Obama Administration in 2014, the Hubs are "intended to help… strengthen agricultural production, natural resource management, and rural economic development under increased climate variability."[373] The Hubs' three primary objectives are to:

1. Conduct research and synthesize scientific information;
2. Develop tools, exchange technologies, and assist with implementation of practices; and
3. Facilitate and conduct education, outreach, and engagement.[374]

The ten regional Hubs leverage their regional expertise to help farmers, ranchers, and forest landowners as they adapt to climate change. They also serve as liaisons to other agencies and entities, including land grant universities, the private sector, non-profits, and regional climate experts.[375]

Although funding for the Hubs waned under the Trump Administration, they have received increased attention as government and stakeholder interest in implementing adaptation strategies has grown. The Climate 21 Project—which "tapped the expertise of more than 150 experts . . . to deliver actionable advice for a rapid-start, whole-of-government climate response" to the incoming Biden Administration—identified Climate Hubs as an important tool in USDA's climate science leadership and recommended significantly increasing their resources to $20–$40 million.[376] The authors noted that up to that point, the Climate Hubs lacked sufficient and dedicated funding.[377] Heeding this advice, USDA's *Action Plan for Climate Adaptation and Resilience* ("*Action Plan*"), published in October 2021, identified the Hubs as "a framework to support USDA Mission Areas delivering adaptation

science, technology, and tools."[378] USDA's Budget Summary for FY2022 included $23 million—$5 million each from the Forest Service's Forest and Rangeland Research, the Agricultural Research Service, and the National Institute of Food and Agriculture, plus $8 million from the Natural Resources Conservation Service—to support outreach, service provision, science production, and technology transfer.[379] The agency's *Action Plan* also articulates a vision for addressing other challenges that have limited the Climate Hubs' impact, such as remedying data access issues and data silos by "increasing access to and use of climate data, models, and decision support tools at the regional and local scales for producers, land managers, state and local policymakers" (Adaptation Action #3 of 5).[380]

LEGISLATIVE OPPORTUNITY

Authorize Climate Hubs and establish mandatory funding

The Hubs recently completed a five-year internal review that identified rising demands for their resources and services from within and outside USDA.[381] In particular, staff may be limited to conducting education, outreach, and engagement activities given capacity similar to that in 2014. According to the National Climate Hub Coordinator, Julian Reyes, "Requests for climate resources and information far exceed our current capacity."[382] The deficit is especially stark in comparison to similarly structured government programs such as the Regional Integrated Sciences and Assessments Program (RISA) at the National Oceanic and Atmospheric Administration (NOAA)[383] and Climate Adaptation Science Centers (CASC) under the United States Geological Survey (USGS).

Given the crucial and growing role of Climate Hubs, Congress should ensure their continued operation with sustained, consistent funding. Mandatory funding through the farm bill will allow the critical functions of the Hubs to meet current demands and grow. Currently, the Hubs are not explicitly authorized in the farm bill and instead rely exclusively on discretionary and unpredictable funding. There is increasing resistance in Congress to appropriate funds for ongoing programs that are not included in authorizing legislation.[384] To solidify the Climate Hubs' role in supporting producers and land managers as they adapt to and mitigate climate change, Congress should include explicit authorization for the Climate Hubs in the next farm bill, coupled with mandatory funding of $50 million.

LEGISLATIVE OPPORTUNITY

Add climate change mitigation to the Climate Hubs' mandate

As currently structured, Climate Hubs focus on developing tools and resources to support climate change adaptation in their region.[385] USDA's *Climate-Smart Agriculture and Forestry Strategy: 90-Day Progress Report* mentions Climate Hubs as a potential tool for "lower[ing] barriers and increas[ing] the rate of adoption" of climate-smart agriculture and forestry practices.[386] However, while USDA recognizes that many of the practices that build climate change resilience "provide co-benefits for climate change mitigation via enhanced soil carbon sequestration,"[387] carbon sequestration is not a primary focus of the Hubs. The Hubs' regional expertise and "unique position to work across organizational boundaries" provide important infrastructure for advancing carbon sequestration and GHG reduction efforts in a given area.[388] For instance, regional expertise will be important in developing and implementing perennial agricultural practices and crops appropriate for a given region's soil and climatic conditions. In authorizing the Climate Hubs in the next farm bill, Congress should expand their mandate to expressly include advancing climate change mitigation alongside adaptation, which must include extensive education, outreach, and

engagement with farmers and ranchers. Making Hubs the center of farmer training programs—where farmers could be trained as leaders and mentors, field day hosts, and workshop leaders—would be an important step in implementing adaptation and mitigation measures. Similarly, Hubs should serve as a center for researchers, producers, technical assistance providers, and other stakeholders to come together to solve key regional climate challenges, with all participants on a level playing field.

LEGISLATIVE OPPORTUNITY

Support environmental justice & equity through Climate Hubs

USDA's *Action Plan* identifies "[d]isproportionate impacts on vulnerable communities" as one of the five main threats posed by climate change and its impacts.[389] Climate Hubs can play a key role in advancing environmental justice and equity in agriculture and USDA programs by providing on-the-ground, locally-relevant expertise and technical assistance to communities and stakeholders. Already, the Hubs' staff work closely with individuals in "cold spots" (areas that are not working closely with natural resources agencies), areas without internet, and with diverse and underrepresented communities (including rural stakeholders and Tribal nations).[390] The *Action Plan* points to Climate Hubs as the primary actors for increasing outreach and education for climate-smart adaptation strategies, including through engagement with under-resourced and underserved communities and partnerships—such as the newly established grant for Extension, Education & USDA Climate Hubs Partnership[391]—with Cooperative Extension Service and educational institutions.[392] Outreach and education through the Hubs could take several forms, including mentorship programs, farmer-led workshops and field days, and training farmer leaders. The *Action Plan* also identifies data access for low-income, socially disadvantaged, and historically underserved communities as a core concern in improving access to climate-related data at Climate Hubs and other USDA agencies.[393] The recently completed, five-year review of the Hubs' services may reveal additional ways in which Climate Hubs could better address disparities in the impacts of climate change and ensure underserved communities have both access and the capacity to take advantage of the Hubs' resources and tools.

Sustained, mandatory funding will better equip the Climate Hubs to advance environmental justice and equity in the context of a changing climate. To ensure these objectives remain priorities over the Hubs' lifetime, Congress should also incorporate environmental justice in the statutory purpose and mandate of the Hubs' authorizing legislation in the next farm bill.

RECOMMENDATION

Preserve, Expand, and Improve the Livestock Indemnity Program

The Livestock Indemnity Program ("LIP") provides payments to ranchers for livestock lost due to "attacks by animals reintroduced into the wild by the Federal Government or protected by Federal law, including wolves and avian predators."[394] The primary purpose of predation compensation schemes like the LIP is to promote the conservation of predators such as wolves. When predators eat livestock, ranchers may kill the predators in retaliation and can become more likely to oppose predator conservation policies. As a result, "livestock depredation is considered one of the driving forces behind the worldwide decline of large carnivores."[395] By ensuring that ranchers receive financial compensation for animals lost to wolf predation, the LIP is supposed to promote

rancher acceptance of wolves and therefore reduce the illegal killing of wolves and decrease opposition to wolf protection policies.[396]

Recent scientific research also suggests that predation compensation schemes may promote carbon sequestration in plant biomass. When top predators are absent from an ecosystem, herbivore populations can explode, leading to degradation and simplification of plant and animal communities.[397] Conversely, when predators are reintroduced, reductions in herbivore numbers and changes in behavior can increase plant and animal diversity, reduce stream bank erosion, improve water quality, and increase carbon sequestration in plants.[398] This kind of sequence of changes in an ecosystem as a result of introducing or removing a single species is known as a trophic cascade. Trophic cascades have been observed in the United States as the result of expansions in wolf populations, both through human-mediated reintroductions and natural extensions of their range into areas from which they had previously been extirpated.[399]

Quantifying the carbon sequestration impacts of trophic cascades has proven challenging. Thus far, the relevant research has involved localized measurements and attempts to extrapolate those results to ecosystem-wide impacts through modeling.[400] One study concluded that gray wolf predation on moose in boreal forests can increase carbon sequestration, while their predation on elk in grasslands can decrease carbon sequestration.[401] This simplified model does not take into account that gray wolves have other prey in grassland ecosystems, or that elk have other predators there as well.[402] Nevertheless, studies in other ecosystems have suggested that trophic cascades, including those resulting from increased predator presence, can increase carbon sequestration.[403]

Payment schemes like the LIP can play an important role in the conservation of large predators. Around the world, some compensation schemes have been credited with helping to ensure the success of species reintroductions,[404] although their overall effectiveness has proven difficult to establish.[405] In fact, some recent review articles have concluded that pure compensation schemes are generally ineffective at changing attitudes towards predators or reducing predator-livestock conflicts.[406]

The LIP embodies several of the shortcomings identified in these reviews. First, the program pays only 75% of the lost animal's market value[407] and calculates market value without accounting for interruptions in the rancher's production system.[408] It therefore fails to make ranchers whole for losses they suffer.[409] Second, it pays ranchers only ex post, when they lose an animal, and is not tied to ranchers' adoption of any conflict prevention measures. This creates a moral hazard problem where ranchers may be less likely to take proactive measures to avoid predation knowing that losses will be compensated, if incompletely.[410] Third, it does not establish any performance benchmarks in terms of the number of predation incidents or predator population numbers.

LEGISLATIVE OPPORTUNITY

Increase LIP payment rates and pilot livestock indemnity payments tied to conservation outcomes

While Congress should maintain the LIP, it should take steps to improve the program. First, it should increase payment rates to ensure that ranchers receive full compensation for lost animals. Second, Congress should direct USDA to conduct pilot studies on other models to compensate farmers for positive ecological outcomes. Better programs would not simply compensate farmers for the loss of their individual animals. Rather, they would incentivize management practices and behaviors that limit conflict and increase the

health of target populations.

Specifically, the next farm bill should pilot a modified version of the LIP based on performance payments. Under such an approach, ranchers receive payments that are tied to the achievement of conservation goals rather than confirmed livestock losses. For example, the payments could be based on the number of offspring born to the carnivore species in a given area, while the compensation level can be tied to expected future harm caused by these animals.[411] This approach avoids the moral hazard problems identified above. In Sweden, a performance payment scheme involving reindeer herders has led to a doubling of the wolverine population in a decade.[412] The payments can also be targeted specifically to ranchers' adoption of prevention measures such as fencing, confinement of livestock at night, guard dogs, and fladry.[413] A study in northern Italy found that the adoption of preventive measures by farmers reduced wolf predation by 93%.[414] The program should also incorporate technical assistance to ranchers on the adoption of preventive measures and a study of the effectiveness of different preventive measures.

LEGISLATIVE OPPORTUNITY

Support research into the carbon sequestration effects of increased predator numbers

Given the remaining uncertainties about the nature and magnitude of carbon sequestration impacts resulting from predator-mediated trophic cascades, Congress should provide funding for research into large-scale monitoring of the impacts of predators on carbon stocks through remote sensing.[415] This research will allow more accurate estimates of the impacts of predator compensation schemes on carbon sequestration and could help determine, for example, whether funding from a carbon bank should be used for this purpose.

GOAL IV

Reform Conservation Compliance to Secure Public Investments in the Agricultural Sector's Future

Through the farm bill, Congress authorizes a significant level of federal spending to provide direct and indirect support to the nation's producers who grow field crops, livestock, poultry, fruits, tree nuts, and vegetables.[416] The farm bill supports production of commodity crops—the vast majority of our nation's agricultural products[417]—by providing direct payments to farmers through commodity programs authorized under Title I of the farm bill (e.g., Price Loss Coverage (PLC), Agriculture Risk Coverage (ARC)). Additionally, the farm bill provides premium subsidies for crop insurance (Title XI) for commodity crops as well as about 80 types of specialty crops (fruits, vegetables, nuts, and nursery crops).[418] These programs reflect a significant federal investment in crop production; at the time of the 2018 Farm Bill's enactment, projected spending for Title I and Title XI programs was $69.45 billion over 2019–23.[419] Actual spending over the first three years of this period was much higher than projected, due to the Market Facilitation Program established in response to trade conflicts with China (approximately $18.07 billion over calendar years 2019–2021) and USDA's pandemic assistance programs (approximately $31.57 billion over calendar years 2020–2021).[420]

Producers are required to meet minimum conservation measures to be eligible for most USDA programs that provide direct, subsidized, or guaranteed financial assistance, including the Title I, Title XI, and ad hoc programs described above.[421] "Conservation compliance" requires that producers, to remain eligible for USDA programs, do not:

- Produce an agricultural commodity on highly erodible land without an adequate conservation system;
- Plant an agricultural commodity on a converted wetland;
- Convert a wetland to make possible the production of an agricultural commodity.[422]

Each year, a producer must submit a two-page form, which certifies they fulfilled the conservation compliance requirements.[423] When a producer does not comply, he or she "may be required to" return the received payments for that year and may not be eligible for future program participation.[424] However, if USDA finds the producer "acted in good faith and without the intent to violate," the producer is not required to refund payments and can continue participating in programs.[425]

Because bedrock federal environmental laws like the Clean Air Act and Clean Water Act largely exempt agricultural activities,[426] the conservation compliance provisions are critically important in addressing environmental harms

resulting from agricultural production. However, multiple factors undermine the efficacy of conservation compliance, including a lack of transparency, weak conservation standards, and a lack of enforcement. For example, NRCS does not report conservation compliance data, making it difficult to assess the robustness of implementation.[427] Further, even when farmers and ranchers are in compliance, the NRCS soil erosion tolerance rates are set so high that there is still a net loss of soils.[428] Moreover, millions of erodible cropland acres are not classified by NRCS as highly erodible, and, therefore, are not subject to conservation compliance requirements.[429] Producers who do not own or operate such lands have no affirmative obligation to adopt conservation or adaptation measures as a condition of receiving federal subsidies. Finally, the minimal requirements set by this standard do little to mitigate climate change or equip farmers to adapt to its impacts. The following recommendations propose alternatives to address these shortfalls.

RECOMMENDATION

Use Conservation Compliance to Promote Climate-Friendly Farming on All Farms Receiving Government Support

The large number of acres enrolled in commodity support and crop insurance programs creates great potential for quick and widespread adoption of climate-friendly practices on farms. In 2018, there were 94.6 million acres enrolled in PLC and ARC, and 313 million acres enrolled in federal crop insurance.[430] Furthermore, these Title I programs supplement producers' income at rates that dwarf payments offered through the voluntary conservation programs described above (i.e., working lands programs);[431] voluntary programs are insufficient to meet the urgency of the moment. To increase the country's resilience to climate change, engage more farms as partners in climate change mitigation, and ensure public dollars are not used to exacerbate environmental degradation, Congress should expand conservation compliance to require adoption of climate-friendly practices on all farms receiving government support.[432]

LEGISLATIVE OPPORTUNITY

Expand conservation compliance to promote uptake of climate-friendly practices

Congress should enact an enhanced version of conservation compliance that requires action on *all* farms participating in these programs, not only those with highly erodible land or a wetland. To receive support, farmers should be required to implement several practices from a list of practices, tailored to that producer's crops and region that provide ecosystem services to further conservation, adaptation, and/or climate change mitigation. Practices could include cover cropping, perennial crops, buffer zones, agroforestry, and conservation tillage. Adding cover crops, for example, such as legumes or grasses, into crop rotation during fallow periods increases soil carbon, reduces soil erosion, and increases crop yield;[433] USDA has already endorsed broad uptake of this practice.[434] Beyond downstream benefits, many of these practices make farms more resilient and aid farmers' adaptation to climate change.[435] NRCS should be charged with creating these tailored lists based on its own or peer-reviewed research, and in collaboration with relevant experts. As USDA's "principal agency for providing conservation technical assistance,"[436] NRCS is the appropriate steward for this expanded program.

There are several ways the list of practices could be used to enact change. For instance, Congress could require that farmers work with NRCS to identify five practices, from a list of

ten, to incorporate on their farm. This model would provide flexibility for farmers to adapt to the new requirements and make choices that resonate with their existing infrastructure, desired investments, and future plans. As different practices will provide ecosystem services with varying degrees of impact, Congress could grant NRCS discretion to accord some practices greater weight than others to account for distinct benefits (i.e., particularly beneficial practices could count for two of the five). If farmers seek to carry out a more comprehensive overhaul, like transitioning to an agroforestry system, NRCS might create an alternative track that breaks the conversion down into incremental steps through which the farmer would proceed to remain in compliance.

Because receipt of government aid would be conditioned on implementation of conservation enhancing and climate-friendly practices, expanding conservation compliance offers the most effective and wide-reaching mechanism for instigating the changes necessary to secure the nation's agricultural sector for future generations.

Alternatively, if developing a list of climate-friendly practices is not adopted, a separate option for improving environmental outcomes through conservation compliance would be to require a positive Soil Conditioning Index (SCI) score to participate in USDA programs. NRCS uses SCI to predict soil organic matter in scenarios with different cropping systems, tillage management, and soil texture.[437] A positive score indicates a predicted increase, whereas a negative score indicates a likely decrease in soil organic matter.[438] This practice agnostic approach would allow for a variety of methods or practices to improve soil quality and carbon sequestration.

RECOMMENDATION

Reform Highly Erodible Land standards to better protect the nation's soils

USDA's methodology for determining which land is highly erodible (Highly Erodible Land or HEL) is outdated and ineffective in conserving soil. The HEL formula used to make this determination relies on soil map units and an erodibility index. The erodibility index for a soil is determined by dividing the potential average annual rate of erosion for each soil (factoring in sheet and rill erosion as well as wind erosion) by its predetermined soil loss

tolerance (T) value (the maximum annual rate of soil erosion that could occur without causing a decline in long-term productivity).[439] Units with a resulting erodibility index of 8 or more are "highly erodible," while units containing a range of index values both above and below 8 are "potentially highly erodible" and a determination is made via further investigation.[440]

The HEL formula is basically a reprint of the Universal Soil Loss Equation (USLE), which was first published in USDA's Agriculture Handbook 282 in 1965 to "predict[] the long-term average annual rate of erosion on a field slope based on rainfall pattern, soil type, topography, crop system and management practices."[441] When it codified the USLE formula and its determination as to what counts as HEL, the 1985 Farm Bill required that the Soil Conservation Service (since folded into NRCS) use the formula to map HEL throughout the country by January 1, 1990. That map is *the* definitive map for HEL: "[d]eterminations are made using the frozen soils legend [the January 1, 1990 map] for each county as it existed on that date."[442] The NRCS Technical Soil Services Handbook stipulates that the soil map classification units determined in 1990 must remain unchanged.[443]

Farmers planting on HEL are required to develop, with NRCS, a conservation plan for their HEL. These plans rest on two basic requirements. First, "[o]n HEL that is already in production, the conservation plan must result in a 'substantial reduction' in soil erosion."[444] Second, "on native vegetation (non-cropland) that is being brought into production, the conservation plan must prevent a 'substantial increase' in erosion."[445] Within this framework, USDA categorizes land according to its status in 1985, when conservation compliance and the USLE were enshrined in the farm bill. Plans approved and implemented before July 3, 1996 (legacy conservation compliance plans), are grandfathered in and deemed compliant with these requirements.[446]

The United States would still face a soil erosion problem even if conservation compliance requirements were followed to the letter by every producer. This is because, as detailed above, the standards do not apply to all erosion-prone cropland and, where they do apply, often allow for unsustainable erosion rates. Congressional action is necessary to make conservation compliance effective in protecting the nation's soils.

LEGISLATIVE & ADMINISTRATIVE OPPORTUNITY

Revise conservation plan standards to prevent soil erosion

Congress should amend the statute governing development of conservation plans to target erosion prevention rather than mere reduction. The current standards still allow for a net loss of soil. For instance, NRCS's application of its current statutory mandate led it to set a standard that permits producers who farm on land that was cropped before 1986 to meet HEL compliance standards while depleting soil at twice the rate it is replenished (i.e., twice the soil loss tolerance or 2T).[447] NRCS formulated the "T" standard decades ago based on its statutory duty to take into consideration the economic burden of compliance on farmers and ranchers, cost-effectiveness, and available technology.[448] It is time for Congress and NRCS to recalibrate the standards, and their scope, to the magnitude of soil loss happening across U.S. cropland. Congress should revise the "substantial reduction" requirement to one that aims to prevent erosion and direct NRCS to reevaluate its HEL criteria and formula accordingly. In addition, Congress should require legacy conservation compliance plans to meet these updated standards.[449]

In the absence of Congressional action, NRCS should recognize it is time for the standard to change. NRCS already has authority to revise the allowable tolerance ("T") rates to achieve a zero-net loss of soils.[450] Much has changed since NRCS set the "tolerable" erosion level at twice the rate of replenishment, particularly technological advancements that include the development of precision agriculture and the analytical power of big data. In light of these changing circumstances, NRCS should use its existing authority to change the T value through the rulemaking process.

LEGISLATIVE OPPORTUNITY

Expand the reach of conservation compliance to protect more soils

Congress should require conservation compliance for soils on all cropland receiving USDA support, not just land currently designated as HEL.[451] Short of enacting sweeping changes to conservation compliance to incorporate a suite of climate-friendly practice requirements, as recommended above, extending even basic compliance requirements to more—and eventually all—acreage receiving farm program benefits would represent a significant shift in conservation policy. As a first step, Congress should commission a revision to the HEL map developed in 1990, using the best available science to revisit the HEL formula used to develop the map. For instance, the current HEL formula does not account for the effect of gullies and tillage, despite evidence of their harmful effects.[452] These findings and other advancements over the last three decades should inform this revision. Congress should also set a process for making periodic updates to the map to ensure that conservation practices respond to an accurate accounting of the nation's soils. Once new HEL are identified, subjecting them to the conservation compliance requirements would provide necessary protection to soils that are currently being depleted.

RECOMMENDATION

Strengthen Wetland Protections and Protect Watersheds

Wetlands play a critical role in sustaining the health of the environment. Wetlands serve to store floodwaters, trap nutrients, filter pollutants, provide habitat for wildlife (animals, insects, and plants), and act as carbon sinks, which absorb carbon from the atmosphere.[453] Further, these wetlands slow floodwaters by functioning as natural sponges, guard against shoreline erosion, and stabilize water stream flows. Wetlands also serve as natural pollution control and improve water quality by removing pollutants and excess nutrients from the water.[454] Due to the vital function of wetlands in conservation efforts, USDA has deemed wetlands conservation as "one of the most important and sensitive natural resource issues in our country today."[455] USDA has further warned that wetland destruction could lead to severe effects, including "increased flooding, extinction of species, and decline in water quality."[456]

Despite the environmental importance of wetlands, by 1984, 54% of U.S. wetlands, constituting 117 million acres, were drained or filled to fulfill development or agricultural needs, such as crop production. To respond to this destruction of wetlands, Congress passed the Wetland Conservation provisions (WC or Swampbuster) and the Wetlands Reserve Program (WRP), to be administered by NRCS. The WC provisions were implemented with the objective of removing incentives "to produce agricultural commodities on convertible lands or highly erodible land." These provisions have had proven success, by dramatically reducing agricultural conversion of wetlands. Specifically, after the implementation of these provisions, wetland conversion fell from 235,000 acres per year to 27,000 acres per

year.[457] In addition, WRP was implemented to provide "technical and financial assistance to eligible landowners to address wetland… and natural resource concerns on private land."[458] The program further aims to enhance wetlands by providing financial incentives in exchange for "retiring marginal lands from agriculture."[459] Since 2014, a similar easement program has been administered as part of ACEP, through Wetland Reserve Easements.[460] In administering these two programs, NRCS aims to assist farmers in protecting, restoring, and enhancing wetlands.[461]

Despite the necessity of conserving wetlands, aspects of the 2018 Farm Bill and recent rules promulgated by NRCS fall short in adequately protecting these wetlands. As such, several legislative and administrative opportunities, detailed below, should be implemented to promote strengthened protection of wetlands.

LEGISLATIVE & ADMINISTRATIVE OPPORTUNITY

Revise NRCS policies for making wetland determinations

Over the objections of numerous stakeholders with expertise and experience in wetland conservation, NRCS recently (August 2020) issued a final rule that enacted several harmful changes to the Swampbuster provisions.[462] Problematic aspects identified for the interim rule (and not changed in the final rule) include:

- Changes that systematically exclude seasonal wetlands in the agency's wetland determinations or increase the risk of exclusion;
- Acceptance of pre-1996 wetland determinations—which were largely and notoriously inaccurate—as certified;
- Reliance on precipitation data from a historically dry period (1971–2000); and
- Failure to prepare an Environmental Impact Statement despite the substantial environmental effect of the change.[463]

These changes elevated efficiency over efficacy and cripple federal wetland conservation efforts. Indeed, when the Office of Inspector General (OIG) reviewed NRCS's informal policy (prior to the rulemaking) of accepting pre-1996 wetland determinations in certain states, it found:

> NRCS officials made this change because they were under pressure to reduce the backlog and because producers complained about the time needed to

> obtain a determination. This change (accepting the pre-1996 determinations) was successful in reducing the backlog, but it also resulted in inaccurate wetland determinations. As a result of this change in the implementation of policy, many acres of wetlands are being inappropriately drained and converted to agricultural production. Based on the 17 tracts OIG reviewed in North Dakota, these changes in the wetland determination process reduced the protection of wetland acreage by nearly 75% on 13 tracts.[464]

Despite critiques of NRCS's existing and proposed policies and practices, the final rule also failed to address the agency's reliance on satellite imagery obtained during the hottest and driest times of the year, when seasonal wetlands may not be detectable.[465] In sum, commenters expressed disdain at the general failure of the agency to use the best available science to make wetland determinations or to evaluate the impacts of its proposed rule.[466]

NRCS should cease implementation of the August 2020 rule and commence new rulemaking that contemplates reliance on best available science in making wetland determinations. NRCS should also ensure that its current methods for identifying wetlands optimize inclusion of seasonal wetlands, such as by using advanced remote sensing technology, the National Wetlands Inventory, and satellite imagery from the spring, rather than late-summer, months.[467] Given that some of the negative changes were driven, at least in part, by capacity challenges, Congress should provide NRCS with additional funding to support staff activities related to wetland identification. Should NRCS fail to take remedial steps before the next farm bill to address the issues noted above, Congress should affirmatively direct NRCS to do so and to ensure its policies meaningfully and accurately account for conservation of seasonal wetlands.

LEGISLATIVE OPPORTUNITY

Raise wetland mitigation standards to preserve critical benefits

Producers who violate the wetland conservation provisions can remain eligible for farm bill programs if they mitigate the wetland loss through "restoration of a converted wetland," "enhancement of an existing wetland," or "creation of a new wetland."[468] Although mitigation measures are meant to restore the lost wetland's "values, acreage, and functions," the statute effectively caps the mitigation requirement at a 1-to-1 acreage ratio[469] for enhancement or restoration projects ("unless more acreage is needed to provide equivalent functions and values that will be lost") and permits that ratio to exceed 1-to-1 in the case of wetland creation "if more acreage is needed to provide equivalent functions and values that will be lost as a result of the wetland conversion that is mitigated."[470] While these provisions ostensibly provide NRCS flexibility in approving mitigation measures, the 2014 Farm Bill Conference Report "encourage[d] [USDA] to use mitigation with the conversion of a natural wetland and equivalent wetlands functions at a ratio not to exceed a ratio of 1-to-1 acreage."[471] Additionally, producers can appeal a mitigation plan ratio that exceeds 1-to-1 acreage.[472] In reality, then, NRCS faces significant pressure to cap all mitigation requirements to a 1-to-1 acreage regardless of lost wetland functionality and value.

Congress should establish 1-to-1 acreage as the statutory minimum offset ratio rather than the presumptive maximum. This would bring conservation compliance standards into alignment with similar mitigation measures required for Clean Water Act section 404 permits and other Department of the Army

permits.[473] As described above, wetlands offer unique and irreplaceable ecosystem functions that are difficult, if not impossible, to fully capture through mitigation efforts.[474] Additionally, our understanding of wetland functions is continuously evolving,[475] counseling caution in relying on mitigation as an effective tool in preserving the many benefits wetlands provide. Size—or acreage—is just one component of restoration and a poor proxy for wetland functionality and value. Congress should amend the statute to establish 1-to-1 acreage as the floor for mitigation efforts, require NRCS to set a ratio above 1-to-1 where necessary to account for differences in function and value, and direct NRCS to use the best available science to ensure that wetland mitigation projects exceed the estimated loss of function and value of the converted wetland, thus accounting for lost benefits that are yet unknown.

RECOMMENDATION

Improve Conservation Compliance Enforcement

Even if conservation compliance standards were sufficiently stringent, enforcement has proven inadequate. Various federal audits as well as USDA data show a chronic lack of conservation compliance enforcement by NRCS.[476] For example, a 2003 Government Accountability Office (then the General Accounting Office) report found that nearly half of NRCS field offices failed to implement required conservation compliance provisions due to a lack of staff, inadequate managerial emphasis on conservation compliance, or because NRCS agents were uncomfortable acting in the role of enforcer.[477] The same report also found that NRCS personnel did not consistently monitor wetlands violations.[478]

In addition to data disclosure issues, statutory exemptions and flexible compliance mechanisms undermine conservation compliance effectiveness. For example, the law provides farmers with flexible timelines and alternate methods for compliance based on their particular needs.[479] Moreover, USDA relies on self-certification[480] and producer good faith. Guidance published by NRCS in conjunction with the FSA and RMA states that "to comply with the HEL Conservation and Wetland Conservation provisions, producers and affiliated persons must fill-out and sign form AD-1026 certifying they will not" violate the compliance requirements.[481] While signing the form "gives representatives of USDA authorization to enter upon and inspect" the farm for conservation compliance,[482] in reality, inspections to verify compliance are rare.

Further, when standards are enforced, it is often unclear what those standards are. A 2016 Office of Inspector General report found that NRCS State offices issue different guidance on interpreting compliance requirements.[483] A violation in one state may not count as noncompliance in a neighboring state, because "NRCS State offices have developed inadequate guidance for consistently applying standards for conducting compliance . . . reviews" which "resulted in inconsistent noncompliance determinations."[484] A few states with some of the highest erosion rates have failed to issue any guidance at all on ephemeral gully erosion identification or control, even though gully erosion is the leading cause of soil erosion.[485] Any initiative by NRCS to increase enforcement of conservation compliance standards demands similar commitment to issuing guidance and providing technical assistance. Otherwise, even well-intentioned producers will persist in bad practices, without a clear understanding of what rules apply or how to abide by them.

The current enforcement regime of self-certification, minimal and inconsistent verification, and USDA's reluctance to follow through with removal of benefits results in

ineffectual environmental protection and a poor value for the taxpayer. Congress should require and fund effective conservation compliance implementation so that the public can stop subsidizing agricultural practices that degrade the soil and drain wetlands.

LEGISLATIVE OPPORTUNITY

Fund NRCS enforcement of conservation compliance standards

NRCS does not receive adequate funding to staff or conduct enforcement activities.[486] A 2012 Office of Inspector General report found that "NRCS must . . . design adequate compliance activities to ensure that program benefits are reaching those who are truly eligible and serving their intended purposes."[487] Analysis of data over the decade between 2003–2013 showed that NRCS documented conservation compliance violations that led to denying nearly $124 million in farm bill program payments, of which $109 million were ultimately reinstated in part because NRCS resources are stretched too thin to uphold violations.[488] Congress should provide permanent funding that is adequate to allow NRCS to enforce conservation compliance provisions.

ADMINISTRATIVE OPPORTUNITY

Target monitoring activities in areas of potential high non-compliance.

NRCS's current sampling methodology does not account for regional variations in risk of non-compliance. Instead, NRCS randomly selects tracts from a national dataset of tracts subject, or potentially subject, to conservation compliance.[489] Tracts that received a variance (i.e., excused noncompliance) or an exemption in the prior year are to be added to the sample at the local level.[490] Although this methodology attempts to target potential repeat offenders, the low annual sampling rate (~1% of tracts) and minimal penalties still mean that the risk of noncompliance is low relative to potential profits. Recent research has demonstrated the effect; in a study on conservation compliance in the U.S. corn belt, Holland, et al., found that estimated rates of noncompliance "were positively correlated with both absolute and relative corn prices."[491] The researchers relied on "continuous corn" production as a proxy for noncompliance, due to the fact that continuous corn is rarely planted in conjunction with required conservation measures, like conservation tillage.[492] Based on their findings, the researchers suggest—in addition to increased funding for NRCS for monitoring—concentrated sampling "in areas that have historic high levels of potentially non-compliance practices that can be cheaply and rapidly assessed" (i.e., areas with high continuous corn acreage).[493] NRCS should implement this recommendation by updating the sampling criteria in Part 518 of the National Food Security Act Manual (5th ed.) to specifically include Crop Reporting Districts where continuous corn is prevalent. NRCS should also consider increasing the concentration of sampling in these regions when corn—or other commodities that exhibit similar patterns—prices increase.

LEGISLATIVE OPPORTUNITY

Direct USDA OIG to investigate FSA conservation compliance enforcement activities

While NRCS is responsible for determining producer noncompliance, FSA has the authority to determine penalties and whether any exemption should apply.[494] Audits concerning conservation compliance have primarily focused on NRCS's role in enforcement and have said little about whether FSA is using its authority to determine penalties appropriately.[495] If the agency is over-awarding good faith exemptions or variances to compliance requirements, it undermines NRCS enforcement efforts and the program's efficacy. Coupled with the

transparency recommendations detailed below, Congress should direct OIG to investigate FSA's conservation compliance enforcement activities and its determinations of producer penalties.[496]

RECOMMENDATION

Bring Transparency to Conservation Compliance

A prerequisite to effective enforcement of the conservation compliance requirements is the gathering and reporting of data on compliance, enforcement, and program efficacy. There is currently no legal mandate that NRCS or FSA report this information to Congress or otherwise make it publicly available. Instead, the Secretary must annually submit a report to the House Committee on Agriculture and the Senate Committee on Agriculture, Nutrition, and Forestry[497] that reports the number of wetland and highly erodible determination requests received and completed by NRCS, and whether the requests are "addressed in a timely manner."[498] These determinations inform producers whether they have wetlands or highly erodible lands that are subject to compliance measures. However, Congress does not require the Secretary to include data regarding conservation compliance enforcement.[499]

In addition, existing law requires that the Secretary submit to Congress an annual report on conservation program enrollment, but not on conservation practice efficacy.[500] These reporting requirements also do not require disclosure of data related to the rate at which producers comply with the requirements.[501] Understanding the relationship between voluntary conservation programs and conservation compliance is necessary to determine whether these programs are achieving their purpose and how they can be improved, in terms of environmental outcomes and cost-effectiveness. For example, it is wasteful to use incentive payments to "induce" a producer to adopt practices that he or she is substantially required to adopt to achieve compliance.

LEGISLATIVE OPPORTUNITY

Require conservation compliance data reporting

Congress should require that compliance and enforcement data are available to the public and reported in a timely manner to Congress, with a granularity comparable to the Agricultural Census. FSA oversees the database that records which land tracts receive farm bill benefits and are, therefore, subject to conservation compliance, but there are inadequate mechanisms requiring disclosure to Congress and the public. USDA Office of the Inspector General has previously found that inadequate procedures for transferring data between the agencies have hindered enforcement,[502] and it is unclear whether corrective action has been taken. Thus, a legal requirement to make compliance and enforcement data available to the public and to report such data to Congress would create a strong incentive for NRCS and FSA to finally develop tracking and reporting procedures necessary to carry out conservation compliance. Reporting this data should also motivate NRCS and FSA to more effectively enforce conservation compliance, and it would also allow both Congress and the public to get a better sense of the true scale of the problem. The next farm bill should therefore include mandatory disclosure of the relevant data to NRCS, to Congress, and to the public.

Improving Transparency and Accountability Through Disclosure Requirements

Currently, USDA and its agents are prohibited from disclosing:

(A) information provided by an agricultural producer or owner of agricultural land concerning the agricultural operation, farming or conservation practices, or the land itself, in order to participate in programs of the Department; or

(B) geospatial information otherwise maintained by the Secretary about agricultural land or operations for which information described in subparagraph (A) is provided.[503]

Information may be released in aggregate form or in other limited circumstances.[504] USDA heavily relies on this statute to deny Freedom of Information Act (FOIA) requests, with one study showing citation to the provision in over 80% of FOIA denials issued in the four years following its enactment.[505]

The individual privacy interests advanced by the limitation pale in comparison to the public benefits lost. The lack of transparency fosters distrust and prevents accountability; many find this level of secrecy disconcerting, particularly given USDA's role in supporting producers and reticence—in general and by individual officers—in acting as an enforcer or oversight authority within the industry.[506] It also inhibits public oversight and evaluation of public—taxpayer—spending and, in turn, sound public policymaking.[507] Further, the provision obstructs information sharing with other federal agencies, thus hamstringing regulation and enforcement of other federal laws, including the Environmental Protection Agency's enforcement of the Clean Water Act.[508] Finally, it keeps researchers from obtaining critical sources of data that could be used to more effectively evaluate the efficacy of conservation and climate change mitigation practices (e.g., through tying geospatial information and conservation practice data to soil health maps), among other research subjects.

Congress should eliminate the statutory disclosure limitation so that USDA's programs operate transparently and the public can oversee public spending and, if necessary, hold the agency accountable to its mandates. To the extent some limitation is determined to be necessary, Congress should enact carve-outs for (1) information disclosed to other federal agencies, (2) information disclosed to researchers pursuant to a memorandum of understanding or confidentiality agreement that limits further disclosure of individualized data, and (3) information disclosed to oversight bodies authorized by Congress to review individualized data to assess USDA program compliance and performance.

Conclusion

The 2023 Farm Bill is an opportunity to establish the agricultural and forestry sector's role in mitigating climate change and securing the future of the country's shared natural resources. Its enactments can also set producers on a path to increase the resilience and regenerative power of their own operations and the industry as a whole. The Goals and Recommendations outlined in this Report offer a roadmap forward, envisioning a role for public investment and partnership with producers in bringing forth the next stage of agriculture. Through USDA's conservation programs and incentives, forest management and reforestation programs, investments in research and development on carbon sequestration, and stronger stewardship of public investments in farm support programs, Congress can, via the farm bill, ensure that the U.S. agricultural and forestry sectors protect and enhance our shared environment for generations to come.

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238 Forest Serv., Forest Legacy Program Implementation Guidelines 15 (2017). The federal government can also hold title to lands or easements under the program. The "Federal option" was the only avenue for implementation prior to inclusion of the "State Option" in the 1996 Farm Bill. *Id.*

239 Food, Agriculture, Conservation and Trade Act of 1990, Pub. L. No. 101-624, 104 Stat. 3359, § 1217 (codified as 16 U.S.C. § 2103c).

240 16 U.S.C. § 2103c(a).

241 Forest Serv., *supra* note 238, at 10.

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243 These criteria are: (1) Importance ("The public benefits gained from the protection and management of the property, including environmental values and the economic and social benefits"), (2) Threatened ("Conversion to nonforest uses is imminent or likely and will result in a loss of forest values and public benefits"), and (3) Strategic ("Contributes to larger conservation plans, strategies, and initiatives, complements existing Federal land and other protected areas, and enhances previous conservation investments"). Forest Serv., *supra* note 238, at 33.

244 *Id.* at 147 ("the plan preparer will consider . . . plan elements").

245 *Id.* at 63, 147–48.

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485 https://perma.cc/C3SX-P7Z7*Id*.

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489 *National Food Security Act Manual (5th ed.), Part 518 – Compliance Review*, Nat. Res. Conservation Serv., https://directives.sc.egov.usda.gov/RollupViewer.aspx?hid=29393 [https://perma.cc/4EYN-BNV6].

490 *Id*.

491 Austin Holland et al., *Complying with Conservation Compliance? An Assessment of Recent Evidence in the US Corn Belt*, 15 Env't. Rsch. Letters 084035, 1 (2020).

492 *Id.* at 2–3.

493 *Id.* at 8. The researchers alternatively recommend increasing the size of the fine to be based on "profit margins or key crop prices" to account for the changing cost-benefit calculus when prices increase. However, because producers lose benefits conferred rather than being changed a fine, implementation of this recommendation would be more challenging.

494 Megan Stubbs, Cong. Rsch. Serv., Conservation Compliance and U.S. Farm Policy 7 (2016), http://nationalaglawcenter.org/wp-content/uploads/assets/crs/R42459.pdf [https://perma.cc/W7ES-9JLT]

495 Max Schnepf, Env't Working Grp., Conservation Compliance: A Retrospective 18 (2012), https://static.ewg.org/pdf/conservation_comp_maxs.pdf [https://perma.cc/J6RR-CYLB]; Megan Stubbs, *supra* note 494, at 10–11.

496 Max Schnepf, *supra* note 495, at 18.

497 16 U.S.C. § 3841(c)(4) ("Not later than November 1 of each year, the Secretary shall submit. . .a report that includes: (A) a description of the extent to which the requests for highly erodible land conservation and wetland compliance determinations are being addressed in a timely manner; (B) the total number of requests completed in the previous fiscal year; (C) the incomplete determinations on record; and (D) the number of requests that are still outstanding more than 1 year since the date on which the requests were received from the producer.").

[498] Agricultural Act of 2014, Pub. L. No. 113-79, § 2602, 128 Stat. 649 (codified at 16 U.S.C. § 3841(c)(4)).

[499] Agricultural Act of 2014, Pub. L. No. 113-79, § 2602(2)(4), 128 Stat. 649 (codified at 16 U.S.C. § 3841(c)(4)).

[500] Agricultural Act of 2014, Pub. L. No. 113-79, § 2605, 128 Stat. 649 (codified at 16 U.S.C. § 3841(i)) ("Beginning in calendar year 2009, and each year thereafter, the Secretary shall submit to the Committee on Agriculture of the House of Representatives and the Committee on Agriculture, Nutrition, and Forestry of the Senate a semiannual report containing statistics by State related to enrollments in conservation programs.")).

[501] Agricultural Act of 2014, Pub. L. No. 113-79, § 2605, 128 Stat. 649 (codified at 16 U.S.C. § 3841(i)).

[502] Off. of Inspector Gen., 50601-0005-31, *supra* note 427, at 3.

[503] 7 U.S.C. § 8791.

[504] 7 U.S.C. § 8791.

[505] Rena I. Steinzor & Ling-Yee Huan, Agricultural Secrecy: Going Dark Down on the Farm: How Legalized Secrecy Gives Agribusiness a Federally Funded Free Ride 4 (2012), https://papers.ssrn.com/abstract=2146240 [https://perma.cc/4L7B-833T].

[506] *Id.* at 6.

[507] NRCS & IPM Working Grp., IPM Implementation Trends, Cost Effectiveness, and Recommendations for Optimizing NRCS Investments in Conservation (Draft) 6 (2014), http://www.ipm.msu.edu/uploads/files/NRCS/DRAFT-NRCS%20IPM%20Report%208-1-14.pdf [https://perma.cc/4PNN-FY39].

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