



**Strengthening the Economy, Health, and Climate Security through
More Resilient Agriculture and Food Systems**



Introduction

For those who can afford to fill their fridge with the click of app icon or live in a neighborhood with fresh produce around the corner, it is easy to forget how complex and fragile our food systems can be. However, for millions of Americans who suffer from poor health because of food insecurity, or farmers and ranchers whose yields are decreasing along with the nutrient density of their product, that fragility is felt every day. Sustainable food systems engender intricate connections and feedback loops among climate change, public health, food security, national security, and social equity. When one of these factors is overstressed, disaster can result.

COVID-19 has underscored the vulnerability of our food systems. The pandemic caused restaurants to close overnight, strained supply chains, and led to food rotting on land, in warehouses, and on shelves. Low-income and food-insecure families waited in lines that stretched for miles while producers and distributors struggled to figure out how to get supplies to those who needed them. Concurrently, generations of racial inequity and the coordinated disenfranchisement of Black, Indigenous, and other people of color (BIPOC) has crystalized as an issue that needs to be addressed at every level in our country, especially within our food and agricultural systems.

Addressing these issues—now and for the future—requires a coordinated response across sectors. Food security is deeply intertwined with public health and social equity. Un- and under-employment, the racial wealth gap, and increased financial hardships for certain communities result in increased malnutrition, obesity, metabolic diseases, and chronic illness, as well as particular susceptibility to severe impacts from COVID-19 infections during the present pandemic. The climate crisis compounds these issues. Farming practices that degrade soil health, reduce agriculture capacity, and compromise the well-being of small farms and rural communities prevent us as a nation from becoming healthier and more secure. As we look at opportunities to “build back better,” we must embrace paradigmatic shifts—fundamental restructuring of our systems that will support equitable and inclusive futures. Compounding crises require changes in not only *what* we do, but how we *think* about what we do.

A fundamental problem is that progress in modern agriculture has been implicitly defined as progress in agricultural technology (AgTech) and biotechnology. Little emphasis is placed on examining whole-systems dependencies and on how connections among soil health, gut bacteria, and antibiotic use in livestock impact human health, economic prosperity, and climate change. With such a narrow view of “innovation,” current practices will solve a handful of isolated problems but create many more.

Fortunately, alternatives are ripe for adoption. Regenerative farming, for instance, is a proven way to combat future warming while increasing the adaptive capacity of our lands, providing equitable access to food, and creating viable rural economies. Regenerative farming can also restore soil



health, which in turn improves food quality while enhancing carbon sequestration and providing natural water treatment.

Transitioning away from dominant but harmful practices is not easy. The shift will require an inclusive innovation ecosystem, investors with long time horizons, new infrastructure, tailored education, economic incentives, and community safety nets. This document explores how the agricultural sector can support, and be supported by, policies that advance science, technology, and innovation while revitalizing living systems and equitable futures. We recognize that agricultural policy often overlooks interventions that are appropriately suited to advance these concepts with Black, Indigenous, people of color (BIPOC) communities and on tribal lands. To avoid this mistake, the concepts presented herein start from the ground up. We focus on the benefits of improving soil health and food security through regenerative agricultural activities, and provide examples of policies that could promote such activities in a variety of ways. Letting practice drive policy—instead of having policy dictate practice—will result in more sustainable, inclusive outcomes for all communities.

While agricultural policy can and should be shaped at the local, regional, state, and national level, this document places special emphasis on the role of the federal government. Building better food systems will require multiple government agencies, especially federal agencies, to collaboratively advance more equitable policies and practices. Most national agricultural programs are housed within the U.S. Department of Agriculture (USDA). But the interconnectedness of how we produce food and fiber (and the ways in which those practices impact our environment and nourish people) demands priority investment not only from USDA, but also from the Environmental Protection Agency, the Department of Energy, the Department of the Interior, the Department of Defense, and the Department of Health and Human Services—to name just a few. This document—based on a review of existing policy recommendations and current practice, development and refinement of new ideas, and identification of underleveraged roles and programs within the government—suggests what such investments might look like in practice.



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1.0 Prioritizing Soil Health and Securing Food Futures

1.1 Soil Health as a National Security Priority

Background

Soil erosion and degradation threatens agricultural productivity, climate stability, and global food security. As a result of industrial farming practices, and exacerbated by extreme climate events, the United States has lost about one-half of its soil since the 18th century. This has decreased agricultural resilience and made land more fragile. Some areas have already lost all of their topsoil, leaving behind only subsoil that cannot support agricultural production. By some projections, the United States will run out of fertile soil on much of its agricultural lands by the end of the 21st century, and many regions could be barren in the next 10 to 20 years. The USDA's annual report on natural resources indicates that across U.S. agricultural land, the average rate of soil loss is ten times greater than the average rate of soil production.

In addition to putting food production at risk, soil erosion has devastating systemic consequences on climate and the environment. A critical aspect of soil health is carbon. When soil is lost, Earth-warming carbon is released...but when soil is retained, carbon can be captured and stored. The Earth's soil has lost 133 billion tons of carbon since the beginning of agriculture but still contains four times as much carbon as the atmosphere. The global potential for additional carbon sequestration in the soil is between 1 and 3 billion tons per year. Over the next few decades, a 10% increase of organic matter in soil worldwide (representing an additional 250 billion tons) would reduce atmospheric carbon-dioxide concentrations by 25%. This would be enough to nearly return the atmosphere to pre-industrial carbon levels. In an important positive-feedback loop, carbon sequestration is also good for soil and plants. High amounts of carbon improve soil architecture and provide a home for the soil microbiome. Soil microorganisms are fed by plant roots in exchange for delivering critical nutrients

Soil loss causes nutrient pollution as well. Eroded soil and accompanying nutrients (such as nitrogen and phosphorus) lost from Midwestern farms reach the Mississippi River, which carries them to the Gulf of Mexico. There, eutrophication has caused a 7,900-square mile dead zone, imperiling the Gulf's wildlife and fishing industry.

Soil degradation and erosion together expose the population of the United States—and the many places that rely on U.S. agriculture—to widespread food insecurity and increased prices, while accelerating climate change and compounding the impacts of climate-related disasters. Prioritizing soil health and soil carbon content as national-security concerns would simultaneously enhance crop production, minimize nutrient runoff, mitigate climate change, and help secure equitable food access for generations to come.



Policy Recommendations

The policy recommendations that follow present opportunities for USDA to cooperate with the following federal agencies and their operating divisions: Department of the Interior (DOI), Department of Energy (DOE), Department of Health and Human Services (HHS), Department of Defense (DOD), and Environmental Protection Agency (EPA).

Adopt a domestic “4 per 1000” policy

In light of President Biden rejoining the Paris climate agreement, the United States should provide international leadership by signing the “4 per 1000” policy that was adopted by 29 countries at the 2015 COP21 climate summit. The 4 per 1000 agreement proposed increasing soil carbon by 0.4% per year worldwide until carbon saturation of the soil is achieved. If this aspirational goal were met, enough carbon would be sequestered in soil to offset projected increases in future carbon emissions—all while restoring and revitalizing topsoil health. The United States should develop a plan to implement the 4 per 1000 policy domestically, and engage in an interagency coordinated effort to meet these goals ahead of 2050.

Relevant agency cooperation: EPA, DOI, DOD

Update and implement the 2016 White House “Framework for a Federal Strategic Plan for Soil Science”

Completed in December 2016, the White House [Framework for a Federal Strategic Plan for Soil Science](#) identified needs and gaps in soil science and in protecting soil ecosystem services. The framework also recommended priorities for future research initiatives. The Biden-Harris Administration should reestablish the [Soil Science Interagency Working Group](#) under the National Science and Technology Council (NSTC) to update this critical action plan and ensure interagency coordination and implementation of the ambitious efforts needed to safeguard soil.

Relevant agency cooperation: DOD, DOE, DOI, EPA

Develop a central, coordinated strategy for soil and land health

More research is needed to improve soil-management practices, quantify benefits of soil health, and reduce costs of regenerative land management. By implementing and building on the aforementioned 2016 White House Framework, the USDA can drive a coordinated strategy for soil and land health that leverages existing research institutions and new technology while preventing duplication of effort and ensuring robust stakeholder participation. USDA’s research mission area already contains significant assets—such as the Economic Research Service, Agriculture Research Service (ARS), National Institute of Food and Agriculture, and land-grant universities/extension services—that can support

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such a strategy. The USDA's Natural Resource Conservation Service and Farm Service Agency (FSA) should also be involved due to their programmatic resources and applied-research financing.

A crucial part of strategy development and implementation will be encouraging federal agencies that do not typically see themselves in having a stake in agriculture to consider how holistic resource management and increased soil health could enhance strategies for mitigating climate change and disasters. For example, the Department of Energy could consider how it integrates large solar arrays into grazing lands maintained by the Bureau of Land Management and operated by private ranchers. The Federal Emergency Management Agency could develop upstream programmatic interventions for agriculture and landscape conservation that prevents downstream flooding and hazardous chemical runoff. Such efforts can build on and funnel learning through the existing USDA climate hubs created among various universities in conjunction with the ARS. Finally, the Foundation for Food and Agriculture Research can mobilize private sector partners to support research and implement recommended actions at a commercial scale.

Relevant agency cooperation: DOD, DOE, DOI, EPA

Implement a “Soil-Safe” food label

Convene an executive task force to establish criteria for a food label that would indicate that the food had been produced with methods that build soil health. A “Soil Safe” label would indicate that the farming methods used to produce the labeled food were protective rather than damaging to soil.

Criteria for earning the label must include increasing soil carbon and avoiding practices (such as plowing) that destroy and erode soil. Farmers could meet these criteria by growing cover crops and preventing erosion by intercropping soil-depleting crops (such as corn and soybeans) with prairie plants. Ranchers could meet these criteria by practicing sustainable grazing, and/or by purchasing soy and corn feedstocks produced using regenerative methods. A well-written standard could take into account BIPOC principles, true-cost accounting, and trackable metrics such as a Soil Carbon Index.

The task force should include farmers, food retailers, experts in food labeling, representatives from federal agencies, and members of the agricultural industry. Labeling certification should be managed by an independent nonprofit organization. Food retailers could contract with the certification organization to cover certification costs instead of passing those costs onto farmers.

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The certification effort should be supported by a marketing effort to educate consumers about the dangers of soil erosion and the value of farming with soil-protective practices. This could be paired with procurement policies that require major federal anchor institutions to prioritize purchasing of “Soil Safe” foods.

Relevant agency cooperation: HHS

Aggregate, advance, and communicate best practices for soil health by region

USDA could work through its existing infrastructure of Farm Bill conservation programs to compile a database of the farming practices that best protect soil health and mitigate environmental issues such as climate change. Each Farm Bill conservation program is implemented via a decentralized, state-by-state approach, meaning that the programs together fund hundreds of different practices. While this system has advantages (e.g., maintaining flexibility to tailor practices to region-specific farming systems), it also makes it difficult to share and scale best practices. USDA could ask each Farm Bill conservation program to identify the most impactful and effective soil-health practices it funds. Examples of such practices include planting cover crops, practicing crop rotation, reducing tillage, and improving pest and weed management. Collecting and sharing these practices would help optimize the billions of dollars spent annually through Farm Bill conservation programs.

Relevant agency cooperation: None

Track and reduce antibiotic use in agriculture

Overuse of antibiotics and antifungals within agriculture contributes to the decreasing efficacy of these medications to treat human diseases. One study found that antibiotic-resistant infections and associated lost productivity cost more than \$50 billion annually. In addition, application of manure from livestock treated with antibiotics has been shown to impact soil health, increasing carbon emissions more than fields applied with untreated manure. These adverse impacts call for a new system to track use of antibiotics and other biocides in agriculture. Targets that align with internationally accepted guidelines are also needed to reduce agricultural use of medically important antibiotics and other biocides.

Given the interface between environmental and public-health concerns when it comes to agricultural use of agriculture, the Centers for Disease Control and Prevention (CDC) should draw on its deep experience with antibiotic resistance to lead this effort.

Relevant agency cooperation: EPA, U.S. Geological Survey (USGS), CDC



1.2 Nutrition and Public Health

Background

The agricultural system has been optimized to maximize output at the expense of nutrition, while the healthcare system has been optimized to manage diseases instead of promoting optimal health and wellness. These priorities have resulted in an agricultural landscape that loses the equivalent of a 116-mile long train filled with soil every day, and a healthcare system overburdened by treating chronic illnesses. At current rates, U.S. topsoil resources may only last through the end of the century. As it depletes, GDP spending on healthcare and disease management continues to increase, on average, by 4.3% a year and accounts for nearly 18% of GDP spending.

We can and must bring agricultural and health systems into alignment. Applying regenerative agricultural practices will improve soil health and soil microbiome diversity. The interaction between a healthy soil microbiome and plants helps transfer nutrients from the soil to the plant. This in turn boosts compounds in plants that make plants nutritious for humans. A more nutritious diet is linked to improved health outcomes. The links between agricultural health and human health are clear.

Improving public health also has implications for national and economic security. As malnutrition, obesity, and metabolic syndrome become increasingly prevalent, food-related health issues have become the dominant reason why recruitment-age individuals do not qualify for military service. Moreover, some existing government agricultural programs lead to negative impacts in other arenas that require government funding to remediate. For instance, crop insurance supports many types of agricultural practices that result in poor-quality food. Poor-quality food increases government-supported healthcare costs further downstream. Identifying and acting to reform these double payments would improve outcomes in our healthcare and agricultural systems while saving taxpayer dollars.

Indeed, the connections between agriculture, food, health, and security deserve increased attention from national research bodies, agencies, and regulatory bodies. Much of the research on links between agricultural and human health is funded by foreign governments. It is time for the United States to exert its leadership and scientific capacity to support healthier people, a stronger nation, and a cleaner environment.

The policy recommendations that follow present opportunities for USDA to cooperate with the following federal agencies and their operating divisions: the Department of Education (Ed), Department of Health and Human Services (HHS), Department of Labor (DOL), and Environmental Protection Agency (EPA).



Policy Recommendations

Improve public health through increased resilience in the human microbiome early in life

Recent Federally supported scientific campaigns, such as the Human Microbiome project and the Earth Microbiome Project, have revealed new information and increased our understanding of the interconnectedness of the human gut and soil microbiome. Early evidence suggests that strengthening the gut microbiomes in the first three years of life is especially important for improving short- and long-term health outcomes. Exposure of children to the soil microbiome influences composition of their gut microbiomes and development of their immune systems. The soil microbiome also affects nutrient density in food and has been shown to shape animals' gut microbiomes, suggesting the soil microbiome has profound influences on human health, directly and indirectly. Further research is needed to establish the intimate connections between environmental microbiomes and human health and generate actionable findings.

The White House Office of Science and Technology Policy should develop a Federal Action Plan to Protect Children's Microbiomes to connect soil science to healthcare policy. The plan should draw on actionable research to identify ways in which policy and practice can improve health outcomes and nourish microbiomes. The Action Plan should investigate microbiome harming chemicals in soil and food products, diet and nutrition for expecting mothers, and additional federal leverage points (such as early childhood development programs) where microbiome health can be protected and enhanced.

Relevant agency cooperation: HHS, EPA

Redefine nutrition for the 21st Century

New evidence shows that the macronutrient and micronutrient profiles of a food can differ based on many variables, including how that food was grown. Federal agencies need to redefine human nutrition to include consideration of these variables: i.e., by examining micronutrient nutrition, nutrient bioavailability, and related microbiome factors when issuing nutrition guidelines or policies. Taking these factors into account for nutrition will help to align health, food, agriculture, and environmental policy. The USDA's dietary guidelines advisory committee will need additional funding, cross-sectoral coordination or mandates, and authority in order to update the Dietary Guidelines for Americans (DGAs) with best-in-class science.

Relevant agency cooperation: HHS

Increase nutritional training for healthcare professionals

Despite the common understanding that healthy food is a foundational component of human health, healthcare professionals receive shockingly little nutritional training. For example, less than 20% of medical schools require any coursework on nutrition and most

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medical students receive less than 25 hours of nutritional training in their four years of medical school (and even this amount has declined in recent decades). Physicians and other healthcare professionals are thus missing essential knowledge that could dramatically improve outcomes for their patients.

Over the past few years federal entities including the National Institutes of Health (NIH) and the National Heart, Lung, and Blood Institute, along with non-governmental organizations such as the American Heart Association and the American Medical Association, have collaborated to create recommendations for improving nutrition education for healthcare professionals. The federal government could help usher in dramatic changes to nutrition education by dramatically increasing funding for research priorities identified through this and similar collaborations. In particular, research is needed to assess what kind of nutrition education for healthcare professionals is most effective in changing typical healthcare practice.

Relevant agency cooperation: Ed, NIH

Fund research on the health benefits of nutrient-dense foods

Humans need specific macronutrients and micronutrients for all bodily functions. Every muscle movement, every brain wave, and every immune-system reaction depends on having the right nutrients available in the body to function properly. Humans primarily get those nutrients from the food they eat. Unfortunately, due to soil depletion, foods are becoming less nutritious. Many experts attribute this to conventional farming practices that strip soil of its own nutrients and thus degrade the nutritional quality or “nutrient density” of food.

In stark comparison, regenerative agriculture practices have been shown to vastly improve the nutrient density of foods. It is already well established that a “healthy diet” can improve health outcomes. It stands to reason that incorporating more nutrient-dense foods into a healthy diet can even more efficiently and effectively improve human health outcomes. This is an exciting and promising supposition that could not only bolster the regenerative-agriculture movement but could transform the very way we approach healthcare in the United States. The NIH and other research-funding agencies should invest significant resources in exploring connections among regenerative agriculture, nutrient density, and human health outcomes. Actions could include creating an interagency commission and research-funding pool dedicated to the topic.

Relevant agency cooperation: NIH



Expand Acceptance of SNAP & WIC Vouchers through the Online Purchasing Pilot

The SNAP and WIC programs provide important sources of funding for lower-income individuals to purchase food. The roll-out of the SNAP Online Purchasing Pilot was accelerated by COVID-19. However, the pilot currently only supports a few large national retailers (such as Amazon and Walmart) and disproportionately benefits industrial agricultural giants employing standard soil-depreciating practices.

Through a cooperation agreement with the National Association of Farmers Market Nutrition Programs, the USDA created and launched access to the SNAP Mobile Transaction Processing Application. This program provides equipment and technical assistance to farmers who want to accept EBT/SNAP benefits at farmers' markets. However, the program has been slow to roll out support for direct sales by farmers, especially for online orders.

The SNAP Online Purchasing Pilot should be expanded to include direct sales from farmers. One way to achieve this efficiently would be to include direct sales from farmers on Amazon and Walmart storefronts. This would have the effect of shortening food-supply chains, increasing access to fresh and local food in underserved communities, creating larger markets for small farmers, and providing a new example of public-private partnerships that increase farmers' access to online storefronts and provide farmers with technical assistance in managing supply-chain logistics.

Relevant agency cooperation: None

Develop mobile meal-distribution models for the National School Lunch Program

Each day, the National School Lunch Program (NSLP) serves 30 million students in 100,000 schools. Since the COVID-19 pandemic began, many of those students have not received the two meals a day from school that many of them rely on to provide daily nutrition. Losing access to these meals has also increased the economic burden on low-income households. Compounding the issue is the fact that school-bus drivers, bus mechanics, and public-school food-service providers are mostly out of work. These problems can be addressed at once by retrofitting and redeploying buses as mobile meal-delivery vehicles. This initiative will create jobs for mechanics to modify vehicles, reemploy public school workers to serve meals from mobile sites, restart farm-to-school supply chains, and provide healthy, nutritious meals to income-compromised families.

Relevant agency cooperation: Ed, DOL

Expand funding for universally free “climate-friendly” school meals

The USDA should establish new guidelines that prioritize school purchasing of “climate-friendly” foods as well as foods from producers that demonstrate their farming practices



provide a net benefit to soil health. In addition, the White House should work with Congress to expand the Healthy, Hunger-Free Kids Act to include an *additional* 6-cent payment for “climate-friendly” foods that help reduce diet-related diseases and are in alignment with recently released 2020 nutritional standards. Finally, the Food and Nutrition Service should eliminate income “burdens of proof” for all families to enroll in the NSLP.

Relevant agency coordination: EPA

2.0 Centering Resilience in Agriculture

2.1 Developing an innovation agenda for inclusive agriculture

Background

Continued innovation and investment in the agricultural sector and agricultural technology (AgTech) are critical to an equitable post-COVID recovery that meets the increasing population's food needs. However, innovation at USDA has been largely confined to advances in biotechnology, pesticides, and the deregulation of their application. Little support has gone towards research into long-term impacts of biotechnology and pesticides on human and ecosystem health.

Additionally, in the absence of a broad and cohesive federal innovation agenda, the rapidly growing AgTech sector is splintering into niche markets that fail to address the needs of many farmers today. By designing *for* farmers rather than *with* farmers, many new AgTech businesses wind up producing products and services that sound good in the pitch room but don't meet the diverse needs of farmers. Part of the issue is that we as a nation tend to invest in technological innovation without commensurately investing in the technological capacity of end users. In agriculture, the result is a tech-literacy gap that makes it difficult for small, independent farms to take advantage of emerging agricultural technologies and market opportunities.

It is time to redirect our innovation systems toward agriculture that balances conservation, human health, and high yields while restoring and revitalizing ecosystems. Across the value chain—from seed genetics that strengthen inputs to advanced harvesting and processing technologies that make more efficient use of outputs—investments need to shift from a quantity-focused food system that depletes the land of nutrients to a quality-focused food system that supports farmers, restores soil health, and jump-starts a supportive entrepreneurial ecosystem.

Policy Recommendations

The policy recommendations that follow present opportunities for USDA to cooperate with the following federal agencies and their operating divisions: the National Aeronautics and Space Administration (NASA), Small Business Administration (SBA), Department of Energy (DOE), Department of Labor (DOL), Department of the Interior (DOI), Department of Defense (DOD), and U.S. Geological Survey (USGS).

Create a Regenerative Agriculture Advanced Research Projects Agency (RA-ARPA)

Whether deployed by agencies, national labs, universities, or through the private sector, federal research dollars have consistently overlooked the science, technology, and broader innovation needs of the sustainable and regenerative agriculture sector, especially as those needs relate to equity. To improve soil health, innovations are needed across big data,



plant breeding, robotics, artificial intelligence and machine learning (AI/ML), sensors, satellite imagery, aeronautics, material science, and more. Establishing a Regenerative Agriculture Advanced Research Projects Agency (RA-ARPA)—modeled on similar existing institutions such as the recently established Advanced Research Projects Agency–Climate (ARPA-C)—could help accelerate such innovations and rapidly advance the shift to a more resilient agricultural sector. RA-ARPA could also help promote increased equity across the broader agricultural sector by explicitly focusing on innovation that meets the needs of underrepresented groups, such as young and beginning farmers and entrepreneurs, members of the BIPOC community, veterans, and Indigenous people.

Relevant agency cooperation: DOD, DOE, NASA

Create an Office of Innovation at the USDA

Grants that support entrepreneurs and new approaches to farming, conservation, and research are distributed across the USDA. However, grant programs are poorly coordinated and often compete for limited agency funding despite working towards the same goals. Additionally, the term “innovation” is often taken to refer to AgTech and biotechnology almost exclusively. Systems management and alternative farming practices should be included under the innovation umbrella. An Office of Innovation at the USDA would take a more expansive approach to agricultural innovation investments, applying an ag/food systems lens to prioritize innovative approaches that balance conservation, human health, and high yields while restoring and revitalizing ecosystems.

Relevant agency cooperation: None

Create an open and shared national database of agrobiodiversity characteristics and farmland management

The siloing of the U.S. government makes it difficult to share, learn, and assess risks and opportunities in economic sectors that span multiple agencies. Our natural landscapes, agricultural landscapes and human health are inextricably linked, yet current policies do not always reflect those linkages. Comprehensive understanding of threats to human health and biodiversity—and connections among those threats—requires accurate, transparent, and traceable data. Fortunately, advances in remote sensing and precision agriculture make it possible to observe a variety of properties at a much higher resolution than ever before, and to make these data actionable.

Similar to the “Experimental Forests and Ranges” program at the U.S. Forest Service, on-farm Conservation Innovation Grants within National Resource Conservation Service, the Agricultural Research Service Long-Term Agroecosystem Research, and ARPA-E’s Rhizosphere Observations Optimizing Terrestrial Sequestration program, the USDA should

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create a robust network of 1,000+ agricultural/farmland sites across the United States—organized along single latitudes, regional clusters, or socioeconomic profiles—to identify and track plant species, chemical pesticides, air quality, soil structure, pollinator health, and other agrobiodiversity indicators at each site. These data should be integrated into the first-ever open dataset of ongoing agrobiodiversity trends to be used for real-time risk management. Receipt of certain types of federal agricultural support (e.g., crop insurance and Farm Bill conservation programs) could become contingent on collection and provision of such data.

Relevant agency cooperation: NASA, DOI, USGS

Develop right-sized technology and tech-literacy programs for farmers

AgTech has been one of the fastest-growing sectors for the past seven years. Investment increased by 6.8% year-over-year to \$4.7 billion in 2019, roughly 370% more than in 2013. Simultaneously, the term “AgTech” has become unmanageably broad. AgTech now encompasses not only agricultural-specific technologies such as precision irrigation and smart sensors, but also farm technologies designed to increase crop yield, reduce losses, and increase resource efficiency as well as food supply-chain technologies designed to streamline processes along the food supply chain.

As agriculture has become increasingly technologized, tech literacy has become increasingly critical to farming success. However, in the absence of a broad innovation and entrepreneurship agenda that addresses the needs of all farmers, private-sector-led advances in AgTech are targeted at the largest industrial producers and leave many small farmers behind. Farmer aging, lack of access to capital for system upgrades, and an absence of tech-training programs all widen the tech-literacy gap, further restricting small and midsize farmers from participating in emerging, tech-heavy agricultural markets and business opportunities.

Programs and policies are needed to assess the tech needs of small and mid-size farmers, identify interventions that could educate older farmers in tech and entrepreneurship, and attract a new generation of digital-natives to farming and ranching. Such programs and policies could be implemented as part of the USDA Rural Development Business Services. In addition, regional technology and entrepreneurship hubs could help maintain the viability of smaller farms by building connections between younger and older farmers, facilitating co-design of products and services that meet the needs of smaller farms, and narrowing the tech-literacy gap for farmers across the board.

Relevant agency cooperation: SBA



Translate emerging trends in entrepreneurship into actionable intelligence

To advance the innovation agenda, USDA's Rural Development Business Programs could partner with agriculture industry analysts and researchers to study patterns in entrepreneurship and emerging technology in agricultural practices and farm management. Data and insights from such studies could be translated into informed policies that effectively support agricultural entrepreneurship. Outputs from these partnerships could also be used to improve USDA support for agricultural innovation and entrepreneurial farmers, as well as to create new business opportunities in sustainable agriculture. Programmatic support for these activities could be provided under the existing mandate of the USDA Office of Partnerships and Public Engagement.

Relevant agency cooperation: DOL, DOI, SBA

2.2 Developing and protecting a resilient food supply chain and robust labor market

Background

COVID-19 and the increasing occurrences of extreme climate events provide compelling arguments for a decentralized and federally supported food and agriculture infrastructure system that makes farmers and farmworkers better able to withstand major shocks. Recent pandemic- and climate-related supply-chain disruptions exposed risks of market consolidation in the food system and underscored reliance on immigrant workers to provide essential services across all aspects of the food and agriculture industry. Immigrant frontline workers play critical roles in food and agricultural systems but are all too vulnerable because of their immigration status. Policies can and should strengthen protections for these essential workers.

Farmers were struggling even before the pandemic. Rising production costs and increasing international competition constricted export markets. Many aging farmers are land-rich but cash-poor. With the pandemic triggering the largest economic downturn in a century, further corporate consolidation of land is likely. While many young people are eager to be closer to the land and more connected to their food supplies, geographical and socioeconomic barriers prevent newcomers from getting started. The capital cost of farmland is high, and farming practices like agroforestry, soil regeneration, and companion planting require knowledge in hydrology, geology, biology, and botany: not to mention the business skills needed to run a financially stable farm. Educational institutions are not set up to deliver advanced, multi-disciplinary agricultural management degrees. These factors together have led agricultural economists to predict a rise in farm bankruptcies across the United States. The upshot will be further consolidation of agribusiness and a commensurate increase in national exposure to consolidation-related risks.



Re-investment in rural America should kick-start a diversified, distributed agriculture that is aligned with the long-term health of people and the planet. By establishing a decentralized, federally funded but state- and regionally operated food-processing infrastructure, local food systems could increase resilience to shocks that disrupt private-sector food conglomerates, reduce greenhouse-gas emissions by localizing food supply chains, and increase market competition for non-commercial small-holder farmers. Finding ways to put millions of Americans back to work restoring the land, protecting small farms and farmworkers, making the farming profession a viable option for middle-class families, and creating multi-disciplinary training programs that educate farmers in how to grow food and restore ecosystems will be imperative to creating a resilient food supply chain and ensure a healthy labor force.

Policy Recommendations

The policy recommendations that follow present opportunities for USDA to cooperate with the following federal agencies and their operating divisions: the Department of Homeland Security (DHS), Department of Health and Human Services (HHS), Department of Energy (DOE), Department of Labor (DOL), Department of the Interior (DOI), Department of Defense (DOD), Department of State (DOS), and U.S. Geological Survey (USGS).

Support diversified and regional processing infrastructure for food system resilience

The Cybersecurity and Infrastructure Security Agency, should update the 2015 National Infrastructure Protection Plan (NIPP) Food and Agriculture Sector-Specific Plan to include a new priority action of establishing a resilient food-processing infrastructure to protect the sector from manmade and natural disasters, increase system resilience and recovery, and engage local and regional food systems in developing localized distribution models.

In 2006, the Department of Homeland Security developed the NIPP, a comprehensive risk management framework that clearly defines critical-infrastructure protection. In 2010, the agency partnered with the USDA, FDA, and HHS to develop the first Food and Agriculture Sector-Specific Plan. The 2015 update to the Plan describes five priorities that help further the goals of protecting food and agriculture infrastructure from manmade and natural disasters. But while the report acknowledges the vast interdependencies within the food supply and distribution chains, it falls short of providing a plan for back-stopping those supply chains in case of a national emergency.

Relevant agency cooperation: DHS, FDA, HHS

Extend frontline-worker protections to food supply chain workers

Congress must create legal definitions of “frontline workers” and “essential industries” to designate how federal benefits and protections will flow to individuals and companies. These definitions should specifically include for food and agriculture supply chain workers.



During the COVID-19 pandemic and other future crises, Congress should establish emergency funding packages that deliver expanded health and life insurance, priority provision of protective equipment, and guaranteed sick leave, hazard pay, and child care to food supply chain workers.

In addition, the President should issue an Executive Order that prioritizes and expedites work visas for immigrant frontline workers within the food supply chain. This category includes but is not limited to farmworkers, workers in food-processing plants, and foodservice providers.

Relevant agency cooperation: DoL, DOS

Expand the USDA Value-Added Producer Grant

While technical and financial support for local and regional food systems increased in the 2018 Farm Bill, there is still comparably little support for small, sustainable farms providing healthy food in communities where most people live. Expanding(1) the Local Agriculture Market Program to \$100 million annually to support the Local Food Promotion Program, the Farmers Market Promotion Program, and the Value-Added Producer Program; and (2) the Community Food Projects to \$10 million annually will provide much-needed support to strengthen local and regional, equitable, and resilient food systems.

Relevant agency cooperation: None

Develop online advanced-degree programs to prepare farmers for sustainable agriculture

Leveraging the Federal Communications Commission (FCC)'s recent \$9 billion dollar investment in rural broadband (5G Fund), the USDA National Institute for Food and Agriculture, in partnership with universities and research institutions, should develop a grant program to develop a structured, online, 2–3 year advanced-degree program to prepare farmers for successful careers on the land. This training, accompanied by mentorship, access to cutting-edge research, and farmer-to-farmer support networks would effectively train and support those interested in agriculture for their transition into the sector. The degree program would take an expansive view of agriculture, going beyond agriculture science into business administration and regenerative farming practices. Development and implementation of the degree program could be funded by the USDA Agriculture and Food Research Initiative (AFRI) Education and Workforce Development Program.

Once the degree programs are operational, USDA should reimburse farmers who complete these programs and continue to farm for a minimum of three years. This could act as a



mechanism to attract young people and those without previous farming experience into agriculture.

Relevant agency cooperation: Ed

Develop a national Farmer-to-Farmer program

Under the approved Next Generation in Agriculture Act, and funded by the 2018 Farm Bill's Farming Opportunity Training and Outreach program, the USDA should create a domestic version of the USAID farmer-to-farmer program that partners new farmers with retired farmers or farmers considering retirement. Such a program would create a “pipeline for purpose” for retiring farmers and for newcomers. The program could also help match farmers who would like to retire their lands with interested successors committed to preserving farmland. Finally, the program could support agricultural apprenticeship initiatives that work across generations of farmers and food-system-focused business accelerators to provide new markets for farm outputs.

Relevant agency cooperation: None

Create a “Farm Hands” service program within a Climate and Conservation Corps

Establish a 21st-Century Conservation Corps as an implementation arm of the Great American Outdoors Act. The Conservation Corps could provide useful work experience for young un- and under-employed Americans, restore and revitalize millions of acres of vulnerable farmland, and secure economic futures for a generation. Members of the Conservation Corps could assist in putting conservation practices into effect on private, public, and land-trust-owned lands

Relevant agency cooperation: DOI

3.0 Reforming Agriculture and Food-System Finance

Background

Increasing soil health through regenerative farming increases nutrient density in food, sequesters carbon, generates more reliable crop yields, and enhances resilience to economic shocks. However, current requirements in crop insurance and farm finance limit farmers' ability to diversify their crops, experiment with alternative farm-management practices, and modify inputs.

Farmers should be rewarded, not penalized, for practicing good land stewardship that adds benefits across the value chain. To financially incentivize farms to move towards more climate- and ecosystem-friendly management systems, USDA and other agencies have multiple policy avenues to offset costs of alternative management practices and appropriately compensate farmers for the wide range of public benefits that an agriculture more focused on soil health provides.

Listed below are key actions that USDA and other federal agencies can take to ensure healthy farm futures. While USDA is the main federal gateway for supporting the agriculture industry, many other sectors and government institutions bear the economic burdens of today's agricultural system. Creative interagency solutions are available to appropriately account for the costs and benefits of different farming practices and to search for innovative and equitable solutions to pressing agricultural challenges.

Policy Recommendations

The policy recommendations that follow present opportunities for USDA to cooperate with the following federal agencies and their operating divisions: the Security and Exchange Commission (SEC), Commodity Futures Trading Commission (CFTC), and U.S. Department of the Treasury (USDT).

Create a National Regenerative Agriculture Green Bank

Public and quasi-public Green Banks have been successful at utilizing public funds to catalyze private investment in the renewable energy sector. These innovative structures have not yet been applied to agriculture. Public financial support could not only help to recruit additional capital to grow the positive climatic, health, and rural economic benefits of a more regenerative agriculture but could also prime other parts of the farm financial sector to begin investing in these critical transitions. Legislation ([H.R. 5416](#) and [S. 2057](#)) has been introduced that would stand up and capitalize a national climate-oriented Green Bank using \$35 billion of federal dollars. This proposed legislation can be used to model how a Green Bank for regenerative agriculture might be constructed and supported.



Establish “Climate Stress Tests” and other mechanisms to prepare agriculture financing for climate-related risks

Agriculturally focused banks need assistance to improve their support of farmers and ranchers in mitigating and adapting to climate change through agricultural activities. Bank stress tests are common tools used to assess how a bank will respond to a crisis, but there are not yet stress tests for the scientifically proven risks of climate change and land degradation associated with current agricultural activities. The USDA’s Economic Research Service and Farm Credit Administration should establish a commission to assess these risks and develop new federal guidelines and programs to help banks create climate stress tests, mitigation- and sequestration-oriented lending guidelines, technical assistance, and planned retirement of stranded assets.

Relevant agency cooperation: SEC, CFTC, USDT

Eliminate the requirement of borrower “graduation” to commercial credit

The FSA’s standard of practice is to push borrowers towards commercial credit, which often forces those buyers prematurely into terms that their operations cannot support. The Secretary of Agriculture has significant authority to provide flexible terms to FSA lending. Acting to eliminate borrower “graduation” from the FSA will set the stage for longer-term positive relationships with agricultural capital providers that will not only benefit producers, but taxpayers and the nation as well.

Relevant agency cooperation: None

Create a Mission Investor Guarantee Pool Amendment to the CDFI Bond Guarantee Program

Expanding access to the type of capital available through the Farm Credit System would be transformative to the agricultural sector. As such, the federal government should ensure that Community Development Financial Institutions (CDFIs)—institutions that employ a more flexible, customer-based approach to consumer finance—have adequate access to capital to provide credit for the growing number of farmers who aren’t a good fit for other agricultural lenders. For instance, CDFIs meeting established collateralization criteria could be granted access to low-interest, long-term loans such as those offered through Farmer Mac, Farm Credit Associations, and others. Including a component in this amendment to establish a Mission Investor Guarantee Pool backed by social-impact investment funds could leverage taxpayer dollars at up to 100:1.

Relevant agency cooperation: USDT



Provide tax incentives for investment in regenerative farms

Various states and countries have incentives for investments in early-stage and local businesses. These incentive programs could be expanded and directed towards regenerative agriculture. One such program is the United Kingdom's Seed Enterprise Investment Scheme (SEIS), which provides accelerated tax deductions for investment in early-stage startups. In the United States, Michigan's Senate Bill 924 proposed a 50% Michigan Tax Credit for any Michigan resident making an eligible investment in a Michigan business. At the federal level, the 2017 Tax Cuts and Jobs Act established large tracts of rural agricultural land as "opportunity zones" in order to spur economic development. Capital gains on qualified opportunity zones are deferred on investments that are held for at least 10 years. The next round of regulations for opportunity zones could expand the definition of "qualified lenders" and provide additional benefits for investment in regenerative or sustainable agriculture farms and rural food-system businesses.

Relevant agency cooperation: USDT

Expand the Aggie Bond Program

Aggie Bonds are an existing federal-state partnership that allows private lenders to receive federal and state tax-exempt interest on loans made to small and mid-size beginning farmers. The program could greatly increase the amount of capital available to regenerative farms, but it has been inefficiently executed. Many states do not support the program, and many of those that do have not developed a streamlined process for implementation. The federal government could nationally scale working processes from the few states with functioning programs. This in turn would increase financial inclusivity and lower the cost of capital for small and beginner farmers, making it easier for such farmers to bear the upfront costs of regenerative farming.

Relevant agency cooperation: None

Build incentives into existing loan-guarantee programs

Existing federal loan-guarantee programs were designed to mitigate risk and ensure fair access to credit. They have worked at the former but failed catastrophically at the latter. Federal loan guarantees offer up to 100% protection for lenders—virtually eliminating risks for banks—but provide little protection or guardrails for borrowers. The federal government could amend existing programs to benefit borrowers by, for instance, subsidizing interest payments and offering higher guarantee percentages to lenders in exchange for better terms for borrowers.

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With respect to farming specifically, the FSA's direct and guaranteed conservation loans are not used to the extent they could be. Through existing authorities, new legislation, and/or changes to the next federal farm bill, the FSA could modify or create new direct loans and loan-guarantee programs that are better aligned with the needs of farmers and ranchers integrating regenerative practices into their operations.

Relevant agency cooperation: USDT

4.0 Reconnecting ecosystem services with agricultural production

Background

Research demonstrates that systems managed with regenerative practices exhibit higher economic value over time than traditional practices and provide multiple co-benefits. When well managed, farms and ranches can provide food, feed and raw materials while enhancing the “ecosystem services” of the farmland. In California, a few ranching operations are employing regenerative practices that restore degraded soils in order to store more carbon, revitalize wildlife habitats for native species, and increase agricultural yields. This practice is also improving environmental quality by reducing application and runoff of harmful chemicals from conventional pest treatment and by providing habitat that is helping to restore an endemic butterfly population.

By contrast, the high volumes of synthetic pesticides and fertilizers used by industrial agriculture to control pests and artificially maintain soil fertility suppress vital ecosystem services—when not disrupting those services entirely. This not only reduces the capability and capacity of farms to produce enough food in the long term, but also costs taxpayers billions of dollars each year in terms of downstream environmental degradation and associated long-term health and climate consequences.

Yet there are no significant federal incentives recognizing the societal benefits that well-managed agricultural lands can provide to the economy and the environment. Current commercial practices, markets, and financing mechanisms in the United States neither account for these benefits services nor support farmers who want to apply practices that are better for society. Farmers interested in regenerative agriculture are often discouraged by the lack of (1) mechanisms to finance the upfront time and costs needed to transition, (2) educational resources and technical support, and (3) markets for ecosystem services or related products.

The federal government can act to ensure that assessment and management of agricultural production is no longer artificially divorced from the essential ecosystem services with which agriculture is inextricably linked. A true-cost/benefit approach could be used to evaluate how much value ecosystem services can provide and how much money such services can save—at both the farm and societal levels. A clear understanding of these economics should drive how farmers are compensated and what they are compensated for, spur market development for ecosystem services associated with agriculture, and normalize sustainable agroecology stewardship practices.



Policy Recommendations

The following policy recommendations fall under the purview of the USDA.

Design incentive payments to enhance climate resilience and build pathways to a net-zero-carbon future

Numerous efforts seek to quantify the carbon benefits of different practices through expanded metrics (such as carbon sequestration) and verification mechanisms (such as satellite data and in-situ monitoring). But the most demonstrably beneficial practices are not yet supported by federal incentives.

USDA can economically support farms of all sizes and types to build economic resilience and mitigate climate change through a variety of financial supports. First, USDA could incorporate net greenhouse-gas emissions (or a series of management actions as a proxy for net emissions) into formulas for deciding how much financial assistance to offer to farmers. The agency could manage assistance payments via a structure similar to a revolving loan fund. Specifically, farmers would pay USDA back only if they find a buyer for their ecosystem and climate services (e.g., buyers in voluntary carbon markets). If services are provided but no buyer is found within a certain time, then no repayment would be required. USDA could look to the private sector to help aggregate payments to farms, thereby avoiding a farm-by-farm approach.

Second, USDA could support development of a carbon or ecosystem-service market for agriculture-based solutions by creating a floor price or guarantee that farms will be paid for certain outcomes—by either the government or by potential future buyers (e.g., buyers in voluntary carbon markets). This financial backstop would assist farms by providing financial bridges to cover upfront costs of implementing sustainable practices while also ensuring that farms are ultimately paid for the ecological and climate services they deliver.

Create “Good Farmer Discount” incentives for crop insurance

The Federal Crop Insurance Corporation, in partnership with the Environmental Quality Incentives Program and the Risk Management Agency, could scale up and broaden the scope of the “Good Farmer Discount” demonstration program. Specifically, the program could provide crop-insurance discounts or better loan rates on capital for transitions and expansions to farmers interested in or currently using regenerative farming practices.

This approach would encourage provision of agriculture-associated ecosystem services while balancing short-term crop production with long-term soil health. It would also increase competition in the insurance marketplace, diversify client portfolios, and give farmers greater choice in how they manage risk. Over time, rewarding regenerative farming



in this way could also reduce weather-related crop losses and insurance claims by increasing farm resilience.

Expand support for perennial and continuous living-cover systems

USDA supports a wide range of crops and practices through research, extension, technical assistance, and outreach programs. Yet these programs have failed to meet the needs of producers using perennial crops and continuous living-cover systems, which have been shown to improve soil health, sequester carbon, and enhance water quality but often require specialized expertise and lengthier programmatic periods.

The National Institute of Food and Agriculture should develop a competitive research and extension grant program to support producers adopting living-cover systems. This new program would fund scientific research and extension activities, technical assistance, and outreach. In parallel, the Risk Management Agency should develop insurance products for living cover systems, as well as underwriting criteria and specialized loan products for use by the Farm Services Agency and Farm Credit Associations. Encouraging living cover will not only yield significant returns for the environment, but will also help farmers diversify revenue sources during a time of increasing instability in global markets.

Develop agroforestry hubs

Agroforestry offers the highest carbon sequestration potential among climate-friendly practices on a per-acre basis, and provides multiple additional benefits for farmers and rural communities. Yet there are few agricultural consultants or extension officials in the United States with the training and expertise necessary to help farmers plan for and implement agroforestry practices. Building on the success of extension, technical assistance, and outreach efforts conducted by the National Agroforestry Center and The Center for Agroforestry, USDA should establish regional agroforestry centers in each of the 12 major ecoregions of the United States. These regional agroforestry hubs would help farmers implement agroforestry plans and would support development of new markets for agroforestry. The hubs would work closely with and provide resources to Council of 1890s institutions and tribal land-grant institutions to ensure the communities they serve are able to benefit from agroforestry's financial and environmental benefits.

Fund local providers of organic technical assistance

Sales of USDA-certified organic food in the United States total over \$50 billion a year and have one of the highest category growth rates across food and agriculture. Yet the technical-assistance resources available to organic farmers, or farmers interested in transitioning to organic production, are extremely limited. To strengthen the support system for organic farmers, Natural Resources Conservation Service (NRCS) programs in every state and region should establish a program to help farmers transition to organic practices

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and provide support to existing organic farmers. In addition, USDA Agricultural Marketing Service should establish a commission to evaluate ecosystem services delivered by organic production and recommend policies to reward and incentivize these services.

5.0 Securing just and equitable land acquisition and ownership

Background

Farmland ownership is highly consolidated and racialized due to a history of dispossession and disenfranchisement of Black people, Indigenous people, and other people of color (BIPOC) communities. There is racial disparity between those who labor on the land and those who profit from it. Over 60% of farmworkers are people of color, largely Latinx. Meanwhile, White people own 98% of all farmland, about 50 times the number of acres owned by people of color. It is estimated that 400 million acres of land will transition ownership by 2030. Without financial-accountability mechanisms that support young, beginner, small (YBS) and BIPOC farmers, there will be further consolidation of industrial farms and practices—threatening food and nutritional security. Creating equity in land access and innovation is central to reestablishing practices for increasing the health of agro-ecological systems and securing equitable food futures.

While there are specialized funds earmarked for these “socially disadvantaged” (as defined by USDA) farming communities, a recent [report](#) from the Government Accountability Office demonstrates that little has changed in USDA’s discriminatory lending practices. From 2015 to 2017, socially disadvantaged farmers represented 17% of primary producers, but only 8% of total outstanding farm debt. The Farm Credit Administration’s (FCA) YBS mission does not have a regulatory-enforcement mechanism that would, like the Community Reinvestment Act (CRA), provide accountability to fulfill its statutory obligations. Additionally, Black-owned farms have decreased by 80% since 1910 because of predatory “Heir’s Property Laws” and inequitable access to loans and insurance products.

Following the leadership of organizations and individuals in BIPOC communities, additional programs should be developed that provide every American with access to land, financing, education, technical assistance, and capacity building. Such programs could include land-accessibility and -security grants, subsidies and incentives, legal aid, and alternative landholding and tenure systems. Such programs must have enforceable objectives and targets in order to maintain accountability.

Policy Recommendations

The policy recommendations that follow present opportunities for USDA to cooperate with the following federal agencies and their operating divisions: the Department of Justice (DoJ), U.S. Department of the Treasury (USDT), and Department of the Interior (DOI).

Expand and create Farm Credit Administration (FCA) programs that increase BIPOC access to, and representation in, the food and agriculture sectors

USDA should provide discretionary funding to the Advisory Committee on Minority Farmers to create farming opportunities with and for BIPOC through policy reforms and programs



that recognize the unique challenges faced by these communities. In addition, the FCA should update the YBS lending program to include BIPOC as a fourth category that can benefit from YBS programs. This can be accomplished through a direct revision to Book Letter 040. Finally, Congress should establish CRA-type regulations that hold the FCA accountable to fulfill its statutory obligations of equitable investment into “socially disadvantaged” communities.

Relevant agency cooperation: None

Expand farmland conservation programs to include “Fee Acquisition of Farmland”

Natural Resources Conservation Service (NRCS) and the Commodity Credit Corporation (CCC) should amend the U.S. Farm Bill’s Agricultural Conservation Easement Program and Agricultural Land Easement Program to allow direct purchase of farmland by land trusts that convey long-term secure-lease tenure to farmers, and that require agroecology stewardship practices and production for regional food systems.

The 2018 Farm Bill includes \$450 million per year for the purchase of agricultural conservation easements and agricultural land easements. These programs help to preserve farmland in states across the country but do not go far enough in preserving farming or food systems since they do not ensure affordable, secure land access for farmers. Acquisition of farmland by land trusts focused on land access for next-generation, YBS, and BIPOC farmers will directly support viable regional food systems close to population centers. Expanding the annual budget of the Agricultural Conservation Easement Program by 1/3 will significantly increase the long-term impact of the Farm Bill on land and food security.

Relevant agency cooperation: None

Expand support for the Farming Opportunities Training and Outreach (FOTO) program

FOTO is the combination of the Beginning Farmer and Rancher Development Program (BFRDP) and the Outreach and Assistance to Socially Disadvantaged and Veteran Farmers and Ranchers Program (2501 Program). USDA’s National Institute of Food and Agriculture administers BFRDP and USDA’s Office of Partnerships and Public Engagement manages the 2501 Program.

FOTO provides mandatory funding of \$30 million for fiscal year (FY) 2020 and increases funding annually up to \$50 million by FY 2023. Annual funding is split equally between BFRDP and the 2501 Program.



The USDA BFRDP offers education, training, outreach and mentoring programs to enhance the sustainability of the next generation of farmers. It is underfunded at current levels and should be expanded to at least double its 2023 rate, from the currently planned \$25 million per year to \$50 million per year by FY 2023.

The Outreach and Assistance for Socially Disadvantaged Farmers and Ranchers and Veteran Farmers and Ranchers Program (known as the 2501 Program) is the main program devoted to addressing past inequities between the USDA and Black farmers. This program should also be funded at double currently planned levels rate to help keep farmers on their land and to meet the needs of a growing population of new Veteran farmers.

Relevant agency cooperation: None

Increase funds for agricultural land acquisition by Native Americans

There is a growing food-sovereignty movement among Native American communities in the United States. This movement aims to create healthy, secure, economically powerful and culturally appropriate food systems for Native people. However, due to the incredibly complicated land ownership laws and arrangements in tribal communities, it is very difficult for tribes to acquire agricultural land to match their food-sovereignty aspirations.

The federal government, through the FSA, has played a role in helping tribes acquire agricultural land. But its efforts should be bolstered. The Administration should work with Congress to dramatically increase funding for the FSA's Indian Tribal Land Acquisition Loan Program and Highly Fractionated Indian Land Loan Program in the USDA budget.

Relevant agency cooperation: DOI

Redress large-scale land loss from Heir's Property Laws

Heir's property refers to lands that have been handed down through generations in the absence of formal title or will, leading to "common" ownership by all heirs whether or not they are present, maintain a relationship with the land, or pay taxes on it. The result is that land-title decisions may be determined by the state, which can lead to forced sales. According to the USDA, Heir's Property Laws have been the leading cause of Black involuntary land loss. A federally funded legal aid program, administered by the USDA and reviewed by the Advisory Committee on Minority Farmers, should be created to assist Black families in reestablishing legal ownership of "Heir's Property" and expedite title clearing, thereby helping redress generations of systematic disenfranchisement.

In addition, USDA should specifically allocate grant funding through the 2501 Program to help Black families purchase disputed family property and pay property taxes to maintain possession of land.



Relevant agency cooperation: DOJ, USDT

Contributors

Caesare Assad - Food System 6

Caesare is the CEO of Food System 6 (FS6), a food and agriculture system incubator that prioritizes social and environmental health and focuses on regionalized food production. She has worked in the food industry for over 20 years with operational experience as a chef, entrepreneur, and executive leader. Her work focuses on leveraging entrepreneurship to create healing through food and community.

Chris Adamo - Danone North America

Chris works for the public-affairs team at Danone North America, where he focuses on sustainable food policy and assists the Danone's agricultural teams with scaling regenerative agriculture strategy. Before Danone, Chris worked with the U.S. Senate and White House Council on Environmental Quality on environmental policies that focused on sustainable agriculture at USDA as well as a variety of wildlife-, water-, and climate-friendly land-management policies across the federal government.

Dan Miller - Steward

Dan is the Founder and CEO of Steward, The World's First Crowdfarming Platform™. Steward's mission is to accelerate the positive impact that regenerative agriculture will have on our health and environment. By financing and servicing small and medium-sized farmers who use regenerative practices, Steward hopes to not only help improve our soil, water, and air, but also to increase access to fresh, healthy food for the 23 million Americans currently living in food deserts.

David LeZaks, Ph.D. - Croatan Institute

David is a Senior Fellow at Croatan Institute, a nonprofit whose mission is to harness the power of investment for social good and ecological resilience. He is an environmental scientist and financial activist whose work is centered around developing innovative mechanisms for financing the transition to agroecological farming and food systems.

David Strelneck - Nourishment Cycle Economies

David has spent the last two decades helping create environmental initiatives at the intersection of the agriculture, health, industry, and food sectors in the United States and other countries. He has contributed to efforts such as EPA's approach to phasing out ozone-depleting CFCs in the automotive industry, PBS' large online kids-in-nature initiative, and the world's first wilderness webcam (launched in 2000 to encourage countries to cooperate on tropical-forest-management policy). Since 2010, David has worked intensively with social entrepreneurs (and some scientists, economists, and local communities) on approaches in business and policy at the nutritional linkage



between land/ecosystems and people/health: linkages collectively known as Nourishment Cycle Economies.

Eric Smith - Grantham Environmental Trust

Eric is an Investment Officer for the Grantham Environmental Trust. He manages a vehicle called Neglected Climate Opportunities from which the Trust makes investments and grants in businesses and technology that can biologically or mechanically sequester or mitigate greenhouse-gas emissions at scale. Eric has years of investing experience in technologies for soil-carbon sequestration and improved land use with SJF Ventures and BlackRock. Much earlier in life, Eric spent four years in Costa Rica, first as a Peace Corps Volunteer and then as a consultant with the Costa Rican government and World Bank helping to develop a “payment for ecosystem services” model.

Ian McSweeney - Agrarian Trust

Ian’s career and life’s work has been focused on the human connection to soil and food. Prior to joining Agrarian Trust, Ian served as Executive Director of the Russell Foundation, a private foundation focused on assisting landowners and farmers through customized approaches to farmland ownership, conservation, management, and stewardship. Ian has participated in many farmland and food-systems initiatives and has served as a consultant for a number of local, regional, and national organizations. Ian and his wife Liz protect their own small New Hampshire farm with a conservation easement, manage their forest as a Certified Tree Farm, lease their farmland to a Certified Natural vegetable grower, keep bees, and manage habitats with an ecological focus.

Jeff Moyer - Rodale Institute

Jeff is the Executive Director of the Rodale Institute, and is an internationally recognized pioneer in organic agriculture research. Jeff’s expertise includes organic crop-production systems with a focus on weed management, cover crops, crop rotations, equipment modification and use, and facilities design. Jeff is perhaps most well-known for conceptualizing and popularizing the No-Till Roller Crimper for use in organic agriculture. He is a past chair of the National Organic Standards Board and currently sits on the boards of Regenerative Organic Alliance (as Board Chair) and the Soil Health Institute. Jeff is a founding board member of Pennsylvania Certified Organic and past Founder and Board Chair of The Seed Farm, a new-farmer incubator project.

Jo Handelsman, Ph.D. - Wisconsin Institute for Discovery

Jo is the director of the Wisconsin Institute for Discovery, an interdisciplinary institute for scientific research and innovation. She previously served as Associate Director for Science in the White House Office of Science and Technology Policy under President Obama. Her areas of expertise are microbiology, diversity in STEM, and STEM education.

**Mandy Ellerton - Independent Consultant**

Mandy recently left a successful career in philanthropy and impact investing to focus on transforming healthcare and agricultural systems to dramatically improve human health and environmental health. Mandy spent the last nine years at the field-leading Bush Foundation in St. Paul, Minnesota, where she played an instrumental role in investing nearly \$80 million in a wide variety of social-innovation projects. Prior to that, Mandy worked at Grassroots Solutions, a national grassroots organizing strategy firm, where she designed movement-building and advocacy strategies on a variety of topics and for a variety of clients. Mandy is a trained social worker and nutritional therapy practitioner and splits time between Minneapolis and the family farm in central Minnesota.

Ma'raj Sheikh - Chicago Food Policy Action Council

Ma'raj is a daughter of immigrants, descendent of liberation leaders, and a Castanea Fellow. Land, food, and justice are in her blood. Ma'raj has worked across many areas of food system development including soil bioremediation, bioenergy, stakeholder relations, consulting in the edible insect industry, and advancing racial equity in land, food, and water access. As a National Science Foundation Fellow, Ma'raj moved to Iowa from Southern California to study Sustainable Agriculture and Community and Regional Planning at Iowa State University. Prior to starting at CFPAC in January of 2020, Ma'raj served as Director of Equity and Community Engagement at Community GroundWorks, where her work focused on improving stable land tenure for Hmong refugee farmers and leading Gardens Network, a partnership with the City of Madison and UW-Extension, that provides support services to a member base of 65+ community gardens across Dane County, WI.

Mark Muller - Regenerative Agriculture Foundation

Mark Muller recently joined the Regenerative Agriculture Foundation (RAF) as executive director. RAF serves as an intermediary funder that advances agriculture grounded in soil health, ecosystems services, racial equity, and a just food and agriculture economy. Prior to joining RAF, Mark directed the McKnight Foundation's Mississippi River program. Mark has spent most of his career working to help transform our agricultural and food systems. He lives in Minneapolis and is part-owner of a farm in eastern Iowa.

Megan DeBates - Organic Trade Association

Megan is the Director of Legislative Affairs and Coalitions for the Organic Trade Association (OTA), the membership-based business association for organic agriculture and products in North America. In this capacity, she develops and implements policy strategies in the interest of OTA's mission and its members. She also engages Congress, federal and state agencies, and other stakeholder groups to further those policy goals. Prior to working at OTA, Megan served as Senior Legislative Assistant to U.S. Congressman Peter A. DeFazio (OR-04) where she advised and developed legislative strategy on agriculture, foreign affairs, international trade, natural resources, and other key issues and served as the lead staffer for the House Organic Caucus.

**Mike Lavender - Union of Concerned Scientists**

Mike is currently the senior manager of government affairs for the Union of Concerned Scientists' Food & Environment program. The program advocates on a wide variety of policy solutions necessary for a healthy, sustainable, and socially equitable food system, including scaling up the adoption of healthy soil agricultural practices. Mike previously worked as a policy analyst at the Environmental Working Group. Before that, he spent six years in the office of former Senator Herb Kohl (D-WI), where he worked on agriculture appropriations, nutrition, dairy policy, and other farm- and food-policy issues.

Nathan Rosenberg, J.D. - Harvard Food Law and Policy Clinic

Nathan is a visiting scholar at the Harvard Food Law and Policy Clinic and teaches agricultural law at the University of Iowa College of Law. His research focuses on inequality, climate change, and agriculture.

Ray Boyle - University of California, Berkeley

After more than a decade of working as an independent consultant on the future of cities and equitable urban systems, Ray is pursuing a Master's of City Planning at UC Berkeley with a dual concentration in environmental planning and urban design. Her current research focuses on translating climate science into actionable policies that shape adaptation pathways for decision-makers. As an innovation specialist with UNDP, she worked with capital cities to unpack and address the complex challenges facing regional economies due to asymmetrical impacts of migration, climate change, and technological advancements. She serves on the Board of Build It Green, helping advance a portfolio of programs aimed toward normalizing regenerative development at the neighborhood scale.

Shauna Sadowski - Independent Consultant

Shauna was Head of Sustainability for the Natural and Organic Operating Unit at General Mills, where she co-developed the company's regenerative-agriculture framework, approach, and implementation plan, helping to launch the company's first products on the market to communicate the impact and story of regenerative agriculture. She has led sustainability programs for Annie's, Cascadian Farm, Muir Glen, Epic, Fork in the Road, and Clif Bar. Through her work, Shauna helps food companies create and manage teams, systems, and programs that build brand credibility by integrating sustainability into the product-design and supply chain, with an emphasis on farming and agricultural programs to drive meaningful impact.

Sophie Egan, MPH - Full Table Solutions

Sophie is the author of *How to Be a Conscious Eater* (Workman, 2020) and the founder of Full Table Solutions, a consulting practice that's a catalyst for food systems transformation. An internationally recognized leader at the intersection of food, health, and climate, Sophie serves as Director of Strategy for Food for Climate League; Co-Director of the Menus of Change University



Research Collaborative; and Senior Advisor for Sustainable Food Systems at R&DE Stanford Dining.

Timothy Male - Environmental Policy Innovation Center

Tim founded the Environmental Policy Innovation Center in 2017. Previously, he served as an Associate Director at the White House Council on Environmental Quality, Vice President for Conservation Policy at Defenders of Wildlife, Director at National Fish and Wildlife Foundation, and Co-Director of agriculture policy at Environmental Defense Fund. His writing has appeared in the Wall Street Journal, Washington Post, Science magazine and a diversity of peer-reviewed journals.