

Rooted in Resilience

Investing in America's Lands and Communities for a Green Recovery

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COVID-19 has created particular hardship for rural, farming, and forestry communities across the US. The agriculture industry is facing significant supply chain disruptions, drops in commodity prices, labor shortages, and reductions in off-farm income.¹

The United States Department of Agriculture (USDA) estimates that US food spending has decreased significantly, down by \$12 billion from last year.² This comes at a time when farmers are already struggling — farm bankruptcies pre-COVID-19 increased 23% from the previous year and are expected to grow with COVID-19 impacts.³

Similarly, the forestry sector is facing an increasingly uncertain future. Changes in demand for housing, manufacturing, and consumer goods have led to a \$1.83 billion loss in value of delivered wood between January to April 2020.⁴ Multiple paper mill closures have contributed to the growing unemployment rate and many mill owners are scarce on supply as a result of earlier shutdowns and layoffs, even as they see an increase in demand for lumber.^{5,6} There are growing concerns around replanting efforts as changes to immigration policy and visa rollbacks have barred an entire seasonal workforce from entering the country.⁷ Additionally, firefighters have been forced to battle record-setting wildfires while maneuvering a myriad of pandemic-related complications.

Introduction (cont.)

Farming and forestry communities face unique challenges as their economic future is inextricably linked with the climate. Rural economies depend directly on reliable weather, but farmers and foresters have seen an increase in the number and severity of extreme weather events like flooding, fires, and drought as a result of climate change. We'll need both emissions reductions and carbon removal solutions to fix climate change — research from The National Academies of Sciences recommended the federal government invest billions of dollars per year in scaling up these solutions.⁸ Storing carbon in our forests and agricultural soils, one such solution, can help build resilience and reduce the near-term impact of extreme weather on land managers' bottom lines while also helping to reduce this climate risk in the future.

Good climate policy both addresses the drivers of climate change and creates an equitable economic future for communities across the country. As Congress looks to provide economic relief during the current pandemic, there are several carbon removal policies that would provide real, tangible support to agriculture, forestry, and other rural communities while helping us meet climate goals. The best climate policies reinforce and center economic development, social and environmental justice, and public health. As we move into new wildfire, hurricane, and drought seasons, it will be critical for the federal government to provide immediate support to land managers and rural communities to protect against further impacts.

Legislative packages focused on economic stimulus provide a unique opportunity to leverage US lands, from farms to forests, to recover and rebuild while also driving climate action. With that in mind, we suggest the following areas for investment:

- Expand USDA conservation programs to improve soil health and carbon storage.
- Create a network of soil carbon demonstration trials.
- Establish a national on-farm monitoring system.
- Bolster forest restoration and hazardous fuels management efforts.
- Expand reforestation efforts on public lands.
- Invest in innovative wood technologies.

The following policies span agricultural and forestry issues, and focus on expanding existing conservation programs, increasing wildfire resilience, planting more trees, and setting up the foundation for even more land-based carbon removal in the next decade.

1. Litkowski, C. & Giri, A. (2020, October). *Farms and Farm Households During the COVID-19 Pandemic*. USDA ERS.
2. Zeballos, E. & Sinclair, W. (2020, August). *U.S. Food Spending in June 2020 Was \$12 Billion Less than in June 2019*. USDA ERS.
3. Newton, J. (2020, May 7). *COVID-19 Will Likely Push Farm Bankruptcies Higher*. American Farm Bureau Federation.
4. Forest2Market. (2020, September). *BREAKING: Impact of COVID-19 on America's Forest Supply Chain*.
5. Verso. (2020, June 9). *Verso Announces Necessary Actions to Offset Unprecedented Market Decline Due to COVID-19*.
6. Dezember, R. (2020, August 6). *Lumber Futures Price Climbs to Record as Covid-19 Sets Off Building Boom*. *The Wall Street Journal*.
7. Crampton, L. (2020, July 12). *A Casualty of Trump's Immigration Policy: Millions of Trees*. *POLITICO*.
8. National Academies of Sciences, Engineering, and Medicine. (2019). *Negative Emissions Technologies and Reliable Sequestration: A Research Agenda*. Washington, D.C.: The National Academies Press.

Agriculture

Analysis from the US Farm Bureau found that decreases in the demand for agricultural commodities as well as increased market volatility due to COVID-19 have caused commodity prices to drop as much as 65% during the first three months of the pandemic.⁹ Because of climate change, farmers and ranchers stand to face significant yield decreases from increased temperatures and extreme weather.¹⁰ Combating the economic slowdown caused by COVID-19 presents a meaningful opportunity for Congress to generate rural jobs and build stronger and more resilient rural economies. In the near term, we have an opportunity to drive funding towards farmers and ranchers suffering during the pandemic through climate-forward actions outlined below. In the long term, these same policies can build resilience to climate impacts and pave the way for new agricultural markets, securing yields and agricultural prosperity for decades to come.

Rec. 1

Expand USDA conservation programs to improve soil health and carbon storage.

The National Academies of Sciences estimates that the US can store 250 million metric tons of carbon dioxide per year through agricultural practices on its farms and rangelands.¹¹ In addition to its climate impact, soil carbon storage can improve on-farm economics by increasing resilience to extreme weather, reducing external inputs like fertilizers, improving forage for livestock, and increasing yield.

Despite growing interest in soil carbon storage in many states, insufficient technical and financial assistance, among other barriers, significantly hinders the implementation of these agricultural practices. As a result, current adoption continues to fall short of a scale relevant for addressing climate change. The federal government already has several conservation programs that support agriculture producers in maintaining carbon-rich, healthy soils. However, these programs are significantly oversubscribed, especially as interest in soil carbon and soil health grows.

The federal government should increase funding for these programs to allow more farmers and ranchers to receive financial support to adopt new conservation practices that bolster soil health. Landowners and extension agents are already familiar with these Natural Resource Conservation Service (NRCS) programs, and the programmatic infrastructure for their expansion already exists. A significant increase in funding for carbon removal practices in these programs could meaningfully stimulate the economy and increase agricultural productivity.

9. Newton, J. (2020, April 7). *Coronavirus Sends Crop and Livestock Prices into a Tailspin*. American Farm Bureau Federation.

10. Fourth National Climate Assessment, Figure 7.6. (Source data: Hsiang et al 2017.)

11. National Academies of Sciences, Engineering, and Medicine. (2019). *Negative Emissions Technologies and Reliable Sequestration: A Research Agenda*. Washington, D.C.: The National Academies Press.



For more information on soil carbon storage, please see [Carbon180's soil carbon fact sheet](#).

RECOMMENDATION: Bolster the Environmental Quality Incentives Program (EQIP) and Conservation Stewardship Program (CSP). In addition to increasing funding, USDA should pair this expansion with investments in NRCS Conservation Technical Assistance in order to effectively implement them.¹²

12. Zelikova, J., Amador, G., et al. (2020). *Leading with Soil: Scaling Soil Carbon Storage in Agriculture*. Carbon180.

13. Ibid.

14. Ibid.

15. Ibid.

- **ENVIRONMENTAL QUALITY INCENTIVES PROGRAM:** Increase funding by \$975 million per year for the next five years.¹³ In addition to funding increases, Congress could consider establishing a special initiative under EQIP for carbon sequestration, similar to the existing Organic Initiative. It could also expand advance payments for costs associated with planning, design, materials, equipment, installation, labor, management, maintenance, or training typically reserved for disadvantaged or new farmers.
- **CONSERVATION STEWARDSHIP PROGRAM:** Increase funding by \$480 million per year for the next five years.¹⁴ To increase continuity between programs, reduce administrative burdens for producers, and support the maintenance of carbon storage on working lands, Congress could authorize an “automatic graduation” option that allows EQIP producers to automatically become eligible for CSP.
- In order to provide support for the duration of time required to yield full benefits for producers, the EQIP and CSP programs should provide cost-share contracts on longer timelines, for a minimum of three years (but potentially longer in dryland ecosystems or with forestry approaches).¹⁵
- For all programs, USDA should give priority to applications 1. with an explicit focus on carbon storage or the inclusion of practices with higher carbon storage potential (including agroforestry and forestry practices) and 2. from historically underrepresented groups in the agriculture and forestry industries, including first time farmers, farmers of color, indigenous land managers, tribes, and young farmers.
- Congress should also gradually increase funding for NRCS Conservation Technical Assistance and cooperative extension services at land-grant universities to ensure that farmers and ranchers can access the technical assistance they need to implement soil carbon practices.

RELEVANT LEGISLATION

- EQIP and CSP have been reauthorized through the Farm Bill process with broad bipartisan support.
- Similar ideas have been proposed in H.R. 4269/S. 2452 The Climate

Stewardship Act, H.R. 5188/S. 2874 The Strengthening Our Investment in Land (SOIL) Stewardship Act, and H.R. 5861 Agriculture Resilience Act.

- FY21 House agriculture appropriations report language explicitly highlighted the value of soil carbon storage and its connection to soil health.¹⁶

16. H.R. 7610, report 116-446. *Agriculture, Rural Development, Food and Drug Administration, and Related Agencies Appropriations Act, 2021*. (2020).

Rec. 2

Create a network of soil carbon demonstration trials.

During our [Leading with Soil work](#) with farmers and ranchers in the Rocky Mountain West, we found that many producers are not widely familiar with soil health practices and/or do not have enough confidence in the benefits of soil health practices to make long-term decisions about their operations. With disruptions from COVID-19, farmers are even more unlikely to take on the additional risk of changing practices to those that could support soil carbon storage. Getting producer buy-in requires de-risking the implementation of new or innovative agricultural practices. Demonstration trials provide “seeing is believing” credibility, help farmers become comfortable with new practices, and decrease the potential operational and economic risks of implementation.

Demonstration projects can also support the long-term scale up of soil carbon storage. While many practices have sufficient scientific basis, other promising solutions require testing and field demonstrations to collect consistent, high-quality data. This is especially true in rangeland systems where different livestock management approaches can yield different soil health and carbon outcomes. There are not enough demonstration projects across the United States, especially in semi-arid western regions.

These projects also result in meaningful on-the-ground learning and support local economies, driving investment in agriculture operations, businesses in the agriculture supply chain, regional conservation districts, non-profits, and universities across the US.

RECOMMENDATION: Expand the Conservation Innovation Grant (CIG) soil health demonstration trials to cover the full geographic and operational diversity of US agriculture. This will be a critical step towards familiarizing producers with soil carbon practices while also performing much-needed economic and soil science research.

- **CONSERVATION INNOVATION GRANT:** Increase funding by \$100 million per year to establish a minimum of 80 soil health demonstration trials.¹⁷
- These demonstration trials should span geographies and operation types and aim to fill knowledge gaps around certain underexplored practices (especially grazing and soil amendments). New analysis is likely needed to assess existing demonstration projects – including those done by the Long-Term Agroecosystem Research (LTAR) Network and the soil health demonstration trials funded in the 2018 Farm Bill – and identify high-priority gaps. The USDA Climate Hubs may be well positioned to carry out this analysis and make recommendations for where to focus new funding.
- These trials should also be done in partnership with the USDA’s Economic Research Service (ERS) and focus on answering key economic questions about the cost of implementation, financial outcomes, potential yield increases, and on-farm and on-ranch soil health benefits from implementation.

17. Zelikova, J., Amador, G., et al. (2020). *Leading with Soil: Scaling Soil Carbon Storage in Agriculture*. Carbon180.

18. H.R. 7610, report 116-446. *Agriculture, Rural Development, Food and Drug Administration, and Related Agencies Appropriations Act, 2021*. (2020).

19. Ibid.

RELEVANT LEGISLATION

- The last Farm Bill included explicit funding for soil health demonstration trials at \$25 million, marking the first specific investment in soil health under CIG.
- FY21 House agriculture appropriations report language explicitly highlighted the value of soil carbon storage and its connection to soil health.¹⁸
- H.R. 5861 Agriculture Resilience Act suggests an aligned increase in funding for CIG soil health demonstration trials.¹⁹

Rec. 3

Establish a national on-farm monitoring system.

To fully realize the scale potential of soil carbon practices, we need to significantly improve current soil carbon quantification methods and improve our knowledge of carbon sequestration baselines. However, there is currently no comprehensive government effort or system to quantify soil carbon reliably and cost effectively across the United States.

USDA currently operates the National Resource Inventory (NRI), a national network of tens of thousands of farm plots that have extensive land management data records dating back several decades. However, the NRI does not collect soil carbon data.

By investing in soil carbon data collection today, we can pave the way for farmers to unlock a new source of productivity and source of revenue in years to come.

There also may be small jobs gains that stem from expanding the NRI workforce to collect and process soil carbon samples.

RECOMMENDATION: Harness the network of the National Resource Inventory to collect and manage soil carbon data across the US.

- **NATIONAL RESOURCE INVENTORY:** Expand the mandate of the NRI to explicitly include soil carbon data collection and increase funding by \$5 million per year to cover program growth.²⁰

RELEVANT LEGISLATION

- No relevant legislation, but this recommendation is aligned with National Academies of Sciences recommendations.²¹

Forestry

Forests are important natural resources and nature's own carbon removal machines — their protection, restoration, and management is critical in meeting the social, economic, and climate demands of today. Roughly one-third of the US is forested, offsetting nearly 16% of the country's total carbon dioxide emissions.^{22,23} However, climate change is causing significant habitat impacts throughout the life of a tree, putting them through physiological stress and leaving them more vulnerable to pest outbreaks, severe wildfires, and large-scale dieback.²⁴ These adverse responses to climate change cause more carbon dioxide to be released into the atmosphere, further perpetuating this cycle.²⁵

COVID-19 has disrupted forest-dependent livelihoods, putting undue hardship on communities already grappling with the impacts of climate change. The need to leverage and protect America's forests for economic recovery could not be more clear. Forests can support climate mitigation, enhance the resiliency of communities and ecosystems, and create jobs in rural and urban communities. In the short term, investments in the forestry sector can be a cost-effective way to create thousands of much-needed jobs across the country.²⁶ In the long term, investments in equitable and durable forest policies can protect those most vulnerable to climate change, including rural and low-income communities, while also helping the US meet climate goals.

20. National Academies of Sciences, Engineering, and Medicine. (2019). *Negative Emissions Technologies and Reliable Sequestration: A Research Agenda*. Washington, D.C.: The National Academies Press.

21. Ibid.

22. Vogt, J.T. & Smith, W.B. (2017, August). *Forest Inventory and Analysis: Fiscal Year 2016 Business Report*. United States Department of Agriculture.

23. U.S. Forests and Carbon infographic. Forest Service and Department of Agriculture & Climate Change Resource Center. https://www.fs.fed.us/climatechange/advisor/scorecard/Carbon_Infographic_Final.pdf.

24. Menezes-Silva, P.E. et al. (2019, October). Different ways to die in a changing world: Consequences of climate change for tree species performance and survival through an ecophysiological perspective. *Ecology and Evolution*.

25. Harris, N., Munroe, T. & Levin, K. (2020, September 16). *6 Graphics Explain the Climate Feedback Loop Fueling US Fires*. World Resources Institute.

26. Edwards, P.E.T., Sutton-Grier, A.E. & Coyle, G.E. (2013, March). Investing in nature: Restoring coastal habitat blue infrastructure and green job creation. *Marine Policy* 38, 65-71.

Bolster forest restoration and hazardous fuels management efforts.

A holistic approach that considers ecosystem restoration, hazardous fuels reduction, fire suppression, and community assistance in a changing climate is critical to long-term wildfire management. A key component missing in addressing US wildfires today is a concerted effort to rebalance natural fire regimes.²⁷ As a result of hundreds of years of fire suppression practices and lack of adequate funding directed towards restoration and proactive forest management, there is a significant forest restoration backlog.^{28,29} As of mid-September 2020, wildfires have already shattered annual emissions records, emitting over 200 million metric tons of carbon dioxide – a 28% increase over all of 2019.³⁰ Although there have been attempts to address this, most notably through the fire funding fix, there are critical programs that need additional support today.³¹ In addition to improving carbon storage potential in forests, there are many co-benefits for restoring and rehabilitating forest ecosystems after wildfires. Forest restoration and hazardous fuels management protect watersheds, help combat invasive species, minimize risk to nearby communities and firefighters, create jobs, and could save millions of dollars over the long term from damaging wildfires.

RECOMMENDATION: Provide additional funding for USDA and US Department of the Interior (DOI) programs that address a breadth of restoration and wildfire risk reduction work on forests and rangelands. This is a necessary step in meeting both short- and long-term goals to create jobs, protect communities, and optimize carbon removal efforts.

USDA

- Direct USDA to establish a grant program that supports local restoration projects on public lands. A collaborative model, similar to the Collaborative Forest Landscape Restoration Program, should be encouraged for “NEPA-ready” projects that involve stakeholders including federal, state, local, and tribal governments, communities, and NGOs.
- **COLLABORATIVE FOREST LANDSCAPE RESTORATION PROGRAM:** Provide an additional \$50 million per year over five years and target highest-priority “NEPA-ready” projects.³² This program leverages local resources that provide jobs and sustain rural economies.

27. Steelman, T. & Burke, C. (2007, March). Is Wildfire Policy in the United States Sustainable? *Journal of Forestry*, 67-72.
28. Wagner, M. (2014, January 31). *Restoring Forest Health: We Need to Pick Up the Pace*. Dalmas Nelson Lecture—Hinckley Institute of Politics.
29. Hoover, K. (2017, October 31). *Wildfire Management Funding: Background, Issues, and FY2018 Appropriations*. Congressional Research Service.
30. Lombrana, L. & Rathi, A. (2020, September 16). California Fires Are Emitting Record Amounts of Carbon Dioxide. *Bloomberg Green*.
31. USDA Press. (2018, March 23). *Secretary Perdue Applauds Fire Funding Fix in Omnibus*. U.S. Department of Agriculture.
32. Hoover, K. & Riddle, A. (2019). *National Forest System Management: Overview, Appropriations, and Issues for Congress*. Congressional Research Service.

- **USDA HAZARDOUS FUELS PROGRAM:** Provide an additional \$150 million per year over five years and target highest-priority “NEPA-ready” projects.³³
- **VEGETATION AND WATERSHED MANAGEMENT PROGRAM:** Provide an additional \$100 million per year over five years to fund forest restoration projects, targeting those with demonstrable carbon sequestration and resilience benefits.³⁴
- **BURNED AREA EMERGENCY RESPONSE PROGRAM:** Provide an additional \$10 million per year over five years.³⁵ In addition to funding, this program could be expanded to incorporate longer-term (minimum five years) post-fire rehabilitation activities on national forests, modeled after the DOI’s Burned Area Rehabilitation program.

DOI

- **HAZARDOUS FUELS MANAGEMENT PROGRAM:** Provide an additional \$100 million per year over five years, targeting highest-priority “NEPA-ready” projects.³⁶
- **BURNED AREA REHABILITATION PROGRAM:** Provide an additional \$15 million per year over five years to support the landscape recovery process following a fire event.³⁷

RELEVANT LEGISLATION

- H.R. 2862/S. 1842 Wildfire Disaster Funding Act of 2017 provided the framework for the fire funding fix that was included in the 2018 omnibus spending bill.

Rec. 5

Expand reforestation efforts on public lands.

The US has significant potential to boost reforestation efforts, with over 2.2 million hectares of public lands currently in need of reforestation that could sequester over 16 million Mg CO₂e per year.³⁸ Under the New Deal in the 1930s, the Civilian Conservation Corps planted three billion trees and employed three million workers.³⁹ A similar coordinated push for large-scale reforestation, incentivized and supported by the federal government, can help meet immediate and long-term job creation needs in both rural and urban areas. However, reforestation should not translate to mass tree planting but be a science-driven and collaborative effort that is funded at multiple stages. This includes support for high-quality seed collection and nursery production,⁴⁰ strategic planting with safeguards that protect existing carbon-rich and biodiverse lands,⁴¹ and post-planting monitoring.

33. Hoover, K. & Riddle, A. (2019). *National Forest System Management: Overview, Appropriations, and Issues for Congress*. Congressional Research Service.

34. Ibid.

35. *Burned Area Rehabilitation*. U.S. Department of the Interior. www.doi.gov/wildlandfire/burned-area-rehabilitation.

36. *Fuels Management*. U.S. Department of the Interior. www.doi.gov/wildlandfire/fuels.

37. *Burned Area Rehabilitation*. U.S. Department of the Interior. www.doi.gov/wildlandfire/burned-area-rehabilitation.

38. Sample, V.A. (2017, July). Potential for Additional Carbon Sequestration through Regeneration of Nonstocked Forest Land in the United States. *Journal of Forestry* 115(4), 309–318.

39. Speakman, J.M. (2006). Into the Woods: The First Year of the Civilian Conservation Corps. *Prologue Magazine* 38(3).

40. Gray, L.K. et al. (2016). Climate change risk management in tree improvement programs: selection and movement of genotypes. *Tree Genetics & Genomes*.

41. Heilmayr, R. et al. (2020, June 22). Impacts of Chilean forest subsidies on forest cover, carbon and biodiversity. *Nature Sustainability* 3, 701–709.

RECOMMENDATION: Increase funding for reforestation efforts across public and private lands by providing grants, expanding existing programs, and establishing a stewardship corps.

- Establish a program that provides federal grants to states, municipalities, tribes, and local governments to expand and establish tree nurseries. With their current capacity, tree nurseries will not be able to sustain a substantial increase in reforestation and tree planting efforts.⁴²
- Establish a stewardship corps, similar to the Civilian Conservation Corps, dedicated to restoring and reforesting public lands. The program can prioritize opportunities for people from low-income communities and those who are newly unemployed due to COVID-19.
- Eliminate the cap on the Reforestation Trust Fund, as advocated for by American Forests and the bipartisan REPLANT Act. The Trust Fund was established in 1980 and receives funds from tariffs on imported wood products. Removing the cap would not increase tariffs but unlock over \$90 million in additional funds.⁴³
- **US FOREST SERVICE URBAN AND COMMUNITY FORESTRY PROGRAM:** Provide additional funding of \$80 million per year for five years to support grants that maintain, restore, and improve community forestland.
- Establish a federal grant program for urban forestry projects eligible to states, municipalities, tribal governments, NGOs, and local community-based organizations that support urban forestry projects, prioritizing projects that are not eligible for the US Forest Service Urban and Community Forestry program and target urban areas with historically low tree canopy cover.

RELEVANT LEGISLATION

- Similar ideas have been proposed in H.R. 4269/S. 2452 The Climate Stewardship Act, H.R. 2358/S.4434 The 21st Century Civilian Conservation Corps Act, and H.R.7843/S.4357 The REPLANT Act.

Rec. 6

Invest in innovative wood technologies.

Supporting research and development of innovative wood technologies, such as cross-laminated timber, can play an important role in incentivizing landowners to

42. Domke, G.M. et al. (2020). Tree planting has the potential to increase carbon sequestration capacity of forests in the United States. *PNAS* 117(40).

43. Daley, J. (2020, July). How to Grow More Trees and Jobs in National Forests. American Forests. *Medium.com*.

invest in and maintain forests on private lands.⁴⁴ Leveraging government procurement to expand research and increase demand for mass timber can support economic diversification efforts in rural areas and incentivize carbon forest management practices. However, incentives for hard wood products must be tied to robust environmental safeguards that ensure sustainable forest management practices.

44. Bonnie, R., Vujic, T., Plutshack, V. & Arata, S. *Rural Investment: Building a Natural Climate Solutions Policy Agenda that Works for Rural America and the Climate*. NI Report 20-04. Durham, NC: Duke University.

RECOMMENDATION: Increase funding for research and development of innovative wood technologies, including cross-laminated timber.

- **FOREST SERVICE WOOD INNOVATION GRANT:** Provide an additional \$10 million per year for the next five years for the Forest Service Wood Innovation Grant program. This program funds wood utilization projects and promotes using wood as a construction material in commercial buildings. Congress should direct USDA to enhance coordination with compatible programs at DOI and the US Department of Energy to advance wood products and support market creation for engineered wood products.
- Congress should authorize a program at USDA, in coordination with state foresters and state officials, that provides technical assistance and education for mass timber applications.

RELEVANT LEGISLATION

- The last Farm Bill included the bipartisan Timber Innovation Act, a bill that promotes new and innovative uses for wood as a building material.