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Farmers and Ranchers

Policy Priorities for Agricultural Innovation

EMPOWERING AMERICA'S FARMERS AND RANCHERS

Key Takeaways:

- American farmers and ranchers are essential to putting safe food on the table for families in the United States and around the world. Farmers are also on the front lines of climate change.
- A stronger agricultural economy and higher incomes for American farmers and ranchers can drive environmental progress.
- Public policy should protect private property rights, empower ranchers and farmers (rather than governments), and harness the power of incentives.
- Expanding opportunities for investment in new equipment, precision and regenerative agriculture, and removing barriers to tackling genetically modified plants and foods, invasive species, and agricultural trade will boost farm output and income while improving soil health, yielding better environmental outcomes, and building more natural climate resiliency.

American farmers and ranchers put safe food on the table for families in the United States and around the world. The people working in the domestic agricultural sector are also some of the world's leading innovators. By investing in new technologies, inventing new techniques, and identifying cost savings, farmers and ranchers have dramatically improved efficiency—producing more crops with fewer inputs. A 2018 study found that, “[i]nnovations in animal and crop genetics, chemicals, equipment, and farm organization have enabled continuing output growth while using much less labor and farmland. As a result, total agricultural output nearly tripled between 1948 and 2015—even as the amount of labor and land (two major inputs) used in farming declined by about 75 percent and 24 percent, respectively.”¹

Newer farm equipment and precision agriculture technologies will improve fuel efficiency and reduce input costs. After food leaves the farm, reducing food waste and developing alternative sources of protein will also save money, minimize environmental impacts, and provide consumers with more choices. The spread of genetically engineered crops and animals will increase productivity with a smaller environmental and climate footprint.²

Furthermore, natural climate solutions such as regenerative and precision agriculture allow for farmers to diversify income with a better environmental outcome. Researchers from the Soil Health Institute examined soil health management practices in the midwestern U.S. and reported, “that you could increase net revenue to farmers by \$52/acre for corn and \$45/acre for soybeans. Additionally, combining silviculture into farming operations can provide greater income stability, which can improve the economic resilience of farms.”³ Increased animal grazing has improved soils, biodiversity and generated climate benefits.⁴ Cover crops improve soil health and reduce erosion, water pollution, and emissions.⁵ While these practices are beneficial for soil biodiversity, the exact emissions reduction impact is unclear⁶ and any part of farming practices as a natural climate solution would benefit from rigorous monitoring, reporting, and verification programs.⁷

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POLICY PRINCIPLES TO MEET OUR FOOD NEEDS AND ENVIRONMENTAL OBJECTIVES

The aforementioned cost-saving, innovative technologies and processes underscore one important fact: Greater food supplies for American families and higher incomes for American farmers and ranchers can increase environmental progress.

As policymakers deliberate how to boost the agricultural economy and address climate change, they should adhere to three fundamental principles:

- **Protect private property rights.** Property owners benefit economically and environmentally from taking care of the asset they own. Conversely, when everyone owns something, no one has an incentive to take care of it. Countries with well-defined and protected private property rights have the strongest environmental records⁸.
- **Empower farmers and ranchers.** American farmers and ranchers are global leaders in agricultural innovation. Government mandates and regulations would take decisions away from farmers and ranchers. Instead, policymakers should eliminate government-imposed barriers to agricultural innovation and provide technical assistance and guidance when applicable.
- **Harness the power of incentives.** Whether it is endangered species, invasive species or carbon offset markets, regulations and poor policy frameworks can disincentivize conservation and stewardship efforts and misallocate resources toward unproductive uses. Reforming regulations to provide incentives for farmers, ranchers, and property owners would increase agricultural output and deliver healthier natural ecosystems.

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POLICY RECOMMENDATIONS FOR THE FARM BILL

The American agricultural industry is the global leader, but better policies would leverage America's competitive advantages, incentivize productive land and forest management practices, and expand economic opportunities for U.S. farmers and ranchers. One way to implement better policies is the 2023 farm bill. Dating back to the 1930s, Congress passes a comprehensive farm bill about every five years. The Nutrition title of the 2018 farm bill, primarily Supplemental Nutrition Assistance Program (SNAP), comprises more than 80 percent of the mandatory spending in the farm bill.⁹ Along with Nutrition, the Commodities, Crop Insurance, and Conservation titles make up 99 percent of the funding in the farm bill. Policies should commit to basic and applied research and development, apply technology neutrality to energy and conservation programs, and improve opportunities for investments in more efficient and innovative technologies. Specifically, the farm bill should:

- **Commit to basic and applied research at the Department of Agriculture.** Federal funding for agricultural research and development helps America's farmers and consumers. From 1990 to 2011, every \$1 spent on federal agriculture R&D yielded \$20 in benefits to the U.S. economy.¹⁰ Yet public funding levels for agricultural R&D have fallen by a third over the past two decades. After adjusting for inflation, it is at the same level as in 1970.¹¹

A key component of capturing the benefits of agriculture R&D is connecting farmers and ranchers to the research institutions. Stronger partnerships between the agricultural industry and the research community will encourage more collaboration and adoption of potentially groundbreaking technologies and practices. The bipartisan, bicameral Conservation and Innovative Climate Partnership Act would help create competitive grants for conservation practices and establish more efficient pathways to connect farmers and researchers.¹²

Policymakers should support research programs at the Department of Agriculture that aim to increase crop yields, drive innovation, improve resilience, and lower the sector's environmental footprint. Key programs to fund include:

- **Agriculture Advanced Research and Development Authority:** AgARDA would fund emerging and breakthrough research on "long-term and high-risk food and agriculture challenges."¹³ The ARPA model is meant to find high-risk, high-reward research projects and technologies that the private sector would not undertake. Research could include everything from plant disease and invasive species to storage and packaging. Congress

authorized AgARDA in the 2018 Farm Bill and the program received \$1 million in FY2023 appropriations, but the USDA has asked for \$45 million to commit to a portfolio of disruptive science in agriculture.¹⁴

- **The Foundation for Food Agriculture Research (FFAR):** Created in the 2014 Farm Bill, FFAR is a nonprofit funded by the federal government to foster public-private partnerships for innovative food and agricultural research. Importantly, every dollar of federal funding is matched with at least one dollar of private funding, which increases the impact of federal investment and requires buy-in from the private sector.¹⁵ FFAR-funded research helped show that a 45-second digital X-ray is a safe, reliable method for analyzing bone density in live hens. The study “could help poultry producers optimize bird selection to improve bone strength and reduce fracturing.”¹⁶
 - **Research and development for biochar:** The use of biochar, or biomass-based charcoal, has numerous documented health benefits for farm animals, soil health, water quality improvement, and improved forest health.¹⁷ Biochar could be particularly effective at sequestering carbon, too, especially if the sources come from agriculture and forest feedstocks and residues like corn stalks and tree trimmings.¹⁸ The bipartisan, bicameral Biochar Research Network Act of 2023 would help research and capitalize on biochar’s use for crop productivity, soil health, and carbon sequestration.¹⁹
 - **Provide consistent funding for research, development, and deployment for invasive species treatment.** A 2021 study estimated that invasive species cost North America \$2 billion per year in the early 1960s, and now cost more than \$26 billion per year (since 2010).²⁰ Private property owners have a direct incentive to eradicate invasive species, but those incentives are weaker if eradication requires active planning, coordination, and action from multiple landowners as well as state and local governments.²¹ USDA’s Agricultural Research Service has collaborated with private landowners and states to treat and eradicate invasive species. Expanding research within USDA, at universities, nonprofits, and the private sector can expand the availability of low-cost solutions.
- **Maximize the efficiency of rural broadband spending.**

Reliable telecommunications are essential for farmers, not just for precision agriculture practices but also to aid in telehealth, sales, and employment. The 2018 Farm Bill allocated \$350 million to the Rural Broadband Program, which awards grants and direct loans to rural communities. The farm bill also established the ReConnect Program, which helps to fund the cost of “construction, equipment, or acquisition of facilities and equipment needed to provide broadband service in rural areas.”²² To improve the efficiency of rural broadband spending, policymakers should:

 - **Consider turning funding into voucher programs.** Vouchers for rural broadband users would empower broadband purchasers, force providers to compete for customers, prevent overbuilding, and be technology neutral.²³
 - **Improve the process to receive federal rights-of-way.** Past Congresses considered bipartisan legislation to require agencies to review and respond to federal right-of-way requests within 60 days and authorize agencies to approve the licensing for all broadband equipment on a federal right-of-way.²⁴ Streamlining the process to receive federal rights-of-way would improve access to broadband services in rural and tribal communities.
 - **Leverage public-private partnerships to expand mapping, especially in underserved communities.** The private sector is the primary deployer of broadband and has access to data that can improve the allocation of federal resources and better illustrate gaps in internet needs.²⁵
 - **Prioritize unserved and underserved areas and ensure technology neutrality.** According to the Federal Communications Commission, 96 percent of Americans had access to broadband in 2019. Spending on rural broadband expansion should focus on the truly unserved and underserved locations, ensure technology neutrality (whether it be cable, fiber, satellite or other) and not favor municipalities, cooperatives, etc. over private providers.

- **Adopt a technology-neutral approach for USDA energy programs.** Current rural development energy programs at USDA provide grants and funding for renewable energy installations and advanced biofuel manufacturing. While these energy sources are important, they may not make sense for every farm across the country. The Department should adopt a more technology-neutral approach to allow for sources such as geothermal and advanced nuclear power, including microreactors and small modular reactors, to be deployed on farmlands.

RECOMMENDATIONS BEYOND THE FARM BILL

Meanwhile, there are other ways, outside the farm bill, to expand precision farming and regenerative agriculture:

- **Expand opportunities for precision farming and sustainable intensification.** This would enable farmers and ranchers to produce more with less. With access to more data, better information, and newer equipment, producers can improve yields while reducing emissions and unwanted environmental byproducts. Automated technologies, GPS, and enhanced imagery allow optimized seed planting while reducing inputs like fertilizers, pesticides, and fuel and water use.²⁶ Studies show that precision agriculture adoption increased corn and soybean yields on existing lands and allowed farmers to avoid cultivating another 10.2 million acres of new cropland, the size of 4.5 Yellowstone National parks.²⁷ Another case study examined the adoption of precision agriculture on a family farm in Illinois and found the family reduced its per acre costs by \$67 and reduced greenhouse gas emissions more than 15 percent.²⁸

American farmers are already global leaders in precision agriculture practices.²⁹ To magnify opportunities for precision agriculture, Congress and the administration should:

- **Make immediate expensing permanently available.** Immediate expensing would allow farmers and ranchers to deduct the cost of automated, more efficient equipment in the year the cost is incurred rather than following cumbersome depreciation schedules.
- **Leverage existing programs for farmers to purchase precision agriculture equipment.** The Producing Responsible Energy and Conservation Incentives and Solutions for the Environment Act (PRECISE Act) would expand USDA conservation loans and programs to include precision agriculture investments and provide technical assistance for farmers and ranchers who want to pursue soil health planning.³⁰
- **Expand opportunities for regenerative agriculture** Regenerative agriculture can diversify farmers' and ranchers' income streams and produce many environmental and climate benefits, including improved soil health, better air and water quality, added carbon sequestration, and diversified wildlife habitats. Improved soil health also reduces soil erosion and makes areas more flood- and drought-resistant.³¹ Transitioning, however, can be a costly and time-consuming endeavor. Congress should repurpose funds to compensate farmers for lost revenue as they switch to a healthier soil cropping system. USDA should make funds available for technical assistance for farmers and ranchers as they consult with USDA's conservation service experts, non-profits, and other farmers.³² The Naturally Offsetting Emissions by Managing and Implementing Tillage Strategies (NO EMITs Act) would achieve several of these goals.³³

Continued innovation will drive efficiency, increase output, maintain American leadership in agriculture and improve the environment. The Farm Bill provides ample opportunity for policymakers to enact pro-growth policies and support agricultural R&D.

ENDNOTES

- 1 Sun Ling Wang, Richard Nehring, and Roberto Mosheim, "Agricultural Productivity Growth in the United States: 1948-2015," U.S. Department of Agriculture Economic Research Service, March 5, 2018, <https://www.ers.usda.gov/amber-waves/2018/march/agricultural-productivity-growth-in-the-united-states-1948-2015/>
- 2 Emma Kovak, "The Environmental Case for Genetically Engineered Crops," The Breakthrough Institute, February 10, 2022, <https://thebreakthrough.org/issues/food/the-environmental-case-for-genetically-engineered-crops>
- 3 Event, "Natural Climate Solutions: A Win-Win Solution for Our Environment and Our Economy," Environmental and Energy Study Institute, May 7, 2021, <https://www.eesi.org/briefings/view/050721natural>
- 4 Lela Nargi, "Can Cows Help Mitigate Climate Change? Yes, They Can!" JSTOR Daily, December 19, 2018, <https://daily.jstor.org/can-cows-help-mitigate-climate-change-yes-they-can/>
- 5 U.S. Department of Agriculture Climate Hubs, "Cover Cropping to Improve Climate Resilience," <https://www.climatehubs.usda.gov/hubs/northeast/topic/cover-cropping-improve-climate-resilience>
- 6 See, for instance, <https://www.sciencedirect.com/science/article/abs/pii/S0167198719310128> and <https://www.sciencedirect.com/science/article/abs/pii/S0016706122003354?dgcid=coauthor>
- 7 Alex Hanafi, "Carbon Credit Quality Initiative," Environmental Defense Fund, August 3, 2021, <https://www.edf.org/climate/carbon-credit-quality-initiative>
- 8 Nick Loris, "Free Economies are Clean Economies," C3 Solutions, March 2021, https://www.c3solutions.org/wp-content/uploads/2021/04/Free-Economies-Are-Clean_Economies.pdf
- 9 Congressional Research Service, "Farm Bill Primer: What Is the Farm Bill?," CRS, February 22, 2023, <https://crsreports.congress.gov/product/pdf/IF/IF12047>
- 10 Emily Bass, "The Breakthrough Institute's Vision for the 2023 Farm Bill," The Breakthrough Institute, January 11, 2023, <https://thebreakthrough.org/issues/food-agriculture-environment/the-breakthrough-institutes-vision-for-the-2023-farm-bill>
- 11 Kelly P. Nelson and Keith Fuglie, "Investment in U.S. Public Agricultural Research and Development Has Fallen by a Third Over Past Two Decades, Lags Major Trade Competitors," USDA Economic Research Service, June 6, 2022, <https://www.ers.usda.gov/amber-waves/2022/june/investment-in-u-s-public-agricultural-research-and-development-has-fallen-by-a-third-over-past-two-decades-lags-major-trade-competitors/>
- 12 Representative Dan Newhouse, "Conservation and Innovative Climate Partnership Act of 2023," <https://www.congress.gov/bill/118th-congress/house-bill/2719>
- 13 U.S. Department of Agriculture, "Agriculture Advanced Research and Development Authority: A Vision for Disruptive Science to Confront Audacious Challenges," USDA, <https://www.usda.gov/sites/default/files/documents/agarda-strategic-framework.pdf>
- 14 Ibid.
- 15 Emily Bass, "What is the Foundation for Food and Agriculture?," The Breakthrough Institute, July 29, 2022, <https://thebreakthrough.org/issues/food-agriculture-environment/what-is-the-foundation-for-food-and-agriculture>
- 16 Ian Dunn, "Radiography could transform poultry breeding," Roslin Institute, October 5, 2022, <https://foundationfar.org/impact/breakthroughs/radiography-could-transform-poultry-breeding/>
- 17 Ka Ya Man, et al., "Use of biochar as feed supplements for animal farming," Critical Reviews in Environmental Science and Technology, Vol. 51, Issue 2, 2021, <https://www.tandfonline.com/doi/abs/10.1080/10643389.2020.1721980?journalCode=best20> and Chase O'Neal, et al., "Biochar: An emerging soil amendment," Michigan State University Extension: Soil Health, June 17, 2020, <https://www.canr.msu.edu/news/biochar-an-emerging-soil-amendment>
- 18 Mark Hertsgaard, "As Uses of Biochar Expand, Climate Benefits Still Uncertain," Yale Environment 360, January 21, 2014, https://e360.yale.edu/features/as_uses_of_biochar_expand_climate_benefits_still_uncertain

- 19 Senator Chuck Grassely, "Biochar Research Network Act of 2023," <https://www.congress.gov/bill/118th-congress/senate-bill/732/>
- 20 National Invasive Species Information Center, "Economic and Social Impacts," U.S. Department of Agriculture, <https://www.invasivespeciesinfo.gov/subject/economic-and-social-impacts>
- 21 Hannah Downey, "What are Invasive Species? A Q&A with Chris Costello," The Property and Environment Research Center, September 12, 2016, <https://www.perc.org/2016/09/12/what-are-invasive-species-a-qa-with-chris-costello/>
- 22 Congressional Research Service, "Farm Bill Primer: Rural Broadband Provisions," CRS, February 9, 2022, <https://crsreports.congress.gov/product/pdf/IF/IF12041>
- 23 Brent Skorup, "The FCC Should Consider Authorizing Broadband Vouchers to Rural Households," The Mercatus Center, January 31, 2022, <https://www.mercatus.org/publications/technology-and-innovation/fcc-should-consider-authorizing-broadband-vouchers-rural>
- 24 Press release, "Curtis, O'Halleran Introduce Bipartisan Rural Broadband Bill," June 17, 2021, <https://curtis.house.gov/press-releases/curtis-ohalleran-introduce-bipartisan-rural-broadband-bill/>
- 25 Colby Leigh Rachfal, "Broadband Data and Mapping: Background and Issues for the 117th Congress," Congressional Research Service, May 19, 2021, <https://sgp.fas.org/crs/misc/R45962.pdf>
- 26 Association of Equipment Manufacturers, American Soybean Association, CropLife America, National Corn Growers Association, "The Environmental Benefits of Precision Agriculture in the United States," <https://app.box.com/s/3s8x8x-q1oIm2ygmguo8iu56mgaowl4l>
- 27 Ibid.
- 28 Ibid.
- 29 Catherine E. Sanders, Kristin E. Gibson, and Alexa J. Lamm. 2022. "Rural Broadband and Precision Agriculture: A Frame Analysis of United States Federal Policy Outreach under the Biden Administration" Sustainability Vol. 14, No. 1: 460. <https://doi.org/10.3390/su1401046>
- 30 Representative Ashley Hinson, "Producing Responsible Energy and Conservation Incentives and Solutions for the Environment," U.S. House of Representatives Committee on Agriculture (Republicans) https://republicans-agriculture.house.gov/uploadedfiles/04.14.2021_preciseacthinsonsummary.pdf?utm_campaign=2760-396
- 31 Noble Research Institute, "Regenerative Agriculture Is About Direction Over Perfection," March 2020, <https://www.noble.org/news/publications/ag-news-and-views/2020/march/regenerative-agriculture-is-about-direction-over-perfection/>
- 32 Natural Resource Conservation Service, "Technical Service Providers," U.S Department of Agriculture, <https://www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/technical/tsp/>
- 33 Representative Rodney Davis, "Naturally Offsetting Emissions by Managing and Implementing Tillage Strategies," U.S. House Committee on Agriculture (Republicans), https://republicans-agriculture.house.gov/uploadedfiles/04.14.2021_noemitsactdavissummary.pdf?utm_campaign=2760-396