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Behavioral Science Advisory Boards Could Strengthen USDA's Conservation Program Amid Unprecedented Spending and Loading Dock Challenges

Kent D. Messer, Paul J. Feldman, Diya Ganguly, Rich Iovanna, and Julie Suhr Pierce

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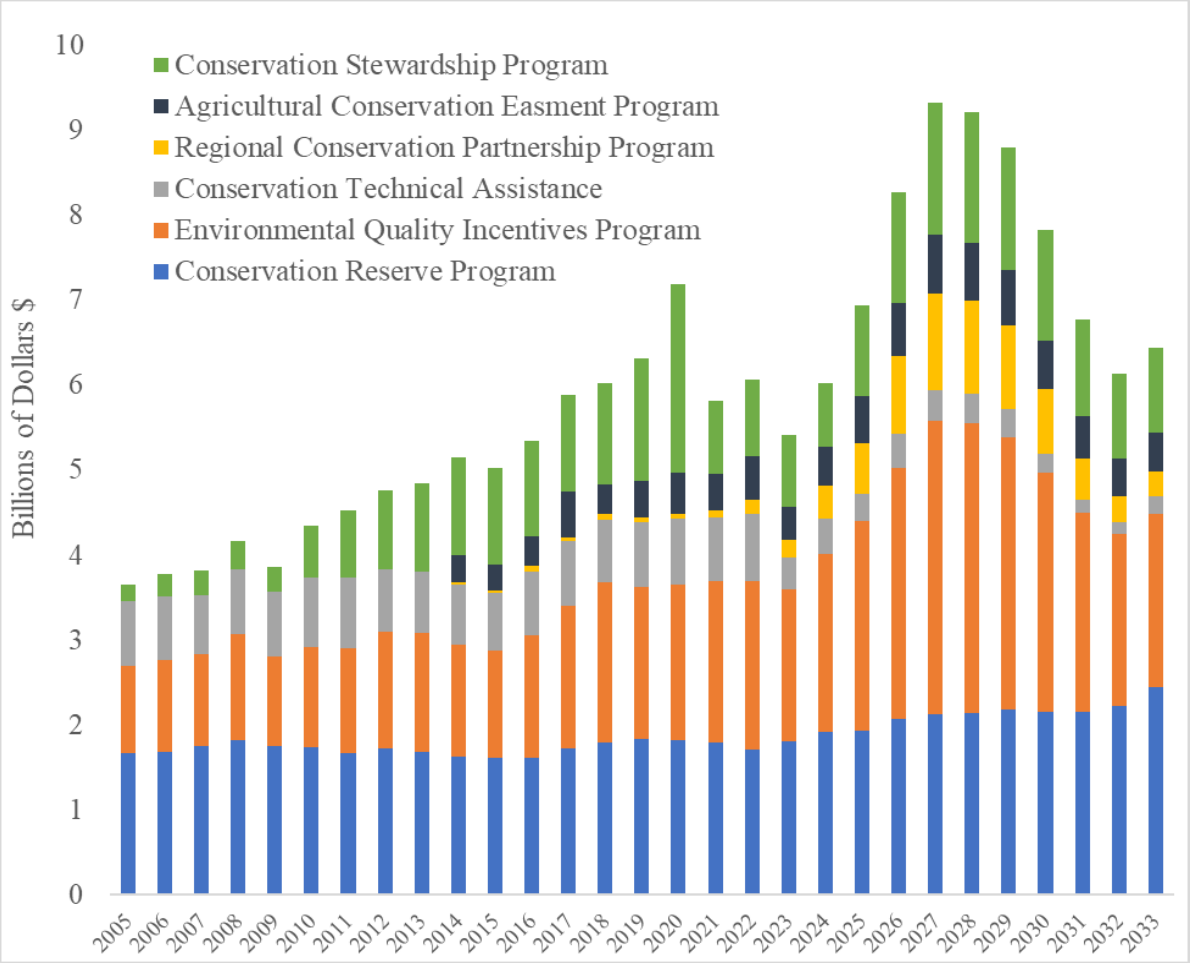
The USDA is investing an unprecedented amount in conservation programs (also called agri-environmental programs), with this amount set to increase dramatically in upcoming years, primarily due to additional expenditures included in the Inflation Reduction Act (IRA). Figure 1 illustrates a significant increase in USDA's conservation funding, with allocations projected to nearly double previous levels. Current projections indicate a peak funding year in 2027, with approximately $9 billion in spending. The IRA allocates approximately $20 billion for financial and technical assistance support, with expenditure estimates extending through at least 2031 (Table 1) on various USDA programs (Figure 2), with a significant amount of this funding being allocated to Historically Underserved Producers, often referred to as HUPs (Figure 3).

The rapid influx of funds from the IRA presents an opportunity both for significant advances in conservation but also for fruitful collaboration among academics, stakeholders from the farming and conservation communities, and the USDA. However, this type of collaboration is not always easy, and efforts are needed to overcome the "loading dock" challenges that frequently arise with academic research and conservation policy implementation (Cash, Borck, and Pratt, 2006). Loading dock challenges can arise when generators of new information, insights, and evidence-based approaches (such as agricultural economists, conservation planners, and behavioral scientists) fail to establish timely and meaningful connections with program administrators, policy makers, and key stakeholders. Instead of making these connections directly, academic researchers often make the dubious assumption that all they need to do is conduct the research and publish the results—and then program stakeholders and policy makers will automatically seek out this information and incorporate these insights into their programs. Loading dock challenges are only exacerbated when academics use language directed primarily toward other researchers, ignore important program implementation factors, focus on issues that are not currently of interest to policy makers and stakeholders, publish their results in journals placed behind expensive paywalls, and do not convey these results in forums attended by policy makers and stakeholders. The loading dock problem thus can lead to a problematic disconnect between the supply and demand for new information, insights, and evidence-based approaches. Hence, developing a forum that fosters collaboration between government agencies and academia is vital to capitalize on this surge in funding and ensure that the positive impacts on conservation are as great as possible. In this paper, we briefly describe several unresolved challenges that agricultural economists and behavioral scientists can help address. We then discuss how the creation of "Behavioral Science Advisory Boards" within the USDA could create this type of collaborative forum and ultimately help improve this situation.

Additionality and Fairness

Additionality and fairness pose challenges to the cost-effectiveness of USDA conservation and carbon sequestration programs. Any conservation practice is "additional" if it can be attributed to farmers receiving payments from a federal program. When implementing conservation programs aimed at carbon sequestration and introducing conservation practices on farmland, it is difficult for policy makers to assess how likely or costly it would be for a farmer to sequester carbon or for a landowner to implement conservation practices without additional incentives, as the landowner's and farmer's costs of these practices are private and seldom revealed. Carbon sequestration efforts create tension

Figure 1. Major USDA Conservation Program Expenditures and Outlays

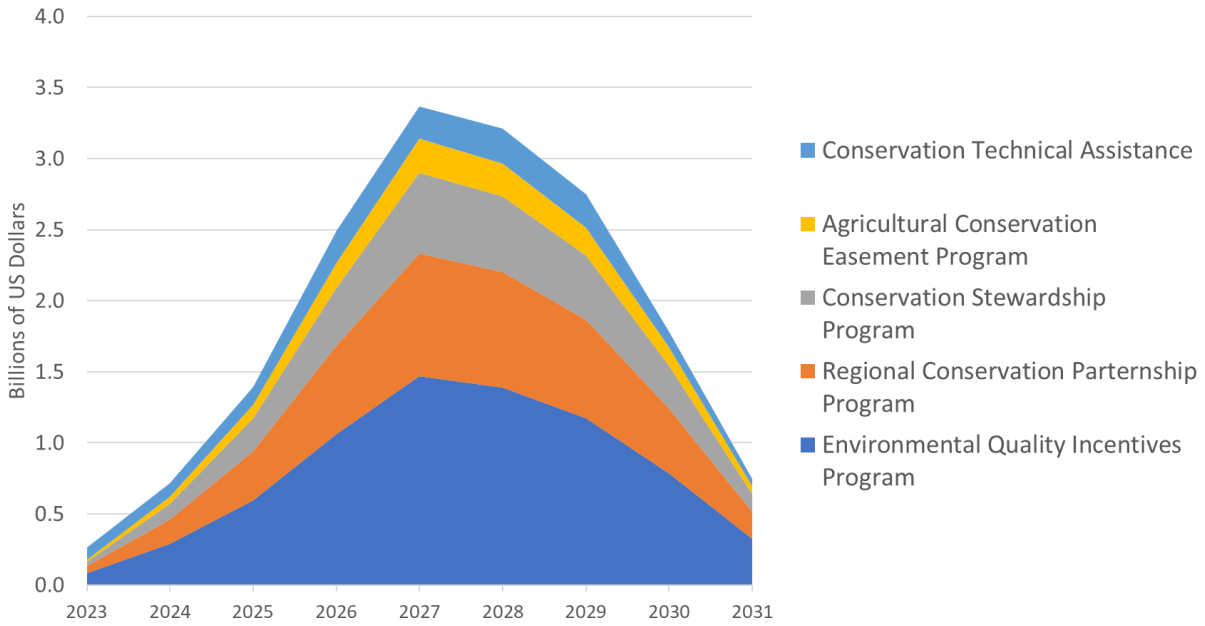


Notes: These figures were based on data available from the IRA Guidebook, with a focus on the funding allocation for EQIP, CSP, ACEP, RCPP, and CTA. For 2022–2031, outlays were estimated based on the CBO budget (Congressional Budget Office, 2022; White House, 2023). We assumed that the percentage per program would remain consistent with recent years. The exact percentages are the following: EQIP, 46.8%; CSP, 18.0%; ACEP, 7.8 %; RCPP, 27.4 %. Note that 23% of Conservation Technical Assistance is for the Greenhouse Gas Emission Quantification program. All estimations are made using the budget outlay figures from the Congressional Budget Office. We use outlay instead of authority because outlays reflect actual projected spending by the Treasury Department, whereas budget authority allows the budget office to incur obligations and submit purchase orders (Heniff, 2012).

between additionality and fairness. Associated programs must enroll producers who were not previously implementing eligible practices on their farms while not disincentivizing those farms that adopted these practices years ago.

Potential solutions forwarded by literature in this domain have highlighted that practices that provide limited on-farm pecuniary benefits accrue benefits over the long term or have high upfront costs generate a higher potential for additionality as there are no direct incentives for conservation practice adoption (Pannell and Claassen, 2020). For instance, 89% of filter strips in Ohio have been calculated as additional (Mezzatesta, Newburn, and Woodward, 2013). Payment programs that support cover crops have generated as high as 98% additionality in Maryland (Fleming, Lichtenberg, and Newburn, 2018). Conversely, conservation tillage has generated mixed results. Estimated additionality is relatively low, at 19% in Ohio (Mezzatesta, Newburn, and Woodward, 2013) and 47% in another study using national data (Claassen, Duquette, and Smith, 2018). Rosenberg and Pratt (2023) find that perennial cover on rejected Conservation Reserve Program (CRP) reenrollments tends to persist, while rejected new enrollments remain engaged in crop production, suggesting that additionality is higher when new acres are enrolled. Therefore, targeting new acreage could be a good strategy for CRP enrollment. Such empirical estimates may help policy makers promote and prioritize those additional environmental and carbon-sequestering activities.

Figure 2. Estimated Inflation Reduction Act Expenditures on USDA Conservation Programs



Note: Annual budget outlays for Conservation Programs in section 21001 of the IRA are estimated proportional to the total budget authority of each program within the Additional Agricultural Investments clause of the IRA.
Source: Estimated Budgetary Effects of H. R. 5376, the Inflation Reduction Act of 2022 (CBO 2022).

Adverse Selection

Adverse selection in the context of conservation can occur when policies intended to protect natural resources inadvertently favor participants who may already be undertaking these activities without needing additional incentives (Arnold, Duke, and Messer, 2013). Adverse selection issues for carbon offset programs can also arise when farmers wait for carbon prices to go up further before enrolling their fields (Thompson et al., 2022), making it hard to reach current climate goals. To encourage enrollment, contract terms provided by new carbon sequestration programs would benefit from having clear contingency language for producers who receive financial assistance from conservation programs, stating that they would be eligible to receive additional funds for new programs targeting carbon sequestration. Plastina (2021) and Rosenberg and Pratt (2023) explore this type of bundling or "stacking" of benefits.

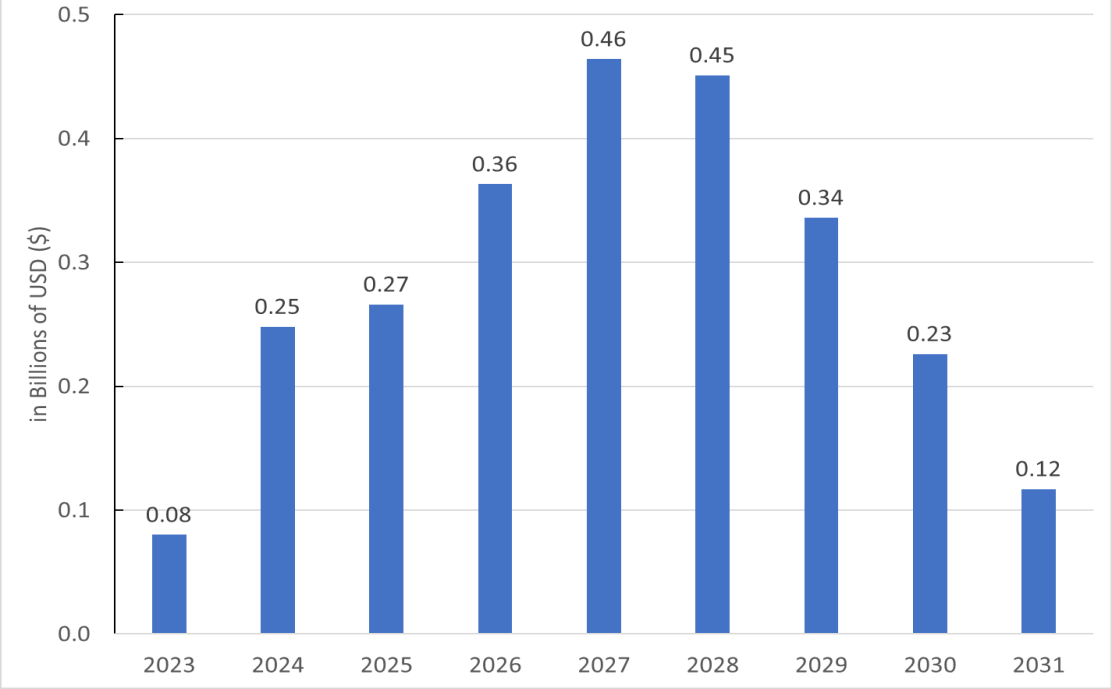
For voluntary programs such as the CRP, adverse selection can arise and is exacerbated when programs target the lowest-cost parcels to secure participation (Arnold, Duke, and Messer, 2013; Aspelund and Russo, 2023). These issues are particularly pertinent for voluntary conservation policies as they tend to attract landowners who are already predisposed to providing such services, which can lead to overstating the incentives' conservation benefits. (Refer to Wu and Babcock, 1996; Cross et al., 2011; Farmer, Chancellor, and Fischer, 2011 for discussion on these contexts.)

Conservation practitioners and outreach at the grassroots level also play an essential role in solving this issue. To achieve their environmental objectives, agencies must communicate in a way that resonates with landowners and farmers and motivates their behavior. Behavioral and experimental insights can help inform the best way to target interventions at the field level by providing insights on framing and information provision. For example, should program messages focus on soil health benefits or yield impacts derived from carbon retention? Or might broader climate change themes better incentivize participation?

Durability and Persistence of Conservation Practices

Realization of the public benefits from various conservation practices, such as cover crops and no-till practices, hinges on their initial adoption and continued use over time. However, the extent to which and how these practices are sustained post-contract could benefit from further exploration. A recent review of research on conservation practice adoption highlighted a critical gap in the understanding of the persistence of these practices (Prokopy et al., 2019). Other studies raise questions about whether the determinants of initial adoption differ from those influencing long-term persistence (Tran and Kurkalova, 2019). In other words, the insights from previous research on practice adoption might not directly apply to understanding practice persistence and could even lead to unproductive or misleading strategies.

Figure 3. Assistance for Historically Underserved Producers (HUPs) in the Inflation Reduction Act by Year



Notes: Based on the IRA Guidebook numbers and funding outlays (Congressional Budget Office, 2022; White House, 2023).

After a conservation contract ends, the persistence of the new behavior is key for sustainability. Persistence depends on whether farmers believe that the on-site benefits of the practice outweigh the costs. The persistence of CRP in the Great Plains has been linked to positive program experiences, desirability of environmental practices, and intrinsic and extrinsic motivations of the landowners to steward their land (Barnes et al., 2023). Conducting follow-up interviews with the beneficiaries of USDA programs can provide vital information that would improve the persistence of a conservation practice. Research conducted among participants of the Little Bear River Watershed Project in Utah found that 78% of implemented practices were still in use over 14 years after the program had ended (Jackson-Smith et al., 2010). It is critical for federal agencies to record and track disadoption once program contracts expire and whether the practice was expanded to other parts of the farm (Claassen and Ribaudo, 2016). At present, two surveys—the Agriculture Resource Management Survey and the Conservation Effects Assessment Project —track conservation practices over a period of 3–4 years. Persistence data can be further tracked by increasing the duration of similar surveys, thereby generating essential data on how farmers use conservation practices over time or through the expanded use of remote sensing technologies.

Persistence is also critical for the CRP and other programs that incentivize the conversion of marginal cropland to perennial covers for soil health improvement and/or habitat restoration. While it is relatively simple to check whether enrolled land has converted from crop production—a systematic yet practical monitoring strategy to assess cover quality and habitat suitability and to encourage program participants to address concerns early on—has yet to be fully realized. For example, wildlife and pollinators may be adversely affected when weeds crowd out a more diverse assemblage of native species. Similarly, the spread of nonbeneficial woody vegetation can disrupt productivity on prairie landscapes (Fogarty, Peterson, and Twidwell, 2022; Vaughan, 2023).

No-till contracts with USDA have mixed evidence on the issue of persistence (Wallander et al., 2017; Pathak et al., 2023). A key issue that this research has highlighted is the need to have transparent contract terms that outline contingencies that may arise due to inclement weather conditions. For example, if a farmer needs to dig trenches in the field for floodwater retention, then their carbon sequestration payouts can be impacted, leading to unintended consequences of the program (Thompson et al., 2022).

In light of the current surge in financial assistance funding, program design deserves some attention from behavioral science researchers. Randomized controlled trials are the behavioral research gold standard to test, develop, and improve policies. To enhance the benefits for participants in conservation programs, we need to

Table 1. Conservation Related Funding for USDA Programs in the Inflation Reduction Act

	Increases in Direct Spending by Fiscal Year ($billions)									
	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Financial Assistance										
Budget Authority	0	0.9	3.4	6.4	8.1	0	0	0	0	0
Estimated Outlays	0	0.2	0.6	1.2	2.3	3.1	2.9	2.5	1.7	0.7
Technical Assistance										
Budget Authority	1.4	0	0	0	0	0	0	0	0	0
Estimated Outlays	0	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.1	0.1

Notes: Based on the IRA Guidebook.

gather more evidence to improve policy implementation derived from randomized controlled trials. These trials would examine what motivates farmers to adopt and sustain conservation practices, what are the most effective ways to deliver technical assistance, what conservation practices should be bundled, what levels of financial assistance are needed to motivate farmers in the short and long run, and what contract lengths work best. Further, there may be unexplored opportunities regarding how to adjust the application, planning, and reporting processes to reduce transaction costs for participants and improve the pace of implementation. In the farm loans context, the USDA has been making promising efforts in this area by its recent efforts at reducing applications from 29 pages to 13 pages, launching an online interactive guided application to simplify loan application processes, and conducting a randomized controlled trial to assess pilot performance (USDA, 2023).

Multi-Objective Optimization

Economists and conservation planners have consistently advocated for prioritizing cost-effectiveness in the design of USDA conservation programs (Miao et al., 2016; Messer et al., 2016; Hellerstein, 2017; Messer and Allen, 2018, Dessart, Barreiro-Hurlé, and Van Bavel, 2019; Wu, 2023). The goal of such a strategy is to target USDA funds to maximize conservation benefits within current budget constraints. This approach provides the maximum possible conservation benefits at the lowest possible cost.

USDA conservation programs often employ benefit indices to evaluate the gains from a project, encompassing aspects like biodiversity, habitat provision, and the quality of agricultural land. The weights attached to the indices significantly influence priorities, yet there is a clear guidance deficit from the research community on aggregating these benefits when they are not directly comparable. In their paper, Game, Kareiva, and Possingham (2013) point out the pitfalls associated with attempts to combine benefits in an index. Hajkowicz (2009) analyzed programs utilizing benefit indices, suggesting an enhanced integration of social preferences into these weights, ascertained through suitable methods and the creation of standardized indices. While many economists would advocate for direct monetization of these benefits (Duke, Dundas, and Messer, 2013), properly accounting for the variable landscape context on which heterogeneous field-level actions occur across the entire nation is a challenge that has yet to be met. It is essential, at minimum, that indices undergo frequent reviews and updates. This ensures they align with evolving public preferences and advancements in our understanding of practices' benefits and ways to measure them.

Spatial Agglomeration

Conservation outcomes are often more favorable when adjoining parcels are managed to achieve a shared conservation goal than when efforts are disconnected and distributed more widely. This implies that the spatial scale is a significant factor, potentially leading to a phenomenon known as spatial benefit agglomeration. This complementarity has been explored in various studies that investigate strategies to encourage landowners to align their conservation efforts, often through financial bonuses for agglomeration. Key research in this area includes work by Banerjee, Kwasnica, Shortle (2012); Banerjee et al. (2014); Drechsler (2023); Fooks et al. (2016); Parkhurst et al. (2002); and Parkhurst and Shogren (2007).

Relatedly, cost-effective conservation is further complicated by the presence of thresholds, which are common in environmental contexts. These thresholds occur when the effectiveness of conservation efforts hinges on surpassing a minimum level (Wu, Adams, and Boggess, 2000; Wu et al., 2004). For instance, a specific amount of habitat or in-stream flow might be necessary

Table 2. Conservation Related Funding for USDA Programs, Including Projected Inflation Reduction Act Outlays

	By Fiscal Year ($billions)											
	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Conservation Reserve Program (CRP)	1.7	1.8	1.9	1.9	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.5
Environmental Quality Incentives Program (EQIP)	2.0	1.8	2.1	2.5	3.0	3.5	3.4	3.2	2.8	2.4	2.0	2.0
Conservation Technical Assistance (CTA)	0.8	0.4	0.4	0.3	0.4	0.4	0.4	0.3	0.2	0.2	0.1	0.2
Regional Conservation Partnership Program (RCPP)	0.2	0.2	0.4	0.6	0.9	1.1	1.1	1.0	0.8	0.5	0.3	0.3
Agricultural Conservation Easement Program (ACEP)	0.5	0.4	0.5	0.6	0.6	0.7	0.7	0.6	0.6	0.5	0.5	0.5
Conservation Stewardship Program (CSP)	0.9	0.9	0.8	1.1	1.3	1.6	1.5	1.5	1.3	1.1	1.0	1.0

Notes: This table breaks down these outlays into the main conservation programs receiving funding through the Inflation Reduction Act and adds projected farm bill outlays for these programs. The IRA provided an additional $8.45 billion for EQIP, an additional $3.25 billion for CSP, an additional $1.4 billion for ACEP, and $4.95 billion for RCPP. Following the figure and the tables, we see an uptake, especially for EQIP and RCPP programs (note that the CRP outlays only include the farm bill projections as the IRA had no separate provisions for CRP.

to support the survival of an endangered species, or dissolved oxygen levels in surface waters may be too low to sustain aquatic life. The USDA should consider adjusting its programs to account for these issues by specifically targeting conservation with the goal of achieving landscape-level thresholds or greater spatial agglomeration or by offering payment bonuses for participants when their land is adjacent to other conservation-oriented parcels. This is also an opportunity to work with conservation groups that may be able to provide bonus payments if the federal government is not able to do so. At present, most research evidence has been experimentally robust, but there is a need for more real-world trials to test incentives against various performance criteria such as cost-effectiveness, leakage issues, distributional consequences, and social welfare. This area could have great potential for collaboration with researchers in the planning stage of funding rollout (Nguyen et al., 2022).

Recommendations and Conclusion

The loading dock problem results in missed opportunities to enhance program effectiveness, optimize U.S. taxpayer funds, and even alleviate staff workload. We note that all federal agencies are now required to develop Learning Agendas, as mandated by the Foundations for Evidence-Based Policymaking Act of 2018 (also known as the Evidence Act). Currently, only one USDA Learning Agenda is related to conservation programs, focusing solely on the question, “What conservation practices are most effective in delivering climate benefits?” (USDA 2024). There is a need to increase the number of questions included in these agendas to encompass a variety of issues, including those elaborated above, that reflect human behavior both of conservation program participants and USDA staff, along with other challenges that have been raised in the literature.

Federal agencies, including the Veterans Administration, military, and NASA, are known for having a shared culture and institutional structures that embrace evidence-based decisions. The Environmental Protection Agency and the U.S. Fish and Wildlife Service also use science advisory boards to help guide programs and policies. What can be done to cultivate an environment within USDA where policy makers and

program staff can more easily encounter, support, and act on new scientific understanding? We recommend a systematic, collaborative project designed to assess the existing evidence and bolster the evidential basis for implementing USDA conservation programs. We refer to this effort and groups as Behavioral Science Advisory Board (BSABs). The BSABs would consist of subject matter experts drawn from program and research agencies, USDA program staff, conservation and production agriculture organizations, and institutions engaged in conservation and program implementation behavioral research. The objectives of BSABs would be to pinpoint critical questions facing these programs and to identify the evidence necessary to address them.

BSABs would convene over a four-year period, aligning with the Farm Bill's development cycle. The first three years would focus on identifying essential questions and answers for each major program. The fourth year would involve compiling the results and providing evidence-based feedback on these programs, serving as a valuable resource for policy makers in preparation for the next Farm Bill. The BSABs would write a final report that would include key recommendations that, ideally, the leaders of these various programs would be inclined to respond to in writing, as it would be key to document why these programs can or cannot address and adopt these recommendations. We also anticipate that by having these meetings regularly, significant progress could be made as some adjustments could be made before the formal Farm Bill cycle and that more meetings may help foster positive working relationships that support USDA in addressing its most current needs.

While there is currently no structured system for comprehensive reevaluation, which is essential for enhancing overall effectiveness over time, the BSABs can lay the groundwork for it. By aligning more closely with research and findings by agricultural economists, behavioral scientists, and other experts, USDA conservation programs can become more adaptively managed, adjusting strategies and tactics in response to the scientific consensus and agency needs. Such a shift toward a more flexible, evidence-based approach is fundamental to ensuring that the programs deliver tangible results and use public funds judiciously.

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About the Authors: Kent D. Messer is the S. Hallock du Pont Professor of Applied Economics with the Department of Applied Economics and Statistics at the University of Delaware. Paul J. Feldman is an Assistant Professor with the Department of Agricultural Economics at Texas A&M University. Diya Ganguly is a Postdoctoral Researcher with the Department of Applied Economics and Statistics at the University of Delaware. Rich Iovanna is an Agricultural Economist at the U.S. Department of Agriculture Farm Production and Conservation. Julie Suhr Pierce is the National Economist at the U.S. Department of Agriculture Natural Resources Conservation Service.

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