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Conservation & Risk, Part 1: Introduction and Hypothesis

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It is possible that the conceptualization of agricultural conservation, as reflected in federal policy, is insufficient, incomplete, or too narrow, and that helps explain issues such as funding challenges, backlogs in approved applications, farmer frustration, low adoption, discontinuation of critical practices, and more (*farmdoc daily*, September 11, 2025; February 13, 2025; May 23, 2024; September 28, 2023). Such questions can fuel criticism, but better serve as diagnosis for rethinking conservation policy design. To that end, the Policy Design Lab, in collaboration with the Agroecosystem Sustainability Center (ASC), entered into a cooperative agreement with USDA's Natural Resources Conservation Service (NRCS) to explore measures of risk associated with the adoption and implementation of conservation practices. The argument, or hypothesis, is that farm risk is integral to developing a more complete understanding of the farmer's costs of conservation; a more complete concept of costs, in turn, could inform policy designs that better assist farmers with managing the learning curve—the transitions and adjustments necessary for successfully implementing conservation (*farmdoc daily*, April 24, 2025; May 9, 2025; June 5, 2025; October 30, 2025). This article introduces a series that will discuss the work undertaken pursuant to this cooperative agreement, as well as offer policy suggestions and avenues for future research and work. A topic of this scale and scope needs a place to start. We began with cover crops and the Environmental Quality Incentives Program (EQIP).

Policy Background: EQIP Developments

In EQIP, Congress authorized payments for "performing a practice" that are not to exceed 75% of the "costs associated with planning, design, materials, equipment, installation, labor, management, maintenance, or training" or "100 percent of the income foregone by the producer," or a combination of the two (16 U.S.C. §3839aa-2(d)(2)). USDA defines income foregone as "an estimate of the net income loss associated with the adoption of a conservation practice . . . one of the costs associated with practice implementation" (7 C.F.R. §1466.3). Note again that Congress has authorized fixed amounts of funding for these payments and practices, moving from $2.655 billion in fiscal year (FY) 2026 to $3.255 billion in FY2031 (16 U.S.C. §3841). Congress has also mandated that at least 50% of the funding be "targeted at practices related to livestock production, including grazing management practices" (16 U.S.C. §3839aa-2(d)(2)). These designs are significant limits on, and complications to, EQIP that impact the farmers seeking the assistance to implement conservation.

When Congress created EQIP in the 1996 Farm Bill, the purpose was to authorize policy that "maximizes environmental benefits per dollar expended" providing both "cost-share payments" and "incentive payments" for implementing conservation practices; funding for the program, however, was set at $200 million per fiscal year at a time when American farmers were planting nearly 270 million acres just to the major row crops on average, representing an investment of less than $0.75 per average planted acre (P.L. 104-127). Congress has evolved EQIP and increased its funding. The 2002 Farm Bill expanded cost-share payments, while increasing funding from $400 million in FY2002 to $1.3 billion in FY2007 (P.L. 101-171). In the 2008 Farm Bill, Congress added the provision authorizing payments for 100 percent of income foregone and increased funding from $1.2 billion in FY2008 to $1.75 billion in FY2012 (P.L. 110-246). Congress generally continued this design for EQIP in the 2014 Farm Bill, with funding from $1.35 billion for FY2014 to $1.75 billion for FY2018 (P.L. 113-79).

In the 2018 Farm Bill, Congress expanded "income foregone" for incentive contracts (in identified watersheds or other appropriate regions) to include "increased economic risk" and any revenue lost "due to anticipated reductions in yield," as well as any "economic losses" during transitions to resource-conserving systems for conservation incentive contracts (P.L. 115-334, at Sec. 2304(g); 16 U.S.C. 3839aa-2(j)). Congress explained that the intent was "that states should increase EQIP incentives for those practices which are especially effective at addressing local or regionalized priority resource concerns . . . to promote further adoption of these highly beneficial practices by producers in high priority watersheds" (*H. Rept*. 115-1072, at 576). USDA implementing regulations mirrored the Congressional text, including as income foregone the "increased economic risk" and "[l]oss in revenue due to anticipated reductions in yield" or other economic losses during transition to different resource-conserving systems (7 C.F.R. 1466.44; see also, USDA-NRCS, September 25, 2020). Congress, by adding and expanding the scope of financial assistance for a farmer's "income foregone" from implementing conservation practices, advanced the design of the program in important ways, although it collides with the overall funding cap and other allocation issues.

Conservation, Cost and Risk

A farmer's income is derived from the value of the crop(s) produced, generally a product of the crop yield and the prices for that crop in the market. That revenue must cover the costs to produce the crop and to operate the farm, from input costs to capital expenses; farm income also includes subsidies from the federal government (USDA-ERS, "Documentation" updated February 5, 2026; *farmdoc daily*, August 25, 2017; *farmdoc daily*, January 13, 2026). The costs of conservation practices, importantly, are in addition to the costs of a conventional production system. The farmer implementing conservation is adding more cost to the operation; that farmer is also adding risk or, at least, altering it in important ways.

Risk is arguably the most critical piece of the farm production puzzle. It also plays an important role in any farmer's decision to implement new conservation practices and continue or expand existing conservation efforts. Perceptions and understandings of risk vary by farmer, can be unique to individuals, and depend on context. Conservation can create, increase, or otherwise modify perceptions of risk "due to technological uncertainty or through various direct, indirect, and opportunity costs such as establishment, hindered establishment of succeeding cash crop, and forgone cash-crop income" (Ramsey, Bergtold, Canales and Williams, 2019, at 380). "Crop yields are a primary channel through which farmers may perceive risks from conservation adoption, yet little research has been done to highlight the connection between farmer-specific yield-risk perceptions and conservation adoption" (Id., at 381) and "a disparity likely exists between risk evaluations made by researchers and by typical farmers" (Id., at 384). There are important distinctions between perceived risks and actual risks, as well as for research approaches to each from social science to biophysical science—effective policy needs to incorporate it all.

Understanding actual farm risks begins with production risk, the uncertainties for yields due to weather and climate, along with other natural challenges to growing plants in fields over multiple months. Next are the market risks, especially uncertain and often volatile crop prices, but also costs for inputs like fertilizer, chemicals, energy, and seeds—costs also impacted by uncertain weather, as well as geopolitical factors. Those are only two of the five generally recognized categories of farm risk, which also include institutional, personal, and financial (Komarek, De Pinto, and Smith, 2020; Ullah et al., 2016; Just, 2001; Harwood et al., 1999). On rented farmland, for example, conservation adoption can be constrained by annual lease renewal, high rental rates, competitive rental markets, information asymmetries, risk aversion, and short-term financial motivations (Ranjan et al., 2019; Houser et al., 2019).

Conservation practices provide environmental and ecosystem services but constitute decisions involving risk for farmers who evaluate expected yield effects, profitability, prior experience, trusted information, stewardship values, and whether the practice fits the realities of their operation (Prokopy et al., 2019; Pannell and Claassen, 2020; Piñeiro et al., 2020). Key conservation practices that improve soil health, reduce erosion, reduce nutrient losses, and generate public benefits are outcomes that ***also depend*** on weather, soil conditions, timing, crop rotation, management skill, costs, and expected yield response (Bowman et al., 2025; Khanna et al., 2022; Khanna, 2020). Conservation is an iterative decision, reassessed as weather, markets, labor, input costs, and incentive payments change (Piñeiro et al., 2020). Time and again, weather is the primary factor of risk because practices depend on short operational windows (Huber et al., 2023).

Cover Cropping and Yield Risk

Cover crops provide a prime example. Cover crop acreage has increased, but it remains a small share of cropland; in the 2022 Census of Agriculture, for example, cover crops were planted on 4.7% of U.S. cropland. More concerning, from 2017 to 2022, cover crop acreage declined in 1,279 (45.6%) counties totaling 2.3 million acres of discontinued practice (Plastina et al., 2024; Zhou et al., 2022). Census of Agriculture data also show that only 48% of operations reporting cover crops in 2012 reported them again in 2017, falling to 27% by 2022 (Pratt et al., 2026).

The benefits of the practice collide with costs and profitability, cover crops can be unprofitable even with cost-share payments or other financial assistance. Proper implementation is complicated because farmers establish a cover crop during harvest windows and terminate the cover crop during the critical spring planting window—both times of the crop year that face substantial time pressure and other operational challenges (Schnitkey, Sellars and Gentry, 2023; Lee & McCann, 2019). The learning curve can be steep and unforgiving of mistakes. For example, the farmer's tillage system, planter setup, herbicide program, and planting date may all have to be altered. Persistent production risks continue even for those farmers experienced with cover crops, while policies reimburse farmers for only a portion of estimated costs but not annual risks inherent to cover crop systems (*farmdoc daily*, April 24, 2025; May 9, 2025; June 5, 2025; October 30, 2025).

With the priority placed on yields by the farmer (and the industry), risks to yields stand at the forefront. For example, research found average yield losses of 5.5% for corn and 3.5% for soybeans associated with cover crops, while positive yield effects were estimated as 0.6% (corn) and 2.6% (soybeans) (Deines et al., 2023). To be clear, these findings should not be interpreted to mean that cover crops always reduce yield, as those outcomes were based on satellite data and modeling across more than 90,000 fields, but they show that outcomes vary across rainfall, temperature, soil productivity, and other field conditions. Another study found yield reductions of about 4% or less occurring under specific conditions but outcomes were management-specific including planting method, site moisture, species, crop sequence, biomass production, nitrogen uptake, soil nitrate and pre-harvest (Koehler-Cole et al., 2023). Timing creates measurable tradeoffs because delaying termination—likely due to weather conditions in the spring window—can increase cover crop biomass but increase cash crop planting risk, which likely reduces yields (Kannberg et al., 2024; Qin et al., 2021). Research provides mixed evidence on yields, with some evidence of yield increases but mostly over longer time horizons with decreased yields in the shorter term (Aglasan et al., 2026).

For the farmer, the short-term costs are the most critical. Early losses jeopardize the long-term viability of the farm. It does a farmer little good that yields could improve in five-to-seven years if the farmer goes out of business in three years, especially given the high percentage of high-cost rented farmland in the Midwest. Using a simple example based on the research findings above for a corn yield of 191 bushels per acre (Illinois average for 2020) and marketing year average price of $4.46 per acre: If a cover crop caused a 5.5% yield loss that year, the cost to the farmer could be nearly $47 per acre in addition to the costs of the practice. Similar for soybeans, a 3.5% yield drag on a yield of 60 bushels per acre (Illinois average, 2020) and marketing year average price of $10.90 per bushel would have cost the farmer an additional $23 per acre. For those losses, consider that even high levels of crop insurance, such as coverage at 85% of expected yields or revenue, do not cover losses between 0% and 15%; known as the deductible range, such losses are not indemnified by the policy but are absorbed by the farmer—yield risks of conservation land in the deductible range of crop insurance.

Conclusion

As will be discussed in future articles, we began our work under this cooperative agreement with cover crops because it is one of the most common and challenging conservation practices on working lands for addressing soil erosion and soil health, as well as nutrient losses. We focused on yield risks for soybeans due to delays in planting that result from the combination of weather and cover crops, analyzing the days suitable for fieldwork to evaluate how workability changes with soil moisture, precipitation, and timing (Huber et al., 2023; Qin et al., 2021). Cover crops may add or alter risk in the planting window for the cash crop due to trouble terminating the cover crop or other delays to planting or preventing it. These risks could translate into lower yields, declines in crop revenue and farm income, which could also translate into challenges managing financial risks with lenders and crop marketing decisions. The risks of conservation practices could easily ripple through a farm operation in one season and over multiple seasons.

Overall, we work on such matters by applying research and science to the risks of implementing conservation practices, incorporating complex biophysical modeling with economic and actuarial modeling, as well as policy analysis and other research. The purpose is to initiate a process and develop a method for quantifying the risks of conservation practices on working farmlands, while also demonstrating the potential for collaborative efforts to apply science and research to inform innovations to agricultural policy (Coppess et al., 2025). The methodologies developed can, in turn, be applied to various risks of multiple conservation practices and to conservation policy design questions (including statutory provisions, funding, and practice standards). Eventually, the work will help develop policy design options or alternatives that can be debated and considered. We contend that successful practice implementation could be advanced substantially if programs better incorporate short-term economic matters, such as yield risk, in addition to ecological benefits and if policies more completely account for trade-offs among productivity, profitability, and environmental outcomes. It is that work that subsequent articles will explore and discuss in further detail.

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