

Interactions between Crop Insurance and Conservation Practices: Insights from Analysis of Farm Survey and Farm Program Data

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Crop insurance is a critical risk management tool in agriculture, offering farmers protection against unpredictable weather and market conditions. The USDA Federal Crop Insurance Program (FCIP) is a pillar of support to farms, covering over 539 million acres of farmland with total liabilities exceeding \$180 billion in 2023 (USDA-RMA, 2024). Program participation is high, with 81% of eligible acres enrolled between 2000 and 2022, at an aggregate coverage level that guaranteed 75% of the expected crop value in 2022 (USDA-ERS, 2024b). Federal expenditures for the FCIP averaged \$7.8 billion annually between 2010 and 2021, which included \$4.9 billion in net indemnity payments to producers and \$2.9 billion to insurance companies for program delivery and underwriting gains (Glauber, 2023).

Meanwhile, the U.S. government also spends a comparable amount on conservation in agriculture, with average spending of \$6.6 billion annually from 2010 to 2021 (USDA-ERS, 2024a). Despite similar funding levels, participation rates differ substantially, with 62% of farms producing row crops participating in federal crop insurance and only 21.9% of farms enrolling in conservation programs in 2022 (USDA, 2024a; USDA-ERS, 2024c). More notably, participation in conservation programs remains limited compared to what would be needed or beneficial for sustainable agroecosystems. For example, in Iowa, research shows that to achieve the state's 45% nitrogen reduction goal, cover crops would need to be adopted on between 10 million and 14 million acres (Iowa Department of Agriculture and Land Stewardship et al., 2019). Currently, cover crops are planted on less than 1.3 million acres in Iowa (Plastina, Sawadgo, and Okonkwo, 2024a).

Recent research shows potential interactions between these traditionally separate programs. Conservation practices, such as cover crops, may improve soil organic

matter and reduce yield losses (Kane et al., 2021), potentially lowering crop insurance losses from excess moisture and prevented planting (Aglasan et al., 2024; Won et al., 2024). Evidence from Midwestern counties shows that high EQIP support for cover crops was associated with reduced crop insurance losses in areas experiencing increased precipitation (Environmental Working Group, 2022). Similarly, with nationally representative corn field- and farm-level data, Ifft and Jodlowski (2024) found that farms with greater crop insurance use had higher adoption rates for some conservation practices. Nevertheless, the evidence is mixed. While some studies suggest that crop insurance is not a barrier (Fleckenstein et al., 2020), concerns remain that crop insurance may discourage use of cover crops (Connor, Rejesus, and Yasar, 2022; Upadhaya and Arbuckle, 2021; Yoder et al. 2025) or other in-field and edge-of-field practices (Upadhaya, Arbuckle, and Schulte, 2023). Miao et al. (2016a) showed that crop insurance subsidies led to more grassland loss to cropland in the U.S. Prairie Pothole Region. Additionally, the Conservation Reserve Program could be more effective if crop insurance subsidies were incorporated in program enrollment decisions (Miao et al., 2016b). Overall, these studies depict somewhat complex interactions among crop insurance use, conservation adoption, and program participation.

On the policy side, there have been initiatives intended to integrate crop insurance and conservation programs. The Government Accountability Office (GAO) has proposed several potential mechanisms to leverage crop insurance programs to enhance climate resilience and reduce financial risks, such as requiring producer adoption of climate-resilient practices to claim crop insurance premium subsidies and offering additional crop insurance premium subsidies for climate-resilient operations (US GAO, 2023). These recommendations may align with farmers' perspectives to some degree, as

research has found that most Iowa farmers supported tying program eligibility to erosion control on highly erodible land and linking nutrient loss reduction to eligibility (Arbuckle, 2013). In 2022, USDA introduced the Post-Application Coverage Endorsement (PACE) program to insure against yield losses when weather prevents in-season nitrogen application. Additionally, in 2021 the USDA implemented the Pandemic Cover Crop Program (PCCP), which provided a premium discount of \$5 per acre to producers who insured their crop and planted cover crops (USDA, 2024b). Several states have also implemented similar programs to promote cover crop adoption, including Iowa, Indiana, and Illinois. For example, Iowa's Crop Insurance Discount Program, now in its seventh year, has enrolled nearly 2,000 farmers covering over 1 million acres of cover crops by offering a premium discount of \$5 per acre (Iowa Department of Agriculture and Land Stewardship, 2023).

Despite these initiatives, use of conservation-linked insurance programs remains limited and research results on the effects of such programs are also mixed. The PCCP program operated for two crop years (2021 and 2022), with its final year support just 2.6% of farms and 4.1% of the total U.S. cropland (USDA-NASS, 2024). Sawadgo (2024) found that Iowa's Crop Insurance Discount Program increased cover crop adoption by 11%, while Irvine et al. (2024) found that such discounts were unlikely to result in significant expansion of cover crop use. PACE has seen even more limited adoption, with only 57 policies covering 9,490 acres across eight participating states (Iowa, Illinois, Michigan, Minnesota, North Dakota, Nebraska, South Dakota, Wisconsin) in 2023, representing around 0.0056% of the 1.03 million total crop insurance policies in these eight states (USDA RMA, 2024). In Iowa specifically, only 10, 6, and 2 PACE policies were sold in 2022, 2023, and 2024, respectively, accounting for just 0.0061%, 0.0036%, and 0.0012% of state's crop insurance policies.

As more policy initiatives are put into place to better align or integrate conservation with crop insurance programs, understanding farmers' perceptions and attitudes is critical since the effectiveness of these initiatives depends on farmers' adoption decisions. Using primary data from surveys of Iowa farmers and secondary data on program participation, this study aims to address the following research questions: First, do farmers perceive a linkage between use of crop insurance and conservation decisions? Second, what are farmers' perspectives on using crop insurance as a policy tool to promote best management practices? Third, how do these perspectives vary by farmers' use of relevant practices and attitudes regarding barriers to conservation adoption? By exploring farmer perspectives regarding crop insurance and conservation, this study contributes to ongoing discussions and policy design about leveraging existing agricultural support programs to achieve better environmental outcomes while maintaining economic stability for farmers.

Survey and Data Description

This study uses data from the 2023 wave of the Iowa Farm and Rural Life Poll (IFRLP), an annual panel survey of Iowa farmers conducted since 1982 (see Arbuckle, 2020, for a detailed explanation of methods) and secondary data from the USDA Risk Management Agency (RMA). The RMA data provide program participation data for the Pandemic Cover Crop Program (PCCP), including producer participation numbers, acreage enrolled, and subsidy totals, as well as information on the PACE program, including policies sold and acreage enrolled by state (USDA-RMA, 2024). The IFRLP surveys are mailed every year in late January or early February, following a modified Dillman, Smyth, and Christian (2014) approach, with an initial survey mailing with a cover letter followed in two weeks by a reminder postcard, then a second copy of the survey sent to nonrespondents 2 weeks after that. We included a set of questions in the 2023 IFRLP survey to investigate farmers' perceptions of crop insurance and conservation practices and conservation practice use. The 2023 poll was mailed to 2,188 farmers, receiving 972 completed responses (44% response rate). The respondents had an average age of 64.3 years and an average farm size of 556 acres, larger than Iowa's average of 359 acres (USDA-NASS, 2024a). This discrepancy is likely due to the Census of Agriculture's inclusion of many small operations with little or no revenue (i.e., the 2022 Census found that 31% of Iowa farms reported sales under \$2,500) (USDA-NASS, 2024a). Because the IFRLP's questions are generally only relevant to active farms, farms with little or no commercial activity typically decline to participate in the poll. Data analyzed for this paper are from the 84% of respondents (n = 813) who planted crops that were eligible for crop insurance in 2022.

Results

Use of Nitrogen Application Timing and Selected In-Field Conservation

Since this study examines how farmers' perspectives on conservation and crop insurance vary based on their use of conservation practices, it is critical to examine respondents' experience with these practices. Among respondents (n = 813) who planted crops that were eligible for crop insurance in 2022, 35.4% reported using growing season nitrogen application and 43.4% reported using spring (starter) nitrogen application. When examining nitrogen application timing, farmers reported applying 33.1% of their total nitrogen in the previous fall, 36.8% in early spring preplanting, 16.0% at planting, and only 14.1% during the growing season. For other conservation practices, nearly half (48.0%) used no-till in all years of rotation, and 29.6% used cover crops. Thus, this sample includes farmers with varying conservation experience levels, providing diverse perspectives on insurance-conservation relationships.

Participation in Nascent Federal Programs Linking Crop Insurance and Conservation

The 2023 IFRLP survey provides some explanation for the low participation in PACE (10 policies sold in Iowa in 2022): Just 8.5% of respondents considered themselves to be “somewhat knowledgeable” or “knowledgeable” about the program, while 17.2% reported themselves to be “slightly knowledgeable” and 70.7% of respondents were “not at all knowledgeable.” While this low level of awareness highlights a clear opportunity for targeted outreach, our survey data also point to deeper, structural challenges. The adoption of in-season nitrogen application, which PACE is designed to support, faces several practical barriers beyond a simple lack of awareness. Among respondents, 78.1% indicated that in-season nitrogen application increased labor and equipment costs, and 58.1% agreed that it complicates spring work scheduling. Still, the fact that 14% of respondents had already adopted in-season nitrogen application but largely did not participate in PACE highlights the need to better understand farmers’ decision-making, not only regarding this program but also for others that aim to promote conservation through insurance.

Farmers’ Perceptions of Interaction Between Conservation Practices and Crop Insurance

The IFRLP survey data reveal complex perspectives regarding crop insurance and conservation use (Table 1). A strong majority of respondents indicated that their crop insurance decisions are not affected by conservation practice adoption (79.9% agree or strongly agree) and vice versa (81.5% agree or strongly agree). However, other survey items reveal a more nuanced relationship. Specifically, nearly half of the respondents (47.8%) indicated that having sufficient crop insurance makes it easier to take risks related to adopting in-field conservation practices such as no-till and cover crops. These responses reflect a nuanced relationship rather than a contradiction. The two statements differ in scope with the first prompts farmers to consider primary motivations for conservation adoption broadly, while the second focuses specifically on how insurance might decrease risks when adopting potentially yield-impacting practices like no-till and cover crops. This suggests different dimensions of decision-making, where insurance may not be the decisive factor in conservation choices (hence high agreement with independence) but still function as a risk management tool that indirectly

Table 1. Farmers’ Perceptions of Crop Insurance and Conservation Practices

	Strongly Disagree	Disagree	Uncertain	Agree	Strongly Agree
My crop insurance decisions are not affected by my conservation practice adoption decisions	1.4%	5.6%	13.2%	65.0%	14.9%
My conservation practice adoption decisions are not affected by my crop insurance decisions	1.0%	3.7%	13.9%	65.5%	16.0%
Having sufficient crop insurance makes it easier to take risks related to adopting in-field conservation practices such as no-till and cover crops	3.6%	18.1%	30.5%	41.3%	6.5%
Conservation practices that improve soil resilience can result in reduced payouts from crop insurance over time	3.9%	18.3%	49.1%	24.8%	3.9%
In-season nitrogen application adds significant yield risk due to potential prevention of timely nitrogen application	3.1%	20.9%	31.5%	38.7%	5.8%
Concern that conservation practices (such as cover crops, no-till) might cause yield declines that negatively impact Actual Production History (APH) is a barrier to practice adoption	14.7%	29.6%	30.5%	22.1%	3.1%
When a farmer adopts a conservation practice (such as no till or cover crops) and has a lower yield as a result, their Actual Production History (APH) should not be negatively affected	3.3%	16.2%	30.5%	42.3%	7.8%

Source: 2023 IFRLP Poll.

supports conservation practice adoption—particularly at the margin, where risk considerations may be more pronounced. Further analysis showed that farmers with agricultural degrees and those already using cover crops and no-till were significantly more likely to view insurance as facilitating conservation risk-taking, while farmers with higher sales were more likely to perceive their conservation decisions as independent of insurance considerations.

Additionally, 28.7% of respondents agreed with the statement “conservation practices that improve soil resilience can result in reduced payouts from crop insurance over time,” while 22% disagreed, and nearly half (49.1%) selected the “uncertain” category. This suggests that farmer perspectives are not aligned with increasing evidence that cover crops, by improving soils over time, can potentially lower crop insurance losses from excess moisture and prevented planting (Kane et al., 2021; Aglasan et al., 2024; Won et al., 2024). This discrepancy between farmer beliefs and the accumulation of empirical evidence may reflect either a knowledge gap about the risk-reduction benefits of conservation practice or real uncertainty about the long-term effects of conservation practices on yield risk and insurance payouts. This is especially so if crop insurance premium will be adjusted with evolving production trends. Concerns about yield effects from conservation practices remain a significant barrier to the adoption of these practices. About half of farmers (44.5%) indicated that they believe in-season nitrogen application adds significant yield risk due to potential prevention of timely application, and 25.2% of farmers signaled concerns about actual production history (APH) being negatively impacted by potential yield declines caused by conservation practices.

Farmers’ Views on Premium Discounts and Conservation Behavior

Despite the seemingly independent nature of crop insurance and conservation decisions reported by respondents, survey results suggest significant potential for crop insurance to promote conservation practices. Nearly half of the respondents (49.4%) supported using crop insurance as a policy tool to incentivize conservation adoption, and 50.6% agreed that offering premium discounts for conservation practices could be effective (Table 2). Around 40% of respondents (38.2%) agreed that sufficient crop insurance discounts could encourage more in-season nitrogen application (Table 2). Relatively few farmers disagreed with these statements, and 37.5% of respondents indicated they might plant more cover crops if insurance discounts exceeded the current level of \$5/acre.

Correlation between Farmers’ Attitudes toward Crop Insurance Premium Discounts and Conservation-Related Variables

To examine relationships between farmers’ views on crop insurance and selected conservation-related variables, we conducted a correlation analysis between three measures of attitudes toward crop insurance as a policy tool and 11 selected farm and farmer characteristics and conservation-related attitudes and behaviors (see Tables 1 and 2 for descriptive statistics and item wording). Table 3 presents the correlation matrix between three variables measuring: (i) openness to increased cover crops use with premium discounts, (ii)

Table 2. Farmers’ Views on Insurance Incentives and Conservation Behavior

	Strongly Disagree	Disagree	Uncertain	Agree	Strongly Agree
In general, I support using crop insurance as a policy tool (such as offering premium discounts) to incentivize farmers to adopt conservation practices	6.0%	17.5%	27.2%	42.6%	6.8%
Using crop insurance premium discounts to incentivize farmers to adopt conservation practices can be effective	4.2%	10.5%	34.7%	45.1%	5.5%
If sufficient crop insurance discounts were tied to in-season nitrogen application, I might increase use	4.9%	18.5%	38.5%	32.4%	5.8%
If crop insurance discounts larger than the current level of \$5/acre were tied to the use of cover crops, I might plant more cover crops	7.1%	17.2%	38.1%	29.3%	8.2%

Source: 2023 IFRLP Poll.

Table 3. Correlation Analysis of Farmers' Attitudes toward Crop Insurance Premium Discounts and Conservation-Related Variables

	A Cover Crop Incentive	B Nitrogen Incentive	C General Support
Number of nutrient management practices used in 2022	0.103**	0.147***	0.139***
Number of soil health practices used in 2022	0.159***	0.059	0.161***
Perceived lack of economic resources to eliminate nutrient loss	0.067	0.112**	0.005
Perception that profit margin pressure reduces capacity to invest in conservation	0.027	0.118***	-0.041
Received cost-share for conservation in last three years	0.147***	0.064	0.147***
Number of meetings with conservation professional to work on soil and water conservation	0.102**	0.062	0.103**
Experienced significant erosion in past 10 years	0.087*	0.073*	0.015
Insurable acres in farm operation	0.106**	0.077*	0.009
Percentage land rented	0.050	0.091**	-0.002
Age	-0.073*	-0.066	0.072*
Education	0.087*	0.106**	0.095**

Source: 2023 IFRLP Poll

Note: *p < 0.1, **p < 0.05, ***p < 0.01.

Cover crop incentive: Correlation with responses to the statement, "If crop insurance discounts larger than the current level of \$5/acre were tied to the use of cover crops, I might plant more cover crops."

Nitrogen incentive: Correlation with responses to the statement, "If sufficient crop insurance discounts were tied to in-season nitrogen application, I might increase use."

General support: Correlation with responses to the statement, "In general, I support using crop insurance as a policy tool (such as offering premium discounts) to incentivize farmers to adopt conservation practices."

openness to increased use of in-season nitrogen application with premium discounts, and (iii) support for using crop insurance as a policy tool to promote conservation practice adoption. See Table 2 for measurement and percentage distributions for these policy statement variables.

Farmers with greater experience in nutrient management and soil health practices were generally more supportive of using crop insurance to incentivize conservation (Table 3). Those who received cost-share funding or worked with conservation professionals also expressed stronger support, suggesting that experience with conservation programs increases openness to insurance-based incentives. Farmers who had experienced erosion in the past 10 years showed greater support for both cover crop and in-season nitrogen insurance incentives. The correlation analysis results have important policy implications. The strong correlation between reported conservation behaviors and support for insurance incentives suggests that targeting current or past adopters of conservation practices might promote more widespread adoption. However, this approach raises concerns about additionality (that is, whether crop insurance premium discounts primarily support farmers who are already adopters). On the other hand, given the high rates of conservation practice disadoption shown in recent studies (Du, Feng, and Arbuckle, 2025; Plastina, Sawadgo, and Okonkwo, 2024b), these discounts could help maintain long-term sustained adoption. Additionality

concerns are further alleviated if premium discounts not only promote continued use of conservation practices but also foster network effects through which more people adopt when they see others in their community or region doing the same.

Discussion and Conclusion

Linking conservation practices with crop insurance presents a promising opportunity to promote environmental sustainability while maintaining farm economic resilience. As the largest federal support program for agriculture, crop insurance's widespread use among farmers makes it a potentially powerful vehicle for incentivizing conservation practices. However, it is important to understand how farmers' perceptions and attitudes about integrating conservation with crop insurance programs because the success of any policy tools will depend on farmers' willingness to participate.

Our analysis of program and farmer survey data reveals mixed results in current efforts to leverage this potential. Survey data indicate that a plurality of Iowa farmers were generally supportive of using crop insurance as a policy tool to incentivize farmers to use conservation practices. Many also indicated they would increase use of cover crops and in-season nitrogen application if more substantial crop insurance discounts were offered. However, participation in crop insurance discount programs to date is low. The fact that over 70% of

farmers reported lack of awareness of the Pandemic Cover Crop Program and Post-Application Coverage Endorsement suggests greater outreach might lead to higher participation rates. Also, despite a much smaller financial incentive for cover crop use (\$5/acre) offered as premium discount, compared to traditional conservation programs like EQIP (approximately \$61.5/acre), the crop insurance premium discount programs currently offered by some Midwestern states have experienced relatively substantial participation. The offering of conservation subsidies through a discount of crop insurance premium potentially reduces administrative barriers compared to standalone conservation programs. This suggests that ease of access and simple administrative process could also be important as financial incentive.

Recent research has also raised concerns about potential negative relationships between crop insurance and use of conservation best management practices (BMPs), and policy-makers have started addressing such concerns. For example, the RMA has recently “recognized” some conservation practices as good farming practices (GFPs). However, the RMA also states that any GFP must “not reduce or adversely affect the yield.” If yields are affected, farmers must then appeal to approved “experts” to make determinations as to whether their practices qualify as GFPs (USDA-RMA, 2023, page 12 and 33). Given this regulatory dynamic, it is possible that farmers’ concerns about impacts of GFPs on crop insurance could serve as a substantial barrier to adoption of some key practices such as cover crops and no-till. This is because these practices could negatively impact yields, especially during early adoption

as farmers learn to manage them in their systems. Thus, it is critical to continue to investigate potential linkages between crop insurance and conservation behaviors to ensure that crop insurance (i) at the very least has a neutral (non-negative) impact on practice use and (ii) ideally would encourage greater application of practices. In other words, it is important to adequately ensure that publicly subsidized crop insurance does not maintain short-term economic viability of individual farms at the expense of society’s long-term food production capacity.

Overall, while crop insurance is widely adopted, our research indicates that its potential as a tool for promoting conservation practices would benefit from further in-depth study. Our survey results showed that nearly half of Iowa farmers supported the use of crop insurance as a policy tool to help incentivize BMP adoption (versus fewer than 25% who did not), and slightly more than half indicated that premium discounts would be effective for this purpose (versus 15% who disagreed). That said, minorities agreed that discounts would incentivize them to increase use of in-season nitrogen application or cover crops (with roughly equal proportions indicating uncertainty). This suggests that premium discount programs may not be sufficient on their own, even with higher discounts. Additional research into relationships between crop insurance and conservation behavior is needed to help better align policies with both farmers’ short-term safety net needs and long-term societal food production needs, which could allow crop insurance programs to become a more powerful instrument for promoting both farm resilience and agri-environmental sustainability.

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