

**UNDERSTANDING HOW CROP INSURANCE IMPACTS ADOPTION OF
CONSERVATION PRACTICES**

by

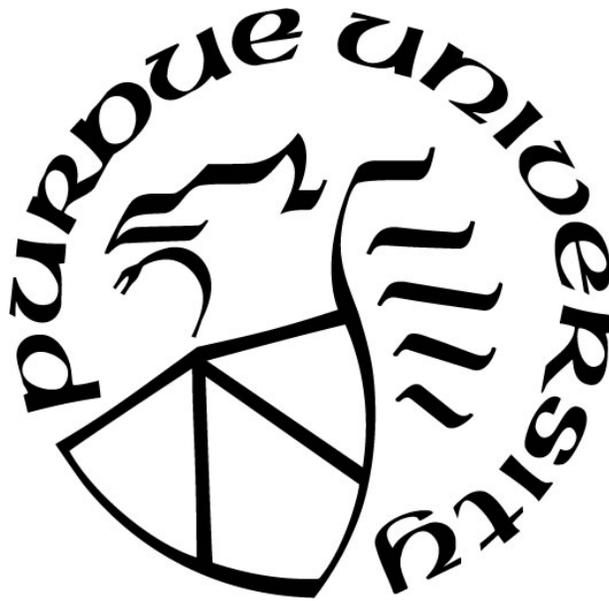
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ABSTRACT

In recent years, agricultural magazine articles have positioned crop insurance requirements as a barrier to conservation adoption. While research exists on both crop insurance and conservation adoption, few studies examine the interactions between them. Our research uses a mixed-methods design with Midwest conventional corn farmers to identify if crop insurance is a hindrance to adoption. Qualitative data was analyzed in Nvivo using thematic coding and quantitative data was analyzed using Stata statistical software. Our results indicate that crop insurance is not a direct barrier to adoption; rather, farmers identify distinct and complimentary outcomes for risk-management from participating in both crop insurance and conservation. These findings reflect broader perspectives on Midwest conventional corn producers' beliefs and rationale for using crop insurance and/or conservation practices.

INTRODUCTION

Problem Statement

Agricultural nutrient runoff is a main ecological concern that is unregulated by the Clean Water Act, where the impact of individual farms is untraceable. Nutrient runoff contributes to impaired water quality, particularly an excess of nitrogen that has contributed to algal blooms (Paerl 1997, Bosch 2014). Government agencies recommend and financially incentivize the use of conservation practices in reducing nutrient runoff and conserving soil (National Crop Insurance Services 2019). Cover crops and conservation tillage, in particular, have been promoted by government agencies such as the Natural Resources Conservation Service for their abilities to protect soil and water resources, as well as provide a suite of on-farm benefits (O'Connor 2013, Gardezi 2019, National Crop Insurance Services 2019). However, use of conservation practices remains low. Research over the last 30 years on conservation adoption has sought to understand why farmers adopt cover crops and conservation tillage and what barriers still exist; a recent examination of this literature has found few variables that are consistent predictors for adoption (Prokopy et. al. 2019). Institutional factors, such as crop insurance, have begun to receive more attention as possible limitations for the adoption of cover crops and conservation tillage. Over the past few years, a number of articles have been written in agricultural magazines, which present crop insurance and conservation to be in opposition to each other (Ohlson 2016, Elsbernd 2018, National Crop Insurance Services 2019). This has been especially apparent when discussing the specific cover crop termination guidelines that must be followed to remain in compliance with crop insurance. Our research seeks to understand if crop insurance is, indeed, a limitation to conservation adoption.

Crop Insurance

This section provides an overview of crop insurance, including a history of some of the key policies that have shaped crop insurance into what it is today.

Crop Insurance History

Crop insurance was initially enacted in 1938 as part of a campaign promise by President Roosevelt, and for decades was available for limited crops in specific counties (Glauber 2013, Goodwin 2013). Originally, only yield insurance was available and in 1996, revenue insurance was added; revenue insurance is now the dominant type of crop insurance used today (Coble 2007). In states like Illinois and Iowa, costs for revenue insurance are relatively low and yield stability for corn and soybeans is more common, making revenue insurance the preferred choice (Coble 2007). In 2018, Illinois corn farmers used revenue protection on 79.3% of planted acres, while yield protection was used on 2.6% (Schnitkey 2019).

The increase in participation in revenue insurance, and crop insurance broadly speaking, are in large part due to increases in government subsidies for the producers' premium rates (Coble 2007). The 1980 Act provided producers' a subsidy on the insurance premium and allowed private companies to sell crop insurance directly (prior to this, crop insurance was sold by USDA employees or through contracts) (Coble 2012, Glauber 2013). However, increases in participation were slow and academics researching crop insurance at the time found that the subsidy level would need to be at least 50% (Coble 2012, Glauber 2013). In 1994, the crop insurance subsidy was increased substantially to 57% and enrollment in crop insurance was also deemed mandatory to receive disaster assistance payments (Knight 1997, Glauber 2004, Coble 2012, Lusk 2017, Schnitkey 2018). By 1995, crop insurance enrollment on eligible acres had

risen to 80% (Glauber 2013). Meanwhile, total liability for the program rose by more than \$10 billion (Knight 1997).

Coble 2007 notes that increases in crop insurance subsidies have resulted in producers choosing higher coverage levels. Additionally, according to Schnitkey 2019, “By 2002, about three-quarters of the revenue-insured acres were at coverage levels of 70 percent or higher.” Illinois farmers tend to use higher levels of coverage, with somewhere between 75-85% coverage the most common (Schnitkey 2019). Today, the amount of the crop insurance subsidy varies based on several factors and averages around 60% for corn and soybean producers (Knight 1997, Annan 2015).

In recent years, there has been a shift in the way that Congress talks about crop insurance. Prior to the 2008 farm bill, crop insurance was primarily left out of the discussions (Coble 2012). However, when budgetary discussions were taking place for the 2008 bill, crop insurance was discussed as the “...the backbone of desired farm programs” (Coble 2012). When cuts to the subsidies were proposed for the 2012 farm bill, Roger Johnson, who was the National Farmers Union President at the time, said, ““Once again, we see that Congress is attempting to balance the budget on the backs of rural America”” (Goodwin 2013). Speaking about the 2012 bill, Senator Pat Roberts, called crop insurance “...the number one priority of virtually every producer that testified before our Committee” (Glauber 2013). Coble 2012 comments, “...support from farmer organizations seems to be increasing over time.”

A potential barrier to conservation?

Conservation practices gained significant attention after the Dust Bowl when a significant amount of topsoil was lost during severe winds (NRCS-a). An increased awareness of soil erosion led to the creation of the Soil Conservation Service, which later became the Natural

Resources Conservation Service (NRCS-a). NRCS provides a number of conservation incentive programs, including cost-share programs for practices such as terraces or cover crops, as well as payments for keeping environmentally-sensitive land out of production (NRCS-b).

Cover crops and conservation tillage are two management practices that are commonly promoted within NRCS for their abilities to enhance water quality and reduce soil erosion. In the last few years, these practices have also been touted as improving soil health, with a range of on-farm benefits including water infiltration and greater organic matter, among others (O'Connor 2013, Gardezi 2019). Recently, both Iowa and Illinois have implemented programs to allow for crop insurance discounts by adopting cover crops. In Iowa, this cover crop incentive program was created in 2017 to give producers \$5 per acre for implementing cover crops on acres that weren't already receiving financial assistance.

In the agricultural economics literature, a number of studies have been conducted on the impact of crop insurance on farmer decision-making. Some studies have focused on the impact of the federal crop insurance subsidy, which have brought up concerns that the federal subsidy distorts risk (Babcock 2005, Annan 2015, Goodwin 2013). In one study, crop insured acres were found to be more sensitive to extreme heat than uninsured acres (Annan 2015). Goodwin 2013 found acreage distortions as a result of the subsidies, meaning that more acres were planted due to participation in crop insurance, noting "...subsidizing risk leads agents to assume more risk."

Recognizing the recent media articles which have claimed crop insurance to be a conservation barrier, as well as crop insurance literature which posits ways in which crop insurance may change farmer behavior, our research seeks to identify if crop insurance is a direct barrier to the adoption of conservation practices. Our research also provides an exploratory approach in understanding inherent beliefs that perpetuate enrollment in crop insurance. Finally,

our research seeks to understand if producers are interested and aware of the cover crop incentive program to gauge if this is a viable strategy for increasing adoption rates.

The Reasoned Action Approach

To understand crop insurance enrollers' inherent beliefs, we ground our work using The Reasoned Action Approach, an updated version of the Theory of Planned Behavior, which is widely used in the fields of behavior change and motivation. This theory provides a rich context for studying participation in crop insurance. The Reasoned Action Approach considers background factors (past behavior, demographics, media exposure, personality, among others) and three sets of beliefs, which could be viewed as pathways for influencing behavior (Fishbein 2011). The first pathway begins with behavioral beliefs and outcome evaluations, which flows into attitudes; the second pathway begins with normative beliefs and motivation to comply, which flows into norms, then intention; the third pathway begins with control beliefs and perceived power, which flows into self-efficacy (Fishbein 2011). Our research seeks to identify specific beliefs about crop insurance in any pathway that are contributing to continued use of crop insurance.

Research Questions and Hypotheses

Our research is comprised of three overarching research questions and hypotheses as follows:

1. Is crop insurance a direct barrier to the adoption of conservation practices?

Hypothesis: Crop insurance is not a direct barrier to adoption, but may be influencing behavior in other ways.

2. What inherent beliefs about crop insurance keep farmers enrolled?

3. Would farmers adopt conservation if given a discount on crop insurance?

Hypothesis: Crop insurance discounts for conservation are a viable option for farmers interested in conservation.

Thesis Overview

This research uses a mixed-methods approach. Chapter 1 introduces the qualitative research methods, along with findings and discussion. Chapter 2 introduces the quantitative methods, as well as the results and discussion. The final chapter provides overall conclusions and areas for further research.

CHAPTER 1: QUALITATIVE METHODS

Introduction

This chapter will cover the methods, results, and discussion of the two qualitative research methods: (1) one focus group of innovative, conservation-minded, Indiana corn producers and (2) 14 semi-structured interviews with conventional corn producers from Indiana and Iowa.

Methods

Our research combined two qualitative data methods to provide insights into Midwest corn producers' crop insurance and conservation behaviors. In the fall of 2017, we conducted a focus group with three forward-thinking, conservation-minded farmers in Indiana. In the spring of 2018, the primary researcher conducted 14 interviews with conventional corn producers in Indiana and Iowa. The results of each method informed the next method of analysis, meaning that the focus group results informed the interviews, and the interviews informed the survey.

Sampling Frame: Focus Group and Interviews

For both the focus group and interviews, participants were initially selected through recommendations from USDA-NRCS, Indiana Association of Soil and Water Conservation Districts (IASWCD) and The Nature Conservancy staff members. Staff members provided contact information for each producer. The main researcher contacted each producer through phone and/or email to inform them about the project and invite them to participate in either the focus group or interviews.

The number of participants for the focus group was limited to 4-5 producers in order to ensure adequate time for each participant to contribute, and to ensure that a single person was not

dominating the conversation. Four producers confirmed their attendance; however, one fell sick the day of the event and shared his input over the phone. For the purposes of the focus group, the researcher chose participants who were less reliant on crop insurance and instead were actively using conservation practices; this was intentional in order to understand how their perspectives differed from the general farming population.

For the interviews, our primary researcher asked agency staff to select interviewees with a diverse range of perspectives and behaviors regarding crop insurance and conservation practices. Participants were contacted through phone and/or email and were told that the topics of the project focused on risk-management, crop insurance, and conservation practices. In total, fourteen interviews took place with ten Iowa producers and four from Indiana.

Interview Guide Development

Careful consideration was taken in developing an interview guide that would resonate with the average American farmer. Interview questions began with general information on the farmer's background and farm history for a general overview of the operation. Next, the interview moved into characterizing risks: identifying the main risks they faced as a farmer and how they managed them. This provided an opportunity for farmers to mention any risk-management practices they used without any prompting. After hearing their own responses, the interviewer asked questions regarding crop insurance. General characteristics about their crop insurance policies (if enrolled) were determined, as well as their general attitudes about crop insurance and the crop insurance subsidy. Next, the interviewer asked if there were any other practices that they used to manage risk, before transitioning into discussing conservation practices as a form of risk-management. The interview concluded with how they manage risks. In total, the interview questions encompassed five key categories: farm history and background,

identifying and managing risks, crop insurance, conservation practices, and risks. Prior to conducting the interviews, several researchers in various disciplines, including agricultural economics, agricultural and biological engineering, and natural resources social sciences, reviewed the interview guide. See Appendix 1 for the full interview guide.

Conducting the Focus Group and Interviews

Both the focus group and interviews were semi-structured to allow for a more natural, conversational style with participants. An experienced facilitator with over 10 years of experience conducted the focus group, which provides an informal platform for the farmers to share their experiences. The focus group was a 2-3 hour conversation over lunch. Interviews were expected to each take around 45 minutes to 1 hour; however, participants were welcome to discuss longer and often did (the average interview length was around an hour and 20 minutes). After 14 interviews, data saturation was met, meaning that similar information was repeated and no new information was coming out. After each interview, participants were asked if they had any recommendations for who else the researcher should talk to. Three out of the 14 interviewees were found this way. Each interview was voice-recorded with a recording device, after receiving prior consent, and then transcribed using TranscribeMe transcription software.

Data Analysis

NVivo Version 12, a standard social science software for qualitative data, was used for the codebook development and analysis of the interviews. See Appendix 2 for the complete codebook. The initial codebook was developed between two researchers using thematic coding. Four rounds of intercoder reliability were performed. To begin, each researcher read through the first two interviews and highlighted the relevant themes and potential codes, then the researchers

met together to agree on the coding scheme. The lead researcher then typed up this initial codebook and this was used to analyze subsequent interviews. The researchers read a portion of the interviews separately, highlighting the themes and identifying which codes they correspond to; then, they met together, discussed, and worked through any discrepancies. The codebook was modified by the lead researcher and the revised version was used for the next round of articles. The researchers then repeated the process: reading through the next round of interviews, coding separately, modifying the codebook as necessary, and continuing until all interviews were coded. The codebook themes were identified primarily through inductive reasoning, allowing the themes in the interview data itself to emerge.

Results

Demographics

The farmers interviewed were corn farmers in the Midwest, typically ranging from around 400-2000 acres. Many were farming a combination of family-owned land, as well as rented land. When asked about the future of their farm, about half thought that it would stay in the family and half were uncertain. There was a combination of both family labor, as well as hired labor. A few farmers also had livestock and commented about the benefits that livestock provided, including extra income and free fertilizer in the form of manure. Other ways that farmers mentioned diversifying their income included specialty crops, such as seed corn or sweet corn. A few farmers had full or part-time jobs outside of farming, such as a government job, selling seed, or selling crop insurance.

Due to the nature of the sampling frame, many of the interviewees who agreed to participate in the study were conservation-focused; yet, all were using crop insurance. In terms of their familiarity and/or use of conservation practices, all had tried cover crops or conservation

tillage (in most cases, both) and all but one were currently using one of the practices (in most cases, both).

RQ1: Is crop insurance a direct barrier to the adoption of conservation practices?

Participants in both the focus group and the interviews did not mention crop insurance requirements being a barrier to adoption. In fact, almost all of the participants were simultaneously using crop insurance and conservation practices. There was no indication that crop insurance requirements posed a direct barrier. One farmer notes:

“Because there’s always chatter about the farm program crop insurance tying our hands too much. I guess I don’t feel like it ties my hands too much.” -Producer, IA

While focus group participants also did not see crop insurance as a direct barrier to adoption, they did express several concerns about the crop insurance subsidy. One farmer in the focus group singled out crop insurance as the greatest hindrance to conservation adoption, stating:

“...subsidized crop insurance and the way that’s managed in this country is the number one impediment to the adoption of more widespread soil practices...we’re never going to move it very far until we change that.”

The main concern by the focus group participants was the fact that crop insurance does not provide a system of benefits or punishments based on level of risk, which is unlike other forms of insurance. A farmer states:

“...you've got two farmers. One guy's really done a great job with soil, one guy's not. This guy's surviving based on his crop insurance. This (other) guy hardly ever needs it. If this was automobile insurance, and we had a guy with three DUIs and a guy who never had a speeding ticket, it would very quickly be differentiated in the system. And one would get charged appropriately for his risk and the other-- that's how it works. We're muting that signal (at) the farmer level.”

Producers in both the focus group and interviews felt that crop insurance can lead to risky farming:

“I think it's rewarding poor farming decisions.”

“...some of the acres that get crop insurance shouldn't be farmed.”

“...could potentially subsidize bad farming practices”

“if you're one of the farmers...opening it up to wind erosion and water erosion, I don't think you deserve crop insurance.”

RQ2: What inherent beliefs about crop insurance keep farmers enrolled?

Two major types of beliefs were found in the interviewed farmers. The first surrounds the ability for crop insurance to protect against risk, which shows its ability to achieve a desired behavioral outcome. This belief feeds into a positive attitude towards crop insurance, ultimately resulting in continued enrollment. The second type of belief is based on crop insurance's ability to provide security in uncontrollable conditions, particularly with regards to weather variability and price fluctuations. Crop insurance provides a sense of security and allows a feeling of self-efficacy, which also perpetuates its continued use.

Behavioral Beliefs: Protection

Interviewed farmers discussed crop insurance as a safety net, something that they were grateful for, especially in times where they needed to file a claim. There was a consensus of gratitude and approval, especially when filing a claim. Farmers mention:

“Thankfully we did take it.... And since then it has helped, it's hit enough that it has been keeping us closer to break even.”

“Thankfully, we have that as a kind of a safety net to help us cushion....And at the end of the year, you just won't make as much money. But it guarantees you that you'll still be positive.”

“Well, I think currently that is the only government safety net...”

Additionally, farmers recognized that it's a way to manage financial security and minimize fear. Interviewed farmers admit:

“It's a definitely a waste of money that way, but... We want that comfort of knowing, and that's what we're paying for”

“...people are willing to pay a lot for... an unknown, to prevent that fear.”

“I want the insurance just to help me if I have a disaster to carry on the next year.”

When mentioning claims, farmers noted that it can be a substantial amount:

“It can be a lot of money.”

“...it was a big check but it probably wasn't what I had paid into the crop insurance over all the years...it was in no means a profit...”

Overall, farmers had positive attitudes towards crop insurance:

“I have always, from day one farming, I've always believed in crop insurance for-- there're two reason. Number one is the risk.”

“...it's a great way to help the farmer out”

“a very good tool in the toolbox to have”

Control Beliefs: Security from the Uncontrollable

When asked the main risks that they faced in their operation, farmers were quick to recognize the vast array of risks involved, often citing several risks in a row:

“I don't like the casino, so I don't go there. I do enough of that every day. I don't need to sit there and play cards and lose money or something.”

“Risk is a big word; it encompasses a lot. I mean, there's risk with the markets and having to manage that. So when you say risk, it's hard because I'm just thinking, everything I do can be a risk [laughter]. And so, there's just a lot of little things that you do to try to manage those.”

The two main risks that farmers identified were weather and markets. These statements support inherent beliefs about the weather and markets being uncontrollable, and later point to the need for using crop insurance as a way to manage these concerns. Farmers state:

“Weather. Weather and markets. That's it.”

“You buy the best seed. You do everything right. And the weather is our limiting factor. It can be the most-- it will make you or break you, in a sense...the risk is tremendous....”

“Well, with farming there's a lot of different variables and only so many that the farmer can keep his fingers on and stuff, so, the weather's probably the biggest one.”

“The problem is, when the farmer takes the corn out in the spring, we don't know what's going to happen. It could be a super wet year, it could be a super dry year, or a super long year.”

“Well, I mean weather is probably the biggest risk. I mean we've seen it too wet. We've seen it too dry.”

“...our biggest risk in this part of the state, in the past, probably has been yield loss usually associated with dry weather.”

Other farmers directly mentioned crop insurance, without being prompted, as ways of managing financial risk:

“The main risk is, obviously, financial risk. So we manage that with the crop insurance programs to a certain extent.”

“We always carried (crop insurance) on beans, but we never carried that on corn way back when. But we've gotten it because the weather pattern's gotten more volatile.”

“There's a lot of risk with farming. Weather is probably the biggest one, the most that you cannot control. So you'd have to use tools to try to mitigate some of that risk.”

Whether it's crop insurance, whether it's planting dates, whether it's harvestability, using different fertilizer programs....”

Crop Insurance Subsidy Beliefs

Interviewed farmers were much more positive about the crop insurance subsidy than focus group participants were:

“It definitely makes it better. From what I understand, it'd basically be-- our premiums would be double of what it would be... I do like that they subsidized crop insurance. I think it's a nice way to give benefit to the farmer.”

“I think it really should be an obligation of the government.... we farmers aren't in the free market... Our government is basically using us as pawns in international diplomacy.... we deserve that they will make us as whole as they can when their policy really costs us a lot of money.”

“But the subsidies make it to where it's-- I think it's a reasonable financial outlet for the coverage we get. But it doesn't guarantee your profits, it's not really luxury coverage...”

Interviewed farmers also had beliefs regarding the impact of the subsidy in helping to ensure a stable food supply:

“The subsidies help create cheap food for our public... we've got the cheapest, safest food supply in the world here because it's probably some of it to do with subsidies.”

“Well, it's because the federal government has guaranteed the public a cheap and stable food supply. And that's the cheapest way to obtain it...”

“... we want to produce food and have enough to keep everybody happy...so if you're going to do that, crop insurance is a fair way....if we're going to have a policy for paying people to produce food, this is a pretty fair way in my opinion...”

They were also more concerned than focus group participants about the potential implications if crop insurance went away:

“Well, I was just thinking here, ‘Just how much is crop insurance?’ and he said, ‘Your count's probably 60%, is subsidized.’ And if it was that much more, could I afford it? Probably not. Or I might have to scale back on the amount. We don't have high yields here.”

“Because otherwise, the premiums would be so ridiculous, I wouldn't be at the coverage levels I'm at. I'd be knocking my coverage way back to the bare minimum.... I wouldn't get rid of it.”

“With the subsidies where they are, it's-- if the subsidies went away and we had to pay for 100% of the cost of the insurance, boy, I mean, it would double in cost and then some. So I don't know. It'd have to really look hard and see...”

When discussing removal of the subsidies, many also expressed concern about what would happen nationally without the subsidy, hinting at disaster:

“I do think if you were to get rid of the subsidies on crop insurance, a lot more people would opt out of crop insurance, which would open up the door for more federal disasters when mother nature gets in the way.”

“I like that I'm not waiting for Congress to do an ad hoc disaster relief program. The government knows what the bill is going to be roughly every year so instead of an ad hoc bill that's 5 times as high, they have this predictable subsidy bill.”

“If they take the subsidy away, it's kind of like when the high prices went away. The rents will readjust. Everything will-- it just takes time to make it settle down and readjust. It's about a five-year period to readjust your way down. And it's not an overly-fun ride.... some of those guys have been running pretty inefficient. And they're going to be in trouble if this subsidy goes away. Because some of them have been counting on it and they've gotten a little sloppy.”

Interestingly, another theme that came out of the interviews was the concept of “free money” and that they might as well take crop insurance since it is heavily subsidized. This was reflected in statements such as:

“You don't have to pay me to do it, but if you're going to pay me, I guess I'll take it [laughter]. I mean, it just helps the bottom line.”

“But the other reason I believe in crop insurance is that, as a general rule of thumb, my premise is this, if someone is willing to pay part of your input cost, let them [laughter].”

“So the subsidy part [laughter], is it necessary? I'm probably going to say it's not absolutely necessary. It does help with the cash flow.”

RQ3: Would farmers adopt conservation if given a discount on crop insurance?

Interviewed farmers were supportive of the cover crop incentive program and most were interested in applying, if they had not already applied. The primary reason that farmers hadn't applied even if they were interested is that they heard about the program too late. This points to the need for ensuring that adequate outreach is provided. The following quote comes from a farmer that was already using cover crops:

"That's definitely helpful. It came about too late this past year...it came about like October or November. And by that time ... a lot of us had our cover crop seeded already."

Two of the Iowa farmers (where the cover crop incentive program is in effect) had already applied. Both were already using cover crops prior to applying for the program. One of these farmers only purchased crop insurance that year because of the cover crop incentive program. The other farmer who applied for the program remarks:

"I've got some of my acres that would qualify ...I may not get a benefit from it, but like I said, I've got my risks spread out so I feel comfortable making the investment in my cover crops even if I wouldn't get that reimbursement for them and stuff, so."

The only farmer who didn't explicitly say that he would apply for the program was already concerned about the cost of cover crops, and wasn't sure that the incentive program would provide enough money to offset the cost.

Other concerns that came up included the stipulation that any acres used for the cover crop incentive program cannot be already receiving any other conservation payments. A few statements from producers discuss this as follows:

“Anything we can do to help promote the cover crops. But that's only on acres that aren't federally or state-subsidized. So how many...of those acres are really not under some sort of a (cost)-share....I think I only had one field that wasn't.”

“Now, I'm not entirely sure, since I lump everything together, how that will affect me because on some of those acres, I do receive (cost) share payments for the cover crops.”

In general, the interviewed farmers spoke on the positive benefits of financial incentives for further adoption of conservation practices, stating:

“Money can drive almost any behavior.”

“The money has done a tremendous amount of good to get people to start the adoption...”

“What a great way to incentivize it. So it's not that they're getting a penalty, but they're not getting a discount. It's more of a carrot instead of a stick approach.”

Another farmer mentioned that they didn't need the payments to make the changes, though it can be helpful for others. He says:

“We have not taken any payments for any of those things... I know a bunch of people have. I think it definitely has value.... We've just never been into going after some of that

stuff. It's been kind of a thing we do on our own. All the conservation that we have done, we've paid for out of our own pocket, so."

"I think if we want to try and solve water quality, soil erosion, I think that would be beneficial. I mean, if you're not getting other payments-- and that's what we're trying to solve as a nation and as a farming community. That's an easy way to hey, help incentivize. ...But there's a lot of little sticking points."

Discussion

Our findings reveal that crop insurance requirements are not a direct limitation to conservation adoption. This directly refutes the claims that agricultural magazines have made which perpetuate that crop insurance and conservation are challenging to do simultaneously. Rather, our results show that all farmers except one were using these two approaches simultaneously. Additionally, farmers revealed a specific set of beliefs about crop insurance, which primarily fall under the categories of protection and security. They believe that crop insurance protects them from risk and feel gratitude for the times in which they've needed to file claims. They also believe that crop insurance provides a level of security, which is especially important given the variability that occurs with the two main risks that they identified: weather and markets. These beliefs make sense given the context and purpose of crop insurance, which is to provide a level of risk-protection that the farmers cannot provide on their own. Finally, many of the interviewed farmers expressed interest in using the crop insurance incentive program for conservation. Still, many of these producers were already using cover crops already, so it may not be helping to enroll new farmers into conservation. In order to understand if these results hold true for the broader agricultural population, we developed a multi-state survey.

CHAPTER 2: MULTI-STATE SURVEY

Introduction

This chapter introduces the quantitative methods, which was a multi-state survey for Midwest corn producers in Indiana, Iowa, and Illinois. This survey encompassed farmers' views of risk-management, including crop insurance and conservation practices. Results and discussion follow, providing clear evidence from a broad sample of Midwest producers as to whether or not crop insurance limits adoption.

Methods: Survey Design and Analysis

Survey Development

The survey was developed in spring 2018 and encompassed several sections, including awareness about current weather conditions and its impact on their farms; farmers' use and views of crop insurance, as well as other risk-management strategies; farmers' use and views of conservation practices; and demographic information. As with the interviews, the survey started out with more general questions that would be easy to answer and continued with more complex questions regarding their opinions and behaviors. All of the questions were developed carefully and reviewed by social scientists trained in survey development to ensure that the questions were free from bias and straight-forward.

The survey was mainly developed by one graduate researcher and one undergraduate researcher, with several revision processes. Several questions on farm operation potential problems (Q1), weather variability (Q2), and risk-management (Q3), as well as conservation questions in Section III on familiarity, willingness, and limiting factors were sourced from

previous work (Prokopy et. al. 2009, Arbuckle et. al. 2013, Prokopy et. al. 2017). Feedback and suggestions for edits were given by various colleagues, including members of the Natural Resources Social Science lab at Purdue University and members of insurance team working on crop insurance and conservation funded by USDA-NIFA. The survey was developed in Adobe InDesign by the researchers and continued to go through multiple formatting and content revisions before the final version was complete. Two separate surveys were created to compare answers between Iowa, which had the cover crop incentive program already, and Illinois/Indiana, which did not have the cover crop incentive program. For the Iowa version of the survey, Iowa residents were asked directly if they would participate in the program; whereas for Indiana and Illinois residents, the questions were framed slightly differently and asked if they would support or participate in a similar program if it was offered in their state.

Survey Distribution

The multi-state survey was sent out in summer 2018 to 2000 conventional corn producers in Indiana, Iowa, and Illinois according to the Dillman 2014 5-wave method. Addresses were obtained through Farm Market iD, a commercial source for agribusiness data, for owners/operators and operators with over 50 corn acres.

The 5-wave Dillman method was followed for the survey mailings. First, an advance letter was mailed to all addresses, notifying the farmers that a survey would be coming in the mail soon, and provided a link to the online survey version to complete if they preferred. Each farmer was given a unique ID which allowed us to track responses. Individuals who completed the online survey would enter their unique ID so that we knew they completed the survey, and then we would not send them any more surveys. Next, the first round of the survey was mailed to all farmers who had not already completed the online survey. Farmers were given a return

envelope and stamp to mail the survey back. When farmers began returning the survey, we noticed that some farmers would comment that they were no longer farming. In order to ensure that our responses were coming from farmers who were still actively farming, we modified the first page of the survey for farmers to check a box if they were no longer farming. A postcard was sent out as the next reminder, followed by two final waves of the updated survey, which completed the 5-wave mailing process.

Data Entry and Quality Control

All mail surveys were entered into Qualtrics. To ensure accuracy between what was entered into Qualtrics and the physical mail survey, 100% quality control (QC) was conducted on the unique ID, response type, and date received. We then checked 10% of these surveys to confirm that there was less than 2% error between the mail survey and Qualtrics for any individual question. There were three questions for which there was greater than 2% error, in which additional measures were taken to ensure quality control.

Several steps were taken for cleaning the data in preparation for analysis. First, we looked for duplicates (meaning that there were two or more surveys with the same identification code) and determined which one to keep. The main rules for this process were to keep the one that was completed first and/or more complete. All written survey comments and data entry notes were reviewed and processed accordingly. Duplicate answers were almost always changed to -99, a code for missing data. All numeric text fields were qualified; for example, if a response said “~100”, this was changed to 100. On the last page, there are several numeric fields for acreage. If a respondent wrote in some answers, but left other answers blank or had a dash mark, these fields were changed to zeros. The graduate researcher and one staff member from the Natural Resources Social Science lab confirmed all skip patterns. Responses were changed or confirmed

as bad addresses when a respondent noted that they were retired, no longer living, or no longer farming. Personally identifying information was removed.

Response Rate

Response rate was calculated by determining the amount of complete responses divided by the number of eligible respondents (bad addresses and respondents no longer farming were categorized as ineligible). It should be noted that the response rate may be higher if some people chose not to respond because they were no longer farming, but did not mail the survey back to inform us. The final response rate was 38.45%.

Regression Analysis Overview

Statistical analysis was performed in Stata. Our analysis includes several binary logit regression models. Most of the questions throughout the survey had a Likert scale of strongly disagree to strongly agree as follows: 5 indicates strongly agree; 4 indicates agree; 3 indicates neither agree nor disagree; 2 indicates disagree; 1 indicates strongly disagree.

Dependent Variables

Our regression models test three behaviors as dependent variables to understand what impacts their likelihood in performing these behaviors. These behaviors are:

- 1) Enroll in crop insurance
- 2) Adopt conservation practices (separated by practice)
- 3) Enroll in the cover crop incentive program (separated by state)

Each of these behaviors were coded as binary variables, coded 0 if they were not performing the behavior and coded 1 if they were performing the behavior. For behavior 1, this

survey question was already written as a binary (yes/no) question and coded 0 or 1 accordingly. For behavior 2, respondents who identified that they currently use the practice were coded as (1) and any other response was coded as (0); similarly, for behavior 3 farmers' who indicated that they would apply or have already applied for the incentive program were coded as (1); all other responses were coded as (0).

Independent Variables

Independent variables were categorized into one of the following categories: farm characteristics, values, perceptions of need, attitudes, behavior, and awareness. All variables, along with the results of each model, can be found in Table 9. Farm characteristics included demographic variables such as farm size, education, age, and state. These four variables were included across all models. Values focused on the two conservation practices and demonstrated if they valued either of these practices as risk-management strategies. Perceptions of need indicated how strongly farmers felt about crop insurance and its ability to help them manage risks. Two main indicators of awareness were used in some of the models. The first and most common indicator had to do with farmers' concern of weather and various weather conditions. The original question was "*How concerned are you about the following potential problems for your farm operation?*" It included the following weather conditions: dry periods and drought, extreme rains, heat stress of crops, loss of nutrients into waterways, saturated soils and ponded water, and soil erosion. These related questions were combined and averaged to get each farmer's mean score, which was then used in the regression models. The second question that was used was related to farmers noticing the weather variability on their fields. These statements tested how concerned the farmer was about an increasing frequency of variable weather, variable rainfall, variable planting dates, and flooding; these questions were also combined and averaged

to get one composite score for each farmer. These statements were as follows: “*in the past five years, I have noticed more variable/unusual weather on my farm*”; “*in the past five years, I have noticed more variable rainfall patterns on my farm*”; “*in the past five years, I have noticed more variable flooding on my farm*”; “*in the past five years, I have noticed more variability in my planting dates due to risks*”. Behavior provided specific behavior options, such as currently using a conservation practice, so that we could understand how different behaviors impacted each other.

Results

Demographics

The average respondent in our survey was 63 years old with 38 years of farming experience. 96.42% of respondents were men. 39.10% had completed their high school diploma or GED; 18.75% had completed some college; 14.83% had completed a 2-year college; 22.09% had completed a 4-year college; 5.23% had completed a post-graduate degree. The mean size of owned acres was 627 acres; the mean size of acres rented from others was 554 acres. Total corn acres mean was 389 acres. The average producer has around 58.40% of their acres tile drained. 91.64% had no irrigated cropland.

Enrollment and Policy Characteristics

89.65% of respondents had enrolled in crop insurance between 2012-2017, leaving 10.35% unenrolled. 76.22% of those enrolled chose revenue insurance, leaving 23.78% choosing yield insurance. 29.77% of producers were required to have crop insurance by their lender; 49.51% of producers were not required to have crop insurance by their lender; and 20.71% of producers did not have a lender. Producers chose higher levels of coverage, with over 80% of

enrolled producers choosing 75, 80, or 85% coverage. See Table below for the complete breakdown on producers' chosen coverage levels.

Table 1. Crop insurance coverage level
Corresponds to Q10: "On average, what coverage level did you choose?"

Coverage Level	Frequency (%; N=597)
50%	1.01
55%	0.34
60%	1.34
65%	2.85
70%	6.53
75%	21.44
80%	31.66
85%	34.84

The most common claims reported in the last five years were drought (42.35%), decline in price (40.16%), and excess moisture (37.73%). 72.85% of producers did not purchase supplemental insurance. 58.29% of producers had filed claims on both crop insurance and supplemental insurance; 13% of producers had filed a claim on crop insurance only in the last five years; 25.12% had not filed a claim on either crop insurance or supplemental insurance. See Table below for the specific claim types and frequencies.

Table 2. Claim type
 Corresponds to Q13: “In the past five years (2013-2017), I have filed claims due to _____.
Check all that apply.”

Claim Type	Frequency (%; N=493)
Drought	42.39%
Hail	32.05%
Excess moisture	37.73%
Frost	0.20%
Other	7.30%
Wind/excess wind	17.04%
Insects	0.41%
Plant disease	3.45%
Decline in price	40.16%

*No other responses

Note: a respondent can choose multiple components and the sum of frequency (%) is greater than 100%.

RQ1: Is crop insurance a direct barrier to the adoption of conservation practices?

Overall, we did not find crop insurance to be a direct barrier to the adoption of conservation practices. On a scale from “not limiting” to “severely limiting”, farmers were asked to identify how limiting the following factors were for (1) cover crops, and (2) conservation tillage. Farmers could choose from the following response options: not limiting, slightly limiting, moderately limiting, severely limiting, or don’t know. When comparing frequencies for cover crops, 34.69% of respondents chose “Don’t know” and 39.09% chose “Not limiting”. For conservation tillage, 64.69% chose “Not limiting” and 18.37% chose “Don’t know”. Additionally, when comparing the intensity of limitation for each factor, crop insurance was the factor that was chosen as least limiting for both practices. See Tables 3 and 4 below.

Table 3. Limiting factors by conservation practice

How much do the following factors limit your ability to implement ... ?	n	Mean
<i>Conservation practice: cover crops</i>		
Limiting Factors		
Cost	576	2.73
Time/labor required	592	2.66
Number of years needed to see benefits	515	2.40
Lack of proven benefits	545	2.47
Lack of equipment/technology	600	2.26
Desire to continue current farming practices/methods	569	2.18
Physical features of my property make it difficult (e.g. soil types, drainage, and/or topography)	574	1.98
Crop insurance requirements	416	1.35
<i>Conservation practice: no-till/reduced tillage</i>		
Limiting Factors		
Physical features of my property make it difficult (e.g. soil types, drainage, and/or topography)	581	2.24
Desire to continue current farming practices/methods	592	1.93
Lack of equipment/technology	600	1.93
Cost	599	1.84
Lack of proven benefits	577	1.75
Number of years needed to see benefits	581	1.71
Time/labor required	582	1.61
Crop insurance requirements	520	1.35

Value based on a 1-4 scale where 1=not limiting; 2=slightly limiting; 3=moderately limiting; 4=significantly limiting

Table 4. Crop insurance as a limiting factor by conservation practice
Corresponds to the question: “How much does crop insurance limit your ability to implement _____?”

Practice	N	Not limiting (%)	Slightly limiting (%)	Moderately limiting (%)	Severely limiting (%)	Don't know (%)
Cover crops	637	39.09	8.79	14.76	2.67	34.69
Conservation tillage	637	64.68	8.01	7.54	1.41	18.37

Adoption rates for each practice were compared by binomial proportion between those who were enrolled in crop insurance and those who were not enrolled. 61.55% of those enrolled in crop insurance in the past five years (2012-2017) were currently using reduced/no-tillage on

some portion of their fields and 25.42% of farmers enrolled in crop insurance were currently using cover crops on some portion of their fields. When comparing the adoption rates of those who were enrolled in crop insurance and those who were not enrolled, no significant differences were found for either practice. See Table 5 below for the results.

Table 5. Differences in adoption by binomial proportion

		Crop insurance enrolled		Crop insurance not enrolled		p-value
		Percentage (%)	n	Percentage (%)	n	
Cover Crops	Non_adopter	74.58	594	79.71	69	0.32
	Adopter	25.42		20.29		
Reduced/No-Tillage	Non_adopter	38.45	593	44.12	68	0.372
	Adopter	61.55		55.88		

RQ2: What inherent beliefs about crop insurance keep farmers enrolled?

Using binary regression, we were able to test the significance of specific statements in enrolling in crop insurance. See Table 6 below for the regression model results. Out of the statements that we tested, those who agreed with the statement “Crop insurance will exist next year” and “Crop insurance will protect the viability of my farm operation regardless of water-related risks” were significantly more likely be enrolled in crop insurance. Interestingly, those who disagreed with the statement “I can’t imagine managing my farm without crop insurance” were significantly more likely to be enrolled. Additionally, age was significant with a negative coefficient, meaning that those who were younger were significantly more likely to enroll. Also, those who responded that they were concerned about various weather conditions on their farms were also significantly more likely to enroll.

Table 6. Binary regression model: crop insurance enrollment

Model Parameters	Coefficient	p-value	S.E.	McFadden's adjusted r ² (n)
<i>Dependent Variable: enroll in crop insurance</i>				0.128 (531)
Farm Characteristics				
Farm Size	0.000	0.504	0.001	
Age	-0.103	0.007**	0.038	
Education	-0.013	0.955	0.239	
State	0.007	0.953	0.121	
Norms				
Crop insurance will exist next year.	0.453	0.028*	0.206	
Perception of Need				
Crop insurance will protect the viability of my farm operation regardless of water-related risks.	0.774	0.016*	0.322	
I can't imagine managing my farm operation without crop insurance.	-1.666	0.003**	0.557	
Awareness				
Weather Concern	1.259	0.034*	0.594	
Noticing Weather Variability	-0.272	0.615	0.541	

In Table 7, participants share their perspectives regarding crop insurance. When looking at beliefs around protection and need, 55.06% of producers agree or strongly agree with the statement “I can’t imagine managing my farm without crop insurance.” 48.95% of producers agree or strongly agree that “Crop insurance will protect the viability of my farm operation regardless of risks.” 46.04% neither agree nor disagree with the statement “I need other ways to manage risks besides crop insurance.”

Other interesting findings include that 84.3% of producers responded agree or strongly agree to the statement: “I trust my crop insurance agent.” 64.85% of producers agree or strongly agree with the statement: “I have spent more money in crop insurance premiums than I have received back in claims.” Finally, for the statement “I will buy crop insurance regardless of whether or not it is subsidized,” 32.34% of producers agree or strongly agree with the statement while 32.16% disagree or strongly disagree.

Table 7. Crop insurance opinions
 Corresponds to Q16: “Please indicate your level of disagreement or agreement with the following statements about crop insurance.”

Statement	N	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree	Mean (<i>sd</i>)
		(1)	(2)	(3)	(4)	(5)	
Frequency (%)							
Crop insurance will protect the viability of my farm operation regardless of water-related risks.	621	3.54	17.07	30.43	42.03	6.92	3.32 (0.95)
I need other ways to manage water-related risks besides crop insurance.	619	2.75	10.82	46.04	34.89	5.49	3.30 (0.84)
I can't imagine managing my farm without crop insurance.	623	5.78	13.16	26.00	40.29	14.77	3.45 (1.07)
Crop insurance requirements limit my ability to implement conservation practices.	621	11.43	41.06	41.55	5.64	0.32	2.42 (0.78)
Lender requirements to carry crop insurance limit my choices of which crops to grow.	620	20.65	44.03	31.29	2.74	1.29	2.2 (0.84)
Crop insurance encourages row crop production on marginal ground.	621	4.99	19.65	40.90	26.41	8.05	3.13 (0.983)
I will buy crop insurance regardless of whether or not it is subsidized.	625	8.16	24.00	35.20	28.96	3.68	2.96 (1.001)

Table 7 continued

Statement	N	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree	Mean (sd)
		(1)	(2)	(3)	(4)	(5)	
Frequency (%)							
I prefer federal crop insurance subsidies to federal price supports, loan deficiency payments, or direct payments.	624	4.97	9.29	41.51	33.97	10.26	3.35 (0.959)
I prefer federal crop insurance subsidies to enrolling marginal land in conservation reserve programs (CRP).	620	6.77	23.23	41.13	23.06	5.81	2.97 (0.983)
I have spent more money in crop insurance premiums than I have received back in claims.	623	1.93	14.29	18.94	40.13	24.72	3.71 (1.050)
I trust my crop insurance agent.	624	0.80	1.28	13.62	55.93	28.37	4.09 (0.731)

In Table 8, producers were also asked to rate their level of confidence that subsidized crop insurance would continue for the next year and the next five years. Results indicate that producers have more confidence that it will exist next year, vs. the next five years. Additionally, confidence goes down further when considering a scenario that involves removing crop insurance and then reinstating it later on.

Table 8. Confidence in crop insurance

Corresponds to Q20: “Please indicate your level of confidence with each statement about the future of crop insurance, where 1 indicates low confidence and 7 indicates high confidence.”

Statement	N	1	2	3	4	5	6	7	Mean (<i>sd</i>)
		Frequency (%)							
Federally subsidized crop insurance for corn and soybeans will exist next year.	685	4.23	3.80	7.45	15.91	18.98	20.58	29.05	5.20 (1.676)
Federally subsidized crops insurance for corn and soybeans will exist for the next five years.	684	4.97	5.41	11.99	25.88	20.18	13.30	18.27	4.64 (1.661)
If federally subsidized crop insurance were removed, how confident are you that it would be reinstated?	683	19.62	13.62	20.20	21.38	13.18	6.00	6.00	3.37 (1.741)

We tested several control beliefs that we found in the interviewed farmers, including their perceptions of weather vulnerability. We asked farmers if they were concerned about specific farm issues and also if they had been noticing more variable weather. In Table 9, producers were asked to rate their concern with experiencing various weather conditions and how that would impact their farm. Our results indicate that farmers are concerned about the impact of weather problems on their farm operations. 62.54% are concerned or very concerned about dry periods and drought; 67.39% are concerned or very concerned about extreme rains; 58.81% are concerned or very concerned about heat stress of crops. Soil erosion was a more common concern compared to loss of nutrients into waterways, with 66.33% concerned or very concerned

about soil erosion, as compared to 51.3%. Farmers also indicated awareness about specific weather variability trends on their own farm operations. In Table 10, 60.66% of producers agree or strongly agree with the statement: “In the past five years, I have noticed more variable/unusual weather on my farm.” 64.85% agree or strongly agree that “In the past five years, I have noticed more variable rainfall patterns on my farm.” Less common were noticing more flooding (31.61% agree or strongly agree) or variability in planting dates (36.61% agree or strongly agree). “Neither agree nor disagree” was the most common response for both “Changes in weather patterns are hurting my farm operation” and “I should take additional steps to protect the land I farm from increased weather variability.” Meanwhile, only 26.26% agree or strongly agree with “I have the financial capacity to deal with any weather-related threats to the viability of my farm operation.”

Table 9. Farm operation potential problems

Corresponds to Q1: “Listed below are problems that some Corn Belt farmers have experienced over the past few years. How concerned are you about the following potential problems for your farm operation?”

Problems	N	Not Concerned	Slightly Concerned	Concerned	Very Concerned	Mean (<i>sd</i>)
		(1)	(2)	(3)	(4)	
Frequency (%)						
Dry periods and drought	694	7.93	29.54	43.52	19.02	2.74 (0.857)
Extreme rains	693	6.35	26.26	44.73	22.66	2.84 (0.847)
Heat stress of crops	687	6.40	34.79	45.27	13.54	2.66 (0.790)
Loss of nutrients into waterways	688	15.70	36.63	35.61	12.06	2.44 (0.896)
Saturated soils and ponded water	694	13.11	35.59	36.46	14.84	2.53 (0.900)
Soil erosion	692	10.40	23.27	39.60	26.73	2.83 (0.942)

Table 10. Farm operation variable weather
Corresponds to Q2: “Please indicate your level of disagreement or agreement with the following statements.”

Statement	N	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree	Mean (<i>sd</i>)
		(1)	(2)	(3)	(4)	(5)	
Frequency (%)							
In the past five years, I have noticed more variable/unusual weather on my farm.	694	2.45	9.80	27.09	48.99	11.67	3.58 (0.884)
In the past five years, I have noticed more variable rainfall patterns on my farm.	697	1.87	10.47	22.81	53.66	11.19	3.62 (0.884)
In the past five years, I have noticed more flooding on my farm.	693	4.04	26.98	37.37	24.39	7.22	3.04 (0.982)
In the past five years, I have noticed more variability in my planting dates due to risks.	692	3.18	24.28	37.57	29.34	5.64	3.10 (0.938)
Changes in weather patterns are hurting my farm operation.	693	5.34	29.00	43.58	18.18	3.90	2.86 (0.908)
I should take additional steps to protect the land I farm from increased weather variability.	694	3.17	17.00	43.95	32.13	3.75	3.16 (0.862)
I have the knowledge and technical skill to deal with any weather-related threats to the viability of my farm operation.	691	2.60	18.23	44.14	31.98	3.04	3.15 (0.841)
I have the financial capacity to deal with any weather related threats to the viability of my farm operation.	693	7.79	33.62	32.32	23.52	2.74	2.80 (0.976)

In Tables 11 and 12, producers were asked to identify if they used specific risk-management strategies for their farm operations and to report which one they valued the most. Crop insurance was found to be the most valued risk-management strategy, among the options

provided. Additionally, 88.82% reported that they were enrolled in crop insurance as part of their short-term or long-term risk management.

Table 11. Risk-management strategies
Corresponds to Q3: “Do you use any of the following as risk management strategies?”

Strategy	N	Not doing and don't plan to	Not doing but considering	Doing as part of short-term risk management	Doing as part of long-term risk management	Mean (<i>sd</i>)
		(1)	(2)	(3)	(4)	
Frequency (%)						
Add new technologies (i.e., precision ag)	682	19.50	25.66	23.02	31.82	2.67 (1.117)
Add off-farm income	680	39.26	14.26	16.76	29.71	2.37 (1.270)
Diversify into other forms of production (such as different crops or livestock)	686	47.23	26.24	8.45	18.08	1.97 (1.132)
Enroll in crop insurance	689	8.42	2.76	21.04	67.78	3.48 (0.901)
Forward-sell crops	686	8.31	13.85	33.24	44.61	3.14 (0.948)
Increase drainage	678	13.13	22.27	19.76	44.84	2.96 (1.094)
Implement edge-of-field conservation practices	679	26.22	27.84	18.41	27.54	2.47 (1.152)
Implement on-farm conservation practices	683	9.96	13.91	25.04	51.10	3.17 (1.010)
Rent additional property	686	41.69	26.68	10.93	20.70	2.10 (1.160)
Restructure cash flow and debt	677	50.37	21.27	16.25	12.11	1.90 (1.069)
Scale back operations or quit farming	681	64.17	25.11	4.70	6.02	1.53 (0.840)
Supplement rainfall with irrigation	687	87.05	6.26	1.60	5.09	1.25 (0.724)

Table 12. Most valued risk-management strategy
 Corresponds to Q41: “Which risk management strategy from the question above do you value the most?”

Strategy	Frequency (%; N=643)
Crop insurance	42.92
Cover crops	3.73
Reduced/no-tillage	21.93
Drainage water recycling	1.24
Supplemental Irrigation	3.27
Additional drainage	26.91

Table 13. Risk-management strategies
 Corresponds to Q5: “Please indicate your level of disagreement or agreement with the following statements. I am interested in additional risk management strategies for _____.”

Strategy	N	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree	Mean (sd)
		(1)	(2)	(3)	(4)	(5)	
Frequency (%)							
Dry periods and drought	676	3.40	8.58	45.41	36.98	5.62	3.33 (0.842)
Extreme rains	676	2.96	7.10	41.12	40.98	7.84	3.44 (0.851)
Heat stress of crops	677	2.81	7.39	45.20	38.55	6.06	3.38 (0.820)
Loss of nutrients into waterways	678	2.80	9.59	41.74	37.91	7.96	3.39 (0.870)
Saturated soils and ponded water	676	2.96	10.80	41.57	38.02	6.66	3.35 (0.868)
Soil erosion	677	2.51	6.94	29.39	46.09	15.07	3.64 (0.906)

Multiple questions were asked to understand farmers’ perceptions of the crop insurance subsidy and how removal of the crop insurance subsidy would impact their behavior. Farmers were asked several questions related to their perception on the crop insurance subsidy, if they were aware of it, and if they thought it should be there. We also asked farmers how they would

manage risk if crop insurance was no longer subsidized. Our results show that crop insurance behavior changes in response to the crop insurance subsidy. Table 15 indicates that around a quarter of farmers would choose to reduce their coverage level if crop insurance was not subsidized. We also asked farmers if they knew how much their crop insurance bill was subsidized; around half (50.25%) of respondents did not know how much their crop insurance premium was subsidized. Table 16 indicates that 49.5% agree or strongly agree that “Crop insurance for risks (too much or too little water) should be subsidized by the federal government”, while 32.51% neither agree nor disagree.

Table 14. Actions without crop insurance subsidy

Corresponds to Q17: “Please indicate your level of disagreement or agreement with the following statements. If crop insurance for water-related risks (e.g., too much or too little water) were not subsidized, I would_____.”

Statement	N	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree	Mean (sd)
		(1)	(2)	(3)	(4)	(5)	
Frequency (%)							
Purchase crop insurance at market value	616	6.66	21.27	45.29	25.00	1.79	2.94 (0.893)
Reduce my coverage level on crop insurance	613	1.79	15.82	37.36	40.78	4.24	3.30 (0.848)
Supplement rainfall with irrigation	614	29.64	40.88	21.50	6.19	1.79	2.10 (0.955)
Implement additional drainage	613	5.22	18.11	39.80	32.63	4.24	3.13 (0.934)
Implement reduced/no-tillage	612	4.08	10.78	45.10	30.88	9.15	3.30 (0.925)
Implement cover crops	612	6.86	16.99	47.55	23.37	5.23	3.03 (0.942)

Table 15. Top priority without subsidy

Corresponds to Q18: “Which action from the question above would be your top priority?”

Top Priority	Frequency (%; N= 585)
Purchase crop insurance at market value	18.29
Reduce my coverage level on crop insurance	23.08
Supplement rainfall with irrigation	4.27
Implement additional drainage	21.71
Implement reduced/no-tillage	16.24
Implement cover crops	16.41

Table 16. Crop insurance subsidy
 Corresponds to Q21: “Please indicate your level of disagreement or agreement with the following statements about crop insurance subsidies.”

Statement	N	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree	Mean (<i>sd</i>)
		(1)	(2)	(3)	(4)	(5)	
Frequency (%)							
Crop insurance for water-related risks (too much or too little water) should be subsidized by the federal government.	689	5.66	12.34	32.51	37.45	12.05	3.37 (1.03)
Crop insurance subsidies for risks help ensure a reliable food supply.	686	4.81	9.91	30.47	38.19	16.62	3.52 (1.04)

RQ3: Would farmers adopt conservation if given a discount on crop insurance?

In regards to the cover crop incentive program, producers were asked three questions which varied slightly depending on which state they resided in. First, all producers were asked if they were aware of the program. 57.93% of Iowa producers were aware of the program, whereas only 3.16% of Indiana producers and 6.67% of Illinois producers were aware of the program.

To gauge support for the program, Iowa producers were also asked their level of support for the program on a 5-point scale, with 5 being high support and 1 being low support. 37.01% of Iowa producers gave this program a 4 or 5 rating; 35.39% of producers gave a 1 or 2 rating; and 27.6% gave a 3 rating. Indiana and Illinois producers were asked if they thought there should be a similar program in their state. 49.78% of producers in Illinois and 44.3% of producers in Indiana said they were not sure; 31.11% of Illinois producers and 35.44% of Indiana producers said yes; and 19.11% of Illinois producers and 20.25% of Indiana producers said no.

Interest in Applying for the Program

In Table 17, when asked if they would participate in the cover crop incentive program, Iowa participants most commonly responded “Not sure” at 36.33%. 32.16% reported that they would be interested in applying or have already applied and 31.51% reported that they were not interested in applying. Illinois and Indiana producers were asked if they would participate in a similar program. 51.35% of Illinois producers and 38.85% of Indiana producers said that they would apply or would be interested in applying. 36.44% of Illinois producers and 42.68% of Indiana producers reported “Not sure”.

Table 17. Participation in similar program
Corresponds to Q24 in the IN and IL survey version: “Would you be interested in participating in a similar program in your state?”

State	N	Not sure (%)	No, I’m not interested in applying (%)	Yes, I would be interested in applying (%)	Yes, I’d apply (%)
Indiana	157	42.68	18.47	28.66	10.19
Illinois	222	36.44	22.97	40.09	11.26

Binary regression models were performed to understand what variables were significant in a producer reporting that they would participate in the incentive program. Regardless of state, producers who value cover crops, currently use cover crops, or are younger were significantly more likely to apply for the cover crop incentive program. In Iowa, producers who would implement cover crops if the federal crop insurance subsidy were removed were also significantly more likely to apply for the cover crop incentive.

Table 18. Binary regression model: Iowa incentive programs

Model Parameters	Coefficient	p-value	S.E.	McFadden's adjusted r ² (n)
<i>Dependent Variable: apply for cover crop incentive (IA)</i>				0.316 (155)
Farm Characteristics				
Farm Size	-0.001	0.132	0.000	
Age	-0.038	0.026*	0.017	
Education	0.077	0.624	0.158	
Values				
I value cover crops as a risk-management strategy.	0.769	0.026*	0.345	
Behavior				
Currently use cover crops	2.265	0.000**	0.624	
If the crop insurance subsidy was removed, I would implement cover crops.	0.947	0.002**	0.300	
<i>Dependent Variable: apply for cover crop incentive (IL and IN)</i>				0.353 (177)
Farm Characteristics				
Farm Size	0.000	0.482	0.000	
Age	-0.046	0.032*	0.022	
Education	-0.036	0.845	0.183	
State	-0.346	0.191	0.264	
Values				
I value cover crops as a risk-management strategy.	1.610	0.000**	0.389	
Behavior				
Currently use cover crops	1.981	0.020*	0.854	
If the crop insurance subsidy was removed, I would implement cover crops.	0.565	0.075	0.318	
If the subsidy was removed, I would reduce my coverage level on crop insurance.	0.073	0.782	0.262	

Survey Limitations

There are several limitations of this survey to keep in mind. First, this survey was designed for Midwest corn farmers, therefore it is not able to be generalizable outside of this specific geographic context and for the specific crop that was studied. Additionally, there are multiple changes that would be made if this study were to be conducted again, which would have provided a greater depth and scope of the research findings. First, while we did study the impact of crop insurance requirements, we did not explicitly mention “cover crop termination

guidelines.” Stating this specific focus in the survey itself would allow our results to be more direct. Second, while results of this survey were able to test specific attitudes and beliefs of crop insurance enrollers, it would have been helpful to be more strategic about which sets of beliefs to include and test and how each relates to the theoretical framework.

Quantitative Discussion

Overall, crop insurance was not found to directly limit adoption of cover crops and conservation tillage through multiple lines of evidence. First, there was no significant difference in adoption when comparing those who enroll in crop insurance and those who do not. Crop insurance requirements were also found to be the least limiting factor to adoption of both conservation tillage and cover crops. Interestingly, producers commonly responded “don’t know” or “not limiting” with regard to the crop insurance requirements being a limiting factor. This may be that producers have not thought about this question before, especially if they have low familiarity with the practice.

A few beliefs about crop insurance were found to be significant in producers’ decision to enroll in crop insurance, including “Crop insurance will protect my operation regardless of water-related risks”. The crop insurance subsidy is certainly influential in changing behavior. Producers were most likely to reduce their coverage levels on crop insurance without the subsidy.

Those who valued cover crops and were using cover crops were significantly more likely to apply for the cover crop incentive program. Overall interest in participating in the program remained low. There are a few considerations that should be kept in mind when addressing this. First, this survey came out during the first year of the Iowa program and before a similar program was available in Illinois. Therefore, knowledge about the program would reasonably be

low. Additionally, a survey is likely not the best way to gauge interest on a new program, as interviews would be more helpful in this regard for producers to understand clearly information about the program. Nonetheless, the findings show that there is some interest in the program, and it is likely that would only increase as the program becomes more known.

CONCLUSIONS

Our results directly contradict the claims made by agricultural press that crop insurance requirements limit adoption of conservation practices. Indeed, results from both the interviews and survey show that these practices can be used simultaneously and that even producers who are not using these practices currently do not find the requirements to be a barrier. In fact, crop insurance requirements were reported as the least limiting barrier for the adoption of either practice. These findings are important because the media has the potential to sway farmers' points of view.

Our results also point to the immense value that producers find from crop insurance and specific beliefs that support their continued involvement in the behavior. Producers believe that crop insurance will provide levels of protection and security that they may not be getting from other forms of risk-management. Access to land, instability of rental agreements and rent prices, and low commodity prices all contribute to real levels of insecurity and risk. Young farmers may be especially vulnerable to this, as they may not have the financial means or resources built up, as compared to those who have been farming for decades. Our demographic findings are also consistent with national crop insurance trends, including producers choosing higher rates of crop insurance coverage and the dominance of revenue insurance.

Another important finding from this research is that crop insurance serves different goals for risk-management than conservation practices. The most common type of crop insurance purchased today, revenue insurance, helps to give security for two significant risks: weather and price. While conservation practices provide value through on and off-farm benefits, farmers still use and find need for crop insurance. For the farmers that we studied, these two behaviors were not used as substitutes, but were in fact complimentary.

Finally, those who use and value cover crops already were significantly more likely to apply for the cover crop incentive program. Interviewed farmers who were using conservation also spoke of applying for the program or interested in applying. These findings may negate the idea that the programs can help to promote conservation adoption to non-adopters; however, there are several positives to the implementation of these programs. These programs further demonstrate that crop insurance and conservation practices can be done simultaneously. They also provide a benefit for “good farming”, creating a positive reward for their behavior, similar to other types of insurance. Lastly, while adopters may initially be more likely to use these programs, it’s possible that implementing this policy through crop insurance may be a good avenue for non-adopters to hear about the program and be more likely to participate, especially as the program becomes more widely-known and utilized.

Future Research

There are many avenues for future research that exist to better understand farmers’ motivations for adopting conservation and their beliefs and decisions regarding crop insurance. While previous studies have examined impacts of farm size on conservation adoption, further research can be done. Additionally, it is likely that producers’ responses to the survey questions are impacted by whether they are using yield insurance or revenue insurance. Future research can examine the impact of this decision on specific crop insurance beliefs. Additional research on the crop insurance subsidy could look into how the crop insurance subsidy impacts their overall beliefs about crop insurance. Studies could also be conducted to examine at what specific levels of reduction in the subsidy amount cause changes in crop insurance participation. Given increasing tensions in global trade markets, it would also be interesting to see how this impacts their level of confidence in crop insurance.

APPENDIX A: BINARY LOGIT MODELS

Binary Logit Models

Model Parameters	Coefficient	p-value	S.E.	McFadden's adjusted r2 (n)
<i>Dependent Variable: enroll in crop insurance</i>				0.128 (531)
Farm Characteristics				
Farm Size	0.000	0.504	0.001	
Age	-0.103	0.007**	0.038	
Education	-0.013	0.955	0.239	
State	0.007	0.953	0.121	
Norms				
Crop insurance will exist next year.	0.453	0.028*	0.206	
Perception of Need				
Crop insurance will protect the viability of my farm operation regardless of water-related risks.	0.774	0.016*	0.322	
I can't imagine managing my farm operation without crop insurance.	-1.666	0.003**	0.557	
Awareness				
Weather Concern	1.259	0.034*	0.594	
Noticing Weather Variability	-0.272	0.615	0.541	
<i>Dependent Variable: apply for cover crop incentive (IA)</i>				0.316 (155)
Farm Characteristics				
Farm Size	-0.001	0.132	0.000	
Age	-0.038	0.026*	0.017	
Education	0.077	0.624	0.158	
Values				
I value cover crops as a risk-management strategy.	0.769	0.026*	0.345	
Behavior				
Currently use cover crops	2.265	0.000**	0.624	
If the subsidy was removed, I would implement cover crops.	0.947	0.002**	0.300	
<i>Dependent Variable: apply for cover crop incentive (IL and IN)</i>				0.353 (177)
Farm Characteristics				
Farm Size	0.000	0.482	0.000	
Age	-0.046	0.032*	0.022	
Education	-0.036	0.845	0.183	
State	-0.346	0.191	0.264	
Values				
I value cover crops as a risk-management strategy.	1.610	0.000**	0.389	

Currently use cover crops	1.981	0.020*	0.854	
If the subsidy was removed, I would implement cover crops.	0.565	0.075	0.318	
If the subsidy was removed, I would reduce my coverage level on crop insurance.	0.073	0.782	0.262	
<i>Dependent Variable: uses cover crops</i>				
Farm Characteristics				0.286 (519)
Farm Size	0.000	0.000**	0.000	
Age	-0.041	0.000**	0.010	
Education	-0.048	0.614	0.096	
State	0.040	0.803	0.161	
Values				
I value cover crops as a risk-management strategy.	1.559	0.000**	0.206	
Behavior				
Crop insurance requirements limit my ability to implement conservation practices.	-0.668	0.000**	0.172	
If the subsidy was removed, I would implement cover crops.	0.447	0.006**	0.164	
If the subsidy was removed, I would reduce my coverage level on crop insurance.	0.214	0.167	0.155	
<i>Dependent Variable: uses reduced tillage/no-till</i>				
Farm Characteristics				0.159 (520)
Farm Size	0.000	0.000	0.008**	
Age	-0.013	0.009	0.142	
Education	0.047	0.079	0.552	
State	-0.059	0.134	0.658	
Values				
I value cover crops as a risk-management strategy.	0.991	0.141	0.000**	
Behavior				
Crop insurance requirements limit my ability to implement conservation practices.	-0.518	0.141	0.000**	
If the subsidy was removed, I would implement reduced/no-tillage.	0.324	0.129	0.012**	
If the subsidy was removed, I would reduce my coverage level on crop insurance.	0.171	0.127	0.179	

*Significant at 0.05 level; **Significant at the 0.01 level

APPENDIX B: SURVEY DESCRIPTIVE STATISTICS

Section 1: Risk Management

Table 19. Farm operation potential problems

Corresponds to Q1: “Listed below are problems that some Corn Belt farmers have experienced over the past few years. How concerned are you about the following potential problems for your farm operation?”

Problems	N	Not Concerned	Slightly Concerned	Concerned	Very Concerned	Mean (<i>sd</i>)
		(1)	(2)	(3)	(4)	
Frequency (%)						
Dry periods and drought	694	7.93	29.54	43.52	19.02	2.74 (0.857)
Extreme rains	693	6.35	26.26	44.73	22.66	2.84 (0.847)
Heat stress of crops	687	6.40	34.79	45.27	13.54	2.66 (0.790)
Loss of nutrients into waterways	688	15.70	36.63	35.61	12.06	2.44 (0.896)
Saturated soils and ponded water	694	13.11	35.59	36.46	14.84	2.53 (0.900)
Soil erosion	692	10.40	23.27	39.60	26.73	2.83 (0.942)

Table 20. Farm operation variable weather

Corresponds to Q2: “Please indicate your level of disagreement or agreement with the following statements.”

Statement	N	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree	Mean (<i>sd</i>)
		(1)	(2)	(3)	(4)	(5)	
Frequency (%)							
In the past five years, I have noticed more variable/unusual weather on my farm.	694	2.45	9.80	27.09	48.99	11.67	3.58 (0.884)
In the past five years, I have noticed more variable rainfall patterns on my farm.	697	1.87	10.47	22.81	53.66	11.19	3.62 (0.884)
In the past five years, I have noticed more flooding on my farm.	693	4.04	26.98	37.37	24.39	7.22	3.04 (0.982)

Table 20 continued

In the past five years, I have noticed more variability in my planting dates due to risks.	692	3.18	24.28	37.57	29.34	5.64	3.10 (0.938)
Changes in weather patterns are hurting my farm operation.	693	5.34	29.00	43.58	18.18	3.90	2.86 (0.908)
I should take additional steps to protect the land I farm from increased weather variability.	694	3.17	17.00	43.95	32.13	3.75	3.16 (0.862)
I have the knowledge and technical skill to deal with any weather-related threats to the viability of my farm operation.	691	2.60	18.23	44.14	31.98	3.04	3.15 (0.841)
I have the financial capacity to deal with any weather related threats to the viability of my farm operation.	693	7.79	33.62	32.32	23.52	2.74	2.80 (0.976)

Table 21. Risk-management strategies
 Corresponds to Q3: “Do you use any of the following as risk management strategies?”

Strategy	N	Not doing and don't plan to	Not doing but considering	Doing as part of short-term risk management	Doing as part of long-term risk management	Mean (sd)
		(1)	(2)	(3)	(4)	
Add new technologies (i.e., precision ag)	682	19.50	25.66	23.02	31.82	2.67 (1.117)
Add off-farm income	680	39.26	14.26	16.76	29.71	2.37 (1.270)
Diversify into other forms of production (such as different crops or livestock)	686	47.23	26.24	8.45	18.08	1.97 (1.132)
Enroll in crop insurance	689	8.42	2.76	21.04	67.78	3.48 (0.901)
Forward-sell crops	686	8.31	13.85	33.24	44.61	3.14 (0.948)
Increase drainage	678	13.13	22.27	19.76	44.84	2.96 (1.094)
Implement edge-of-field conservation practices	679	26.22	27.84	18.41	27.54	2.47 (1.152)

Table 21 continued

Implement on-farm conservation practices	683	9.96	13.91	25.04	51.10	3.17 (1.010)
Rent additional property	686	41.69	26.68	10.93	20.70	2.10 (1.160)
Restructure cash flow and debt	677	50.37	21.27	16.25	12.11	1.90 (1.069)
Scale back operations or quit farming	681	64.17	25.11	4.70	6.02	1.53 (0.840)
Supplement rainfall with irrigation	687	87.05	6.26	1.60	5.09	1.25 (0.724)

Table 22. Risk-management strategies

Corresponds to Q5: “Please indicate your level of disagreement or agreement with the following statements. I am interested in additional risk management strategies for _____.”

Strategy	N	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree	Mean (sd)
		(1)	(2)	(3)	(4)	(5)	
Frequency (%)							
Dry periods and drought	676	3.40	8.58	45.41	36.98	5.62	3.33 (0.842)
Extreme rains	676	2.96	7.10	41.12	40.98	7.84	3.44 (0.851)
Heat stress of crops	677	2.81	7.39	45.20	38.55	6.06	3.38 (0.820)
Loss of nutrients into waterways	678	2.80	9.59	41.74	37.91	7.96	3.39 (0.870)
Saturated soils and ponded water	676	2.96	10.80	41.57	38.02	6.66	3.35 (0.868)
Soil erosion	677	2.51	6.94	29.39	46.09	15.07	3.64 (0.906)

Section 2: Crop Insurance

Table 23. Crop insurance enrollment

Corresponds to Q6: “Have you enrolled in crop insurance in the past five years (2013-2017)?”

Response	Frequency (%; N=686)
Yes	89.65
No	10.35

Table 24. Years of crop insurance enrollment
 Corresponds to Q8: “Which years did you enroll in crop insurance? *Check all that apply.*”

Year	Frequency (%; N=605)
2013	95.87
2014	96.20
2015	96.69
2016	96.20
2017	95.54

*No other responses

Note: a respondent can choose multiple components and the sum of frequency (%) is greater than 100%.

Table 25. Crop insurance enrollment type
 Corresponds to Q9: “Have you enrolled in crop insurance in the past five years (2013-2017)?”

Type	Frequency (%; N=576)
Revenue	76.22
Yield	23.78

Table 26. Crop insurance coverage level
 Corresponds to Q10: “On average, what coverage level did you choose?”

Coverage Level	Frequency (%; N=597)
50%	1.01
55%	0.34
60%	1.34
65%	2.85
70%	6.53
75%	21.44
80%	31.66
85%	34.84

Table 27. Supplemental insurance enrollment
 Corresponds to Q11: “Have you enrolled in supplemental insurance in the past five years (2013-2017)?”

Type	Frequency (%; N=615)
Yes	27.15
No	72.85

Table 28. Claims

Corresponds to Q12: “Have you filed a claim on crop insurance or supplemental crop insurance in the past five years (2013-2017)?”

Type	Frequency (%; N=609)
Yes, both	13.30
Yes, crop insurance	58.29
Yes, supplemental insurance	3.28
No, neither	25.12

Table 29. Claim type

Corresponds to Q13: “In the past five years (2013-2017), I have filed claims due to _____.
Check all that apply.”

Claim Type	Frequency (%; N=493)
Drought	42.39%
Hail	32.05%
Excess moisture	37.73%
Frost	0.20%
Other	7.30%
Wind/excess wind	17.04%
Insects	0.41%
Plant disease	3.45%
Decline in price	40.16%

*No other responses

Note: a respondent can choose multiple components and the sum of frequency (%) is greater than 100%.

Table 30. Lender requirements

Corresponds to Q14: “Are you required to have crop insurance by your lender?”

Type	Frequency (%; N=618)
Yes	29.77
No	49.51
I do not have a lender	20.71

Table 31. Subsidy level
 Corresponds to Q15: “My crop insurance bill is subsidized _____.”

Type	Frequency (%; N=599)
20-39%	6.51
40-59%	22.87
60-79%	8.68
80-99%	1.50
No subsidy	10.18
I don't know	50.25

Table 32. Crop insurance opinions
 Corresponds to Q16: “Please indicate your level of disagreement or agreement with the following statements about crop insurance.”

Statement	N	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree	Mean (<i>sd</i>)
		(1)	(2)	(3)	(4)	(5)	
Frequency (%)							
Crop insurance will protect the viability of my farm operation regardless of water-related risks.	621	3.54	17.07	30.43	42.03	6.92	3.32 (0.95)
I need other ways to manage water-related risks besides crop insurance.	619	2.75	10.82	46.04	34.89	5.49	3.30 (0.84)
I can't imagine managing my farm without crop insurance.	623	5.78	13.16	26.00	40.29	14.77	3.45 (1.07)
Crop insurance requirements limit my ability to implement conservation practices.	621	11.43	41.06	41.55	5.64	0.32	2.42 (0.78)
Lender requirements to carry crop insurance limit my choices of which crops to grow.	620	20.65	44.03	31.29	2.74	1.29	2.2 (0.84)

Table 32 continued

Crop insurance encourages row crop production on marginal ground.	621	4.99	19.65	40.90	26.41	8.05	3.13 (0.983)
I will buy crop insurance regardless of whether or not it is subsidized.	625	8.16	24.00	35.20	28.96	3.68	2.96 (1.001)
I prefer federal crop insurance subsidies to federal price supports, loan deficiency payments, or direct payments.	624	4.97	9.29	41.51	33.97	10.26	3.35 (0.959)
I prefer federal crop insurance subsidies to enrolling marginal land in conservation reserve programs (CRP).	620	6.77	23.23	41.13	23.06	5.81	2.97 (0.983)
I have spent more money in crop insurance premiums than I have received back in claims.	623	1.93	14.29	18.94	40.13	24.72	3.71 (1.050)
I trust my crop insurance agent.	624	0.80	1.28	13.62	55.93	28.37	4.09 (0.731)

Table 33. Actions without crop insurance subsidy

Corresponds to Q17: **“Please indicate your level of disagreement or agreement with the following statements. If crop insurance for water-related risks (e.g., too much or too little water) were not subsidized, I would_____.”**

Statement	N	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree	Mean (sd)
		(1)	(2)	(3)	(4)	(5)	
Frequency (%)							
Purchase crop insurance at market value	616	6.66	21.27	45.29	25.00	1.79	2.94 (0.893)
Reduce my coverage level on crop insurance	613	1.79	15.82	37.36	40.78	4.24	3.30 (0.848)

Table 33 continued

Supplement rainfall with irrigation	614	29.64	40.88	21.50	6.19	1.79	2.10 (0.955)
Implement additional drainage	613	5.22	18.11	39.80	32.63	4.24	3.13 (0.934)
Implement reduced/no-tillage	612	4.08	10.78	45.10	30.88	9.15	3.30 (0.925)
Implement cover crops	612	6.86	16.99	47.55	23.37	5.23	3.03 (0.942)

Table 34. Top Priority
Corresponds to Q18: “Which action from the question above would be your top priority?”

Top Priority	Frequency (%; N= 585)
Purchase crop insurance at market value	18.29
Reduce my coverage level on crop insurance	23.08
Supplement rainfall with irrigation	4.27
Implement additional drainage	21.71
Implement reduced/no-tillage	16.24
Implement cover crops	16.41

Table 35. Confidence in crop insurance
Corresponds to Q20: “Please indicate your level of confidence with each statement about the future of crop insurance, where 1 indicates low confidence and 7 indicates high confidence.”

Statement	N	1	2	3	4	5	6	7	Mean (<i>sd</i>)
		Frequency (%)							
Federally subsidized crop insurance for corn and soybeans will exist next year.	685	4.23	3.80	7.45	15.91	18.98	20.58	29.05	5.20 (1.676)
Federally subsidized crops insurance for corn and soybeans will exist for the next five years.	684	4.97	5.41	11.99	25.88	20.18	13.30	18.27	4.64 (1.661)

Table 35 continued

If federally subsidized crop insurance were removed, how confident are you that it would be reinstated?	683	19.62	13.62	20.20	21.38	13.18	6.00	6.00	3.37 (1.741)
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Table 36. Crop insurance subsidy

Corresponds to Q21: “Please indicate your level of confidence with each statement about the future of crop insurance, where 1 indicates low confidence and 7 indicates high confidence.”

Statement	N	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree	Mean (sd)
		(1)	(2)	(3)	(4)	(5)	
Frequency (%)							
Crop insurance for water-related risks (too much or too little water) should be subsidized by the federal government.	689	5.66	12.34	32.51	37.45	12.05	3.37 (1.032)
Crop insurance subsidies for risks help ensure a reliable food supply.	686	4.81	9.91	30.47	38.19	16.62	3.52 (1.035)

Table 37. Iowa cover crop program

Corresponds to Q22: “Iowa recently implemented a new program that gives farmers a \$5 per acre discount on their crop insurance over the next three years for planting cover crops. Have you heard about this program?”

State	N	Yes (%)	No (%)
Indiana	158	3.16	96.84
Iowa	309	57.93	42.07
Illinois	225	6.67	93.33

Table 38. IN/IL survey version: Support in similar program
 Corresponds to Q23 in the IN/IL survey version: “Do you think there should be a similar program in your state?”

State	N	Yes (%)	No (%)	Not sure (%)
Illinois	225	31.11	19.11	49.78
Indiana	158	35.44	20.25	44.3

Table 39. Iowa Survey: Support for the program
 Corresponds to Q23 in the Iowa survey version: “Please indicate your level of support for this program.”

Type	Frequency (%; N=308)
1 (Low Support)	21.10
2	14.29
3	27.60
4	18.18
5 (High Support)	18.83

Table 40. Participation in similar program
 Corresponds to Q24 in the IN and IL survey version: “Would you be interested in participating in a similar program in your state?”

State	N	Not sure (%)	No, I’m not interested in applying (%)	Yes, I would be interested in applying (%)	Yes, I’d apply (%)
Indiana	157	42.68	18.47	28.66	10.19
Illinois	222	36.44	22.97	40.09	11.26

Table 41. Iowa Survey: Interest in applying
 Corresponds to Q24 in the Iowa survey version: “Would you be interested in participating in this program?”

Type	Frequency (%; N=311)
Yes, I’ve applied	6.11
Yes, I’m interested in applying	26.05
No, I’m not interested in applying	31.51
Not sure	36.33

Section 3: Conservation

COVER CROPS: Cover crops include grasses, legumes, and other broadleaf plants established for winter cover, increased soil organic matter, and other conservation purposes.

Table 42. Cover crops familiarity
Corresponds to Q25: “How familiar are you with this practice?”

Type	Frequency (%; N=684)
Never heard of it	3.65
Somewhat familiar with it	34.65
Know how to use it; not using it	36.99
Currently use it	24.71

Table 43. Cover crops willingness
Corresponds to Q26: “Are you willing to try this practice?”

Type	Frequency (%; N=523)
Yes, on all of my farm	3.06
Yes, on part of my farm	21.41
Maybe	51.05
No	19.50
Not relevant for my operation	4.97

Table 44. Cover crops and risk
Corresponds to Q29: “Please indicate your level of disagreement or agreement with the following statements. Cover crops can reduce risk associated with _____.”

Strategy	N	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree	Mean (<i>sd</i>)
		(1)	(2)	(3)	(4)	(5)	
Frequency (%)							
Dry periods and drought	656	4.27	18.29	42.68	30.79	3.96	3.12 (0.898)

Table 44 continued

Extreme rains	666	3.15	7.81	25.83	52.25	10.96	3.60 (0.898)
Heat stress of crops	657	3.81	17.96	52.36	22.22	3.65	3.04 (0.836)
Loss of nutrients into waterways	663	1.06	3.92	19.16	59.13	16.74	3.87 (0.771)
Saturated soils and ponded water	661	3.33	14.83	42.06	34.34	5.45	3.24 (0.887)
Soil erosion	663	1.06	1.96	11.92	55.51	29.56	4.11 (0.760)

REDUCED/NO-TILLAGE: Manages the amount, orientation, and distribution of crop and other plant residues on the soil surface year-round, while limiting soil disturbance activities (e.g., no-till, strip-till, ridge-till).

Table 45. Reduced/no-tillage familiarity
Corresponds to Q30: “How familiar are you with this practice?”

Type	Frequency (%; N=681)
Never heard of it	3.96
Somewhat familiar with it	15.86
Know how to use it; not using it	19.82
Currently use it	60.35

Table 46. Reduced/no-tillage willingness
Corresponds to Q31: “Are you willing to try this practice?”

Type	Frequency (%; N=325)
Yes, on all of my farm	16.00
Yes, on part of my farm	24.62
Maybe	35.69
No	19.08
Not relevant for my operation	4.62

Table 47. Reduced/no-tillage and risk
 Corresponds to Q34: “Please indicate your level of disagreement or agreement with the following statements. Reduced/no-tillage can reduce risk associated with _____.”

Strategy	N	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree	Mean (<i>sd</i>)
		(1)	(2)	(3)	(4)	(5)	
Frequency (%)							
Dry periods and drought	649	2.47	8.01	29.43	49.46	10.63	3.58 (0.875)
Extreme rains	651	2.92	10.75	27.65	46.08	12.60	3.55 (0.944)
Heat stress of crops	646	2.17	10.99	47.06	31.11	8.67	3.33 (0.864)
Loss of nutrients into waterways	649	1.39	4.47	21.57	55.47	17.10	3.82 (0.813)
Saturated soils and ponded water	647	3.55	15.61	40.19	33.54	7.11	3.25 (0.926)
Soil erosion	650	2.00	2.15	13.54	56.62	25.69	4.02 (0.812)

DRAINAGE WATER RECYCLING: Includes capturing and storing drained water from a field in a pond or reservoir to serve as a source of supplemental irrigation during extended dry periods.

Table 48. Drainage water recycling familiarity
 Corresponds to Q35: “How familiar are you with this practice?”

Type	Frequency (%; N=673)
Never heard of it	46.06
Somewhat familiar with it	40.71
Know how to use it; not using it	12.18
Currently use it	1.04

Table 49. Drainage water recycling willingness
Corresponds to Q36: “Are you willing to try this practice?”

Type	Frequency (%; N=418)
Yes, on all of my farm	0.72
Yes, on part of my farm	3.83
Maybe	30.14
No	42.11
Not relevant for my operation	23.21

Table 50. Drainage water recycling and risk
Corresponds to Q29: “Please indicate your level of disagreement or agreement with the following statements. Drainage water recycling can reduce risk associated with _____.”

Strategy	N	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree	Mean (sd)
		(1)	(2)	(3)	(4)	(5)	
Frequency (%)							
Dry periods and drought	429	1.40	3.26	32.40	52.21	10.72	3.68 (0.764)
Extreme rains	431	3.48	10.44	41.76	38.52	5.80	3.33 (0.869)
Heat stress of crops	430	1.16	6.51	44.42	40.00	7.91	3.47 (0.780)
Loss of nutrients into waterways	429	2.10	6.29	38.46	45.69	7.46	3.50 (0.808)
Saturated soils and ponded water	430	4.19	10.70	47.67	32.09	5.35	3.24 (0.869)
Soil erosion	431	3.02	6.73	44.78	38.98	6.50	3.39 (0.828)

Table 51. Valued risk-management strategies
Corresponds to Q40: “Please indicate your level of disagreement or agreement with the following statements. I value _____ as a risk management strategy.”

Strategy	N	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree	Mean (sd)
		(1)	(2)	(3)	(4)	(5)	
Frequency (%)							
Crop insurance	676	2.66	2.96	12.43	52.51	29.44	4.03 (0.881)
Cover crops	672	5.06	11.90	48.51	28.87	5.65	3.18 (0.897)

Table 51 continued

Reduced/no-tillage	675	2.52	6.67	25.48	50.22	15.11	3.69 (0.896)
Drainage water recycling	669	6.73	13.45	63.53	14.05	2.24	2.91 (0.792)
Supplemental Irrigation	671	10.58	16.54	51.27	17.29	4.32	2.88 (0.960)
Additional drainage	674	1.78	4.45	25.07	52.52	16.17	3.77 (0.836)

Table 52. Most valued risk-management strategy
Corresponds to Q41: “Which risk management strategy from the question above do you value the most?”

Strategy	Frequency (%; N=643)
Crop insurance	42.92
Cover crops	3.73
Reduced/no-tillage	21.93
Drainage water recycling	1.24
Supplemental Irrigation	3.27
Additional drainage	26.91

Section 4: About Your Farm Operation

Table 53. Years Farming
Corresponds to Q42: “How many years have you been farming? Please enter a numeric value.”

Years	Years (N=662)
Range	0-80
Mean	38.00
Median	46

Table 54. Owned/rented acres of farmland
 Corresponds to Q43: “Please estimate the total acreage (owned and/or rented) for your farming operation in 2018. *Please enter a numeric value.*”

Farmland acres	N	Acres Mean (sd)	Acres Range
<i>Total acres</i>			
Total owned acres	627	419.85 (818.374)	0-14,800
Acres rented to others	327	62.63 (154.665)	0-1,100
Acres rented from others	554	518.14 (738.992)	0-10,000

Table 55. Tile acreage
 Corresponds to Q44: “What percent of acres that you farm has tile installed? *Please enter a numeric value.*”

%	Frequency (%, N=636)
Range	0-100
Mean	58.40
Median	68

Table 56. Owned/rented acres of farmland
 Corresponds to Q45: “**In 2018, how many acres of each of the following did you manage?** *Please enter a numeric value. If none, please enter a zero.*”

Farmland acres	N	Acres Mean (sd)	Acres Range
<i>Total corn acres</i>			
Total corn acres	656	388.62 (633.64)	0-8500
How many corn acres were no-till, strip till, or ridge till?	657	131.91 (331.727)	0-5000
How many corn acres were in cover crops?	657	26.67 (103.874)	0-1335
How many corn acres were provided irrigation to supplement rainfall?	657	18.27 (139.76)	0-2500
<i>Total soybean acres</i>			
Total soybean acres	656	329.03 (539.001)	0-8700
How many soybean acres were no-till, strip till, or ridge till?	657	196.31 (375.050)	0-5000
How many soybean acres were in cover crops?	657	32.508 (111.324)	0-1085
How many soybean acres were provided irrigation to supplement rainfall?	657	8.83 (64.823)	0-1000
<i>Total conservation acres</i>			
Total conservation acres set aside	658	9.17 (29.170)	0-300
Conservation Reserve Program (CRP)	658	13.04 (45.507)	0-600

Table 57. Source of irrigation water
Corresponds to Q46: “What is your source of irrigation water?”

Source	Frequency (%; N=586)
No irrigated cropland	91.64
Pond/lake/reservoir	0.68
Stream/ditch/canal	0.34
Lagoon/wastewater (not tailwater)	0.34
Well	7.68

Section 5: About You

Table 58. Gender
Corresponds to Q47: “What is your gender?”

Gender	Frequency (%; N=699)
Male	96.42
Female	3.58

Table 59. Age
Corresponds to Q48: “What year were you born?”
(reported as age in years)

Age	Years (N= 674)
Range	19-96
Mean	63
Median	52

Table 60. Education
Corresponds to Q49: “What is the highest level of
education you have completed?”

Education Level	Frequency (%; N=688)
High school diploma/GED	39.10
Some college	18.75
2-year college	14.83
4-year college	22.09
Post-graduate degree	5.23

APPENDIX C: INTERVIEW GUIDE

Crop Insurance & Risk Management: Farmer Interview Guide

The purpose of this interview is to learn more about your farm operation, how you identify risk, and crop insurance.

Your participation in this interview is completely voluntary. If you choose to participate in this interview, your responses will remain confidential and your name will never be used in any report or publication. You may skip any questions you do not want to answer and you can stop the interview at any time.

Do you mind if I record this interview for transcription purposes?

General Questions

1. Can you tell me a little bit about yourself, your background, and your farm?
 - a. What crops do you grow? How many acres?
 - b. What's your background? What got you interested in farming?
 - c. What are your long-term goals or plans for this farm?
 - d. Do you rent out any of your land? (% rented)
 - e. Is farming your main source of income?
 - f. Do you have any hired or voluntary labor?
 - g. How long have you been farming?
 - h. What are the main changes you've seen during your time farming?

Identifying Risk

1. The nature of farming comes with a lot of inherent risks, both on-farm and market-related. What would you say are the main risks that you face?
 - a. Do you think these are the main risks that others farmers in the Midwest face?
2. What do you think are the main ways that farmers manage or cope with the risks faced in farming? What strategies do you use to manage risks such as potential crop loss, adverse weather, or disease?

Crop Insurance

1. Do you think that crop insurance is one way to manage risk? What risks do you think crop insurance reduces?
2. Do you use crop insurance?

Yes - crop insurance:

1. How long have you used crop insurance?
2. Can you share more about your crop insurance policy, such as level of coverage and if your lender requires you to have crop insurance? Do you have coverage on all of your fields (%)?
Do you get crop insurance every year?

3. What's your overall take on crop insurance? (personal experiences, perspectives/opinions)
4. Have you filed a claim before? How did this experience affect your future management decisions?
5. Do you think crop insurance is something that should be subsidized by the government?
 - a. Would you still buy it if it wasn't subsidized?
 - b. How would you manage risk without crop insurance? How would that change how you farm?
 - c. Do you think there are management practices you can use to help reduce risk?

No – crop insurance:

1. Have you ever bought crop insurance?
2. What's your reasoning behind not having crop insurance?
3. Would you ever consider having crop insurance in the future?
4. Do you think crop insurance is something that should be subsidized by the government?
5. Do you think there are management practices you can use to help reduce risk?

Current Practices

1. Are there any practices you use now to reduce risk?
2. Have you heard of practices such as cover crops or no-till?

Yes

- a. What have you heard about them?
- b. Have you considered using any of these practices?
- c. Do you think these practices could help you reduce risk?

No

- a. These practices can help protect your field, improve soil health and infiltration, among other benefits. Do you think these practices could be beneficial to your operation?
- b. Do you think these practices could help you reduce risk?
3. If you were to receive a monetary benefit for using some of these practices, do you think you would use them?
4. If the monetary benefit was offered as a discount on crop insurance, do you think you would use them?

On-Farm and Risks

1. How do you manage or reduce risks? Do you find yourself facing risks from too much water or too little water during the growing season?
 - a. What strategies do you use to manage risks?
 - i. Do you irrigate?
 - ii. Do you use surface or subsurface drainage?
 - iii. Are there other strategies you've considered?

2. One drainage strategy captures and stores water when there's too much, and then is irrigated back onto the field later.
 - a. What do you think about a strategy like this?
 - b. Do you think something like this could fit into your operation?
 - c. Would you be more likely to install this practice if you were to receive a discount or monetary payments?
 - d. If the monetary benefit was offered as a discount on crop insurance, do you think you would use it?

Are there any other farmers that you think I should talk to? Thank you for your time and participation.

APPENDIX D: QUALITATIVE INTERVIEW CODEBOOK

Crop Insurance Interview Codebook

1. **Farm: general farm characteristics, farm future**
 - a. **Land:** Ownership of the farmer's land
 - i. *Family Land:* The land is owned by the family/farmer
 - ii. *Rented Land:* The land is rented by the farmer
 - b. **Labor:** Information about additional labor
 - i. *Family:* Family assists with labor
 - ii. *Reduce:* The farmer has a goal of reducing labor costs
 - iii. *Scarce:* Quality outside help is hard to find
 - iv. *Hired:* Outside help is hired to assist with labor
 - c. **Income:** general information about the farmer's income
 - i. **Type:** Where the farmer gets income from
 1. *Custom Farm:* If the farmer receives income from custom farming
 2. *Diversify:* Other ways the farmer receives income besides crops
 - ii. **Job:** what kind of job outside the farm the farmer might have
 1. *Full Time:* The farmer is employed full-time outside the farm
 2. *Gov Employee:* The farmer is employed in a government position
 - iii. **Cash Poor:** "asset rich, cash poor"- most money is invested in the farm, little accessible funds
 - d. **Farmer:** characteristics about the farmer
 - i. *Knowledge:* knowledge that the farmer has which helps inform his decisions
 - e. **Farm Future:** farm future
 - i. *Unknown:* if the farm future is unknown
 - ii. *Family:* if the farm will stay in the family
 - f. **Acreage:** acreage of the farm
2. **Community: talks about the farming community, including neighbors, other farms, etc.**
 - a. **Outreach:** talks about if they have hosted field days, mentors, opportunities for sharing the information, involvement with organizations
 - i. *Mentor:* experiences with mentorship or interest in being a mentor
 - ii. *Field Days:* involvement w/ or interest in holding field days, past experience hosting field days
 - iii. *Org:* involvement with organizations, typically conservation orgs.
 - b. *Other Guys:* when they reference other guys' fields; anecdotes about what other farmers do

3. **Current Issues: current issues or trends that they see in ag.**
 - a. *Land*: issues in ag. regarding land
 - b. *Current State*: current state of ag.

4. **Gov Programs: Agricultural programs implemented by the government**
 - a. **EQIP**: Environmental Quality Incentives Program - provides incentives for conservation practices on farm
 - b. **Positive**: Positive attitude about government programs
 - c. **Cost-Share**: Farmer and landowner split the costs/income of the farm
 - d. **CRP**: Conservation Reserve Program - farmer sets aside acres for conservation
 - e. **Landowners**

5. **Main Risks: stance or involvement in government programs related to agriculture and/or conservation**
 - a. **Price**: Fluctuating prices of crops in the market
 - b. **Many**: There are numerous risks
 - c. **Health**: The farmer's health and physical dangers on farm
 - d. **Weather**: Unpredictable weather and events like drought, flooding, not enough/too much rain, etc.

6. **Manage Risks: How the farmer manages risk on their farm**
 - a. **Crop Insurance**: The farmer uses crop insurance
 - i. **Opinion**: Farmer's opinions on crop insurance
 1. **Systemic**: Effects of crop insurance on agriculture
 2. **Nonfarmers**: Perception of non-farmers on crop insurance
 3. **Safety Net**: Farmer is grateful for crop insurance and view it as a safety net
 4. **Recommendations**: Farmer's recommendations to change/improve structure of crop insurance
 5. **Risky Farmers**: Crop insurance may encourage farmers to practice riskier management
 6. **Trust**: Farmer's trust of their crop insurance agent
 7. **Payments**: Payments on crop insurance
 - ii. **Policy**: Crop insurance policies
 1. **Coverage Level**: The coverage level the farmer carries
 2. **Banker**: Bank requires farmer to have crop insurance
 3. **Type**: Type of crop insurance- revenue or yield
 4. **Requirements**: Any requirements on management and the effect on farms
 - iii. **Subsidy**: The subsidy on crop insurance
 1. **Opinion**: Farmer's opinions of subsidies

- a. *Food Supply*: Farmer believes subsidies ensure adequate food supply for the US/world
 - b. *Free Money*: Farmer has a neutral opinion on subsidies, but views it as “free money”
 - c. *Payments*: Payments on subsidies
 - d. *Approve*: approves of subsidies
 - 2. **Without**: How farmer views agriculture without subsidies
 - a. *Affordability*: Farmer doubts affordability of crop insurance, may reduce coverage
 - b. *Disaster*: Farmer believes agriculture without crop insurance subsidies would be a disaster
 - iv. **History**: Previous history of the farmer’s usage of crop insurance
 - 1. *Claims*: Claims the farmer filed in the past
 - v. **Without**: Farmer’s views on agriculture without crop insurance
 - vi. **Market Strategies**: The farmer implements market strategies in addition to crop insurance to maximize benefit
- b. **Conservation**: Conservation practices used in agriculture
 - i. **Cover Crops**: Plants grown to help manage the field by providing benefits to the soil
 - 1. **Benefits**: Benefits of cover crops
 - a. *Soil Health*: Improves the overall health of the soil
 - b. *Insight*: Insight on cover crops
 - c. *Water Quality*: Improves the quality of nearby water sources
 - d. *Weeds*: Reduces weeds
 - e. *Nutrients*: Provides essential nutrients to the soil/crop
 - f. *Moisture*: Provides moisture as needed
 - 2. **Length**: Length of time the farmer has been using cover crops
 - 3. **Challenges**: Challenges in implementing cover crops
 - a. *Financial*: Expensive, great financial investment
 - b. *Management*: Characteristics of the farm/farmer’s management make it difficult
 - 4. **Motivations**: Motivations for using cover crops
 - a. *Farm Future*: Farmer wants to ensure farm’s future
 - b. *Take Care of the Land*: Farmer feels an obligation to treat the land well
 - ii. **Reduced/No-Till**: Reduced tillage or no-till
 - 1. **Benefits**: Benefits of reduced/no till
 - a. *Maintain Soil Structure*: Helps maintain the soil structure of the fields
 - b. *Cost Savings*: Saves costs on fuel, equipment, labor, etc.
 - c. *Water-Holding*: Retains water
 - 2. **Challenges**: Challenges in reduced/no-till

- a. *Soil Quality*: Does not help the soil quality
 - b. *Lag Time*: Benefits are slow to appear
 - 3. **Length**: Length of time the farmer has been doing reduced/no-till
- iii. **Overall**: Other information about managing risk with conservation practices
 - 1. **Incentives**: Incentives for implementing conservation practices
 - a. Behavior Change: Changing the behavior of the farmer
 - b. Carrot or Stick: Influencing decisions by providing incentives or by regulation
 - c. Influence: Other farmers' influence in decisions
 - d. Financial: Providing financial incentives
 - e. Iowa Incentive: Iowa's incentive to reduce crop insurance cost in exchange for implementing cover crops
 - 2. **Family Support**: Family supports farmer's decisions
 - 3. **Stewardship**: Farmer taking care of the land, soil, water, etc.
 - 4. **Weather**: Effect of weather on managing risk
- c. **Strategies**: Farmer's strategies on management
 - i. **Max Yield**: Farmer's goal is to maximize yields
 - ii. **Long Term**: Farmer considers long term effects on farm
 - iii. **Reduce Cost**: Farmer wants to reduce overall costs
- d. **Management**: Farmer's management of their fields
 - i. **Drainage**: Water drainage on fields
 - 1. **Tile**: Farmer has implemented tile to assist with drainage
 - ii. **DWR**: Drainage water recycling - storing drained water and later using it for irrigation
 - 1. **Doubt**: Farmer has doubt about relevance of DWR on their farm
 - 2. **Money**: DWR is expensive and farmer doubts affordability/cost-benefit ratio
 - 3. **Water Need**: If the fields need more/less water
 - 4. **Land**: If the land is appropriate for DWR
- iii. **Field**: State of the farmer's fields
- iv. **Technology**: Technology the farmer uses
 - 1. **Nitrogen**: The farmer applies or uses nitrogen
 - 2. **Chemical Application**: The farmer applies chemicals to their fields
- v. **Management**: Management techniques used on farm
 - 1. **Crop Rotation**: The farmer rotates crops to maintain health of land
 - 2. **Grazing**: The farmer has livestock graze on their land
 - 3. **Manure**: The farmer uses manure as fertilizer

APPENDIX E: MULTI-STATE SURVEY

Managing Water-Related Risks in the Corn Belt

Dear agricultural producer,

Purdue University, in partnership with Iowa State University, would like to know how you manage your farm operation, especially in instances of too much or too little water. We would also like to know if you use crop insurance and/or conservation practices to manage risk. We value the time that you take to complete this survey and your opinion.

 If you are not an agricultural producer (e.g., you are a non-farming land owner), please check here and return the survey. We will stop sending you reminders.

There are two ways in which you can complete our survey:

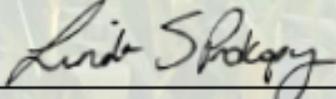
1. The most convenient way is for you to enter the following website address into your web browser and provide your responses securely online:
<https://tinurl.com/CropInsurance2018>
If you choose to complete the survey online you will need to enter the following code: _____. This will indicate that you completed the survey and we will stop sending reminders.
2. We have also included a postage-paid return envelope if you prefer to respond by mail.

We ask that this survey be completed by the person in your home **who makes most of the agricultural management decisions** and is at least 18 years old. Unless otherwise instructed, please select the answer choice that best describes your situation or opinion. This survey should take approximately 15 minutes to complete.

Your participation in this survey is voluntary. The information you provide will be kept confidential. It will be linked to the code provided above and not to your name.

For more information regarding the survey, please contact Linda Prokopy at lprokopy@purdue.edu or at (765) 494-0825. Thank you in advance for your help!

IOWA STATE UNIVERSITY


Linda Prokopy, Purdue University

PURDUE UNIVERSITY

Risk Management and Conservation

Section I: Risk Management

1. Listed below are problems that some Corn Belt farmers have experienced over the past few years. How concerned are you about the following potential problems for your farm operation? *(Please mark one circle on each line.)*

	Not Concerned	Slightly Concerned	Concerned	Very Concerned
a. Dry periods and drought	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b. Extreme rains	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c. Heat stress of crops	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
d. Loss of nutrients into waterways	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
e. Saturated soils and ponded water	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
f. Soil erosion	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

2. Please indicate your level of disagreement or agreement with the following statements.

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
a. In the past five years, I have noticed more variable/unusual weather on my farm.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b. In the past five years, I have noticed more variable rainfall patterns on my farm.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c. In the past five years, I have noticed more flooding on my farm.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
d. In the past five years, I have noticed more variability in my planting dates due to water-related risks.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
e. Changes in weather patterns are hurting my farm operation.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
f. I should take additional steps to protect the land I farm from increased weather variability.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
g. I have the knowledge and technical skill to deal with any weather-related threats to the viability of my farm operation.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
h. I have the financial capacity to deal with any weather related threats to the viability of my farm operation.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Risk Management and Conservation

3. Do you use any of the following as risk management strategies?

	Not doing and don't plan to	Not doing but considering	Doing as part of short-term risk management	Doing as part of long-term risk management
a. Add new technologies (i.e., precision ag)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b. Add off-farm income	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c. Diversify into other forms of production (such as different crops or livestock)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
d. Enroll in crop insurance	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
e. Forward-sell crops	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
f. Increase drainage	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
g. Implement edge-of-field conservation practices	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
h. Implement on-farm conservation practices	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
i. Rent additional property	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
j. Restructure cash flow and debt	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
k. Scale back operations or quit farming	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
l. Supplement rainfall with irrigation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

4. Do you use any other risk management strategies? If so, describe below.

5. Please indicate your level of disagreement or agreement with the following statements. I am interested in additional risk management strategies for _____.

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
a. Dry periods and drought	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b. Extreme rains	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c. Heat stress of crops	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
d. Loss of nutrients into waterways	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
e. Saturated soils and ponded water	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
f. Soil erosion	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Risk Management and Conservation

Section II: Crop Insurance

6. Have you enrolled in crop insurance in the past five years (2013-2017)?

Yes (Please skip to Question 8, below)

No

7. Please explain why:

(Please skip to Page 6, Question 20)

8. Which years did you enroll in crop insurance? *Check all that apply.*

2013

2014

2015

2016

2017

9. On average, in which type of crop insurance did you enroll?

Revenue

Yield

10. On average, what coverage level did you choose?

50%

55%

60%

65%

70%

75%

80%

85%

11. Have you enrolled in supplemental insurance in the past five years (2013-2017)?

Yes

No

12. Have you filed a claim on crop insurance or supplemental crop insurance in the past five years (2013-2017)?

Yes, both

Yes, crop insurance

Yes, supplemental insurance

No, neither

13. In the past five years (2013-2017), I have filed claims due to _____. *Check all that apply.*

Drought

Wind/excess wind

Hail

Insects

Excess moisture

Plant disease

Frost

Decline in price

Other (please specify):

14. Are you required to have crop insurance by your lender?

Yes

No

I do not have a lender

15. My crop insurance bill is subsidized _____.

20-39%

40-59%

60-79%

80-99%

No subsidy

I don't know

Risk Management and Conservation

16. Please indicate your level of disagreement or agreement with the following statements about crop insurance.

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
a. Crop insurance will protect the viability of my farm operation regardless of water-related risks.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b. I need other ways to manage water-related risks besides crop insurance.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c. I can't imagine managing my farm without crop insurance.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
d. Crop insurance requirements limit my ability to implement conservation practices.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
e. Lender requirements to carry crop insurance limit my choices of which crops to grow.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
f. Crop insurance encourages row crop production on marginal ground.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
g. I will buy crop insurance regardless of whether or not it is subsidized.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
h. I prefer federal crop insurance subsidies to federal price supports, loan deficiency payments, or direct payments.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
i. I prefer federal crop insurance subsidies to enrolling marginal land in conservation reserve programs (CRP).	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
j. I have spent more money in crop insurance premiums than I have received back in claims.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
k. I trust my crop insurance agent.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

17. Please indicate your level of disagreement or agreement with the following statements. If crop insurance for water-related risks (e.g., too much or too little water) were **not subsidized**, I would _____.

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
a. Purchase crop insurance at market value	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b. Reduce my coverage level on crop insurance	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c. Supplement rainfall with irrigation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
d. Implement additional drainage	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
e. Implement reduced/no-tillage	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
f. Implement cover crops	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

18. Which action from Question 17 would be your top priority? (Please check only one.)

- a
 b
 c
 d
 e
 f

19. Are there any other actions you would take to reduce water-related risks? If so, describe below.

Risk Management and Conservation

20. Please indicate your level of confidence with each statement about the future of crop insurance, where 1 indicates low confidence and 7 indicates high confidence.

	Low						High
a. Federally subsidized crop insurance for corn and soybeans will exist next year.	1	2	3	4	5	6	7
b. Federally subsidized crop insurance for corn and soybeans will exist for the next five years.	1	2	3	4	5	6	7
c. If federally subsidized crop insurance were removed, how confident are you that it would be reinstated?	1	2	3	4	5	6	7

21. Please indicate your level of disagreement or agreement with the following statements about crop insurance subsidies.

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
a. Crop insurance for water-related risks (too much or too little water) should be subsidized by the federal government.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b. Crop insurance subsidies for water-related risks help ensure a reliable food supply.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

22. Iowa recently implemented a new program that gives farmers a \$5 per acre discount on their crop insurance over the next three years for planting cover crops. Have you heard about this program?

- Yes No

23. Do you think there should be a similar program in your state?

- Yes
 No
 Not sure

24. Would you be interested in participating in a similar program?

- Yes, I'd apply
 Yes, I'd be interested in applying
 No, I wouldn't be interested in applying
 Not sure

Risk Management and Conservation

Section III: Conservation

COVER CROPS: Cover crops include grasses, legumes, and other broadleaf plants established for winter cover, increased soil organic matter, and other conservation purposes.

25. How familiar are you with this practice?

- Never heard of it (*Skip to Page 8, Question 30*)
- Somewhat familiar with it
- Know how to use it; not using it
- Currently use it (*Skip to Question 28, below*)

26. Are you willing to try this practice?

- Yes, on all of my farm
- Yes, on part of my farm
- Maybe
- No
- Not relevant for my operation

27. If this practice is not relevant, please explain why:

28. How much do the following factors limit your ability to implement cover crops?

	Not limiting	Slightly limiting	Moderately limiting	Severely limiting	Don't know
a. Cost	<input type="radio"/>				
b. Crop insurance requirements	<input type="radio"/>				
c. Desire to continue current farming practices/ methods	<input type="radio"/>				
d. Lack of equipment/technology	<input type="radio"/>				
e. Lack of proven benefits	<input type="radio"/>				
f. Number of years needed to see benefits	<input type="radio"/>				
g. Physical features of my property make it difficult (e.g., soil types, drainage, and/or topography)	<input type="radio"/>				
h. Time/labor required	<input type="radio"/>				

29. Please indicate your level of disagreement or agreement with the following statements. Cover crops can reduce risk associated with _____.

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
a. Dry periods and drought	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b. Extreme rains	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c. Heat stress of crops	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
d. Loss of nutrients into waterways	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
e. Saturated soils and ponded water	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
f. Soil erosion	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Risk Management and Conservation

REDUCED/NO-TILLAGE: Manages the amount, orientation, and distribution of crop and other plant residues on the soil surface year-round, while limiting soil disturbance activities (e.g., no-till, strip-till, ridge-till).

30. How familiar are you with this practice?

- Never heard of it (*Skip to Page 9, Question 35*)
 Somewhat familiar with it
 Know how to use it; not using it
 Currently use it (*Skip to Question 33, below*)

31. Are you willing to try this practice?

- Yes, on all of my farm
 Yes, on part of my farm
 Maybe
 No
 Not relevant for my operation

32. If this practice is not relevant, please explain why:

33. How much do the following factors limit your ability to implement reduced/no-tillage?

	Not limiting	Slightly limiting	Moderately limiting	Severely limiting	Don't know
a. Cost	<input type="radio"/>				
b. Crop insurance requirements	<input type="radio"/>				
c. Desire to continue current farming practices/ methods	<input type="radio"/>				
d. Lack of equipment/technology	<input type="radio"/>				
e. Lack of proven benefits	<input type="radio"/>				
f. Number of years needed to see benefits	<input type="radio"/>				
g. Physical features of my property make it difficult (e.g., soil types, drainage, and/or topography)	<input type="radio"/>				
h. Time/labor required	<input type="radio"/>				

34. Please indicate your level of disagreement or agreement with the following statements.

Reduced/no-tillage can reduce risk associated with _____.

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
a. Dry periods and drought	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b. Extreme rains	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c. Heat stress of crops	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
d. Loss of nutrients into waterways	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
e. Saturated soils and ponded water	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
f. Soil erosion	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Risk Management and Conservation

DRAINAGE WATER RECYCLING: Includes capturing and storing drained water from a field in a pond or reservoir to serve as a source of supplemental irrigation during extended dry periods.

35. How familiar are you with this practice?

- Never heard of it *(Skip to Page 10, Question 40)*
- Somewhat familiar with it
- Know how to use it; not using it
- Currently use it *(Skip to Question 38, below)*

36. Are you willing to try this practice?

- Yes, on all of my farm
- Yes, on part of my farm
- Maybe
- No
- Not relevant for my operation

37. If this practice is not relevant, please explain why:

38. How much do the following factors limit your ability to implement drainage water recycling?

	Not limiting	Slightly limiting	Moderately limiting	Severely limiting	Don't know
a. Cost	<input type="radio"/>				
b. Crop insurance requirements	<input type="radio"/>				
c. Desire to continue current farming practices/methods	<input type="radio"/>				
d. Lack of equipment/technology	<input type="radio"/>				
e. Lack of proven benefits	<input type="radio"/>				
f. Number of years needed to see benefits	<input type="radio"/>				
g. Physical features of my property make it difficult (e.g., soil types, drainage, and/or topography)	<input type="radio"/>				
h. Time/labor required	<input type="radio"/>				

39. Please indicate your level of disagreement or agreement with the following statements. Drainage water recycling can reduce risk associated with _____.

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
a. Dry periods and drought	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b. Extreme rains	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c. Heat stress of crops	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
d. Loss of nutrients into waterways	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
e. Saturated soils and ponded water	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
f. Soil erosion	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Risk Management and Conservation

40. Please indicate your level of disagreement or agreement with the following statements. I value _____ as a risk management strategy.

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
a. Crop Insurance	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b. Cover crops	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c. Reduced/no-tillage	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
d. Drainage water recycling	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
e. Supplemental Irrigation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
f. Additional drainage	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

41. Which risk management strategy from Question 40 do you value the most? *(Please check only one.)*

- a b c d e f

Risk Management and Conservation

Section IV: About Your Farming Operation

42. How many years have you been farming? *Please enter a numeric value.*

Years

43. Please estimate the total acreage (owned and/or rented) for your farming operation in 2018.
Please enter a numeric value.

	Owned acres	Acres rented to others	Acres rented from others
Number of acres	<input type="text"/>	<input type="text"/>	<input type="text"/>

44. What percent of acres that you farm has tile installed? *Please enter a numeric value.*

%

45. In 2018, how many acres of each of the following did you manage? *Please enter a numeric value. If none, please enter a zero.*

- 45.1. Corn..... acres
- a. How many corn acres were no-till, strip till, or ridge till?..... acres
- b. How many corn acres were in cover crops?..... acres
- c. How many corn acres were provided irrigation to supplement rainfall?..... acres
- 45.2. Soybean..... acres
- a. How many soybean acres were no-till, strip till, or ridge till?..... acres
- b. How many soybean acres were in cover crops?..... acres
- c. How many soybean acres were provided irrigation to supplement rainfall?..... acres
- 45.3. Total conservation acres set aside..... acres
- a. Conservation Reserve Program (CRP) acres
- 45.4. Other (please specify): acres

46. What is your source of irrigation water? *Check all that apply.*

- No irrigated cropland Stream/ditch/canal Well
- Pond/lake/reservoir Lagoon/wastewater (not tailwater)

SECTION V: About You

47. What is your gender?

- Male
- Female

48. What year were you born?

49. What is the highest grade in school you have completed?

- High school diploma/GED
- Some college
- 2-year college
- 4-year college
- Post-graduate degree

Thank you for your time and assistance!

Please return your completed questionnaire in the postage-paid envelope provided. Please use the space below for any additional comments about this survey, crop insurance, and/or conservation.

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