Cover Crops, Farm Economics, and Policy

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Leveraging Large Existing Federal Programs to Induce the Adoption of

Climate Smart Conservation Programs

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Abstract

Cover crops have many environmental benefits. For example, cover crops can significantly reduce nitrate and phosphorus leaching from agricultural fields by scavenging residual nutrients, storing them in the soil, and making them available for future crops. Moreover, cover crops provide significant soil health benefits, including building organic matter over time and reducing erosion of topsoil. Cover crops have potential to remove carbon dioxide from the atmosphere and store it as soil carbon, building high quality soil organic matter over time (Lal et al. 1998). Yet, farmers often do not receive enough benefits to warrant planting cover crops, particularly when they have no prior experience with managing cover crops. Therefore, public policies supporting cover crop use may be justified given their public benefit. Herein, we will discuss methods to provide public support for cover crops, including direct subsidies for planting cover crops and providing insurance benefits for cover crops. Overall, direct subsidies likely are the most efficient ways of providing support and may only need to be temporary as individuals gain experience with cover crops.

Key Words: Carbon sequestration, Cover crops, Crop insurance, Farm economics, Nitrogen management, Risk

Introduction

According to the Sustainable Agricultural Research and Education (SARE), a cover crop is “a plant that is used primarily to slow erosion, improve soil health, enhance water availability, smother weeds, help control pests and diseases, increase biodiversity, and bring a host of other benefits to your farm (SARE, 2007).” For many years, farmers have incorporated cover crops into their crop rotations to replenish the soil and act as fertilizer, but with the introduction of synthetic nitrogen fertilizer and herbicides, cover crop use became rare (Groff, 2015). More recently, attention has been brought back to cover crops due to their environmental benefits which have value for farmers, landowners, and society. While cover crop use on U.S. farms is increasing, it remains a relatively small portion of total U.S. crop land. According to the 2017 Census of Agriculture, farmers planted more than 15.4 million acres of cover crops, a 50-percent increase compared to the 10.3 million acres planted in 2012 (Wallander et al., 2021). More recent increases do not suggest faster growth rates (Center for Regenerative Agriculture). The acres planted in cover crops in 2017 represent 3.9% of all U.S. cropland (Zulauf and Brown, 2019). Financial incentives from Federal and state governments along with private organizations are one reason for the increase in cover crop adoption (Wallander et al., 2021). There are opportunities for further support of cover crops through direct subsidies and crop insurance.

Our purpose is to describe the societal and private benefits from cover crop use, followed by a summary of studies that have evaluated farm-level returns and costs. Current farm economic studies suggest that private benefits do not incentivize large cover crop use. These finding are supported by the low level of cover crop adoption. We examine the success of cover crop incentive programs, with focus given to NRCS programs. We then make policy recommendations designed to increase the use of cover crops.

Societal and Private Benefits from Cover Crop Use

Benefits from cover crops accrue to society in general and to private individuals more specifically. Societal benefits are many, with much of the current interest focusing on carbon sequestration, water quality improvements, and reductions in soil erosion. One study estimates the benefits of crop crops between $39.05 per acre to $80.27 per acre (Pratt et al., 2014). Cover crops sequester carbon (Poeplau & Don, 2015, Blanco-Canqui, 2022), and nascent soil carbon markets allow companies to pay farmers to sequester carbon, thereby assisting corporations that have made climate commitments around greenhouse gas reductions, often with a commitment to reach carbon neutrality by a specific date. In addition, efforts have been advanced by the Federal government to pay for soil sequestering benefits provided by cover crops.

In addition to sequestering atmospheric carbon dioxide, cover crops also have the potential to improve water quality, with much of the current attention focusing on reducing nitrates and phosphorus leaving fields and entering water bodies. Tile drainage studies find that use of cover crops are one of the most effective means of reducing nitrate runoff, often more effective than managing nitrogen fertilizer rates, reducing nitrogen load by 40 to 50% (Ruffatti et al., 2019, Hanrahan et al., 2021). Because of their potential to reduce nitrate losses, cover crops are seen as a tool in Midwest states to meet goals of reducing nitrates moving into the Mississippi River and, ultimately, the Gulf of Mexico. As a result, nutrient reduction strategies of both Iowa and Illinois prominently feature cover crops as a means of reducing nitrate levels. Twelve states within the Mississippi River Basin have been directed by U.S. Environmental Protection Agency to develop their own nutrient reduction plans, outlining a pathway to reduce the amount of phosphorus and nitrogen lost from their respective state by 45% by 2035. The

Illinois Nutrient Loss Reduction Strategy compares 13 different practices and scenarios to reduce nitrate-N losses from agricultural fields, and the management practice with the greatest reduction potential is, by far, cover crops. The Illinois Nutrient Loss Reduction Strategy suggests that if cover crops were planted on all corn/soybean tile-drained acres in Illinois, nitrate-N would be reduced by 84 million pounds, a 20.5 percent reduction from the baseline. Cover crops on all corn and soybean tile-drained acres would also reduce total phosphorus by 4.8 million pounds, a 12.8 percent reduction from the baseline (Illinois Environmental Protection Agency, 2015; McIsaac et al., 2013). The Iowa Nutrient Reduction Strategy suggests that if a cover crop of cereal rye were planted on all conventional soybean and conventional corn acres, the nitrate-N would be reduced by 221 thousand short tons (442 million pounds), a 28 percent reduction from the baseline. Total phosphorus would be reduced by 8.3 thousand short tons (166 million pounds), a 50 percent reduction from the baseline (Iowa Department of Agriculture and Land Stewardship, 2017). The potential impact to society of planting cover crops on all tile drained corn and soybean acres in Illinois and all conventional corn and soybean acres in Iowa is a 526 million pound reduction in nitrate-N and a 170.8 million pound reduction of phosphorus in the water.

Carbon sequestration, nitrate loss reductions, and coinciding benefits of cover crops such as reduction of soil erosion and improved soil biological diversity can accrue to society, thereby providing justification for governmental subsidies of cover crops. There also are potential for private benefits, such as increased soil organic matter, reduced soil compaction, improved weed control, enhanced water infiltration rate, and additional nutrients supplied to the plant that accrue to farmers and landowners as a result of using cover crops. Planting cover crops has immediate impacts on financial returns and costs from crop production. Moreover, there is a hope that soil improvements over time can result in greater soil productivity potential in the future. More detail on this is covered in the following section.

Farm-Level Cost and Returns

Cover crops typically grow when cash crops are not being produced. For corn and soybean in the Midwest, cover crops grow after harvest in the fall and may continue to grow in the spring if the cover crop over-winters. Planting typically occurs after harvest, but also can occur before harvest, through aerial seed applications, or during harvest, with attachments on combines. Cover crop species are either winter terminal, meaning they are killed by freezing weather, or over-wintering, meaning they enter a dormant state over winter that allows them to survive freezing and grow again in the spring when temperatures become favorable. Winter terminal cover crops present fewer management risks and eliminate the need to terminate the cover crop in the spring prior to (or immediately after) planting the cash crop. Overwintering cover crops resume growth in spring, providing more environmental benefits such as nutrient loss reductions, soil erosion reductions, and increased carbon sequestration. Over wintering crops typically have to be terminated. Much experimentation is currently occurring with cover crops and standard recommendations for managing cover crops have been slow to develop. Cover crop efficacy will be influenced by many factors including cover crop species and seeding rate, method of cover crop planting, method of cover crop termination, changes to tillage needs, and changes to herbicide and other pest control resulting from adoption of cover crops (see SARE, 2007).

There are costs associated with using cover crops, including cover crop seed, seedbed preparation, and termination costs (Bergtold et al., 2017). Cover crop seed is often the largest additional cost, with per-acre costs depending on seeding rate and species used. Preparation costs includes the planting of the crop and may include an additional tillage pass. Termination costs are associated with additional herbicide applications or tillage passes required to kill the crop before planting.

Cover crop use will have impacts on other management decisions and production outcomes as well (see Bergtold et. al., 2017 and SARE, 2007 for a more complete discussion):

- Yield changes. Use of cover crops is hoped to increase yields over time but a recent study found that covers resulted in yield losses of 5.5% for corn and 3.5% for soybeans (Deines et al 2022).
- Fertilizer use. Cover crops may reduce need for commercial fertilizer application in the future, as nutrient retention and cycling are enhanced, but that does not occur in initial years. In fact, use of cover crops may increase optimal levels of nitrogen applications in corn (see Hughes and Langemeir, 2022). A cover crop can temporarily immobilize nitrogen which could have been used by the corn plant, requiring additional nitrogen.
- Herbicide use. Herbicide use may be decreased by cover crops through proper cover crop management. However, the termination costs associated with cover crop use can offset the decrease in cost from reduced herbicide use.

Anecdotally, cover crops benefits increase over time. SARE, a U.S. Department of Agriculture grant program, has been heavily involved in the evaluation and promotion of cover crops in the U.S. SARE has conducted farmer surveys among farmers who use cover crops (SARE, 2013, 2014, 2015, 2016, 2017, 2020). Based on that survey data, SARE suggests that cover crops will be profitable by year three (Myers & Tellatin, 2019). In corn, use of cover crops is estimated to reduce returns by -$31.35 per acre in the first year of adoption, but then increase returns to $1.42 in year two, and $17.90 in year 3 (Myers & Tellatin, 2019). Soybean returns with cover crops are projected to be -$23.55 lower in in year 1, $0.42 per year higher in year 2, and $10.18 per year higher by year 3. Other research similarly suggests that longer-term cover crop users perceive that cover crops increase net profits (Wang et al., 2021).

Several agricultural economists have evaluated cover crops using experimental data or budgeting approaches. Zhou et al. (2017) used experimental data to evaluate the profitability of cover crops in upland cotton and concluded "A cotton producer would maximize profits by not planting cover crops." Plastina et al. (2018) collected data from mail surveys, and then used partial budgets to examine the economics of covers crops grown in in Midwest states. Plastina et.al. (2018) evaluated several different practices for using cover crops. Overall, they found that cover crops reduce the profitability of corn even with inclusion of payments from cost share programs. Plastina et al. (2018) also found that cover crop use was profitable with the inclusion of cost share. Without inclusion, cover crops in soybeans were not profitable. Hughes and Langemeier (2022) examined cover crops using data from an experimental farm. They found that corn financial returns would be increased if oats/radish or cereal rye was used as the cover crop but was reduced when annual rye was the cover crop.

Another study from Illinois evaluated cover crops using data from central Illinois fields enrolled in Precision Conservation Management (PCM) on central Illinois soils (Sellars et al., 2023). This study compared fields that grew cover crops to those that did not grow cover crops. In PCM, farmers provide all field passes and details about crop inputs, from which returns are economically engineered. Panel A shows results for soybeans with 588 fields having over-wintering cover crops, 28 fields with winter terminal cover crops, and 3,066 fields with no cover crop. From a yield perspective, fields with cover crops have lower yields than those fields without cover crops: 68 bushels per acre average for cover cropped fields compared to 70 bushels per acre for fields without cover crops. The cost for planting and managing cover crops averaged $23 per acre for overwintering fields and $29 per acre for winter terminal cover crops. Other non-land costs were not lower for fields with cover crops, resulting in cover crops having higher non-land costs than fields without cover crops. Overall, non-cover crop fields had $44 higher profits than over-wintering cover crops ($420 vs. $376 operator and land return), and $21 higher profits than winter terminal fields ($420 vs. $399 operator and land return).

Corn results were similar to soybeans. Non-cover crop fields had higher yields (221 bushels per acre for non-cover crop fields compared to 214 bushels per acre for over-winter cover crops and 215 bushel per acre for winter terminal crops). Non-land costs were higher for cover crop fields: $543 per acre in non-land costs for non-cover crop fields compared to $562 for over-wintering fields and $602 for winter terminal fields). Higher yields and lower costs resulted in higher returns for non-cover crop fields: $313 per acre return for non-cover crop fields, $42 higher than the $271 return for over-wintering fields and $81 higher for winter terminal fields. The above results from PCM do not include any additional government or private income from cost share incentives received for growing cover crops. Cost-share assistance would improve the profitability of cover crops use relative to non-cover crops fields.

Overall, use of cover crops is a large change for farmers. Cover crops need to be planted during the same timeframe when harvest occurs and termination of cover crops occur in spring and may also present time pressures. Overall, cover crops can be thought of as a substantial practice change, perhaps having larger operational issues than a switch to conservation tillage. Those considerations could hinder use of cover crops (Lee & McCain, 2019), even if cover crops were profitable without financial assistance.

Discrepancies in Returns and Cover Crop Use

Discrepancies exist in the above studies of cover crop profitability. Studies by SARE and perception studies had more positive views relative to returns on fields with cover crops while the studies conducted by agricultural economists tended to point to cover crops having negative returns. Three of those studies had roughly the same scope: corn and soybeans in Midwest states. Myers et al. (2019) used SARE data suggest that cover crops will be more profitable than non-cover crop fields after year two. Plastina et al. (2018) used a partial budgeting approach and did not find use of cover crops to be more profitable, except in a specific situation for soybeans with payments from cost share covering additional costs. Sellars et al. (2020) did not find cover crops to be more profitable, at least without cost share. Sellars et al. (2020) indicated cover crop cause yield losses, a finding supported by recent satellite imagery (

Several explanations can be given for the differences in results. A first set of reasons revolves around the selection of farmers to be included in the study. SARE has been a leading institution in the promotion and evaluation of cover crops. SARE's participants likely are early adopters of cover crops, and more committed to the practice of cover crops. Overall, participants may be more environmentally oriented than typical farmers. Plastina et al. (2018) and Sellars et al. (2023) likely have more typical farmers who choose to use cover crops as an experiment and are using cost share to cover some of the costs of the cover crops. In Sellars et al., for example, on 57% of the fields, cover crops were being used for the first time. The second is the type of study. Survey methods were used on those studies that found cover crops more profitable, perhaps leading to biases in reporting. On the other hand, those studies that tended to find cover crops unprofitable were either budgeting exercises, or studies making comparisons of fields with and without cover crops.

Overall, growth in cover crop acres do not suggest that use increases profitability greatly. According to census data, U.S. farmers increased use of cover crop acres from 10.3 million acres in 2012 to 15.4 million in 2017 (Wallander, et al., 2021). In 2017, cover crop acres equaled 3.9% of acres, growing from 2.6% of acres to 3.9% of acres, less than a 1% increase per year. Estimates are that cover crops grew to 20 million acres in 2020 (Center for Regenerative Agriculture, 2022), or an increase to 5.1% acres. Given this estimate, cover crop use increased by less than 1% per year. By way of comparisons, use of soybean seeds with Genetically Engineered (GE) traits grew from 7.4% of soybean acres in 1997 to 94% in 2006, an average annual growth rate of 8.7% (ERS, 2022). GE traits increased greatly in corn and cotton over the same ten-year period. Adoption of GE traits increased without subsidies, while various programs have offered subsidies on cover crop use.

Public Incentives for Farmers to Plant Cover Crops

Public support for cover crop programs comes from both Federal and state sources. Up to now, most of the Federal support has come through programs offered by the National Resources and Conservation Service (NRCS), an agency of the U.S. Department of Agriculture. NRCS programs include Environmental Quality Incentives Program (EQIP), Conservation Stewardship Program (CSP), and Regional Conservation Partnership Program (RCPP). State programs also play a role, and crop insurance programs are being instituted. Also, climate smart partnerships may have an increasing role in the future.

EQUIP provides financial and technical assistance to enhance conservation on farms. To be eligible for EQUIP, farmers must own or be in control of farmland, meet adjusted gross income (AGI) limitation requirement, follow highly erodible land and (HEL) and wetland conservation requirements, and complete an NRCS EQUIP plan of operation[i]. Plans of operation usually include more than one practice that can improve environmental outcomes. Cover crops are an eligible practice, along with no or strip tillage and conservation crop rotations. Generally, EQIP funding can be obtained for five years. Farmer applications are ranked and funded, with some of that ranking influenced by priorities set in farm bills.

Similarly, CSP also provides financial and technical assistance to farmers. EQUIP programs generally focus on the adoption of a practices, while CSP programs focus on the enhancement of practices. Use of cover crops can be included in a CSP plan. Farmers must meet AGI along with HEL and wetland requirements. CSP contracts typically are five-years in length, implying that a farmer will have control of the land even if it is rented farmland. Contract extensions of another five years are possible. Farmers applications are ranked, and funding decisions are made.

RCPP extend NRCS administrative programs through partners. An organization can act as a partner in the direction of NRCS programs including EQIP and CSP. The partnering organization identifies needs which are generally local and submits a plan to mee those need. In 2022, $197 million were allocated through RCCP in 41 programs[ii]

Cost share on these programs at least have a positive correlation with cover crop use (Wallaner et al., 2021; Zhou, et al., 2022), and econometric analyses have made statistical linkages between funding and cover crop use (Sawadgo and Plastina). In 2017, per acre support in EQUIP ranged from $62.33 per acre in Illinois to $92.27 per acre in Delaware (Wallaner et al, 2021). The cost share on EQUIP payments exceed the reduction in cover crop returns found in most economic studies. CSP rates were lower at $7.96 per acre in Arizona to $14.65 in Wyoming.

While the per acre cost share on those programs are relatively large, funding in the EQUIP, SCP, and RCPP programs are not large enough to impact a significant amount of acres. From 2014 to 2021, funds obligated on the three programs ranged from $1.5 billion to $2.2 billion, with obligations being $1.8 billion in 2021 (see Table 4). Those funds were allocated to 21.6 million acres in 2021. In 2021, there were 895 million acres in farms, meaning that these programs operated on 2% of acres in US farms. Not all of EQUIP, CSP, and RCPP funding relates to cover crop practices. In 2021, 15% of EQIP funds, .8% of CSP, and 11% of RCIP were allocated to cover crop practices.

In addition, there are awareness and transaction costs issues associated with NRCS programs. In the past, most farmers would not agree that they are aware of USDA conservation programs (McCann and Claassen, 2016, Reimer and Prokopy, 2014). At least compared to commodity title programs offered by Farm Service Agency (FSA) and crop insurance programs administered by the Risk Management Agency and offered through independent agents, the process of applying for NRCS programs is onerous. McCann and Claasen (2016) estimated that successful farmer spent 28.5 hours developing applications, signing the contract, and documenting compliance. One can view that time in different ways. Undoubtedly, there is a transaction cost associated with NRCS programs.

Further Federal support was offered for the first time in Federal crop insurance programs through the Pandemic Cover Crop Program (PCCP) in 2022. This program offered a reduction in farmer-paid premium up to the level of farmer-paid premium, with the PCCP reduction not to exceed $5 per acre[iii] To receive the premium reduction, farmers had to file the Report of Acreage form (FSA-578) by March 15, 2022, simply moving up the deadline for filing the report from its usual July 15 deadline. This program supplements state level programs in Illinois, Indiana, and Iowa. Analysis of the impacts of these on cover crop use have not been conducted. While cover crops have risk implications, the design of the PCCP does not address any risk management issues, and is simply another cost-share program for cover crops that are insured..

Several state programs also deal with cover crop programs. Those programs vary in type, with some providing cost-support while other include tax credits, equipment loans, and technical assistance (Wallander, et al., 2021) The largest of these programs is the Maryland Agricultural Water Quality Cost-Share program, which provides about $20 million in annual funding and impacts over 600,000 acres (Wallander, et al., 2021). Maryland's program aids in addressing water quality issues in the Chesapeake Bay. Relative to NRCS programs, total funding and acres impacted by state programs are relatively small.

A new program that may impact cover crop use is a USDA program called the Partnership for Climate-Smart Commodities[iv]. On September 14, 2022, USDA announced funding of 70 programs with $2.8 million. These partnerships are to support the development of climate smart commodities, with those commodities likely including carbon credits that companies can buy as part of their plans to reach carbon neutrality. Farmers will receive payments to provide carbon credits to those markets. For Midwest crops, cover crops, reduced tillage methods, and nitrogen management practices will play roles in providing carbon credit. How these plans impact cover crop uses or carbon sequestration is not known as the plans of the partnerships are just starting.

Recommendations

Economic studies and trends in cover crop use indicate that continued Federal studies will be needed to increase cover crop use. Herein, we present several policy recommendations that may aid in generating cover crop use. We focus these on Federal programs as carbon markets are already being addressed with new partnerships.

First, amount of total funding of cost shares needs to be increased in cost-share program if more acres are expected to be brought into production. Current per acre levels of spending between $62 and $93 per acre are sufficient to induce more cover crop use, as most economic studies find the cover crop use does not reduce profits by that level. However, total funding on cover crop programs need to be increased in order for funding to reach a significant number of acres.

To illustrate the levels of potential increase, we take a $30 per acre cover crop cost-share. That level is above levels needed to cover reduced cover crop returns suggest by Plastina et al. (2018) , but below those in Sellars et al (2023). Overall, a $30 level would be below that currently offered by EQUIP programs. Still, $30 per acre will result in significant outlays. If a program was focused on Illinois and Iowa, funding would likely be targeted at corn and soybean acres. In 2021, there were 23,000,000 acres of corn and 20,720,000 acres of soybeans in Illinois and Iowa (NASS, 2022). If all acres were covered, a $30 per acre payment would result in $690 million of funding for corn and $622 million for soybeans, or $1.3 billion of funding for both corn and soybeans in Illinois and Iowa. A $1.3 billion funding level is 72% of the $1.8 billion allocation to EQUIP, CSP, and RCPP programs in 2021. To continue the example to the broader U.S., there were 80,844,000 million acres of corn and 86,631,000 million acres of soybeans. Funding at a $30 per acre level would require $5 billion for all US corn and soybean acres. The current total for EQUIP, CSP, and RCPP programs of $1.8 billion would result in coverage of 36% of corn and soybean acres. The USDA Partnerships for Climate-Smart Commodities have $2.8 billion allocated which would cover 2.15 years of funding for every acre in Illinois and Iowa. The above example simply points out the scale of funding needed to have cost-share on a significant number of acres in the U.S.

We suggest developing a "Cover Crop Introduction Program." Farmers who have not adopted cover crops likely have a learning curve to implementing cover crops and figuring out how to use cover crops profitably. Rather than making large changes in their operations, focusing on introducing cover crops likely will aid farmer developing experience with cover crops. We suggest developing a special program targeted at introducing cover crops. This program could be farmer specific and provide an operation with a large enough cost share to induce participation. Funding could be limited to a specific number of acres per farmer, thereby providing more farmers with experience. Also, there could be a time limit on the program, thereby making support this program not a permanent vehicle of support for cover crops. Further, burdens for entry into this program should be light, and farmers should not be required to develop conservation plans like those with the EQUIP program. The reason for low barriers to entry is to induce more farmers to implement cover crops and minimize the time and management costs for farmers deciding to plant cover crops for the first time. Area-specific cost-level support could be developed, but entry into the above program would be straightforward. Technical support and educational materials about cover crop use could be provided to the farmer to assist with the learning curve of using cover crops.

The above program is based on the premise that cover crop programs will become profitable as more experienced is gained with cover crops. This premise is not a foregone conclusion. While SARE and other perception studies suggest profitability may increase with time, the agricultural economics studies did not address this issue. We suggest further work on the long-run profitability of cover crops. Some of this work could begin by evaluating choices made by former EQUIP participants who had cover crops as part of their EQUIP plans. Survey work to see if those farmers continued cover crops after the end of the EQUIP programs would be useful.

Further work on the profitability of cover crop systems would be useful. Cover crop use may be like the adoption of conservation tillage, which has increased over time (Claasen, et al, 2018). Conservation tillage technologies have improved, and farmers have gained familiarity with the technologies, thereby making these technologies the default in agriculture. A similar result may occur with cover crops. Farmer familiarity may aid in adoption. Further development of new technologies could aid in cover crop adoption. Public funding of research in increasing the profitability and efficacy of cover crops could aid in the process of making cover crops more profitable.

Summary

Cover crops promise to deliver societal benefits including reduced nutrient effluent, and increased carbon sequestration. Private benefits from cover crop use have not generated large increases in cover crop use, with several agricultural economic studies showing that cover crops reduce farm returns. We suggest placing more funding in programs designed to provide cost support to farmers in their initial stages of cover crop adoption. If cover crops can be made profitable, a program such as this will aid in increasing the adoption of cover crops. On the other hand, a cover crop introduction program also will identify if long-termed subsidies are needed to maintain cover crop uses. If those issues arise, future policy efforts can be used to address that reality.

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Table 1. Estimates of Change in Returns from Using Cover Crops from Year of Adoption

	Corn ($/acre)	Soybeans ($/acre)
One Year	–31.35	–23.55
Two Years	1.42	0.42
Three Years	17.9	10.18

Source: SARE Cover Crop Economics

Table 2. Change in Profit from Using Cover Crops in Midwest States

	Corn ($/acre)	Soybeans ($/acre)
With Cost Share	–20.76	25.13
Without Cost Share	–46.09	–2.95

Source: Plastina, Liu, Sawadgo, Miguez, and Carlson

Table 3. Yield, Returns, and Costs from None Cover Crop and Cover Crop Fields on High-Productivity Farmland in Central Illinois, 2015 - 2021.

	Over-wintering	Winter-Terminal	None Cover Crop
Panel A. Soybean Results			
No of Yields	588	28	3066
	$ per acre	$ per acre	$ per acre
Yield per acres	68	68	70
Gross Revenue	666	675	686
Cover crop establishment costs	23	29	0
Other non-land costs	267	247	266
Total land costs	290	276	266
Operator and land return	376	399	420
Panel B. Corn Results			
Number of Fields	243	109	3423
	$ per acre	$ per acre	$ per acre
Yield per acres	214	215	221
Gross Revenue	833	834	856
Cover crop establishment costs	25	29	0
Other non-land costs	537	573	543
Total land costs	562	602	543
Operator and lan0d return	271	232	313

Source: Sellars, Schnitkey, and Gentry

Figure 4. Spending and Acres Covered by Select National resources Conservation Service Programs

Year	EQUIP [1]	CSP [2]	RCPP [3]	Total [4]
Panel A. Sending Obligations on NRCS Programs.				
	$ in millions			
2014	797	708	-	1,506
2015	750	1,379	-	2,129
2016	900	971	48	1,921
2017	1,000	944	77	2,022
2018	1,164	815	100	2,080
2019	1,140	444	105	1,690
2020	1,170	494	84	1,748
2021	1,263	511	34	1,809
Panel B. Acres Covered by Programs				
	Million acres			
2014	10.2	8.8		19.0
2015	8.7	22.8		31.4
2016	9.7	16.4	0.5	26.7
2017	10.8	15.2	0.7	26.7
2018	12.9	11.3	1.6	25.8
2019	12.3	5.3	1.2	18.8
2020	10.3	8.8	0.6	19.7
2021	11.6	9.7	0.2	21.6

[1] Environmental Quality Incentives Program

[2] Conservation Stewardship Program

[3] Regional Conservation Partnership Program

[4] Sum of EQUIP, CSP, and RCPP.

Source: Data downloaded from Financial Assistance Dashboard of Farmer.gov

[i] Much of this discussion is summarized from EQUIP descriptions on NRCS's website, with the description of the Iowa program being particularly useful (https://www.nrcs.usda.gov/programs-initiatives/eqip-environmental-quality-incentives/iowa/environmental-quality-incentives).

[ii] A list of RCCP sites is given on the NRCS website (https://www.nrcs.usda.gov/programs-initiatives/rcpp-regional-conservation-partnership-program/regional-conservation-partnership-program-2022-projects).

[iii] Information was taken from Risk Management Agency factsheet on the Pandemic Cover Crop Program (https://www.rma.usda.gov/en/Fact-Sheets/National-Fact-Sheets/Pandemic-Cover-Crop-Program).

[iv] Information on the Partnership for Climate-Smart Commodities program was taken from the USDA announcement of funding of the 70 projects on the USDA website under climate smart commodities (https://www.usda.gov/climate-solutions/climate-smart-commodities).