



**Conservation Technology
Information Center**



asta

**american
seed trade
association**

NATIONAL COVER CROP SURVEY REPORT 2022-2023

AUGUST 2023

TABLE OF CONTENTS

ABSTRACT	03
FOREWORD	05
INTRODUCTION	06
METHOD	07
RESPONDENTS	09
• Demographics	10
• Crops Produced	14
• Land Ownership	15
• Tillage Practices	18
• Changes in Tillage Practices	20
COVER CROP USERS	23
• Cover Crop Goals	25
• Cover Crop Species	28
• Cover Crop Mixes	30
• Sources of Information	32
CASH CROPS AND COVER CROPS	33
• Corn and Covers	33
• Fertilizer in Corn	35
• Weed Control in Corn	38
• Soybean Production and Cover Crops	40
• Wheat Production After Cover Crops	44
• Cotton and Cover Crops	45
• Cover Crops and Sorghum	46
• Yield Impacts: Soybeans, Corn, and Wheat	47
• Horticulture and Other Cash Crops	49
LIVESTOCK AND COVER CROPS	52
COVER CROP SEED	56
• Seed Supply Chain	56
• Growing Cover Crop Seed	60
SEEDING COVER CROPS	61
TERMINATING COVER CROPS	64
HERBICIDE RESISTANT WEEDS	66
PLANTING GREEN	68
INCENTIVES AND PAYMENTS	72
SOIL CARBON PROGRAMS	75
RESEARCH PRIORITIES	76
NON-USERS	77
CONCLUSION	84

ABSTRACT

The 2022-2023 SARE/CTIC/ASTA National Cover Crop Survey marked a return to gathering insight and attitudes on cover crops from farmers across the country after a three-year hiatus.

Nearly 800 farmers (795)—current cover crop users, former users, and farmers/growers who have never planted covers— representing 49 states and a wide range of crops shared their perspective in this year’s survey. Nine out of 10 of them were the decision-makers on their farms, and at 59 years old, the average age was just slightly higher than the national average for farmers.



Cover crop users planted an average (mean) of 413.6 acres of cover crops in 2022, a steady increase over the previous 5 years.

Non-users reported an interest in reducing inputs by using cover crops (70% agreement) but were primarily deterred from adoption by concerns over economic return (selected by 60% from a list of barriers to adoption), followed by worries of yield reductions following cover crops—which, of course, are also economic concerns. Non-users were eager for information

addressing their economic concerns (63%), as well as for incentive or cost-share payments (59%). When asked whether they would consider cover crops, 80% chose one of the 3 positive responses from “maybe” to “definitely yes.”

Among the notable findings in this year’s survey could challenge assumptions on cover crop adoption on owned vs. rented land—100% land ownership was equal between users and non-users of cover crops, and that slightly more cover crop users (14%) than non-users (10%) reported not owning any of their land.

90% OF THE COVER CROP USERS WHO RECEIVED PAYMENTS IN 2022 REPORTED THAT THEY EITHER DEFINITELY OR PROBABLY PLANNED TO USE COVER CROPS AFTER THE PAYMENTS END.

More than half (52%) of corn growers reported no change in fertilizer costs in corn following at least 3 years of cover crops, and the second-largest group, 21%, said they saved more than \$20 per acre on nutrients in corn following the use of cover crops.

ABSTRACT CONT'D

Similarly, 55% of respondents saw no change in herbicide costs in corn following cover crops—and 3 out of 4 of those saw improved weed control—while 42% noted that they saved money on corn herbicides after covers. In soybeans, the results were similar: 52% of respondents reported equal herbicide costs following cover crops, and 45% saved money.

Soil health and protection were the most popular goals of the cover crop users polled in the 2022-2023 survey. Aligned with that priority, the greatest research interest among cover croppers was understanding soil biology, marked “highly interested” by 63% and “moderately interested” by 24% for a total of 87%.

The 2022-2023 survey was the first in the series to explore the integration of livestock into cover crop programs. One in 4 respondents integrated livestock with their cover crops, primarily through grazing. Most owned the livestock they grazed or fed with forage harvested from cover crops; of those who grazed, 76% reported a net increase in profit from the practice.

Planting green—seeding a cash crop into a growing or just-terminated cover crop—has grown in popularity, with 61% of respondents reporting planting green somewhere on their operation. Though the difference in respondent pools precludes tracking trends from one survey to another, it is interesting to note that 52.5% of the respondents in the 2019-2020 survey reported planting green.

Availability of cover crop seed did not seem to be an issue for a majority of cover crop users, with only 7% of respondents reporting regular challenges in sourcing cover crop seed. Additionally, seed quality is important to respondents, with 57% of cover crop seed buyers always looking for a seed tag or analysis and 27% sometimes requesting them.

About one-quarter of cover crop users have received incentive payments. Private carbon market programs could become significant sources of payments for cover crops in the future—16% of survey respondents who received payments in 2022 reported participating in carbon programs—but write-in comments indicated that further education and publicity is still necessary.

Perhaps most exciting, 90% of the cover crop users who received payments in 2022 reported that they either definitely or probably planned to use cover crops after the payments end.



FOREWORD

Just weeks after the survey period for the 2022-2023 SARE/CTIC/ASTA National Cover Crop Survey closed, the world saw a tragic consequence of soil erosion—more than 70 vehicles collided on an Illinois highway caused by a dust storm that blinded drivers. Seven people died that day in the pileup, and a harsh spotlight shined on tillage practices that leave some of the world's best farmland unprotected against the forces of wind and water.

May 1, 2023, represented a sudden and profound human tragedy for the families and friends of the seven people who died in the chain of crashes. But we also caught a glimpse that day of a slow, massive societal tragedy—the steady loss of our topsoil, the slow erosion of the productive farmland that built America and helps feed, clothe, and fuel the world.

Since the days of the Dust Bowl nearly a century ago, we have known the importance of cover crops and other practices in protecting soil against erosion. Our grandparents and their grandparents knew that keeping the soil covered was good for the land, and now, with advanced research tools and greater awareness of the importance of microbial ecosystems, we are starting to scratch the surface on the universe that makes soils healthy.

It's become clear that cover crops are vital to building healthy soils, and—for many farmers—healthy farms.

All of this tragedy and wonder underscores the importance of cover crops. Since 2012, CTIC has had the privilege of conducting the National Cover Crop Survey with support from the U.S. Department of Agriculture's Sustainable Agriculture Research and Education (SARE). In 2014, the American Seed Trade Association (ASTA) brought its industry insight and skilled team to the effort.

Together, we have explored not only the growing enthusiasm for cover crops among many farmers, but also the questions users and non-users of cover crops have about the practices and challenges growers face in growing them, as well as the obstacles that keep non-users from trying cover crops.

At CTIC, our vision and relentless work is focused on seeing millions more acres of cover crops on the landscape, which is why we have joined the Farmers for Soil Health partnership, which has set a lofty goal of doubling the number of U.S. acres of cover crops to 30 million by 2030. To make that viable, farmers need the tools, knowledge, and support to increase their confidence to integrate cover crops into their operations in ways that help them farm more sustainably—and ideally increase their profitability. As an Iowa farmer and cover crop user, I know first-hand the risks, challenges, and frustrations of managing cover crops. I also deeply believe in their benefits.

As this 2022-2023 National Cover Crop Survey Report goes to press, I want to thank Dr. Rob Myers at the University of Missouri Center for Regenerative Agriculture and his team at USDA SARE for the passion and commitment that has fueled this project for more than a decade. This project would not be possible without the financial and logistical support from SARE. I'd also like to thank Bethany Shively and the ASTA team that has boosted the project for years with their professionalism and enthusiasm for the survey. Bethany Bedeker at the University of Missouri Center for Regenerative Agriculture has been untiring in sorting through mountains of data. Steve Werblow and Callie North at CTIC lent their expertise in writing and communications to bring the results of the survey to a wider audience. And designer Jason Lester of Slingshot Designs has made it all attractive and approachable.

Together, I hope we will help farmers and their trusted advisers connect with approaches that help them take their operations to new heights. I hope we will help growers hesitant about cover crops find the information, insights, or incentives that help them make cover crops a productive part of their future. I hope we will guide research and communication efforts to address the pressing questions about cover crops, and help policymakers and industry leaders and conservation specialists create roadmaps that weave cover crops into sustainability efforts where they fit.

Preventing another tragedy—the profound heartbreak of traffic pileups and the slower catastrophe of topsoil loss—next spring will start with cover crops this fall.



RYAN HEINIGER

Executive Director

Conservation Technology Information Center

INTRODUCTION

After nearly two years of Covid lockdowns, remote work, economic uncertainty, and disruptions in the agrifood chain, USDA's Sustainable Agriculture Research and Education (SARE) Program, the Conservation Technology Information Center (CTIC), and the American Seed Trade Association (ASTA) agreed it was time to conduct another survey of farmer attitudes and approaches to cover crops.

The last SARE/CTIC/ASTA Cover Crop Survey Report was published in 2020 in the wake of an extremely wet 2019, when delayed planting was common and concerns were high about cover crops' effects on timing and management. That year's survey dug deep into "planting green" into standing cover crops and the impact of cover crops on the timing of planting.

In 2022, American Corn Belt farmers encountered a cool early spring followed by a warm, dry growing season. Lack of moisture in Iowa and along the Missouri River threatened to suppress corn yields, but crops prevailed and good harvest weather ultimately ended in high crop quality, strong yields, and timely harvests in the Midwest. A second year of La Niña also left much of the West, Plains, and southeastern Coastal Bend in drought during the 2022 growing season. Winter rainfall in late '22/early '23 inspired some optimism for a planting season with restored reservoirs and adequate soil moisture in parts of the country, though the Plains states from the Texas Panhandle to portions of South Dakota remained in very severe levels of drought, and concerns were rising in parts of the Corn Belt about low soil moisture levels in the winter.

The following report details insights gathered early in 2023, as farmers watched the skies and anxiously awaited planting season.





METHOD

The seventh SARE/CTIC/ASTA National Cover Crop Survey was conducted via Qualtrics between March 1 and April 2, 2023. The survey featured 110 questions in formats including pull-down choices, Likert scale slider bars, guided choice, and free response.

The initial question asked respondents if they were farmers; those answering “no” were ushered out of the survey and given an opportunity to look at the questions if they were interested. Cover crop users and non-users followed separate tracks of questions. Several answers on cover crop history or crops grown opened secondary paths of questioning for more detailed exploration.

Questions included many of the same queries on demographics, cover crop experience, yield impacts and influences on decision making that have been asked in previous National Cover Crop Surveys. Though answers cannot be statistically correlated between different years’ surveys because respondents and questions differed from year to year, examination of changes over time can allude to trends in thinking or practice. New questions on growing cover crops for seed, soil carbon programs, and grazing cover crops were included in this year’s survey.

Not all users answered every question they were asked, and some follow-up questions were not asked of every user, so the number of respondents (n value) differs from question to question in this report. Rather than use only complete surveys, we chose to gather as much insight as possible and include answers from incomplete, validated surveys where growers chose to provide their perspective. Several questions also allowed more than one answer, so percentages can total more than 100%.

The survey instrument was designed by a committee representing SARE, ASTA and CTIC and posted by SARE.

All data were collected anonymously, but respondents were offered the option of submitting their email address for more information on cover crops from CTIC. Respondents who completed the survey could also enter their email addresses in a random drawing for one of three \$100 Visa gift cards, which were awarded shortly after the close of the survey.

METHOD CONT'D

THE SURVEY WAS PUBLICIZED IN A WIDE RANGE OF WAYS:

- Press releases picked up by farm media such as *No-Till Farmer* and *Successful Farming*, as well as conservation-oriented organization newsletters such as the National Association of Conservation Districts' online newsletter;
- SARE, ASTA, and CTIC social media channels;
- Direct emails to 30,000 Penton/Farm Progress farm magazine subscribers nationwide;
- An email by DTN to 100,000 farmer subscribers;
- Listservs of the Midwest and Southern Cover Crop Councils;
- Emails to respondents to previous SARE/CTIC/ASTA National Cover Crop Surveys;
- Email lists of ASTA and CTIC cooperators and members;
- Participants in past CTIC events and programs;
- Farmers contacted directly via email by the United Soybean Board;
- Direct email contact by the Missouri Soybean Association;
- Email contact from the National Pork Producers Association;
- National Center for Regenerative Agriculture list of farmers and crop advisors;
- SARE list of farmers, crop advisors and other contacts.

The quality of the final data of the 2022-2023 National Cover Crop Survey is the direct result of the extraordinary diligence and commitment of Bethany Bedeker of the University of Missouri.

More information on this survey is available at https://www.ctic.org/data/Cover_Crops_Research_and_Demonstration_Cover_Crop_Survey

RESPONDENTS

In all, 795 farmers participated in the 2022-2023 National Cover Crop Survey, providing perspective from around the country and across a wide range of ages, crops, and farming histories.

The respondent pool strongly represented cover crop users, with 639 of the 795 respondents (80%) reporting that they were cover crop users and 67 (8%) stating that they had used cover crops in the past but do not currently plant them. Eighty-nine of the farmers (11%) said they did not and have not used cover crops. Both the “never used” and “I have in the past” groups are categorized as non-users in this report.

The proportion of cover crop users is extremely high compared to the national average—the 2017 U.S. Census of Agriculture determined that cover crops were planted on 153,402 farms (approximately 7.5% of farms in the census), accounting for 3.9% of U.S. cropland. The high ratio of cover crop users is not surprising for a survey that was largely publicized through conservation farming channels. The goal of this survey is not to reflect national averages, but to delve into the practices, perceptions, and motivations surrounding cover crops. The dedicated farmers—cover crop users and non-users alike—who took the time to provide their insight through this questionnaire helped the authors accomplish that goal.

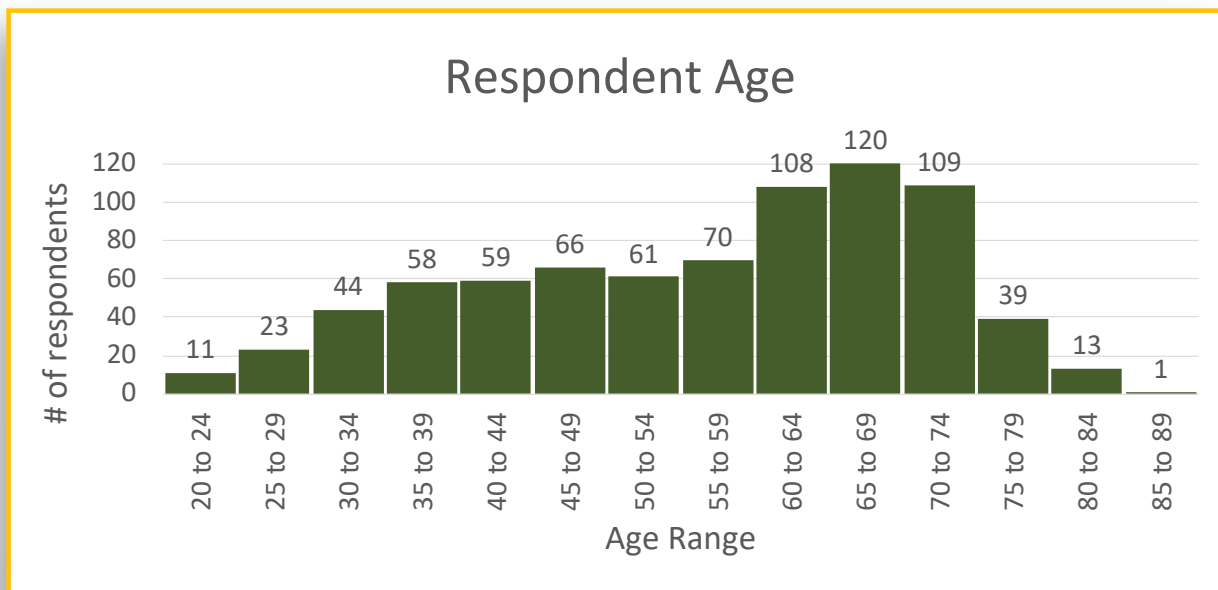


RESPONDENTS CONT'D

DEMOGRAPHICS

Nearly 90% (711 respondents of the 795 who answered the question, or 89.4%) reported that they were the primary decision makers on their farm, while 5% (38 respondents) said they were not and another 5% (43 people) selected “other situation.” Of the “other situation” respondents, half note that they equally shared decision-making with a partner.

The median age of the respondents to this year’s survey was 59, just slightly older than the 57.5 year median age for U.S. farmers reported by the 2022 USDA Census of Agriculture. The respondent pool in the National Cover Crop Survey skews to the older side of the curve—of the 782 farmers who reported their age, 521 (66.6%) were above the age of 50. Eleven respondents (1.4% of those who reported their age) were in the 20-to-25-year-old bracket, while 14 (1.7%) were 80 years old or older.



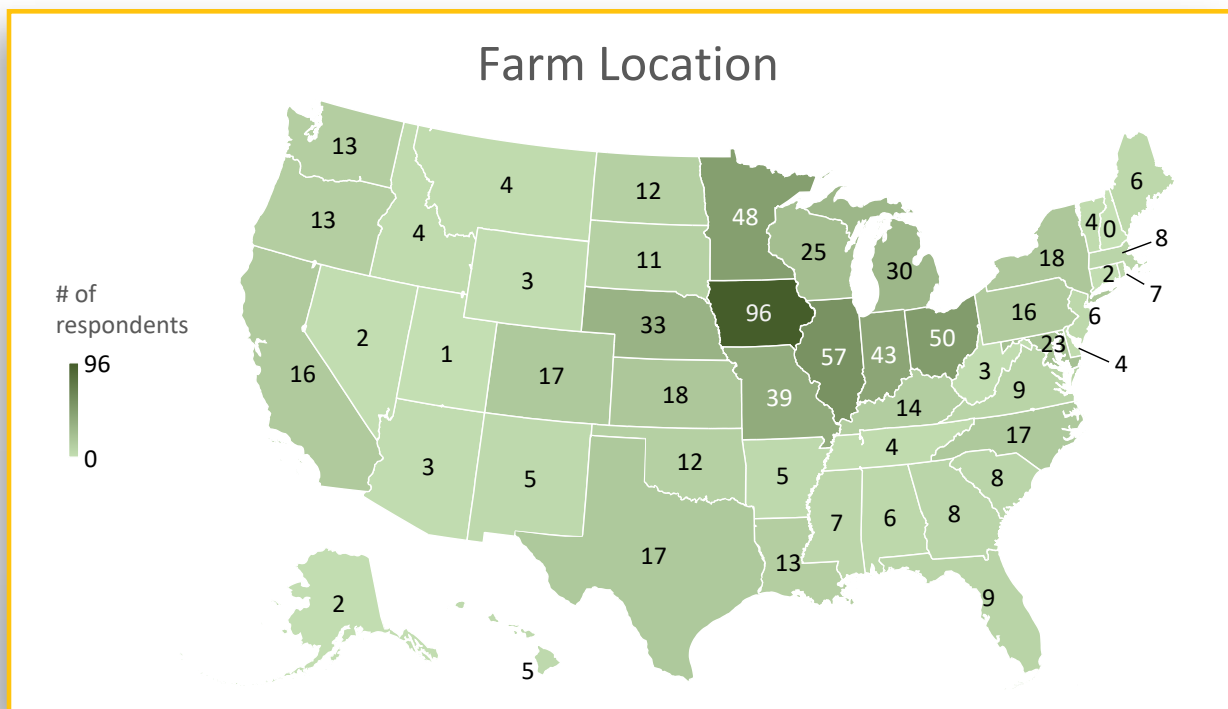
n = 782



DEMOGRAPHICS

Of the 795 respondents whose data were included in this analysis, 780 reported the state in which most or all of their farm is located.

Among the 49 states represented in the data, the largest contingent of respondents (12.1%, or 96 people) farms in Iowa. Illinois (7.2%, or 57 respondents), Ohio (6.3%; 50) and Minnesota (6.0%; 48) round out the top four participating states. The only U.S. state not represented in the survey was New Hampshire. One respondent from Puerto Rico and 3 from Canada were also included in the analysis.

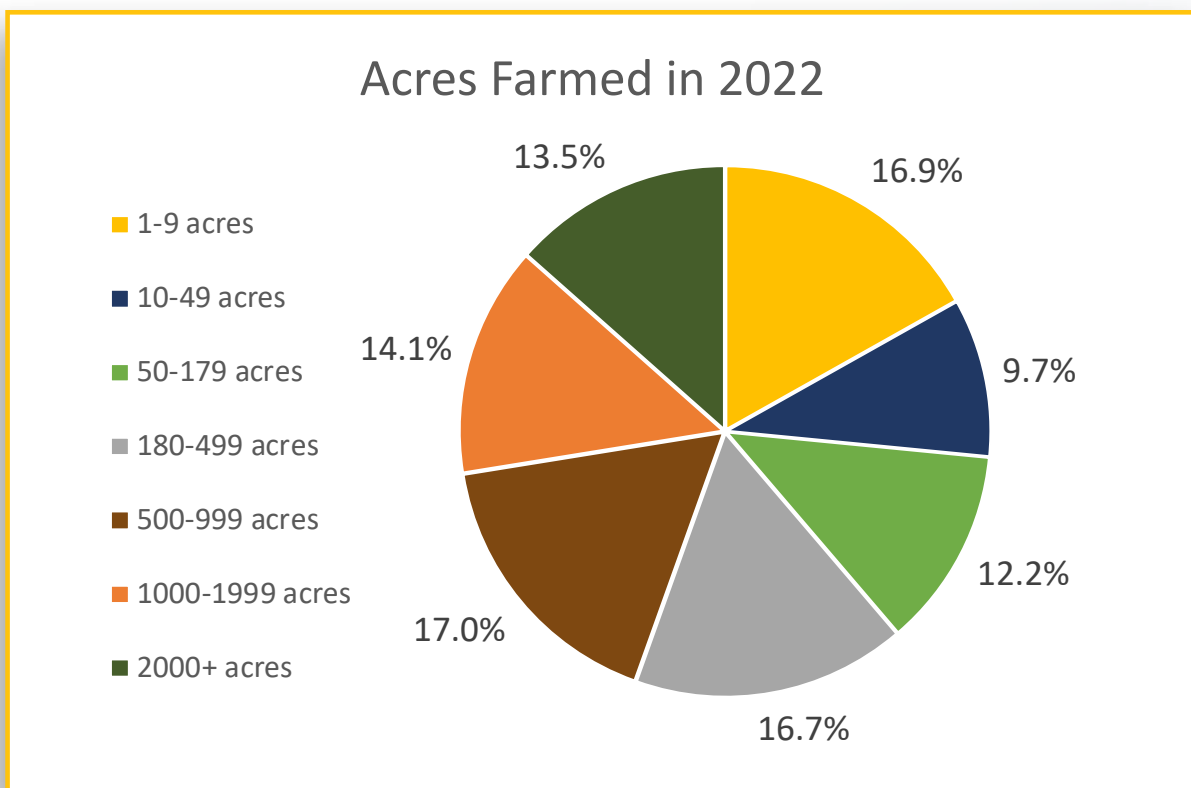


n = 780



DEMOGRAPHICS

Farm size was extremely diverse and almost evenly distributed among respondents in this year's survey. All 795 respondents answered the question about how many acres they farmed in 2022. For the total pool, including cover crop users and non-users, 134 (17%) selected the smallest category for farm size, 1 to 9 acres, while 107 (13%) fell into the largest category of 2,000 or more acres. The 10-to-49-acre farm size represented the smallest total group of respondents at 77 (10%), while the other acreage breakdowns accounted for 12% to 17% of the respondents.



n = 795

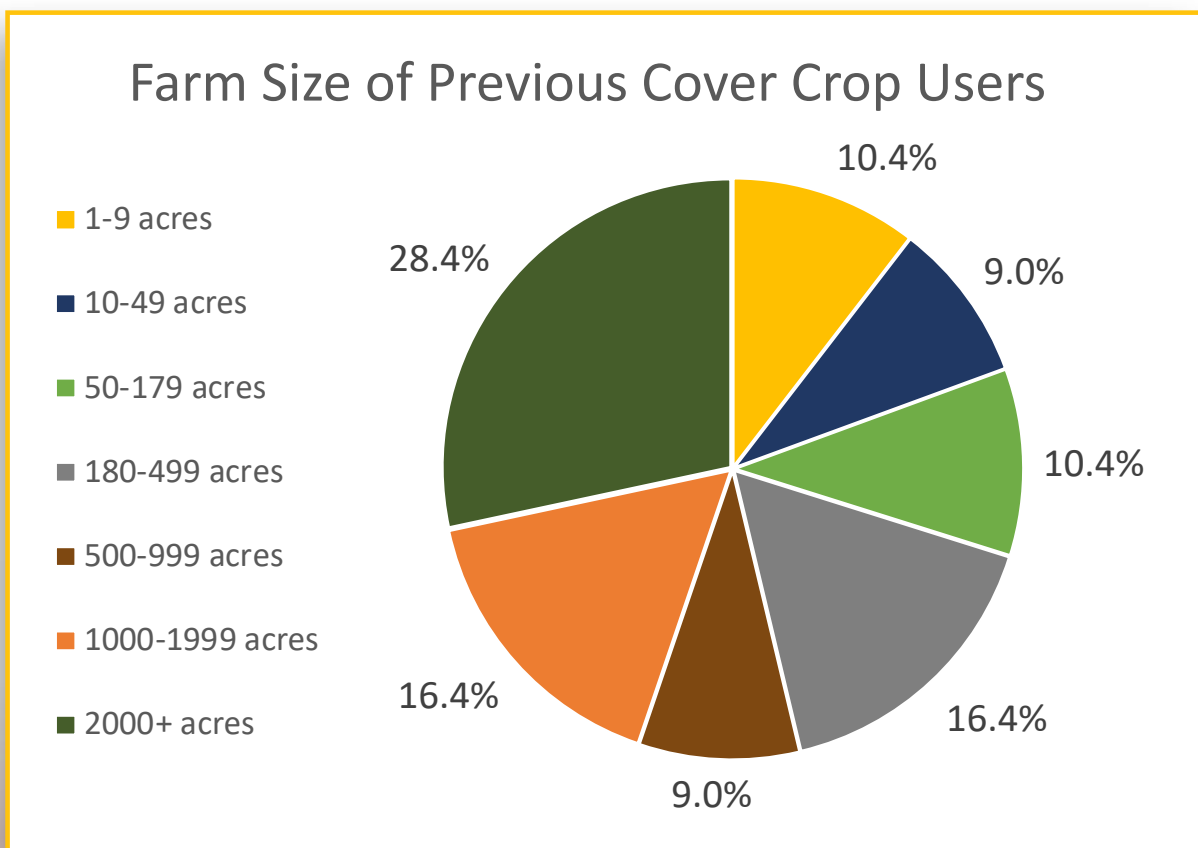
Cover crop users who participated in the survey—639 of the 795 respondents—displayed a similarly even spread across the range of farm sizes. The largest bands of farm sizes among cover crop users were 18% for both the 1-to-9-acre breakout and the 500-to-999-acre group. The 10-to-49-acre farm size was represented by the smallest group, 60 cover crop users or 9%. At 12% to 16%, the remaining 4 size categories were fairly evenly represented among cover crop users.

Non-users who had not tried cover crops, accounting for 89 respondents, were weighted slightly to the 180-to-499-acre group (17 farmers, or 19%). The mid-sized category, 500 to 999-acres (15 people, or 17%) and small category, 1 to 9 acres (14 farmers, or 16%) were nearly equal, while the balance of the categories fell between 10% and 14% of the non-users.

DEMOGRAPHICS

A more significant pattern appeared among the non-users who had tried cover crops in the past, a group totaling 67 farmers, who skewed toward the larger end of the acreage spectrum—19 of them (28%) farmed 2,000 acres or more and 11 (16%) farmed 1,000 to 1,999 acres.

Another 11 (16%) reported farm size of 180 to 499 acres, while the next-largest groups were evenly split at 7 respondents (11%) for the 50-to-179 acre category and the 1-to-9-acre group, followed by 6 (9%) apiece for the 10-to-49-acre and 500-to-999-acre groups.



n = 67

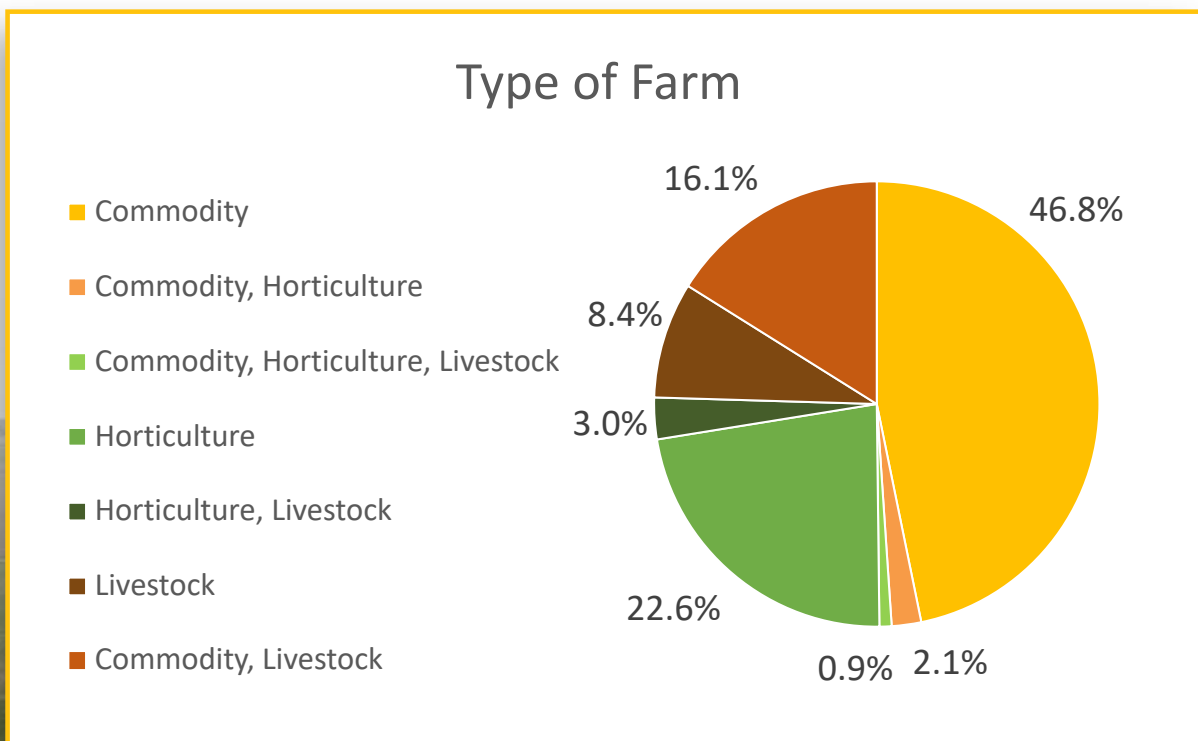
RESPONDENTS CONT'D

CROPS PRODUCED

A significant majority of the respondents in the survey produced commodity crops (described in the survey as “corn, soybean, wheat, cotton, sorghum, etc.”). Of the 795 respondents who provided an answer to the question—key to being allowed to proceed with the rest of the survey—372 (47%) identified themselves as commodity crop growers, 128 (16%) reported producing commodity crops and livestock, 17 (2%) said they grew commodity and horticulture crops, and 7 (0.8%) listed commodity crops, horticulture crops, and livestock.

“Horticulture crops or vegetables” was selected solely by 180 (23%) of the respondents, while 24 (3%) selected both horticulture crops and livestock.

Sixty-seven respondents (8%) reported that they were specifically livestock producers.

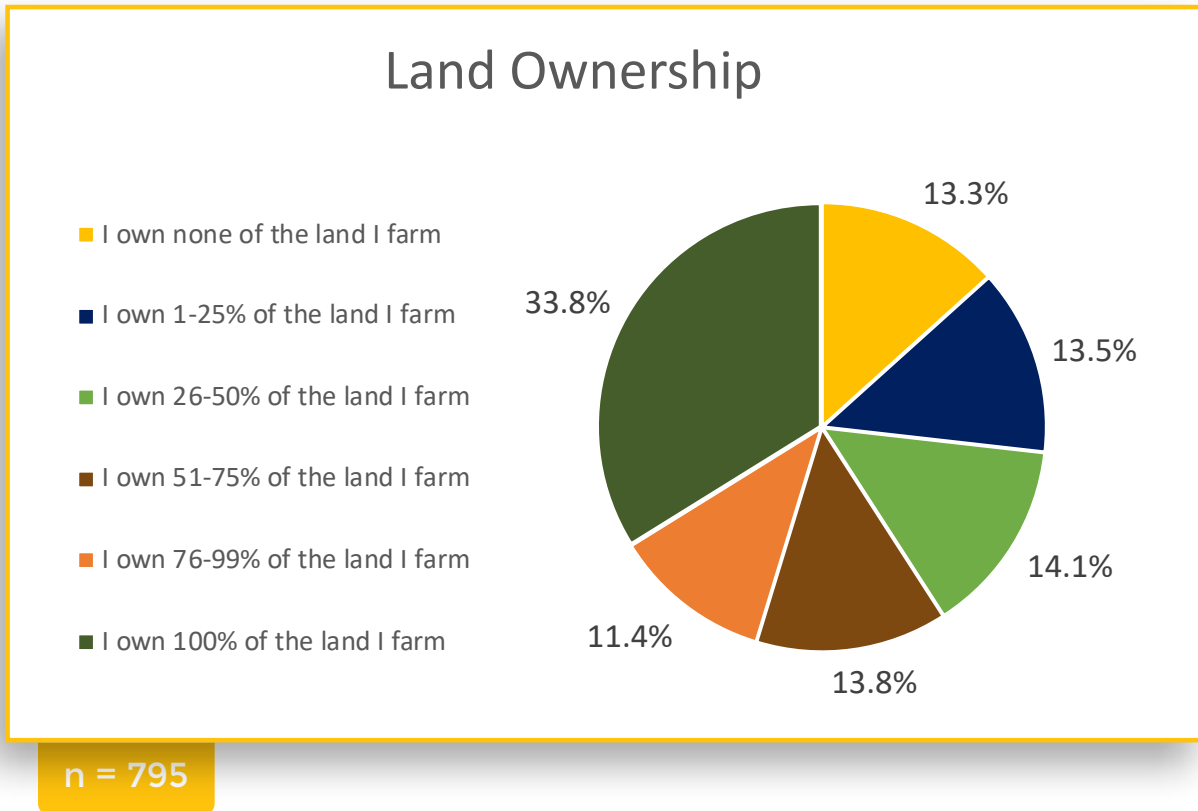


n = 795

RESPONDENTS CONT'D

LAND OWNERSHIP

About one-third (269 farmers, or 34%) of the total respondent pool owned 100% of the land they farmed, while 106 (13%) owned none of their farmland. Ownership stakes of 51% to 75% (110 respondents, 14%), 26% to 50% (112 farmers, 14%) and 1% to 25% (107, 14%) were equal, and the smallest category by a small margin (91 farmers, 11%) owned 76 to 99% of their farm ground.



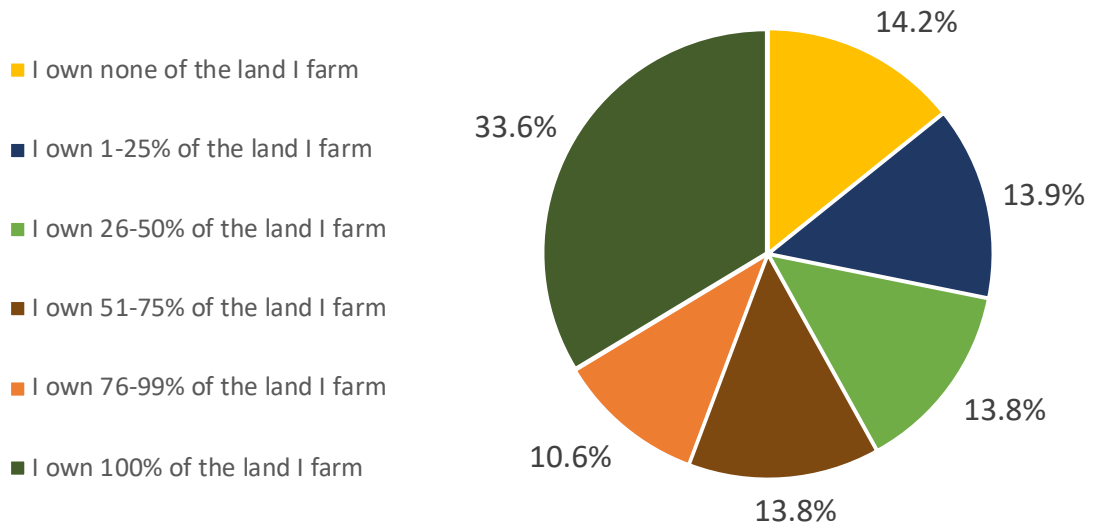
The similarity in land ownership between cover crop users and non-users is of particular note—100% land ownership is almost identical between the two groups, with 34% of cover crop users and 35% of non-users reporting that they own all their farmland.

Just as interesting, slightly more cover crop users (14%) than non-users (10%) reported owning none of their cropland. That could allay widely held concerns that land ownership is an important predictor of cover crop use, or the corollary that non-ownership reduces interest in or opportunity to adopt cover crops.

34% OF COVER CROP USERS AND **35%** OF NON-USERS REPORTED THAT THEY OWN ALL THEIR FARMLAND; **14%** OF COVER CROP USERS AND **10%** OF NON-USERS OWN NONE

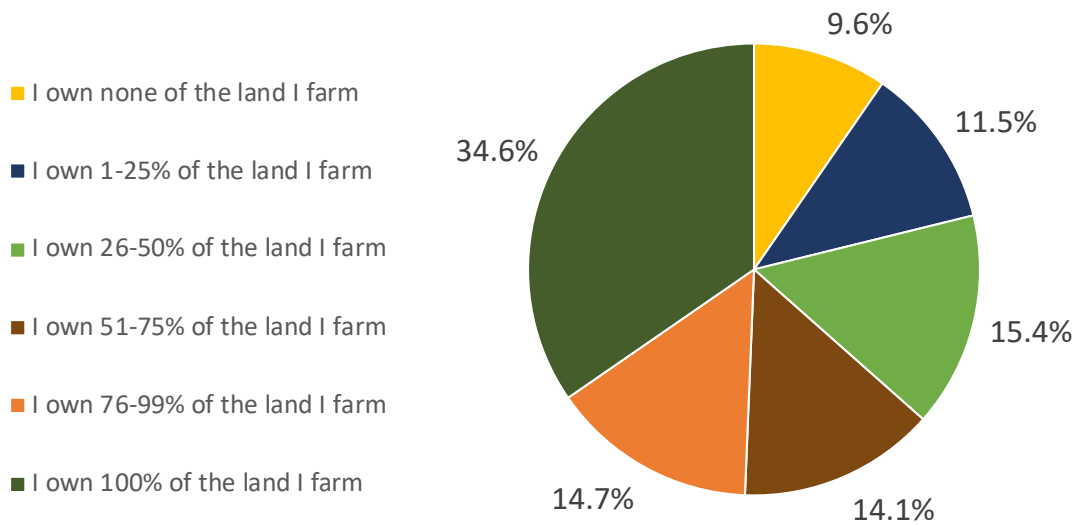
LAND OWNERSHIP

Land Ownership of Cover Crop Users



n = 639

Land Ownership of Cover Crop Non-Users

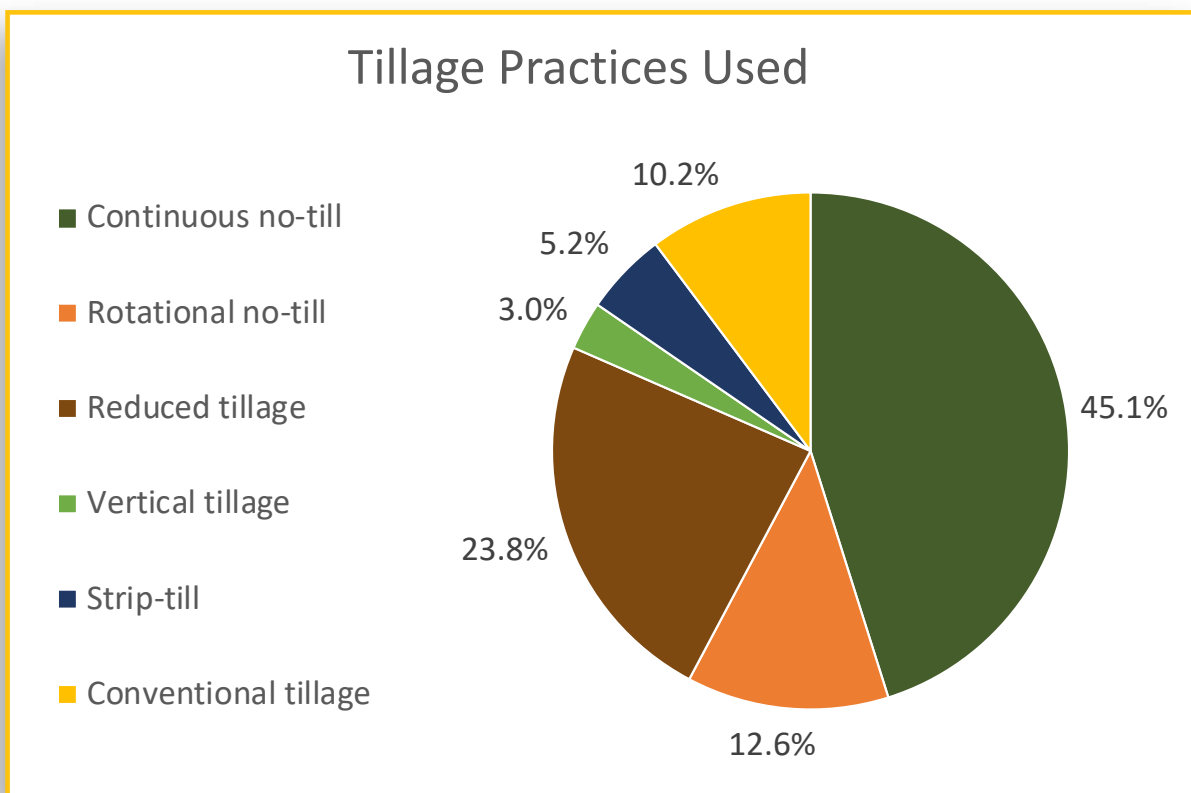


n = 156

TILLAGE PRACTICES

Cover crops are just one of many effective conservation practices, and it is enlightening to explore the connections among those management techniques.

The 2022-2023 National Cover Crop Survey respondent pool has a strong bent toward conservation tillage practices, with 357 of the 791 farmers (45%) reporting that continuous no-till was the most-used practice on their farm; 100 (13%) practicing rotational no-till, in which some crops are no-tilled and others are managed with some sort of tillage; and 188 (24%) engaging in reduced tillage.



n = 791

Cover crop users tended to be more likely to practice continuous no-till (49%) than non-user no-tillers (30%). Rotational no-till adoption was much more equal between the user and non-user groups, with 12% of the cover crop users and 14% of the non-users rotating between no-till and some form of soil disturbance. So are strip-till (5% of both users and non-users) and vertical tillage (3% of users and 4% of non-users). Reduced tillage absorbed the non-users of cover crops who did not practice no-till in some fashion—30% of the non-users reported using reduced tillage, while 22% of cover crop users practiced reduced tillage.

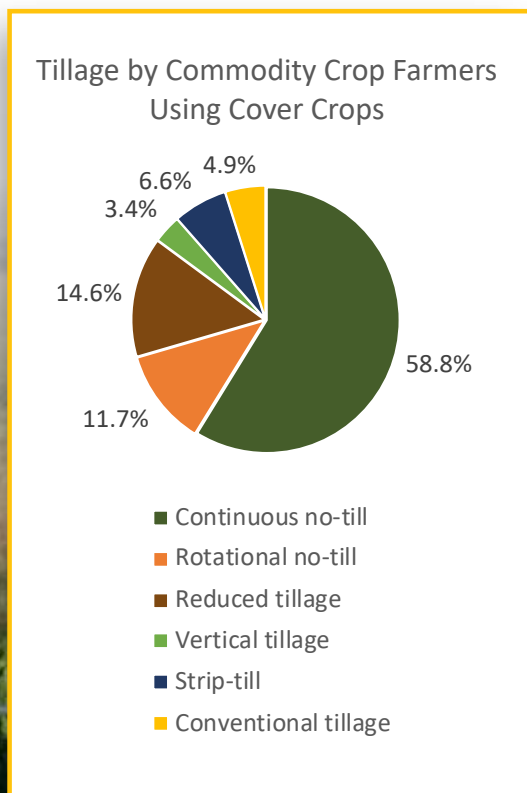


TILLAGE PRACTICES

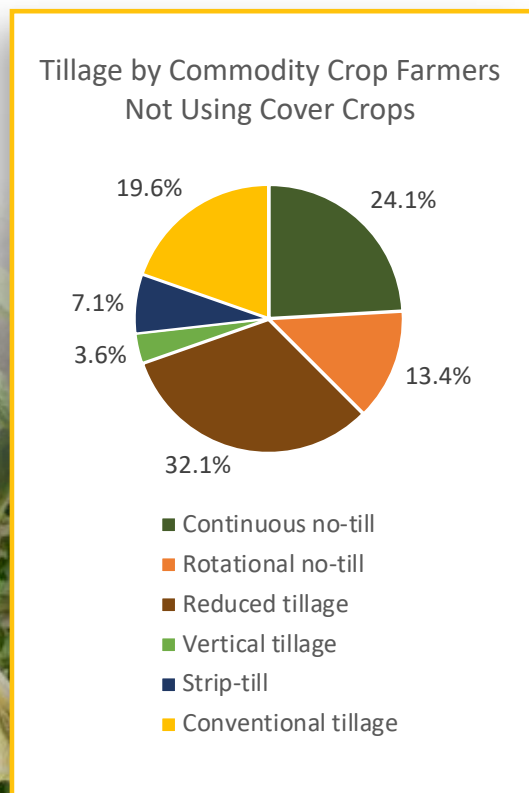
A stronger correlation between cover crop use and conservation tillage practices became apparent when the data were calculated for commodity crop growers. Among the cover crop users who identified themselves as commodity crop producers, 241 of 410 (59%) practiced continuous no-till and 48 (12%) reported rotational no-till, and just 5% (20 commodity grower/cover crop users) practiced conventional tillage.

Commodity producers who did not use cover crops were significantly less likely to practice no-till—of 112 farmers in the category, 27 (14%) practiced continuous no-till and 15 (13%) used rotational no-till. These figures are higher than the national average—the 2017 U.S. Census of Agriculture tallied 13.6% of American farms as practicing some form of no-till.

Reduced tillage was the most-reported practice among commodity-producing non-users with 36 responses (32%), followed by 22 farmers (22%) who reported practicing conventional, full-width tillage. Strip till and vertical tillage represented 7% and 4%, respectively, among the non-user commodity growers.



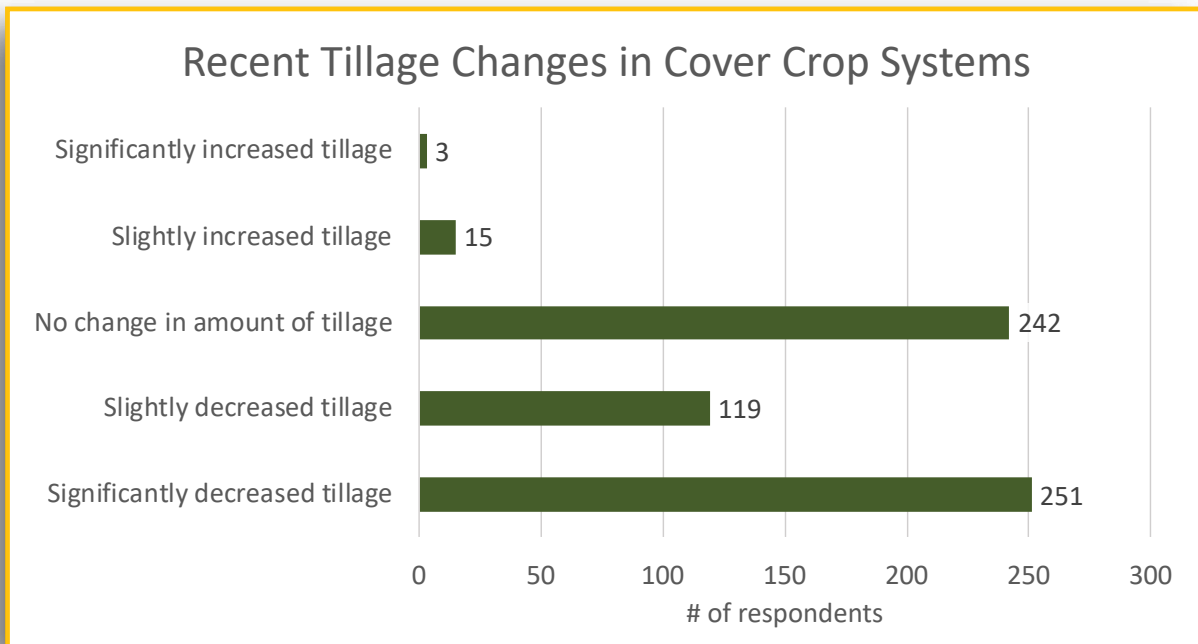
n = 410



n = 112

CHANGES IN TILLAGE PRACTICES

Cover crop users were asked whether the tillage practices they used in conjunction with cover crops had changed in recent years. Of the 630 cover crop users who answered the question, 251 (40%) reported significantly decreasing tillage and 119 (19%) said they slightly decreased tillage in conjunction with their cover crops. Only 3 (0.5%) significantly increased tillage in conjunction with cover crops, and 15 (2.4%) slightly increased; 242 (38%) reported no change in the amount of tillage they conducted in conjunction with cover crops.



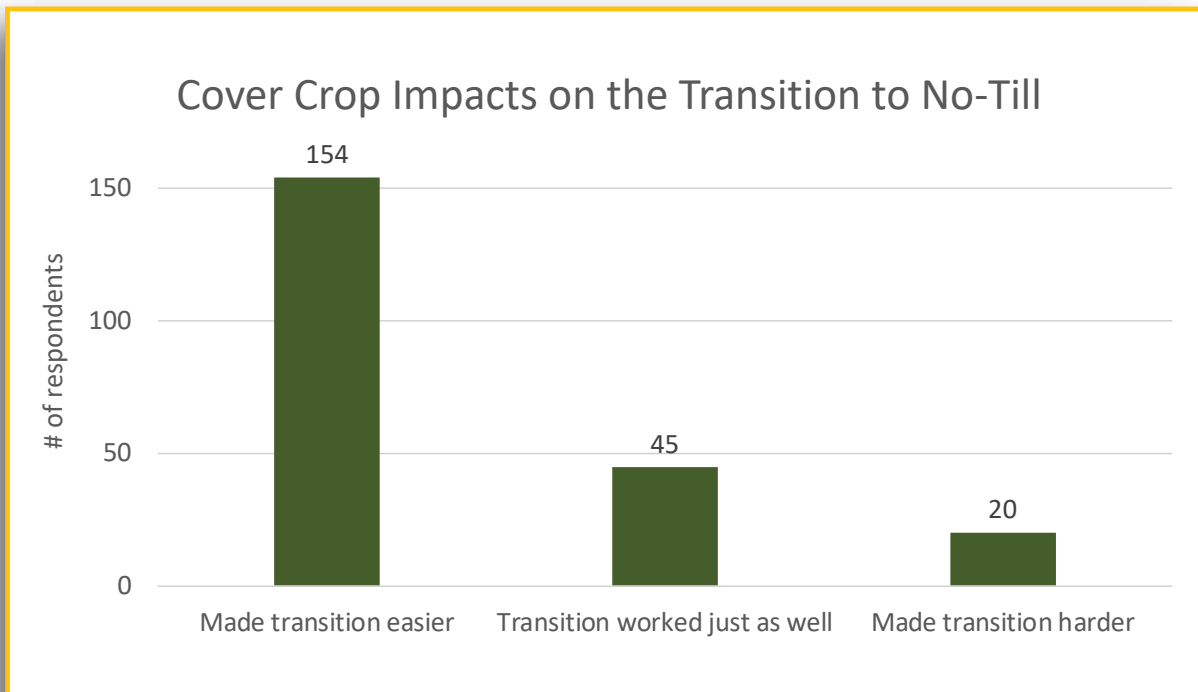
n = 630

The survey dove deeper into the connections between cover crop use and no-till, exploring common anecdotal reports that many no-tillers use cover crops to mitigate yield dips associated with the early years of no-till. In all, 261 of 633 cover crop users (41%) reported using cover crops to transition to no-till.

Among those who reported that they used cover crops to adopt no-till, 154 of 255 respondents (60%) said cover crops made the transition easier, 45 (18%) reported that the transition to no-till worked just as well with or without cover-crops, 20 (8%) felt transitioning to no-till was harder when also using cover crops, and 36 (14%) selected, “this situation is not applicable to me.”



CHANGES IN TILLAGE PRACTICES



n = 255

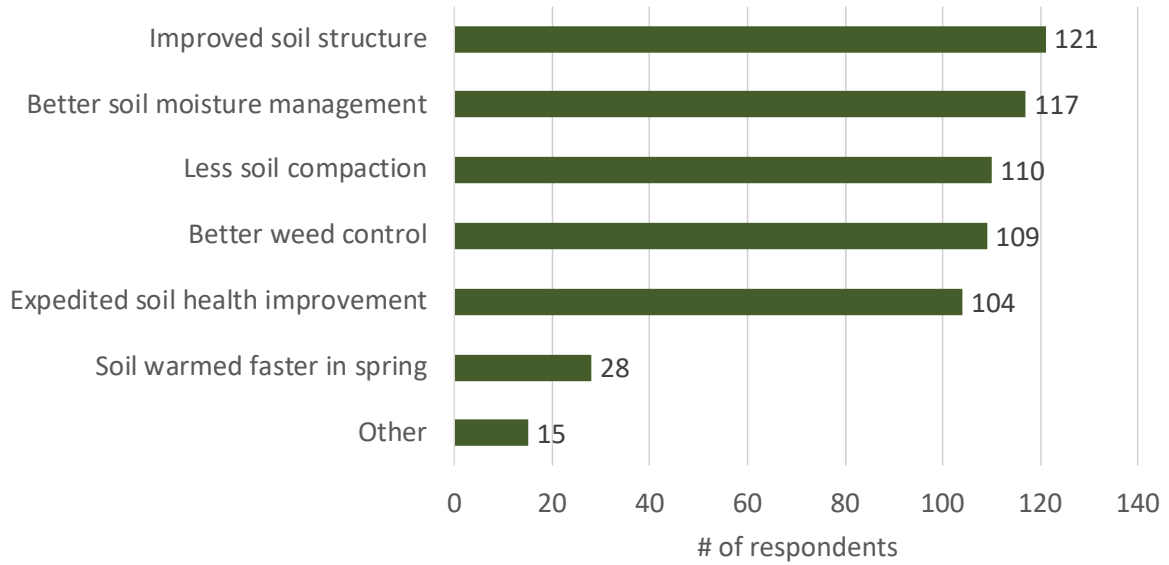
The survey followed up with a “how” question—“How did cover crops make it easier to transition to no-till?” Respondents could choose more than one response. The top response, with 121 of 255 cover crop users who said cover crops helped them transition to no-till (47%), was that cover crops improved soil structure. Nearly as many (117, or 46%) said cover crops eased the transition to no-till by providing better soil moisture management. Close behind, with 110 responses (43%) was “less soil compaction,” followed by “better weed control,” with 109 (43%) and expedited soil health improvement.

Lagging a substantial distance behind was “soil warmed faster in the spring,” with 28 responses (11%).

The “other” write-in option was selected by 15 respondents (6%). Several pointed to cover crops’ increases in factors that boosted no-till success, including more soil biology, more nitrogen and carbon retained in the soil, and improved wildlife. Others pointed out what cover crops decreased to make no-till better, including less soil erosion, less excessive soil moisture and runoff, less work, and fewer rocks to pick. One farmer reported transitioning away from fertilizer, while another pointed out that cover crops created a great seedbed for winter squash. Finally, a grower pointed out that cover crop roots helped prevent sidewall smearing in wet conditions.

CHANGES IN TILLAGE PRACTICES

Cover Crop Benefits in No-Till Transition



n = 255

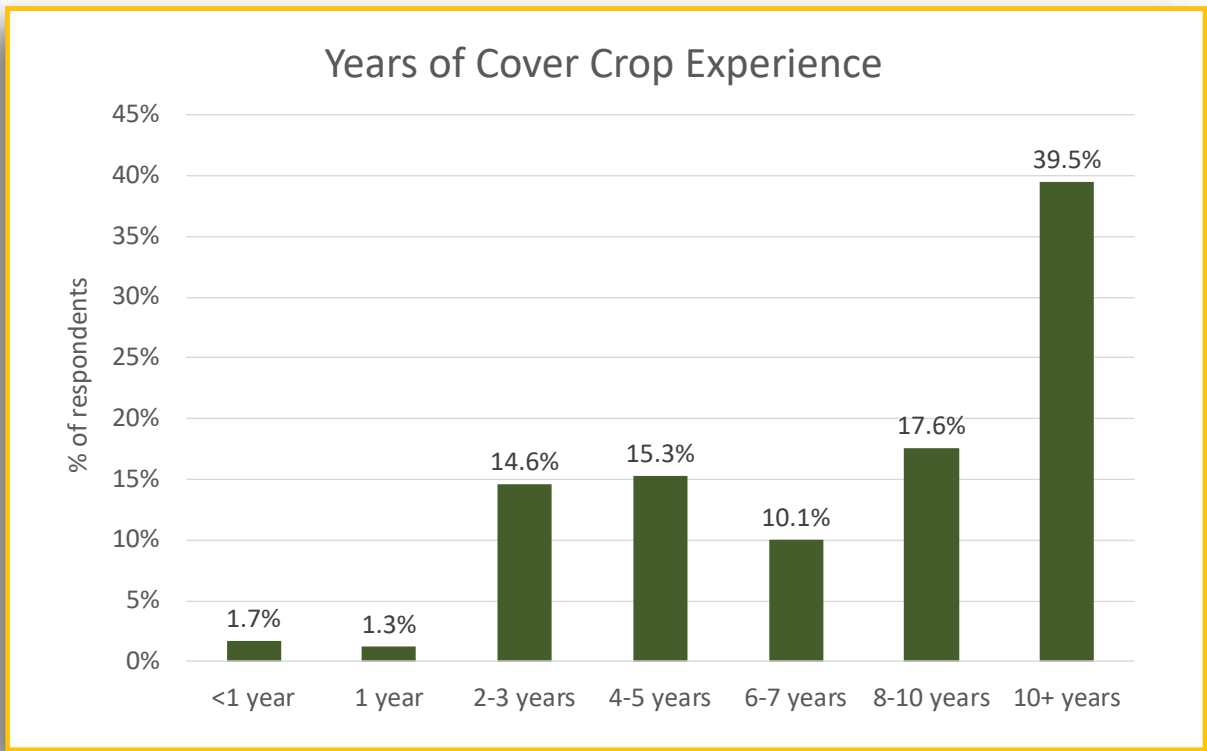




COVER CROP USERS

Cover crop users who participated in the 2022-2023 survey tended to be quite experienced with cover crops. In fact, the largest single category of users (251 of 636, or 40%) reported more than 10 years of experience with cover crops, and the next-largest group had 8 to 10 years of experience (112 farmers, or 18%). The organizers of the survey were excited to know that so many of the respondents were providing perspective grown from years of experience and a range of cropping conditions.

Just 19 respondents (3%) reported having 1 year or less of cover cropping experience. The balance of the farmers reported 2 to 3 years (93 farmers/15%), 4 to 5 years (97 people/15%) or 6 to 7 years (64 respondents/10%) of experience with cover crops.

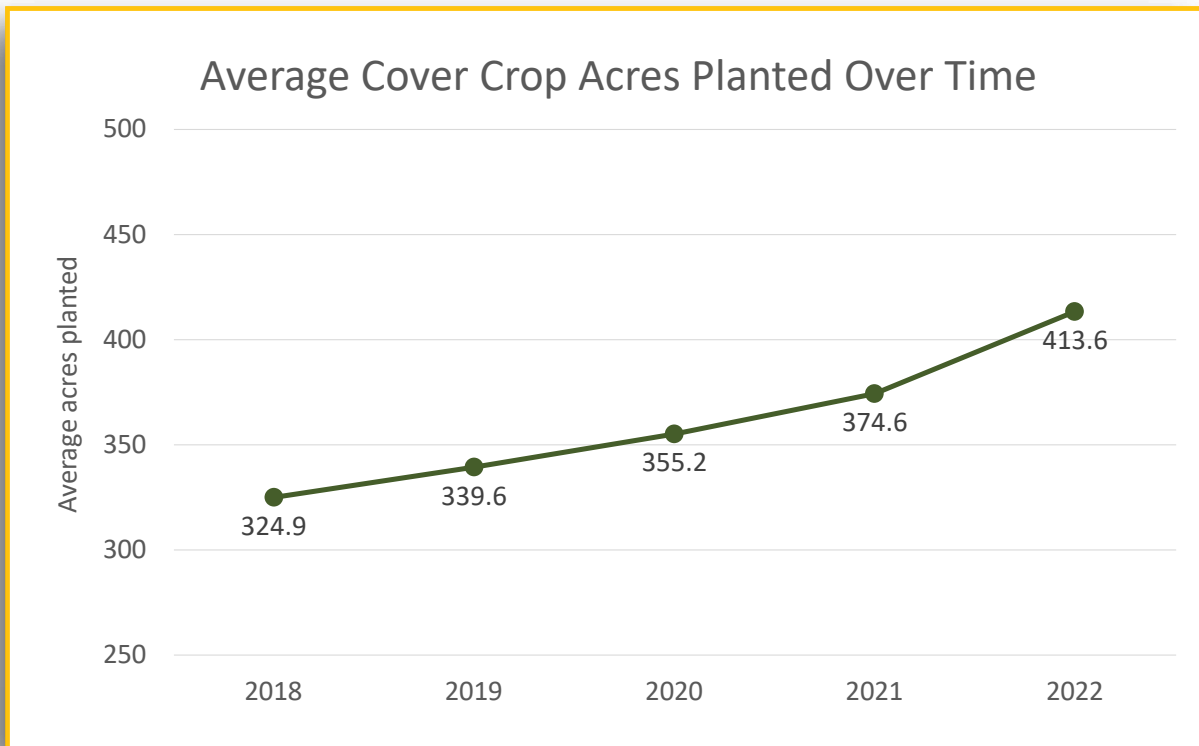


n = 636

COVER CROP USERS CONT'D

The mean number of acres of cover crops planted by this year's survey respondents who used cover crops reached 413.6 after a steady climb since an average of 324.9 acres in 2018.

The increasing trend in acreage is consistent with results from previous National Cover Crop Surveys. However, the acreage figures this year were below the planted acres reported in the 2019-2020 survey, which left off with a reported average of 422 acres per respondent in 2018 and 465 acres in 2019. It is likely that a higher number of horticulture crop farms in the current survey—which tend to be smaller than commodity crop farms—pulled the acreage figure down compared to prior surveys.



2018: n = 480 | 2019: n = 517 | 2020: n = 560 | 2021: n = 585 | 2022: n = 610
Anticipated 2023: n = 599



COVER CROP GOALS

Before delving into the impacts of cover crops—on yields, inputs, and farmers' bottom line—it is helpful to establish some context by considering the goals producers hope to achieve with their cover crops.

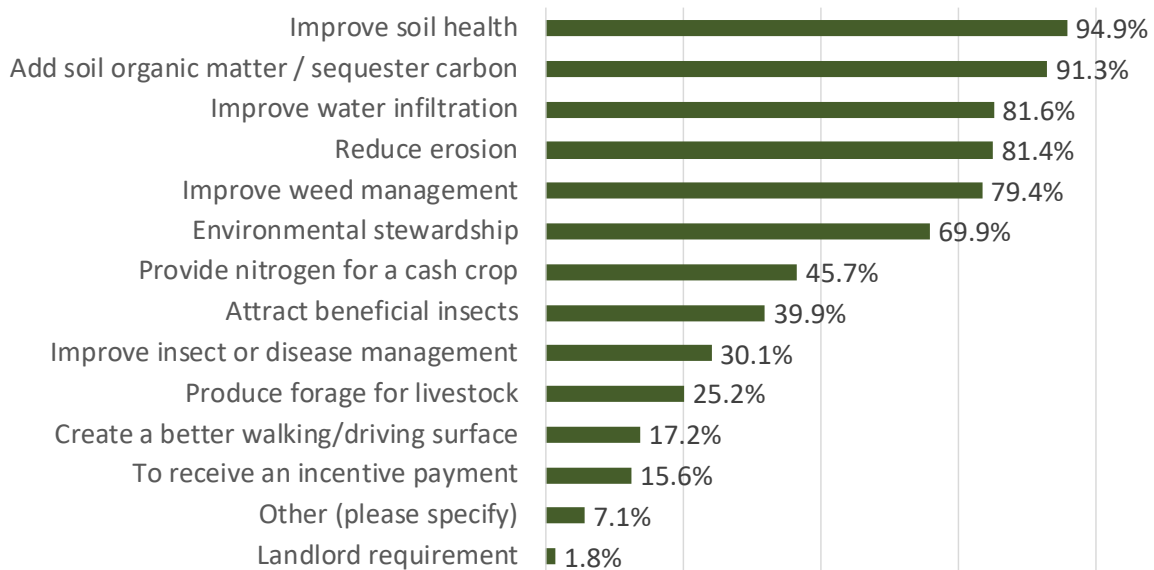
Soil is a key focus for nearly all of the cover crop users who participated in the survey: 95% selected "soil health" and 91% chose "add soil organic matter/sequester carbon" when asked to identify their cover cropping goals.

Improving water infiltration was an objective for 82%, followed closely by reducing erosion (81%) and improving weed management (79%). At 70%, environmental stewardship was the last of the goals chosen by a majority of respondents. More specific benefits, such as providing nitrogen for a cash crop (46%), attracting beneficial insects (40%), or improving insect or disease management (30%) were selected by significantly fewer respondents.

The number of cover crop users who selected "produce forage for livestock" (25%) is very close to the number who reported grazing or harvesting cover crops for livestock (24%) earlier in the survey.

At the bottom of the list, 1.8% reported that their landlord required them to plant cover crops.

What are your primary goals for using cover crops?



n = 564

COVER CROP GOALS

Forty respondents provided additional insight by selecting “other.” Soil health was a leading theme, with several write-in answers emphasizing microbial life in the soil and a few naming a reduction in soil compaction. Nutrient cycling or retention was mentioned by 3 growers, moisture management—trapping or utilizing water—by 3; erosion control came up twice. Wildlife was cited by 4, and diversity appeared in several answers. Two respondents pointed to cover crops’ benefits to bees.

Aesthetics were noted by a couple of growers, and two summed up their goals as, “right thing to do.”



Growers in the survey indicated that cover crops are helping them achieve most of those goals. For each goal they chose, respondents were asked to indicate their level of agreement with a statement that they have seen improvements in the goal area.

Among 531 respondents that marked improved soil health as a goal, 93% strongly agreed (60%) or somewhat agreed (33%) that they had seen improvements toward that goal; 5.5% chose the neutral option and just 1.5% disagreed to some degree. As far as adding soil organic matter or sequestering carbon, 50% of the 513 respondents strongly agreed and 37% somewhat agreed, for a total favorable response of 87%. Eleven percent chose the neutral answer and 1.8% disagreed.

Both producing forage for livestock (139 respondents) and creating a better walking/driving surface (97 respondents) scored equally well, with 71% strongly agreeing that they’d seen improvements and 27% somewhat agreeing. Environmental stewardship (390 respondents) earned 70% strong agreement and 24% modest agreement, while reducing erosion (458) was just a heartbeat behind with 69% strong agreement and 25% “somewhat agree.”

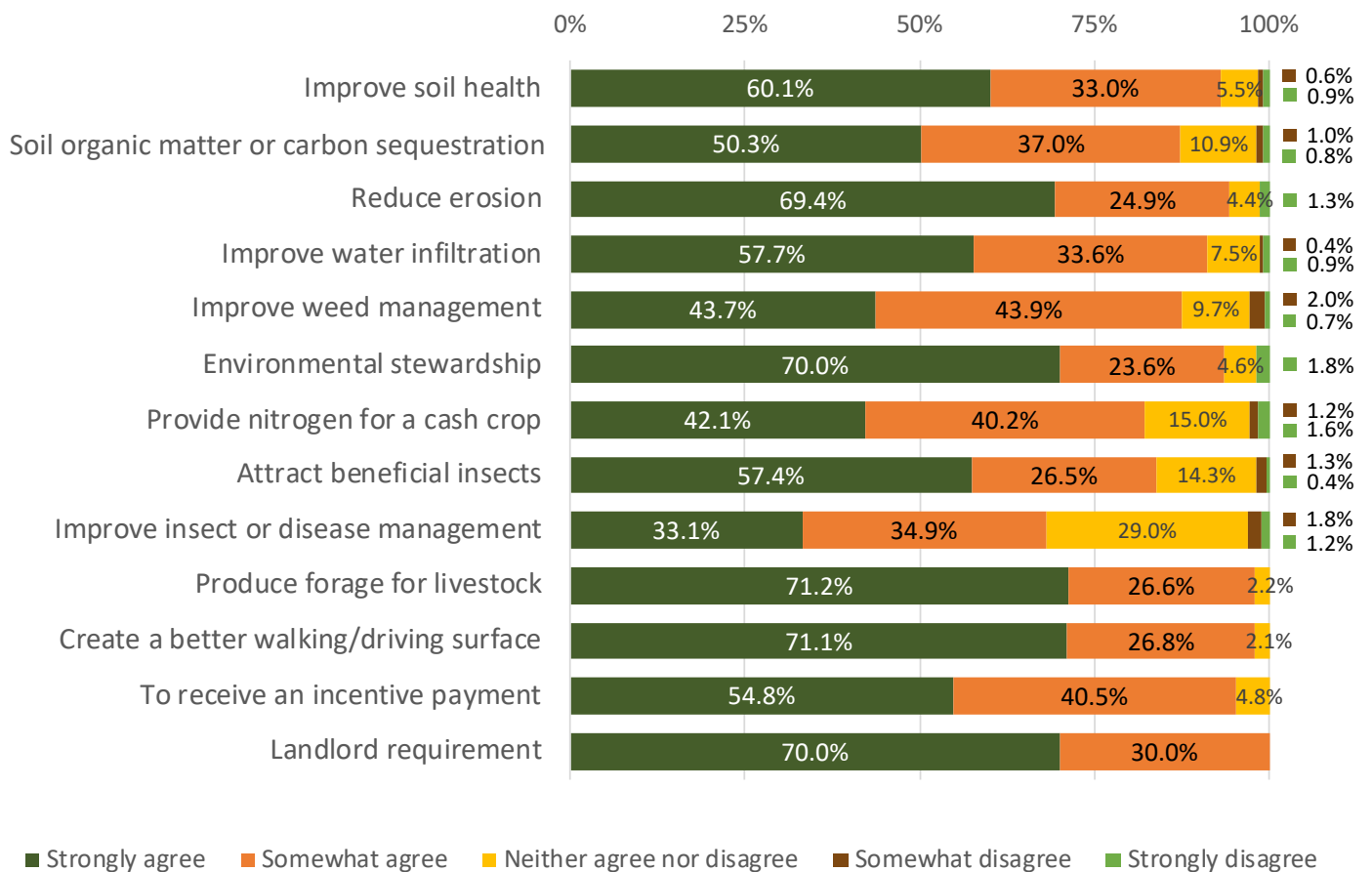


COVER CROP GOALS

Improving weed management (442 responses) attained an overall positive score of 88%, the positive answers were equally split between strong and moderate agreement. Improving insect or disease management scored lower overall among its 169 respondents, with 33% strong agreement and 35% moderate agreement for a total of 68% positive. While only 3% disagreed on insect or disease management—the highest level of disagreement among all the goals—29% chose the neutral option.

Details for all answers appear below.

Farmer Agreement that Goal Progress Has Been Observed

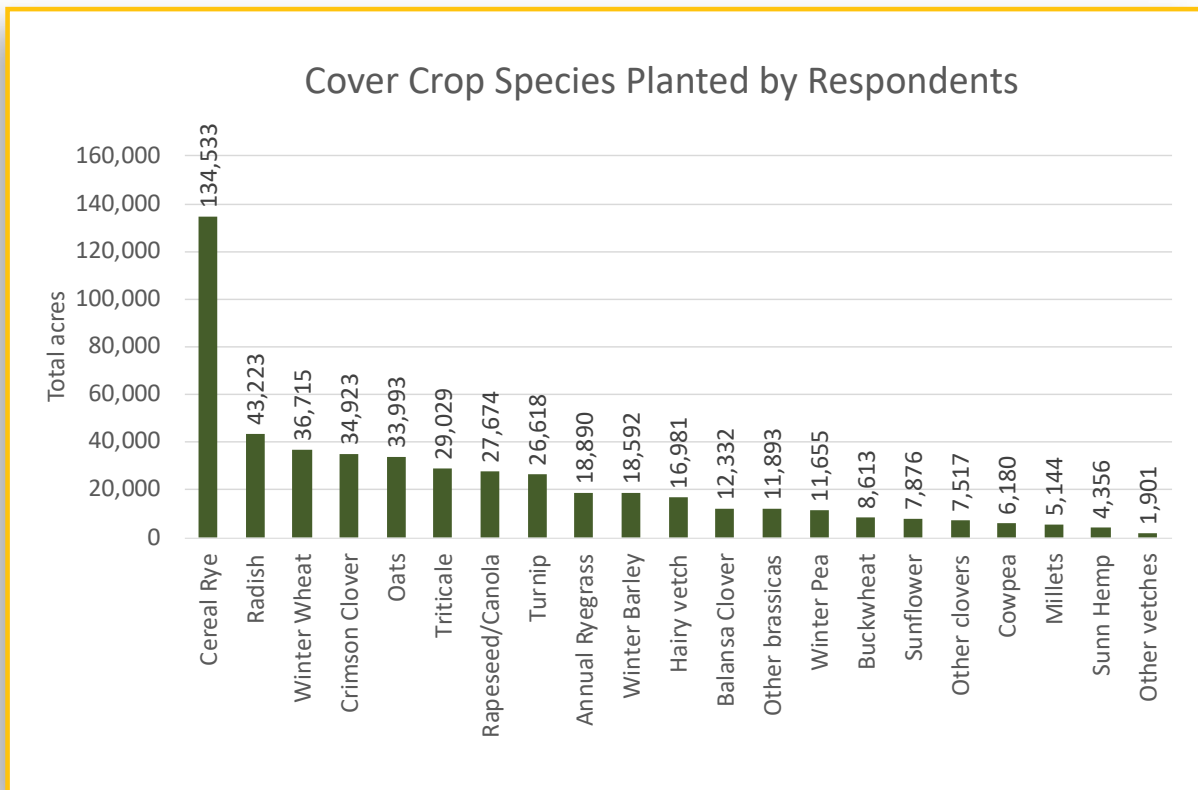


COVER CROP SPECIES

Cover crop users achieve their goals through a wide range of approaches. Mixes of species represent a level of engagement, sophistication, and possibility for many cover crop users. Blending grasses, legumes, and/or brassicas allows farmers to achieve a variety of benefits from their cover crops and hedge their bets on establishing a stand. Cover crop users were asked if they planted a mix of species, and if they did, they were asked a couple of follow-up questions.

Cereal rye was, by far, the most commonly planted cover crop species. From 575 respondents asked to provide their planted acreage for a list of cover crop species, cereal rye covered 134,533 acres. The next most popular species was radish, with 43,223 acres, followed closely by wheat (36,715 acres), clover (34,923), and oats (33,993).

Triticale (29,029 acres), rapeseed or canola (27,674), and turnip (26,618) formed the next tightly packed group, followed by another cluster comprising annual ryegrass (18,890), winter barley (18,592), and hairy vetch (16,981). The rest of the species—all of them broadleaves except millets (5,144 acres)—represented fewer than 13,000 acres apiece.

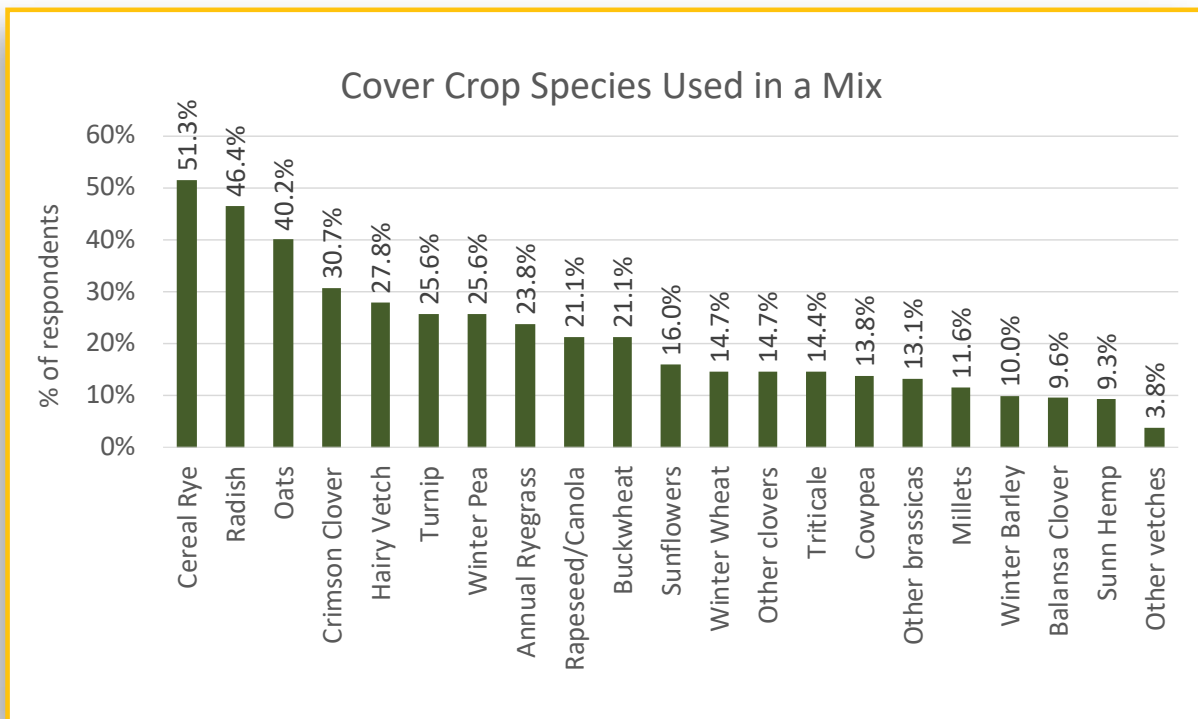


In cover crop species mixes, cereal rye remained the dominant choice, with 51% of 450 farmers reporting that they used the popular grass in cover crop blends. Radish was also extremely popular in mixes, with 46% of blend users reporting it in their combinations. Oats was the third clear favorite, appearing in mixes used by 40% of the respondents.

COVER CROP SPECIES

The next level of popularity in cover crop mixes was led by crimson clover (31%). Hairy vetch, though listed toward the end of the overall acreage list in the previously discussed question, was a popular choice in blends with 28% of the respondents including it. Turnip (26%), winter pea (26%), and annual ryegrass (24%) made up the next cluster, followed closely by rapeseed/canola and buckwheat at 21% each. At 16% or below, sunflowers, winter wheat, other clovers, triticale, cowpea, and a combination of grasses, brassicas, and legumes hint at a wide range of goals farmers sought to achieve through cover crop mixes.

Compared to the 2019-2020 species list—compiled from responses from a different pool of farmers—oats and radish maintained their popularity, while winter wheat and crimson clover bumped oats down two notches and triticale made a big jump up the list.



n = 450

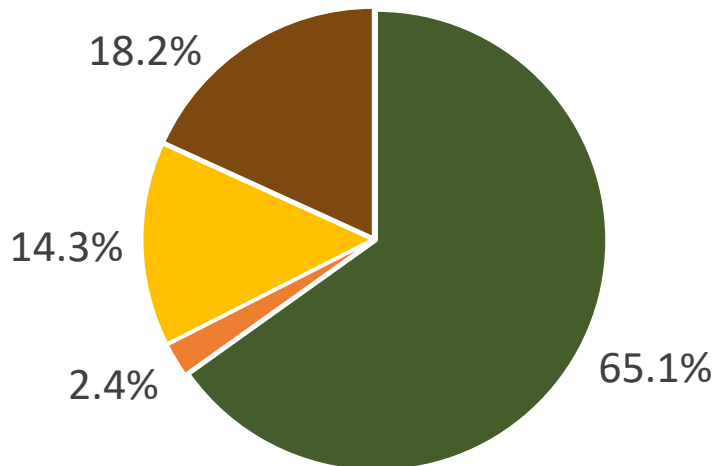
(Respondents could choose more than one option in the species list when describing their mixes, so the values add up to much more than 100%.)



COVER CROP MIXES

Cover crop users who plant species mixes appear to be committed to the practice. Among the 588 cover crop users who answered a question about planting mixes of cover crop species in the 2022 or 2023 cropping seasons, 383 (65%) said they planted mixes in 2022 and planned to do so again in 2023. Eighty-four (14%) said they had not used cover crop mixes in 2022 but planned to do so in 2023, and just 14 (2.4%) reported that they planted mixes in 2022 but would not plant them in 2023. Eighteen percent (107 cover crop users) said they did not use cover crop mixes.

Use of Cover Crop Mixes



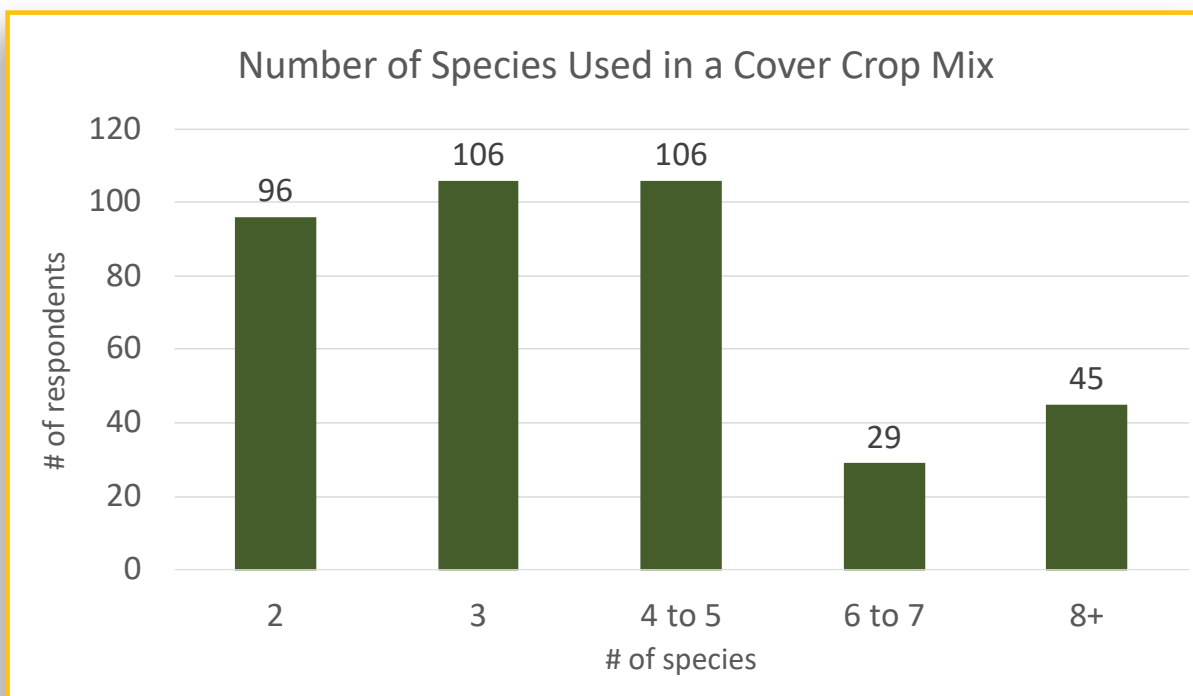
- Planted mixes in 2022 and plan to again in 2023
- Planted mixes in 2022 but do not plan to in 2023
- Did not plant mixes in 2022 but plan to in 2023
- Have not used cover crop mixes

n = 588

COVER CROP USERS CONT'D

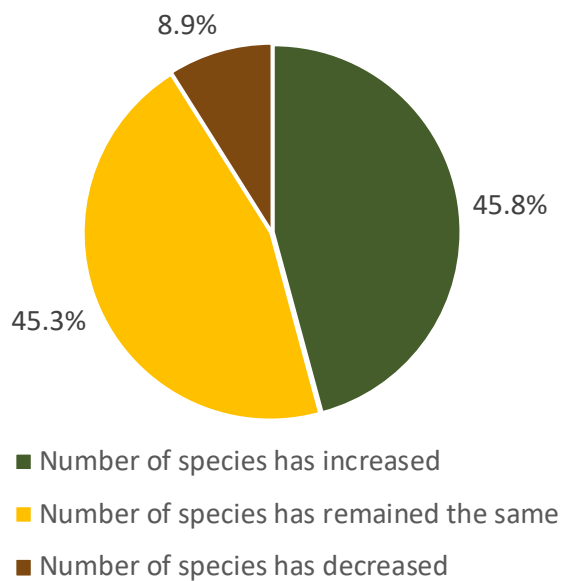
COVER CROP MIXES

Most mixes contained 3 to 5 species—of 382 users of cover crop mixes, 106 (28%) said they blended 3 species, and an equal number of farmers said they mixed 4 to 5 species. The next most-popular approach was a mix of 2 species, practiced by 96 of the respondents (25%). More complex mixes were more scarce—29 (7.6%) reported blending 6 to 7 species, while 45 (12%) said they mixed 8 or more species of cover crops.



n = 382

Change in Cover Crop Mix Diversity Over Time



n = 380

Asked about changes in the number of species they blended, 174 growers, or 46% of the users of mixes reported that over time, the number of species in their mixes has increased, while an almost equal number (172 growers, or 45%) said the number of species in their mix has remained the same. Only 34 growers, or 9% of the 380 mix users who answered the question, said the number of species in their mixes has decreased.

SOURCES OF INFORMATION

Information is key to cover crop adoption and success, and the National Cover Crop Survey seeks insight into the kinds of information, and information channels, that farmers consult in order to better understand and manage cover crops.

Cover crop users are clearly a hands-on group. Of 585 cover crop users asked to check all the sources of information of cover crops they typically use, more than three out of four (455, or 78%) selected, “My own experience or trial and error.” “Other farmer” reaped the second-highest number of selections, with 258 (44%).

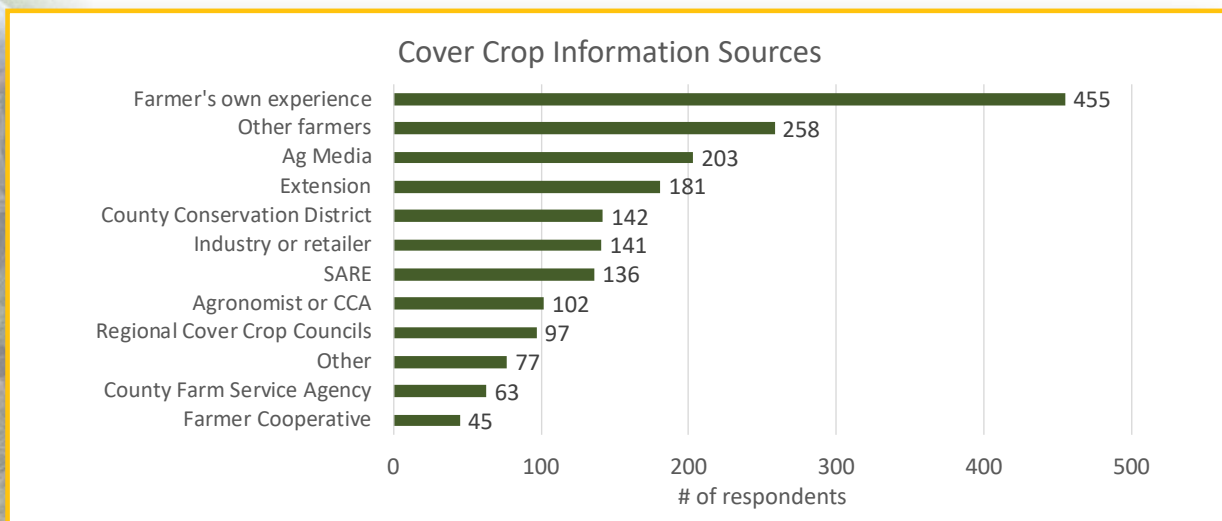
Ag media—magazines, radio, TV, social media, podcasts, etc.—was selected by 203 (35%), while Extension garnered 181 (31%). The county Soil and Water Conservation District received 142 (24%), nearly tied with industry or retailer sources at 141 (24%) and close to USDA Sustainable Agriculture Research and Education (SARE) with 136 (23%).

Certified Crop Advisers or agronomists were selected as key information sources on cover crops by 102 users (17%), with regional Cover Crop Councils not far behind at 97 (17%), county office of the USDA Farm Service Agency (63, or 11%), and farmer co-operative at 45 (7.7%).

Seventy-seven respondents chose “other” and typed in responses. Some of those echoed choices that were offered on-screen (for instance, specifying local soil and water conservation district or university research, or naming farmers they trust for insight), but it was enlightening to see certain sources highlighted more than once—for instance, Practical Farmers of Iowa was named 12 times, and the National No-Till Conference were called out by 3 respondents among 8 mentions of conferences.

Books were cited by 6 respondents, while 8 cited YouTube.

While scientific research was sought by several respondents, one farmer wrote, “government and research info is extremely outdated,” and another said, “industry is far ahead of universities.” The most detailed answer—and perhaps the most telling—was one in which the farmer wrote: “Broad brush generalities are leading folks astray. This will be one of the limiting factors for cover crop adoption....Most just want recipes, and they don’t work in a living biological system.”



CASH CROPS & COVER CROPS

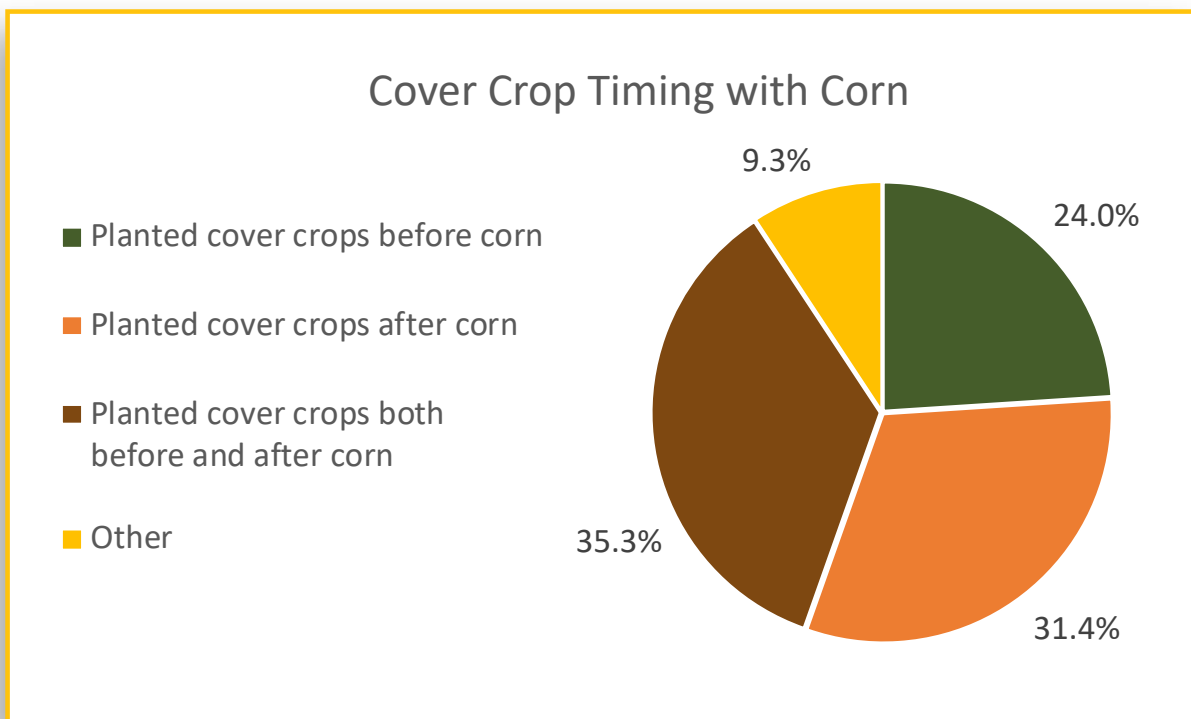
The 2022-2023 National Cover Crop Survey asked cover crop users to answer several questions about their cash crops and how cover crops integrated into their cash crop rotations. Respondents who reported growing particular cash crops were directed to questions specific to the crops they said they grew.

CORN AND COVERS

Of the cash crops highlighted in the 2022-2023 survey, corn was the most widely grown, with 388 cover crop users reporting that they produced corn.

More than one in three cover crop users who grow corn (137 of 388, or 35%) reported planting cover crops both before and after their corn crop. A similar number (122, or 31%) said they planted cover crops after corn, while a smaller group (93 users, or 24%) planted cover crops before corn.

Thirty-six respondents (9.3%) selected “other.” Half of them—18 farmers—noted in the write-in box that they interseeded or companion cropped covers with their corn. Several used the selection to point out that they do not plant cover crops before corn.

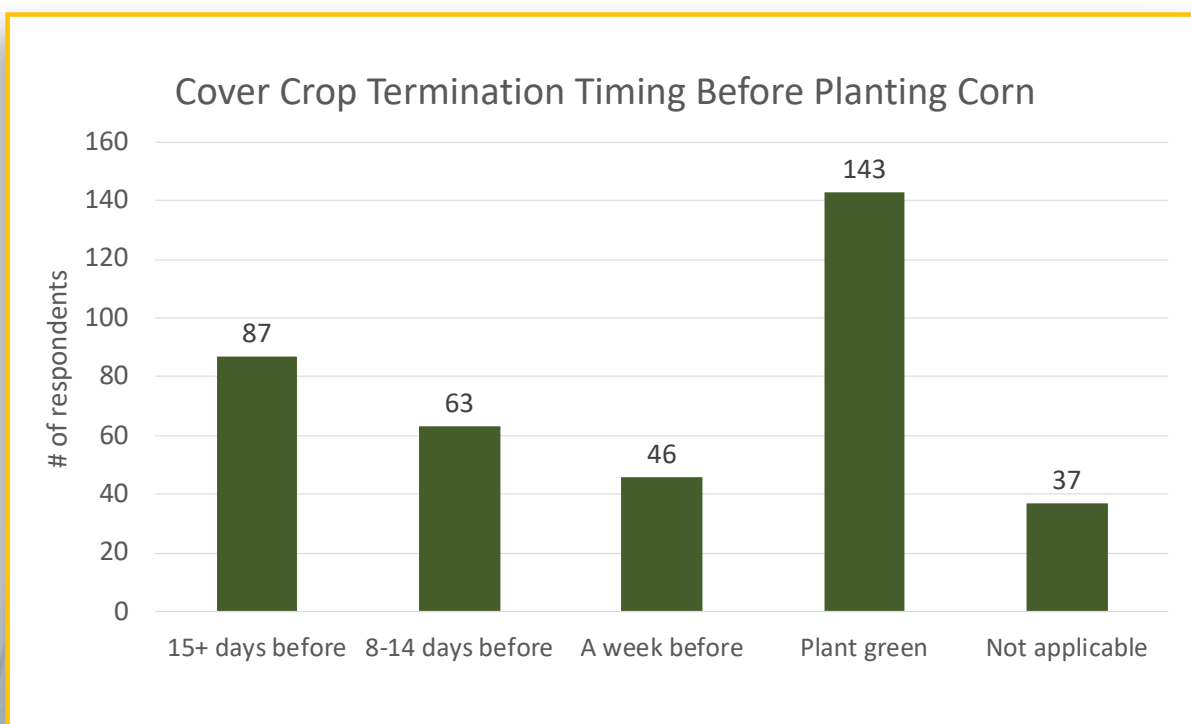


n = 388

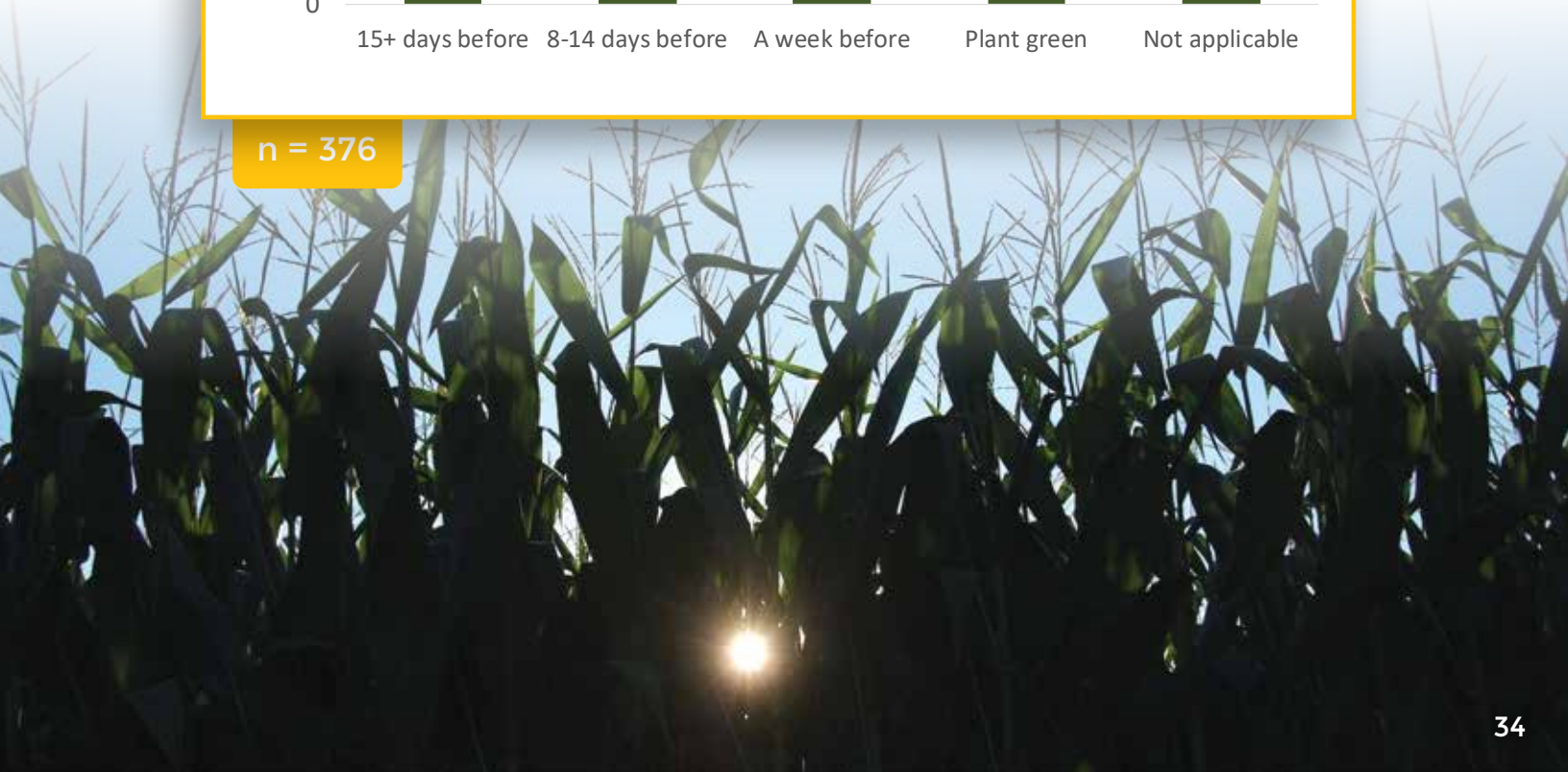
CORN AND COVERS

The timing of cover crop termination in relation to corn planting is of great interest in cover crop circles. In the 2022-2023 survey, 143 cover crop users who plant corn (38%) reported “planting green”—terminating the cover crop at planting or shortly after seeding their corn. (Planting green is also covered in greater detail later in this report.)

For those corn-growing users who did not plant green, terminating the cover crop 15 days or more before corn planting was the top choice (87 of the 376 respondents, or 23%), followed by an interval of 8 to 14 days before planting (63 farmers, or 17%). Forty-six (12%) terminated their cover crop the week before planting corn. Finally, 37 respondents to the question (10%) reported that they do not plant cover crops before corn.



n = 376

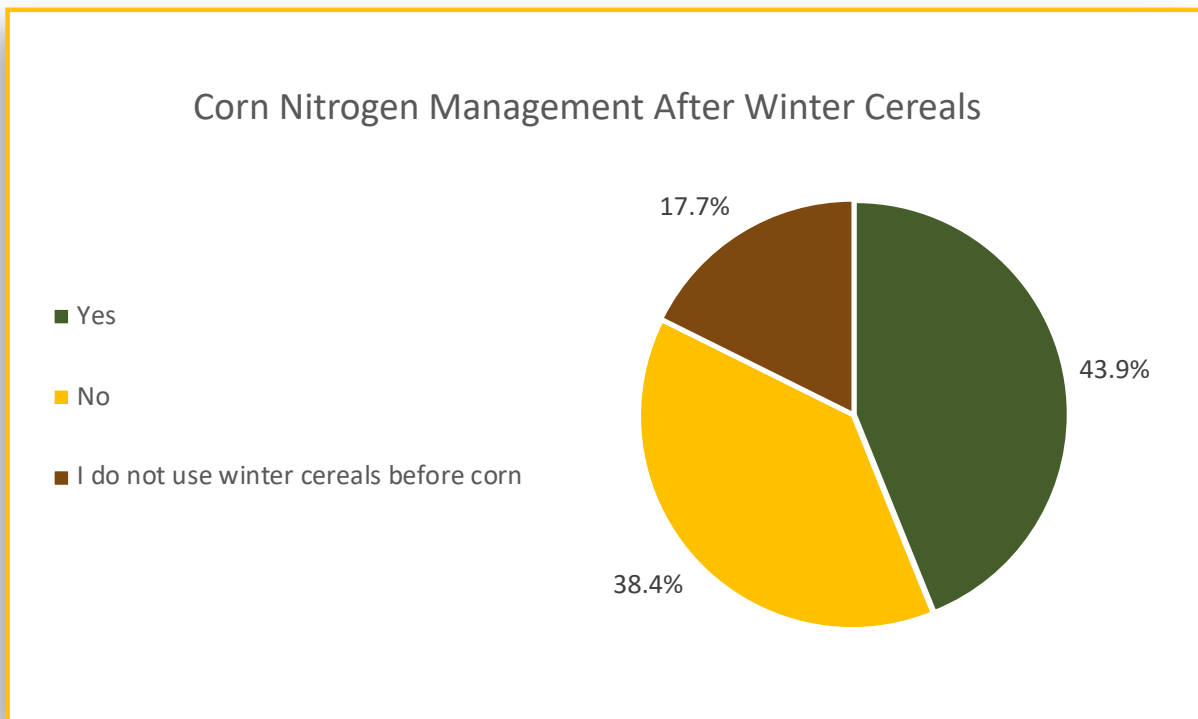


FERTILIZER IN CORN

This was the first year the survey explored the use of extra nitrogen in corn following winter cereal cover crops. Nutrient dynamics following cover crops can be complex. Legume cover crops provide their own boost of nitrogen by fixing atmospheric N in the soil, while the high carbon-to-nitrogen ratio of grass straw can tie up soil nitrogen early in the season, prompting reports of cover crop users boosting nitrogen levels with fertilizer applications while planting cash crops after winter cereal covers.

Of 385 respondents to the question, 169 (44%) said they did apply extra nitrogen around the time of corn planting when following winter cover crops, and 148 (38%) reported that they did not.

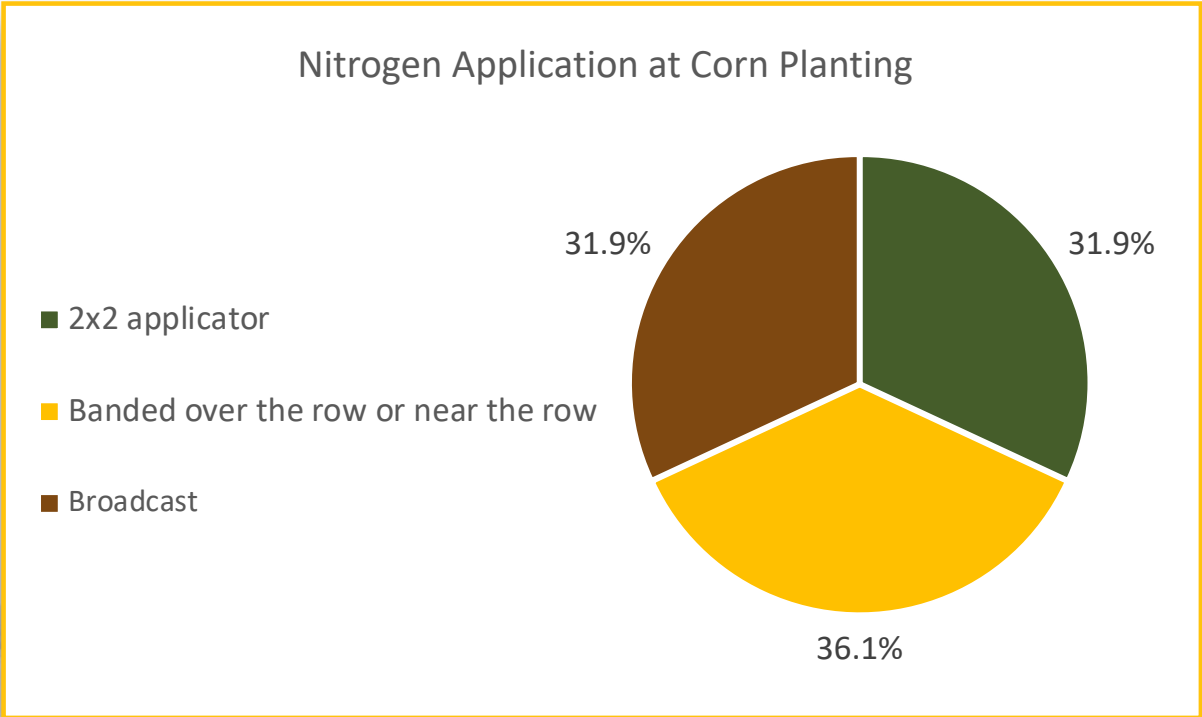
Sixty-eight respondents (18%) selected “I do not use winter cereals before corn,” an answer that encompasses farmers who plant non-grass cover crop species before corn and those that do not plant cover crops at all before corn.



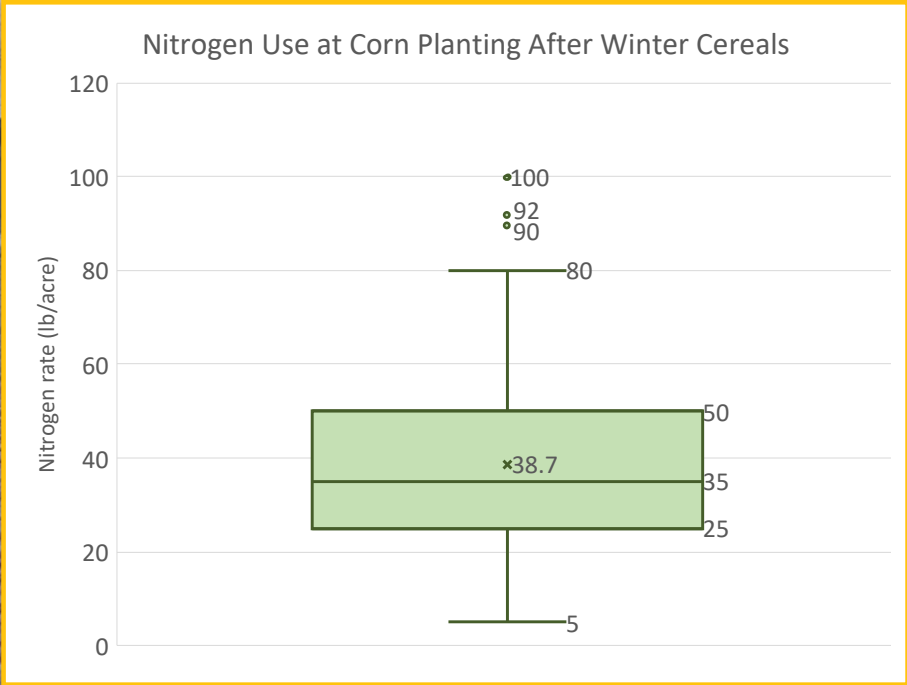
n = 385

Of 166 respondents who indicated their method of applying extra nitrogen around the time of corn planting after winter cereals, techniques were nearly evenly divided—53 farmers (32%) broadcast their nitrogen fertilizer, the same number (53/32%) applied their N 2 inches below and 2 inches to the side of the seed (2x2), and 60 (36%) banded over or near the row.

FERTILIZER IN CORN



n = 166



n = 166

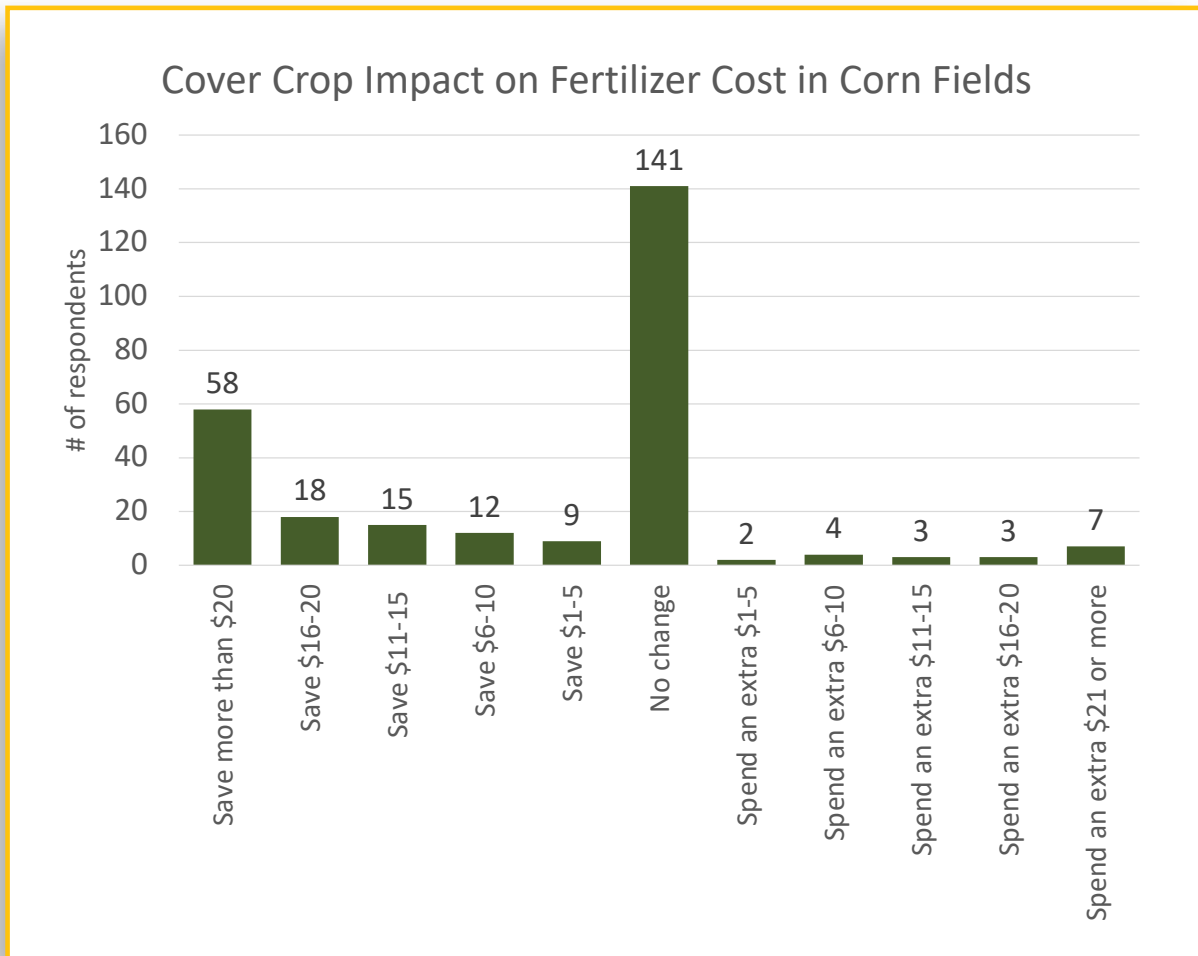
The reported rate of extra nitrogen applied to corn following a winter cereal cover crop varied dramatically, with farmers moving a slider bar in the online survey instrument to indicate rates that ranged from 5 pounds of nitrogen per acre to highs of 90, 92, and 100 pounds per acre. The vast majority of rates fell between 25 and 50 pounds of N per acre, with a mean of 38.7 pounds and median of 35 pounds.

FERTILIZER IN CORN

Healthier soils appear to be better able to store and release nutrients, particularly phosphorus and potassium, to growing crops. Even with an investment in additional nitrogen following winter cereal cover crops in corn, the vast majority of corn producers responding to the 2022-2023 survey reported no change or cost savings on fertilizer in corn following cover crops.

In fact, more than half (141 of 272 growers, or 52%) of the respondents reported no change in fertilizer costs when asked “In corn fields where cover crops have been used for at least 3 consecutive years, how has fertilizer cost been impacted (in \$/acre)?”

The next-largest group was 58 growers (21%), which reported saving more than \$20 per acre on fertilizer following cover crops. Another 18 (6.6%) saved \$18 to \$20 per acre, 15 (5.5%) saved \$11 to \$15, 12 (4.4%) saved \$6 to \$10, and 9 (3.3%) saved \$3 to \$5 per acre. Just 7% of the respondents (19 of 272) reported spending more on fertilizer after at least 3 consecutive years in cover crops, with a nearly equal distribution reporting additional investments ranging from \$1 to \$20 per acre, and 7 (2.6% of the 272 growers answering the question) reporting an added investment of \$21 or more.



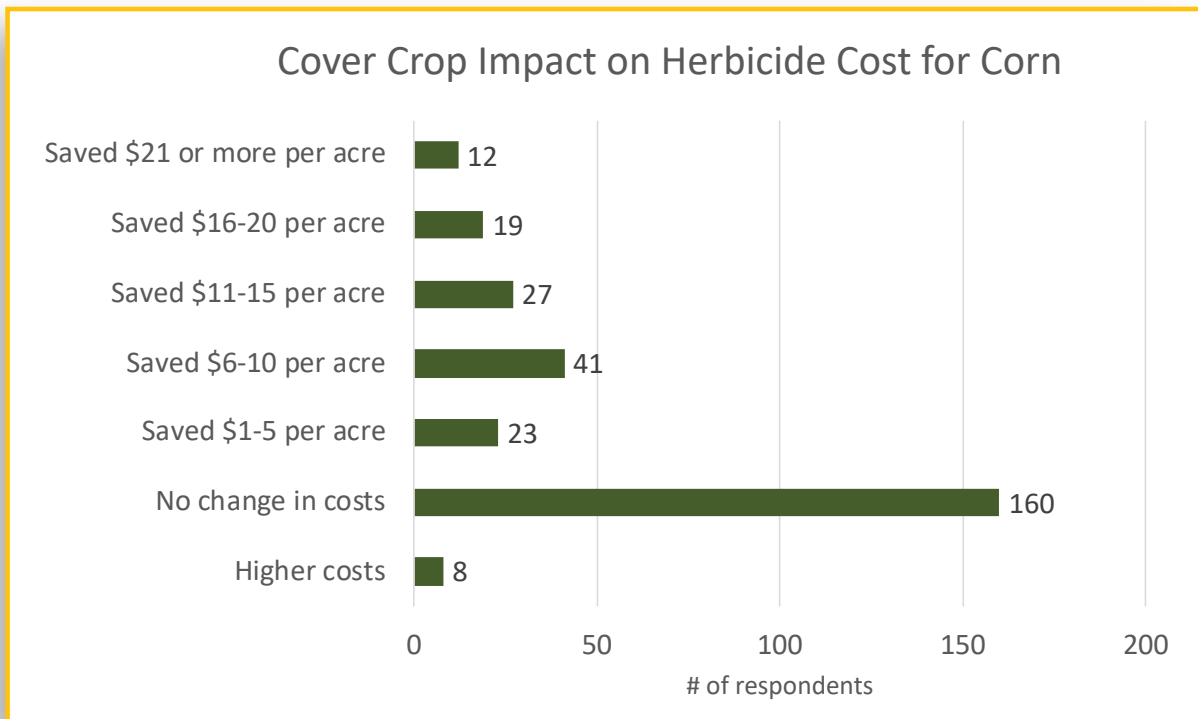
n = 272

WEED CONTROL IN CORN

The pattern of cost savings on inputs following cover crops was similar when farmers were asked about the effects of at least 3 consecutive years of cover crops on their herbicide bills. Of the 290 respondents to this question, 160 (55%) said they experienced no change in herbicide costs, and 122 (42%) reported that they have saved money on corn herbicide following cover crops. Just 8 farmers (2.8%) noted an increase in herbicide costs in corn on fields with at least 3 consecutive years of cover crops.

Of the 122 growers who reported cost savings, the largest group (41 growers, or 14%) saved \$6 to \$10 per acre on herbicide following cover crops. The second-largest cost savings category was \$11 to \$15 per acre (27 respondents, or 9.3%), followed by \$1 to \$5 per acre (23/7.9%), \$16 to \$20 (19 farmers or 6.6%), and 12 respondents (4.1%) reporting savings of \$21 per acre or more.

The pool of 290 respondents does not include 84 growers who marked "N/A" or not applicable as their answer to this question.

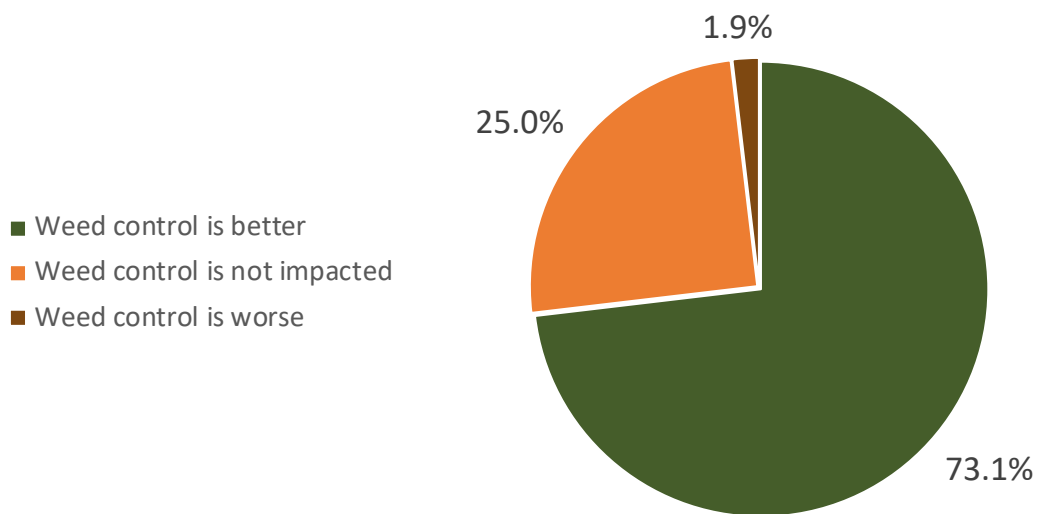


n = 290

WEED CONTROL IN CORN

Among the 160 producers who reported no change in herbicide costs, three out of four (117 growers, or 73%) said that although their herbicide bills had not changed, their weed control improved following cover crops. An additional 40 (25%) said they saw neither a change in herbicide cost nor a change in weed control. Only 3 farmers (2%) reported unchanged herbicide costs accompanied by worse weed control following cover crops.

Weed Control Effectiveness Among Corn Farmers With No Change in Cost

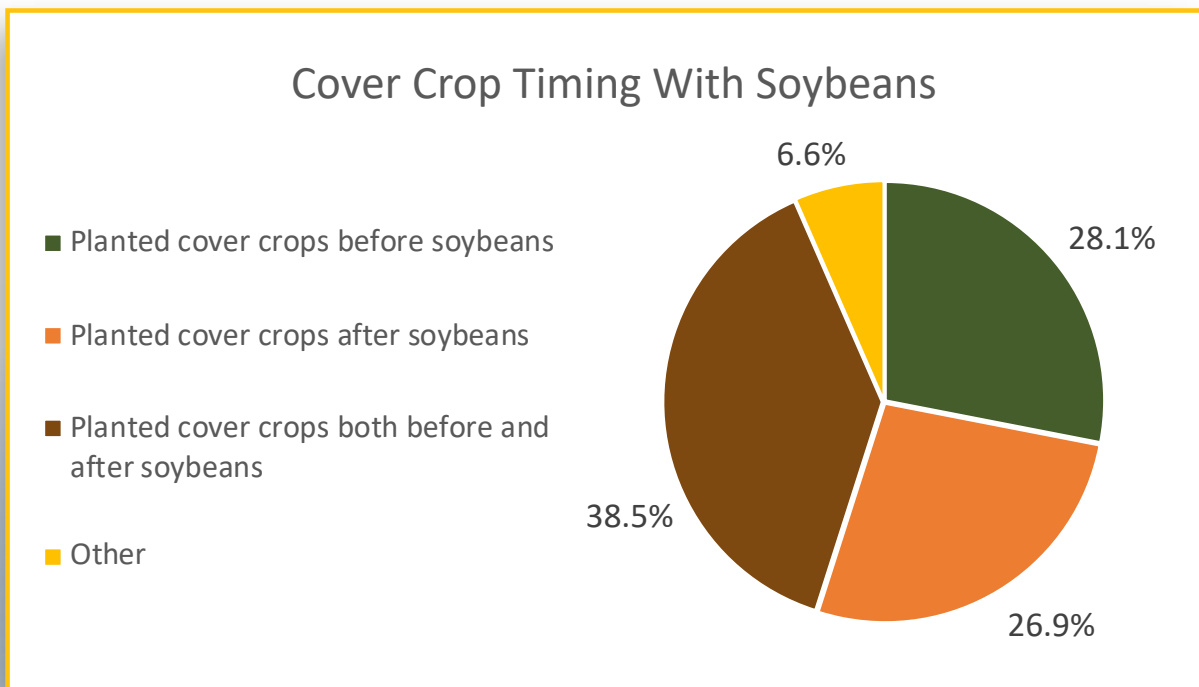


n = 160

SOYBEAN PRODUCTION & COVER CROPS

Growers participating in the 2022-2023 survey described a variety of uses for cover crops in conjunction with soybeans. Of 335 respondents answering a question about how they rotate cover crops with soybeans—a large proportion of the 350 who said they had grown soybeans in 2022—38% (129 growers) said they planted cover crops before and after soybeans. Another 94 (28%) said they planted cover crops before soybeans, and 90 (29%) planted cover crops after soybeans.

Twenty-two soybean growers (6.6%) chose the “other” option. Of those, 6 (1.8% of the total respondents to the question) wrote that they interseeded cover crops into standing soybeans, which could also be considered using cover crops to follow soybeans. Another 8 (2.4% of the total) said they did not use cover crops with soybeans.



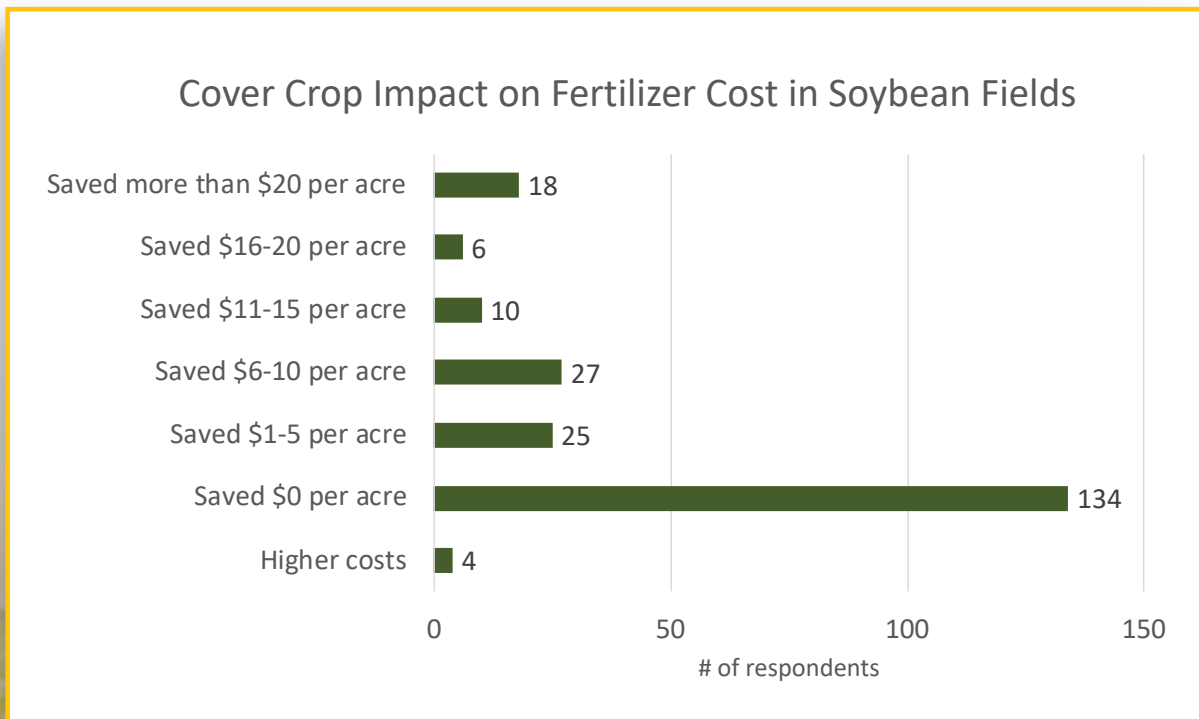
n = 335



SOYBEAN PRODUCTION & COVER CROPS

As with corn, fertilizer costs in soybeans following at least 3 consecutive years of cover crops were either equal or lower. Of 224 soybean growers answering the question, 134 (60%) reported no change in fertilizer costs. The next-largest group, 27 growers (12%) logged a fertilizer savings of \$6 to \$10 per acre, while an almost equal number—25 (11%)—saved \$1 to \$5. Not far behind, 18 soybean growers (8%) reported saving more than \$20 per acre. Ten (4.5%) saved \$11 to \$15 per acre while 6 (2.6%) saved \$16 to \$20. Ten (4.5%) saved \$11 to \$15 per acre while 6 (2.6%) saved \$16 to \$20.

Just 4 growers (1.8%) said they spent more on fertilizer in soybeans following cover crops.



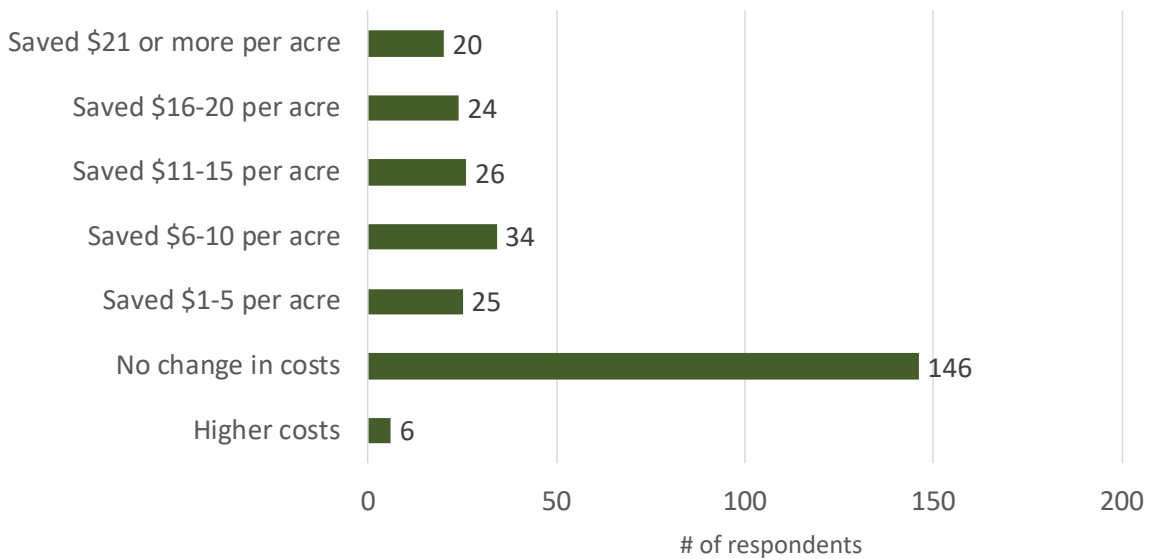
n = 224

SOYBEAN PRODUCTION & COVER CROPS

Savings on herbicides followed a very similar pattern. Of 281 soybean growers, 146 (52%) said their herbicide costs in soybeans were equal with or without cover crops. The next-largest group at 34 respondents (12%) saved \$6 to \$10 on soybean herbicides following a cover crop, followed by nearly-equal numbers of growers who saved \$11 to \$15 per acre (26 growers/9.3%), \$1 to \$5 (25/8.9%), and \$16 to \$20 (24, or 8.5%). Twenty growers (7.1%) saved more than \$20 per acre on herbicide in soybeans following cover crops.

In contrast, just 6 (2.1%) reported spending more on herbicides in soybeans following cover crops.

Cover Crop Impact on Herbicide Cost for Soybeans



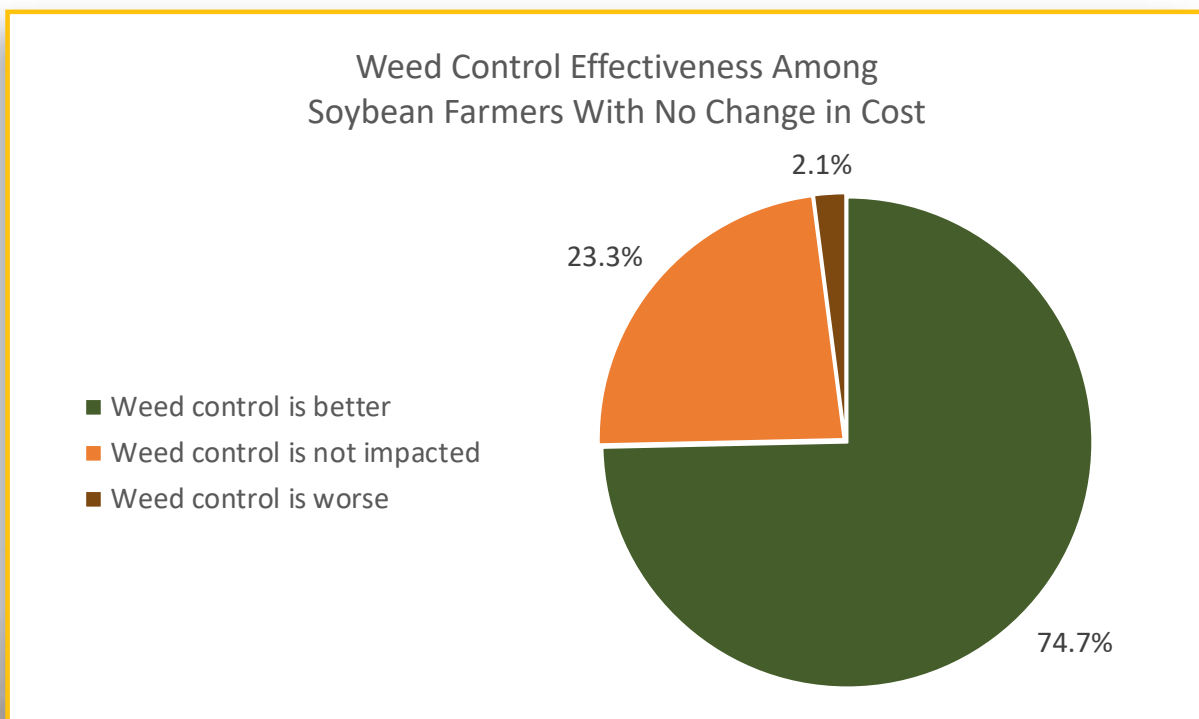
n = 281



SOYBEAN PRODUCTION & COVER CROPS

The advantage of cover crops in reducing weed pressure in soybeans is strongly apparent in responses to a follow-up question posed to producers who reported no change in their soybean herbicide costs following a cover crop. Three-quarters of the group (109 of 146, or 75%) said their soybean herbicide costs did not change after a cover crop, but they got better overall weed control. Another 34 (23%) said their costs and their weed control remained the same.

Just 3 growers (6.2%) reported worse weed control and no change in herbicide costs. Forty-nine "N/A" responses were not included in the data.



n = 335

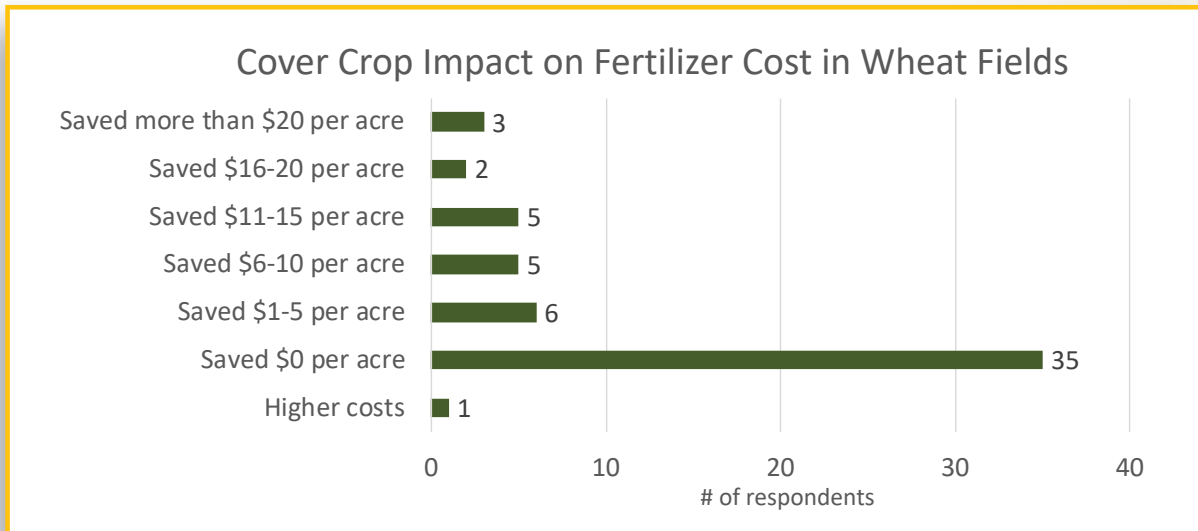


WHEAT PRODUCTION AFTER COVER CROPS

Insight into the impact of cover crops on wheat yields was more difficult to ascertain. Because the questions on wheat did not specify spring wheat, several respondents identified themselves as wheat growers and noted that they used winter wheat as a cover crop.

Of 57 growers who produced wheat in 2022, 35 (61%) said their fertilizer costs remained the same in wheat in fields where cover crops had been used for at least 3 consecutive years. Just 1 grower (1.8%) experienced higher fertilizer costs in wheat following cover crops, while 6 (11%) saved \$1 to \$5 in fertilizer costs after cover crops. Two categories of savings—\$6 to \$10 per acre and \$11 to \$15 per acre—were each selected by five growers (8.8%). Two producers (3.5%) reported saving \$16 to \$20 per acre on fertilizer in wheat where cover crops were grown, and 3 (5.3%) saved more than \$20 per acre on fertilizer.

“N/A” was selected by 44 wheat growers. They were not included in the above figures.



n = 57

A very similar savings pattern emerged in wheat herbicides following cover crops. Of 59 respondents (not including 43 who selected “N/A”), 34 (58%) reported no change in herbicide costs in wheat following cover crops. Of those, 34 answered the follow-up question on whether they achieved better, worse, or equal weed control in wheat with their same-priced herbicide program after cover crops. A majority—18 growers, or 53%—said the cost was the same but weed control was better. Fifteen (44%) said both herbicide cost and weed control were the same, and 1 (3%) said herbicide costs were the same but weed control was worse.

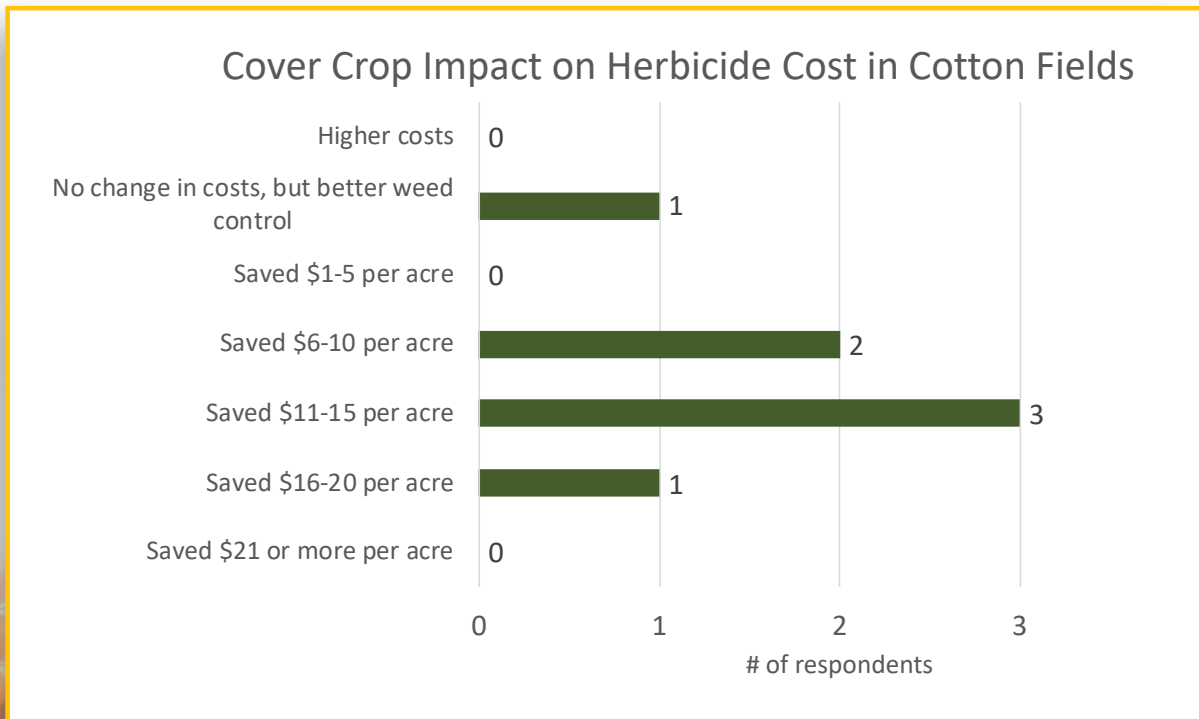
Two of the 59 wheat growers who reported on their herbicide costs (3.4%) said their herbicide costs for wheat went up after cover crops. The largest subset of wheat growers who saw a difference in herbicide costs was a group of 9 (15%) who saved \$1 to \$5 per acre. Four growers (6.8%) chose each of the categories covering \$6 to \$10 in savings, \$11 to \$15 cost reduction, and \$15 to \$20 per acre. Finally, 2 farmers (3.4%) saved more than \$20 per acre in herbicide in wheat following cover crops.

COTTON AND COVER CROPS

Just 16 growers (2% of the respondent pool) stated that they grew cotton in 2022. Part of the low response rate among cotton growers is likely to result in part by the strong Midwestern bent of several of the promotional channels and networks used to solicit feedback. Cotton Incorporated also conducted an extensive survey that included questions on cover crops just a couple of weeks before the 2022-2023 National Cover Crop Survey, so it is likely that there was some confusion—and, equally likely, some survey fatigue—among cotton producers in early 2023.

Among a very small sample of 8 growers, though, more than \$20 per acre in savings on fertilizer following at least 3 years of consecutive cover cropping was reported by 3 cotton producers (38%), equal to the number who reported no difference in fertilizer costs. Two producers (25%) said they saved \$16 to \$20 on fertilizer after cover crops.

Seven cotton growers provided insight on herbicide costs in cotton after cover crops. None had higher herbicide bills, and 1 (14%) reported no change in herbicide costs but better weed control. The largest group—3 growers, or 43%—saved \$11 to \$15 per acre, followed by 2 (29%) who saved \$6 to \$10 per acre in herbicide and 1 (14%) who saved \$16 to \$20.



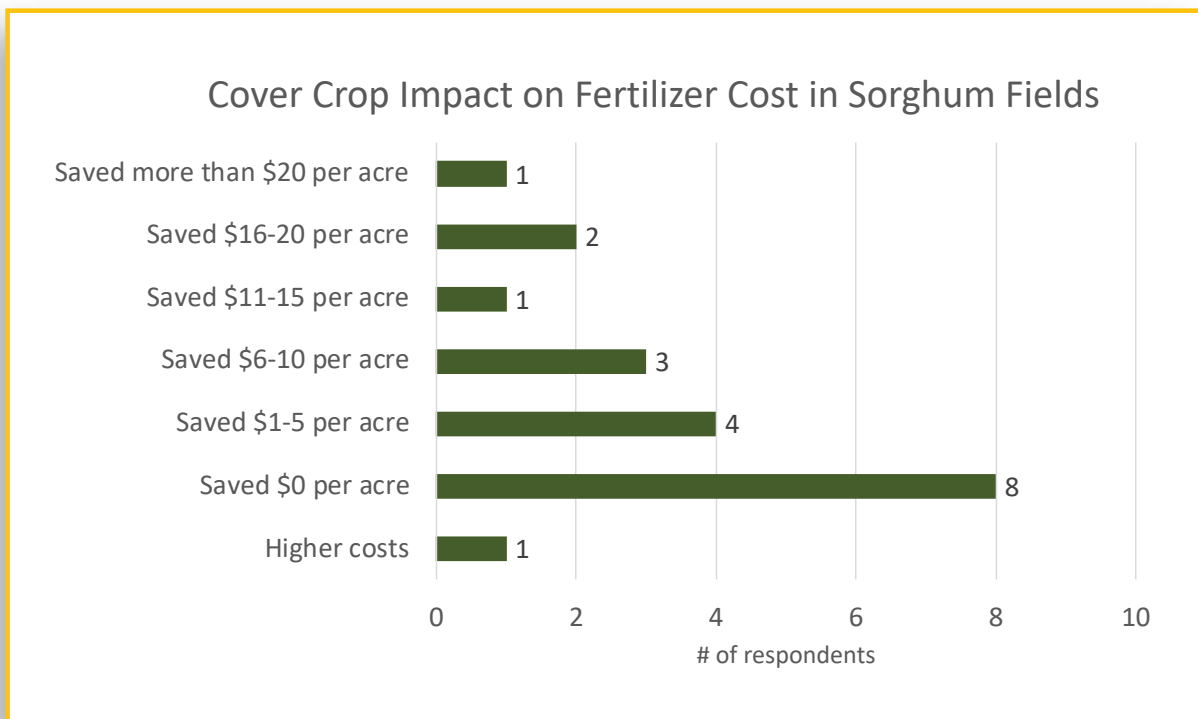
n = 7

COVER CROPS & SORGHUM

Grain sorghum, or milo, is a drought-tolerant crop planted on 4 to 8 million acres in the U.S. Acreage varies significantly from year to year, and little data exists on the impact of cover crops in sorghum rotations.

Unfortunately, the 2022-2023 National Cover Crop Survey received few responses from sorghum producers. Furthermore, some respondents indicated some confusion over whether the sorghum questions—which did not specify “grain sorghum”—pertained to sorghum sudangrass, a forage grass that can be planted as a cover crop.

Among sorghum growers who participated in the 2022-2023 survey, fertilizer costs remained the same in milo after at least 3 continuous years of cover crops for 8 of 20 who provided data (40%; 20 more growers chose “N/A”). One grower (5%) reported higher fertilizer costs, while 4 (20%) saved \$1 to \$5 per acre on nutrients, 3 (15%) saved \$6 to \$10 per acre, 2 (10%) saved \$16 to \$20, and 1 each (5%) saved \$11 to \$15 or more than \$20 per acre.



n = 20

No sorghum producers reported higher herbicide bills following cover crops, while 9 of 21 (43%) said their herbicide costs did not change. Four growers (19%) chose each of the next categories of herbicide savings: \$1 to \$5 and \$6 to \$10 per acre. One grower saved \$16 to \$20 per acre on herbicide, and 3 (14%) said they saved more than \$20 per acre on weed control in sorghum following cover crops. An additional 20 sorghum growers selected “N/A.”

Among the sorghum growers who observed no change in their herbicide costs following cover crops, 6 of 9 (67%) said they saw improved weed control, 1 (11%) said weed control was the same, and 2 (22%) said weed control was worse.

YIELD IMPACTS

U.S. If farmers had yield data from both cover cropped and non-cover cropped fields with similar soils and cash crop management, they were asked to provide an average for both and indicate the average number of consecutive years of cover cropping on the cover cropped fields. The question also asked respondents to provide seed varieties and planting dates.

In soybeans, 188 growers representing an average of 4.9 years of cover crop use reported a 2.07-bushel yield increase per acre following cover crops, a yield improvement of 3.6%. That bushel-per-acre figure is nearly equal to the yield increase reported by respondents to the 2014-2015 National Cover Crop Survey and comfortably within the range of 1.5 to 4.9 bushels of increase (2.8 to 11.6%) following cover crops reported throughout the history of the survey project. Seventy-seven responses to the question were not included in the data because they did not include yield for both cover cropped and non-cover-cropped acreage.

The corn yield advantage following cover crops was modest in 2022, an average boost of 1.09 bushel per acre (0.5%) over non-cover-cropped yields of 192.92 bushels per acre. While yield differences between cover cropped and non-cover cropped fields in 2022 were modest, particularly for corn, a bigger difference was found when comparing farmers with 10 or more years of cover crop experience to those who had been using cover crops for two years or less. The farmers with 10 or more years of cover crop experience had yield gains of 6.30% on soybeans and a similar 6.27% on corn, while those with two years or less of cover crop experience had soybean yield gains of 3.37% with corn yields that were not statistically different between cover crops and no cover crops (other reported yield differences were statistically significant).

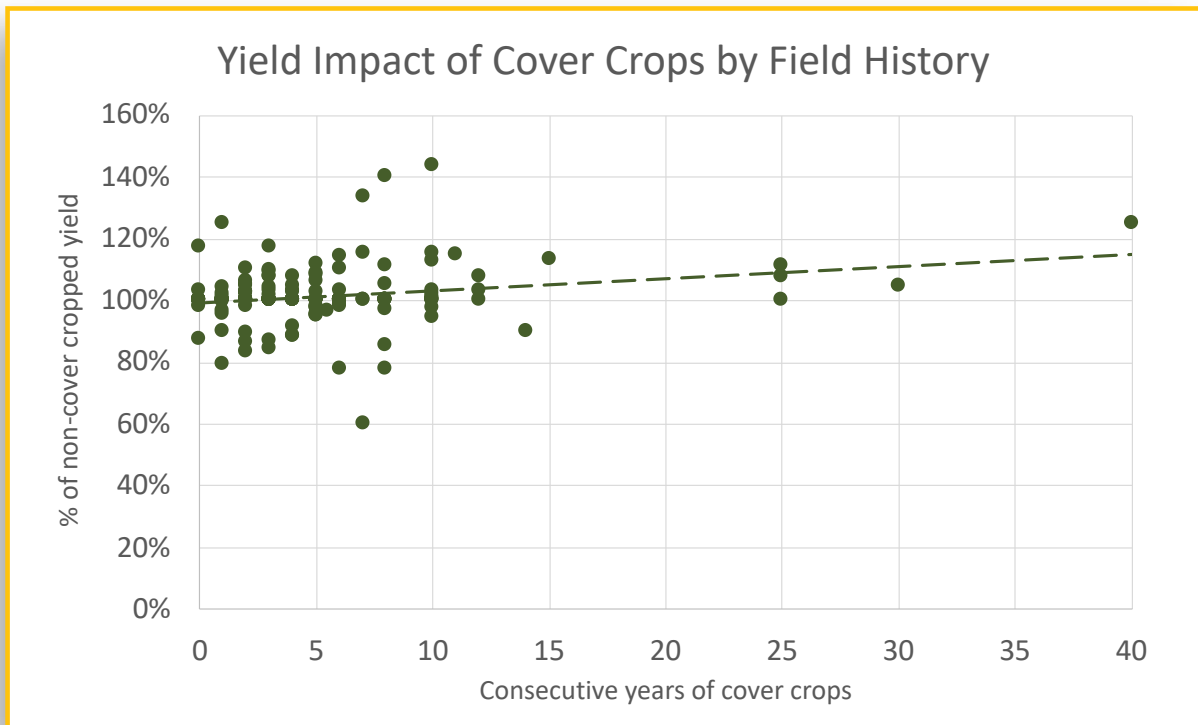
Of course, even without a dramatic yield improvement, the other benefits of cover crops in corn, including improved soil health, reduced erosion, and weed control still hold true. The fact that corn growers experienced an average yield increase also helps address concerns among some producers that cover crops could detract from cash crop yields.

The 180 farmers that reported yield data comparing cover cropped corn fields and comparable non-cover-cropped corn on their land averaged 5.16 years of consecutive cover cropping experience. An additional 97 responses to this question were removed from the data because the respondents did not provide comparative data for fields with and without cover crops.



YIELD IMPACTS

An analysis plotting the number of years in cover crops reported by growers against the corn yield difference they reported between their cover cropped and non-cover cropped fields indicates that the longer fields were cover cropped, the larger the yield difference became.



n = 170

As noted earlier in this report, the sample size of wheat growers in the current survey was small, and the question did not specify whether it was asking about winter wheat or spring wheat, so growers of both responded. In all, the number of respondents who provided a comparison of wheat yields from both cover cropped and non-cover-cropped fields was also quite small at 34, or 4.3% of the total pool of farmers.

With those caveats in mind, the average yield of wheat following cover crops was 70.9 bushels per acre, 3.0 bushels (4.2%) higher than the respondents' average wheat yield without cover crops. The yield difference is roughly twice as great as the 1.6-bushel-per-acre difference in spring wheat with and without covers reported in the 2019-2020 survey and over 50% larger than the 1.9 bushels per acre noted in the 2016-2017 survey.

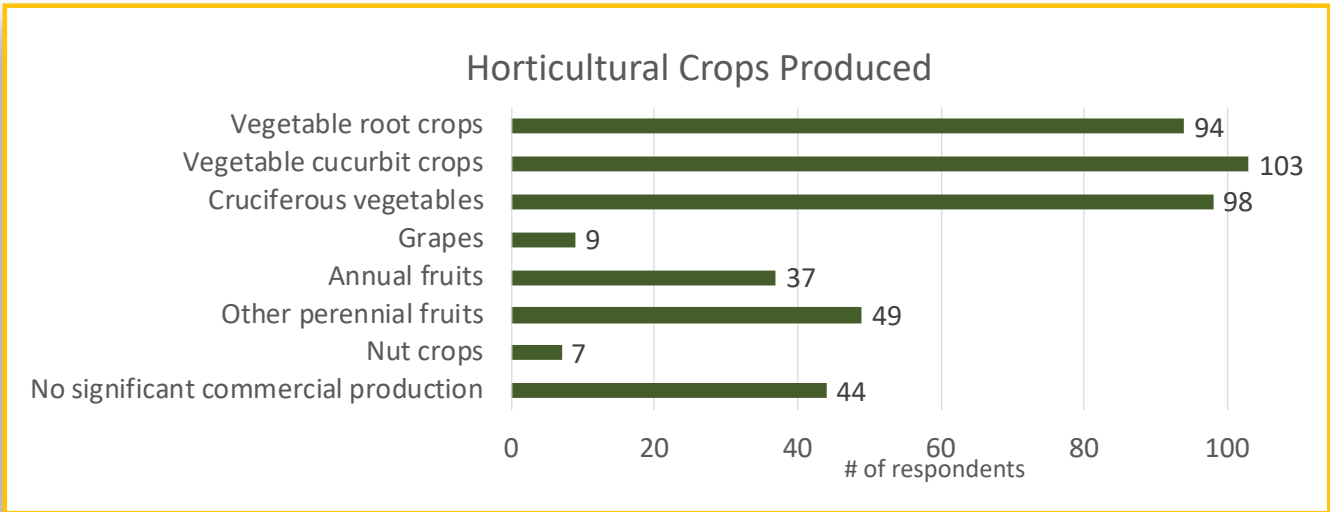
Yield comparisons for cotton and grain sorghum did not elicit enough data for analysis.

HORTICULTURE AND OTHER CASH CROPS

The most diverse category of cash crops was “Horticulture Crops,” which included fruit, vegetable, nut, and other products. Of 203 cover crop users who indicated that they produced horticulture crops, 192 shared the kinds of crops they produced. Because respondents could select as many categories as they wanted, the total number of responses far exceeds 192.

The top horticulture crops produced by respondents were vegetable cucurbit crops such as pumpkins, zucchini, squash, and other gourds, with 103 responses (54%), followed by greens or brassicas like cabbage or broccoli (98 farmers, or 51%) and vegetable root crops such as carrots, potatoes, or radishes (94 respondents, or 49%).

Perennial fruits other than grapes were represented by 49 growers (26%), annual fruits such as strawberries and melons by 37 (19%). Nine grape growers (4.7%) and 7 nut growers (3.6%) rounded out the commercial horticulture producers in the group. Forty-four respondents (23%) said they did not raise horticultural crops on a significant commercial basis.



n = 192

On the whole, horticultural crop producers participating in the survey found cover crops to be neutral or positive on their bottom line.

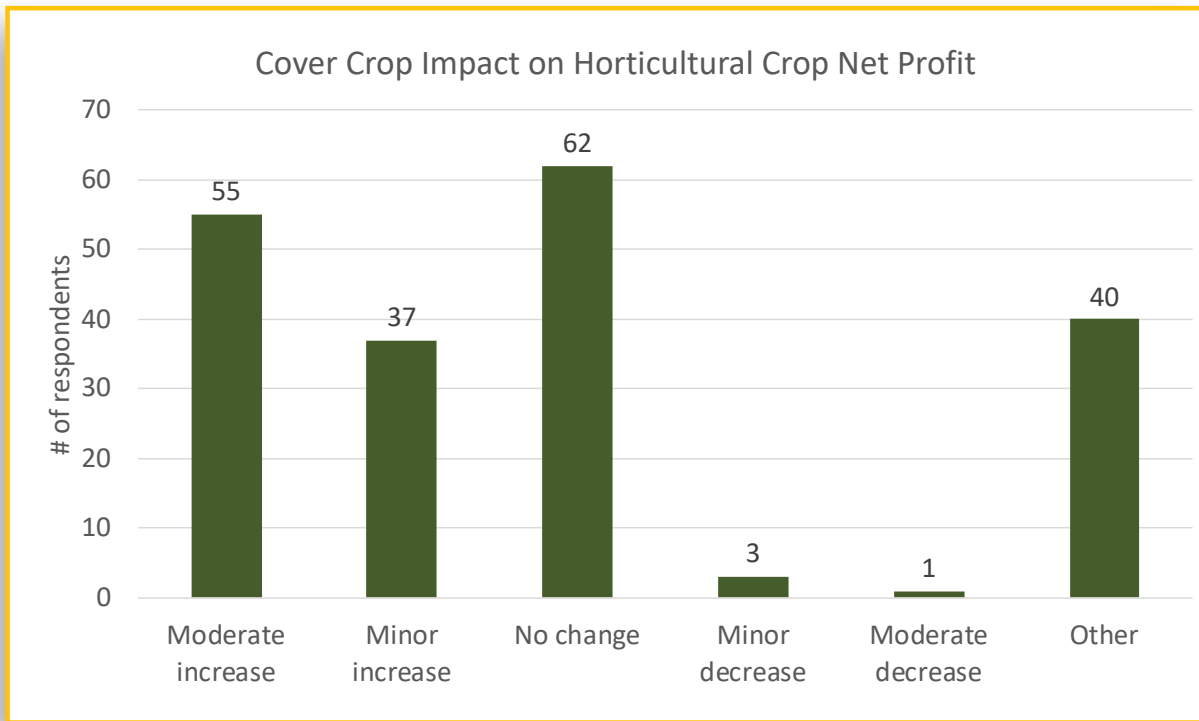
Asked, “how have cover crops impacted the profitability of your horticultural operation (factoring in productivity, yield of your crops, overall labor costs for weed control, other pest control/labor costs, fertility costs, cover crop seed costs and termination),” the largest number of responses (62 of the 198 respondents, or 31%) said they saw no significant change in net profit, which was defined as plus-or-minus 1% change.

The second largest group of respondents (55, or 28%) chose “moderate increase,” which was defined as 5% or more increase in net profit. Another 37 (19%) indicated that they had seen a minor (2 to 4%) increase in net profit. Decreases were noted by just 3 respondents (1.5%) reporting a minor decrease and 1 (0.5%) noting a moderate decrease in net profit.

HORTICULTURE AND OTHER CASH CROPS

Forty respondents (20%) chose “other,” sharing a range of insights that varied from “don’t know” to special cases including a couple of farmers who donate or consume their crops rather than sell them, so profitability isn’t an issue. Others pointed out that their goal is soil health, erosion control, forage for animals, or a living mulch between cash crops, which are more important to them than tracking profitability. Three respondents pointed out that they have always used cover crops, so they have no non-cover-cropped land to compare, and a few others are studying the economic impact but did not have data at the time of the survey.

One respondent pointed out that cover cropping with mustard and arugula provided vital tools for organic control of nematodes and soilborne diseases, calling cover crops “a game changer.”

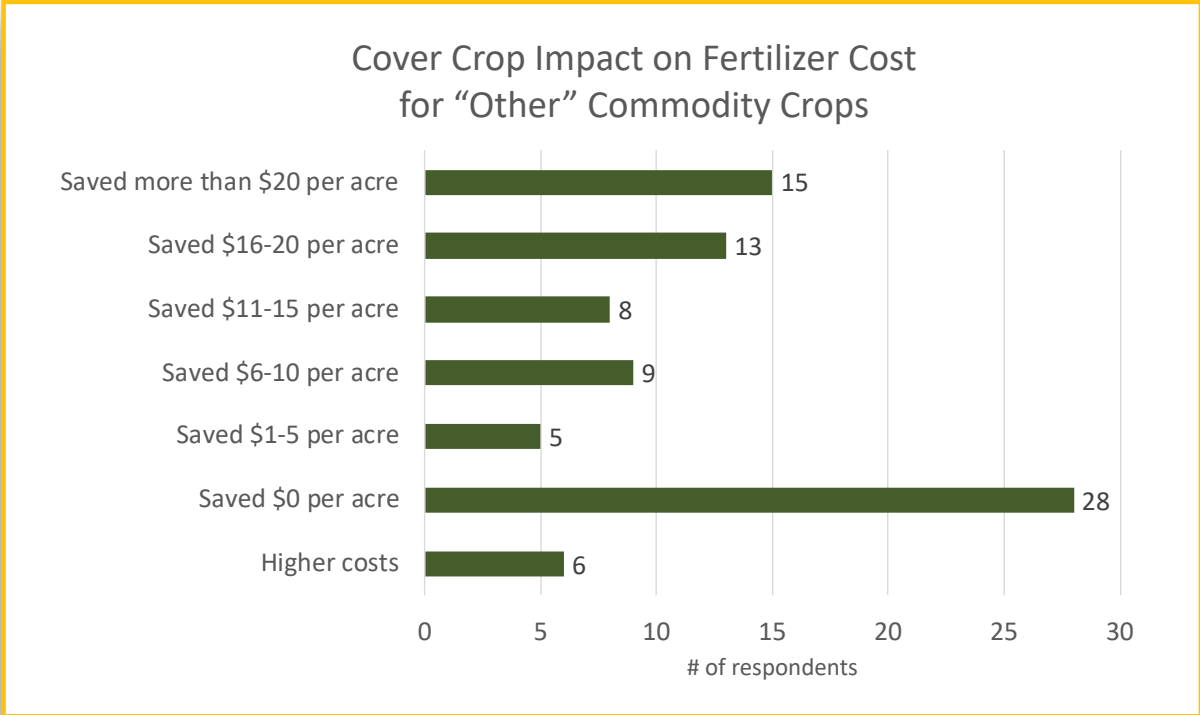


n = 198

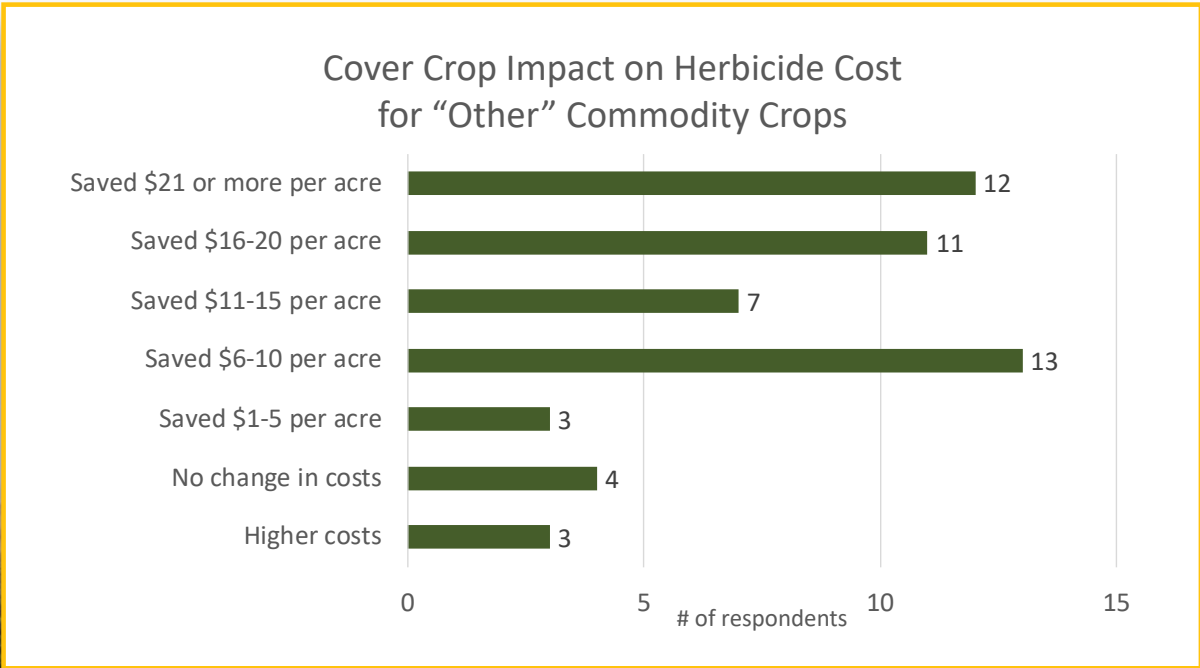
In addition, another question in the survey asked cover crop users to list “other cash crops.” Many of the crops listed were horticulture crops, though barley, rye, buckwheat, edible beans, alfalfa, millet, oats, hops, seed crops, alfalfa, and other forages made the list.

Among the growers of that wide array of cash crops, the pattern of fertilizer cost savings mirrored those of other commodities. The largest group—28 of 84, or 33%—reported no change in fertilizer costs following at least 3 consecutive years of cover crops. Six (7.1%) said their fertilizer costs rose following cover crops, while the second-largest group, 15 (18%) saved more than \$20 per acre on nutrients. The next-biggest category was 13 growers (16%) who saved \$16 to \$20 per acre, followed by 9 (11%) who saved \$6 to \$10, 8 (9.5%) who saved \$11 to \$15, and 5 (5.9%) who saved \$1 to \$5 on fertilizer.

HORTICULTURE AND OTHER CASH CROPS



Herbicide bills for the assortment of other cash crops trended toward significant savings. Of 53 growers who responded to the question, just 4 (7.5%) saw no change in herbicide costs after cover crops and 3 (5.7%) saw higher herbicide expenditures. The largest group, 13 growers or 24.5%, reported savings of \$6 to \$10 on weed control per acre, followed closely by 12 (23%) who saved more than \$20 per acre, 11 (21%) who saved \$16 to \$20, 7 (13%) who saved \$11 to \$15, and 3 (5.6%) who saved \$1 to \$5 per acre on herbicide.





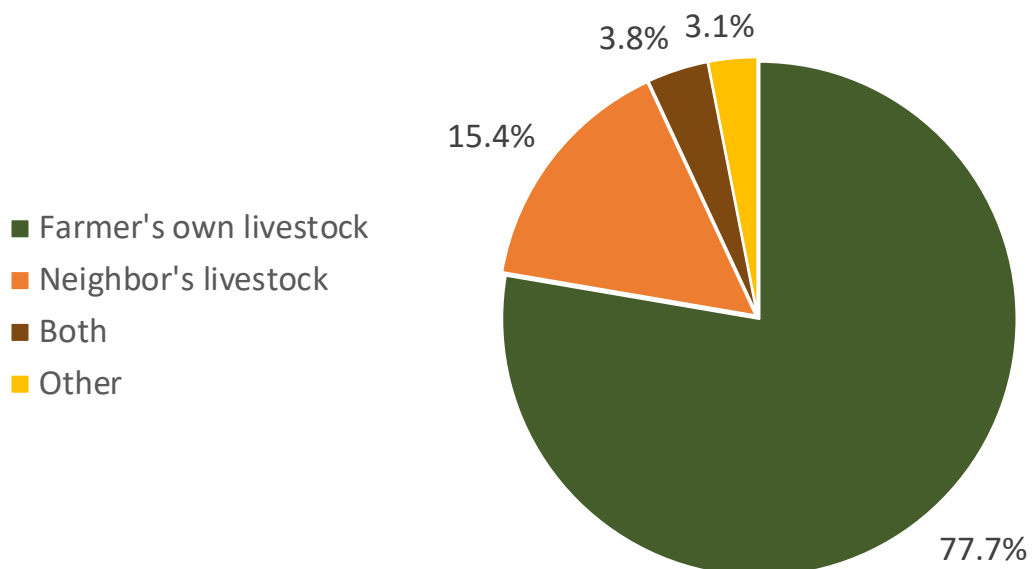
LIVESTOCK & COVER CROPS



Among respondents to the 2022-2023 National Cover Crop Survey, 1 in 4 respondents integrate livestock with their cover crops, with 18% (131 of 741) reporting that they or someone else graze their cover crops, and 6.1% (45 producers) harvesting cover crops for baleage, haylage, or hay.

Eight out of 10 producers who integrate livestock with cover crops (101 of 130, or 78%) reported that the animals were part of their own operations; just 20 (15%) brought on livestock solely from a neighbor's operation, and 5 (3.8%) reported that their cover crops were grazed by their own livestock as well as neighbors' animals.

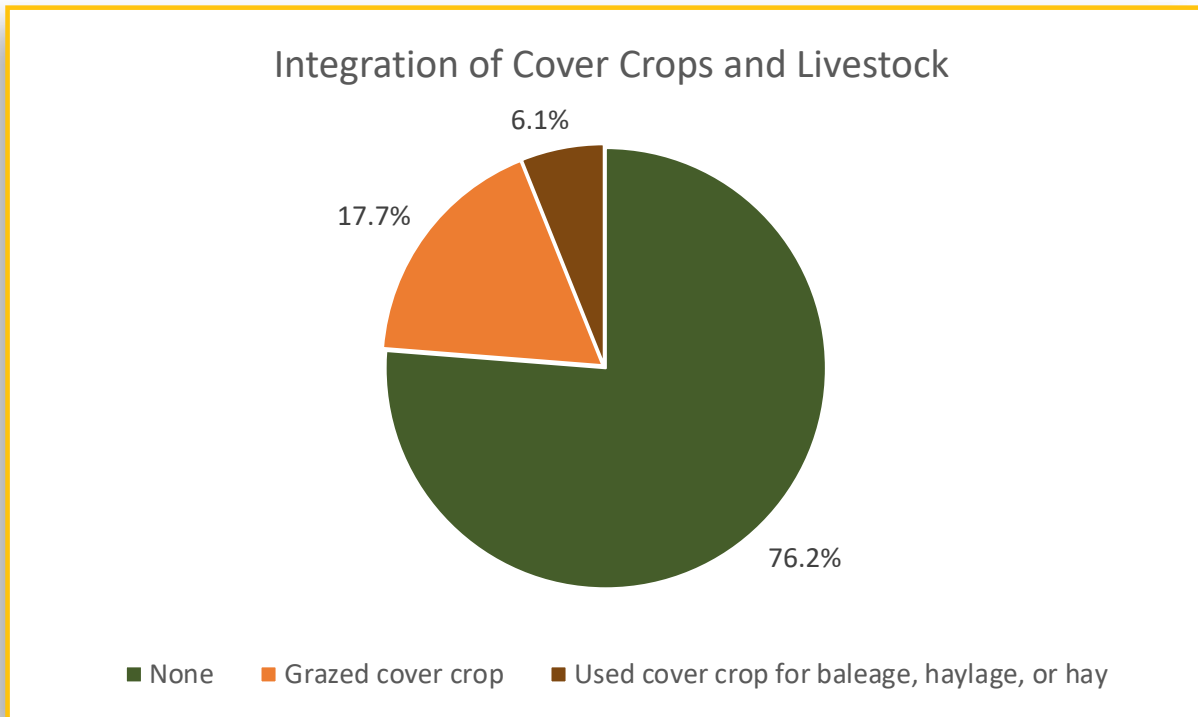
Ownership of Livestock Grazing Cover Crops



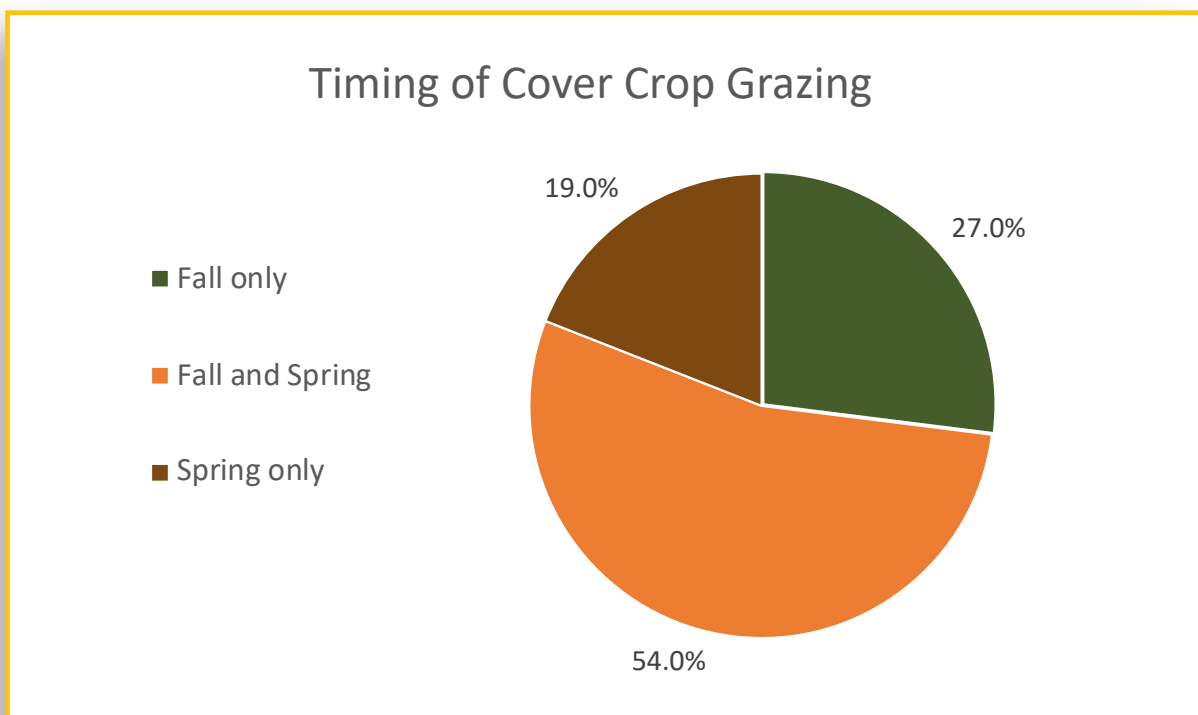
n = 130

LIVESTOCK & COVER CROPS CONT'D

By far, cattle were the most widely integrated livestock species, with 102 of 130 producers (78%) naming them. Sheep were a distant second at 23 (18% of responses; respondents could choose more than one species), closely followed by pastured chicken/poultry (19, or 15%). Goats (12 responses, or 9.2%), hogs (9, or 6.9%), and horses (3, or 2.3%) accounted for the rest.



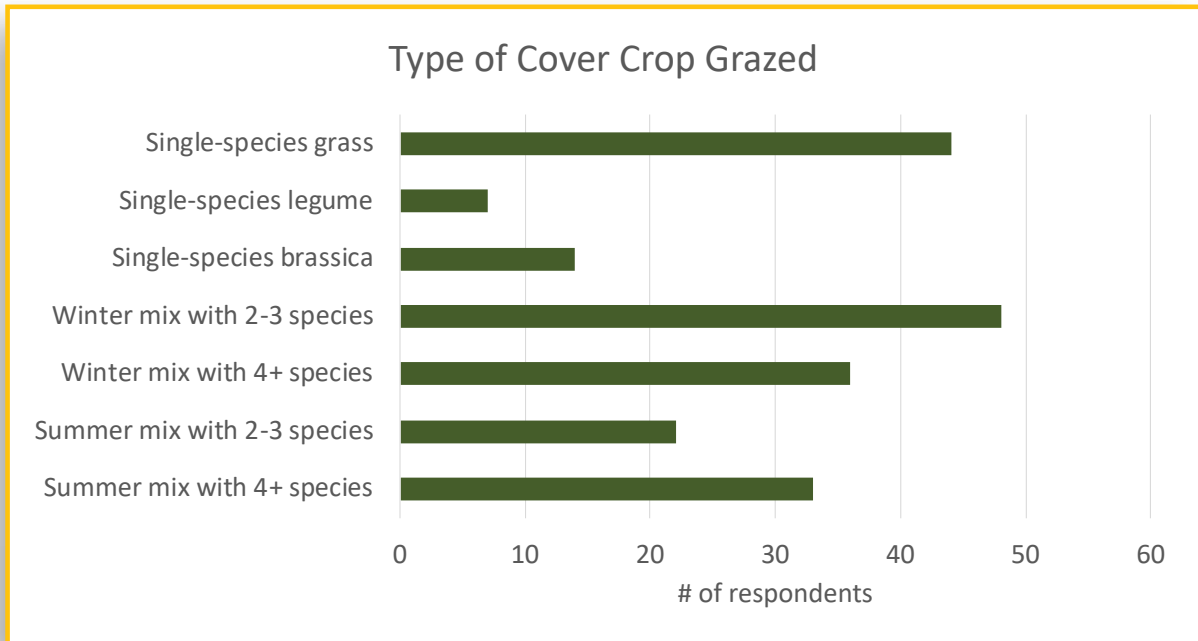
Among the grazers, 68 of 126 (54%) reported grazing cover crops in both fall and spring, while 34 (27%) grazed covers only in the fall and 24 (19%) grazed them only in the spring.



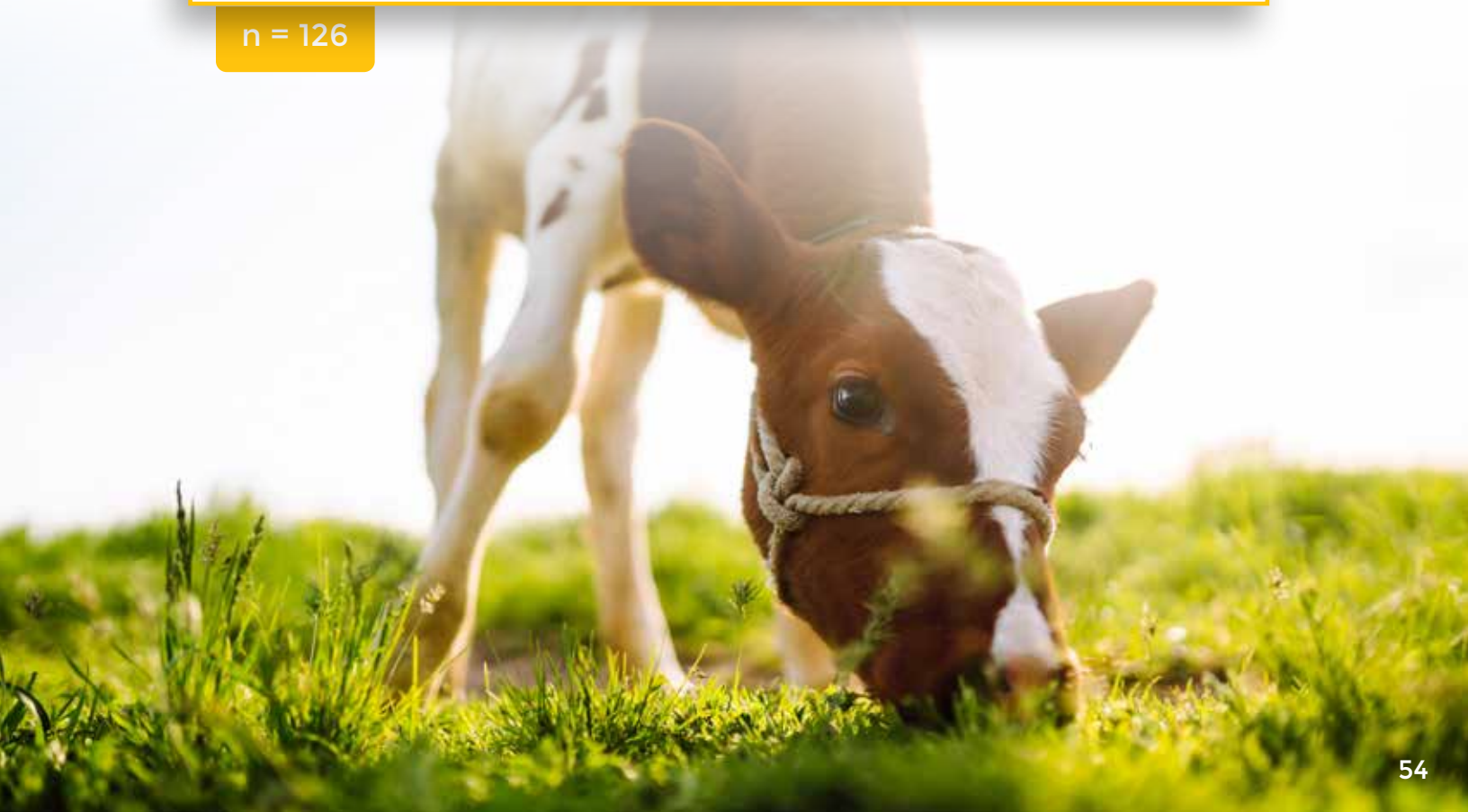
LIVESTOCK & COVER CROPS CONT'D

Grazing was most commonly done on mixed cover crop stands. The most popular cover crops for grazing were winter cover crop mixes of 2 to 3 species, reported by 48 of 204 respondents (24%). Winter mixes of 4 or more species were grazed by 36 (18%), while summer cover crop mixes of 4 or more species were grazed by 33 (16%) and summer blends of 2 to 3 species by 22 (11%).

Among single-species cover crops, cereals—rye, wheat, triticale, barley, or oats—were most popular for grazing, with 44 (22%) of the responses. Single-species brassica stands were grazed by 14 (6.9%), and 7 (3.4%) of the producers grazed single-species legume covers.



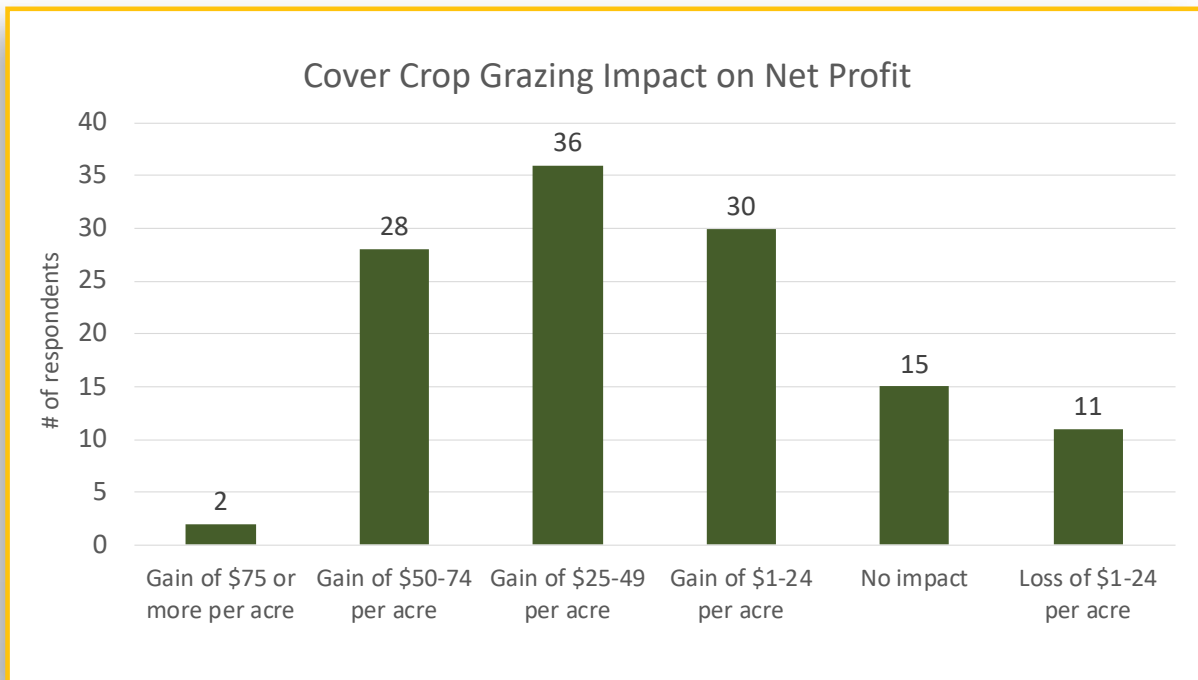
n = 126



LIVESTOCK & COVER CROPS CONT'D

Seven out of 10 respondents who grazed cover crops reported that the process added profit to their operations. Of 122 respondents to the question, 36 (30%) reported a net profit of \$1 to \$24 per acre, 30 (25%) gained \$25 to \$49 per acre from grazing cover crops, 15 (12%) earned an extra \$50 to \$74 per acre, and 11 (9%) reported a net profit gain of \$75 or more.

Twenty-eight cover crop grazers (23%) reported no change in profit, and just 2 (1.6%) reported a net profit reduction of \$1 to \$24 per acre.



n = 122



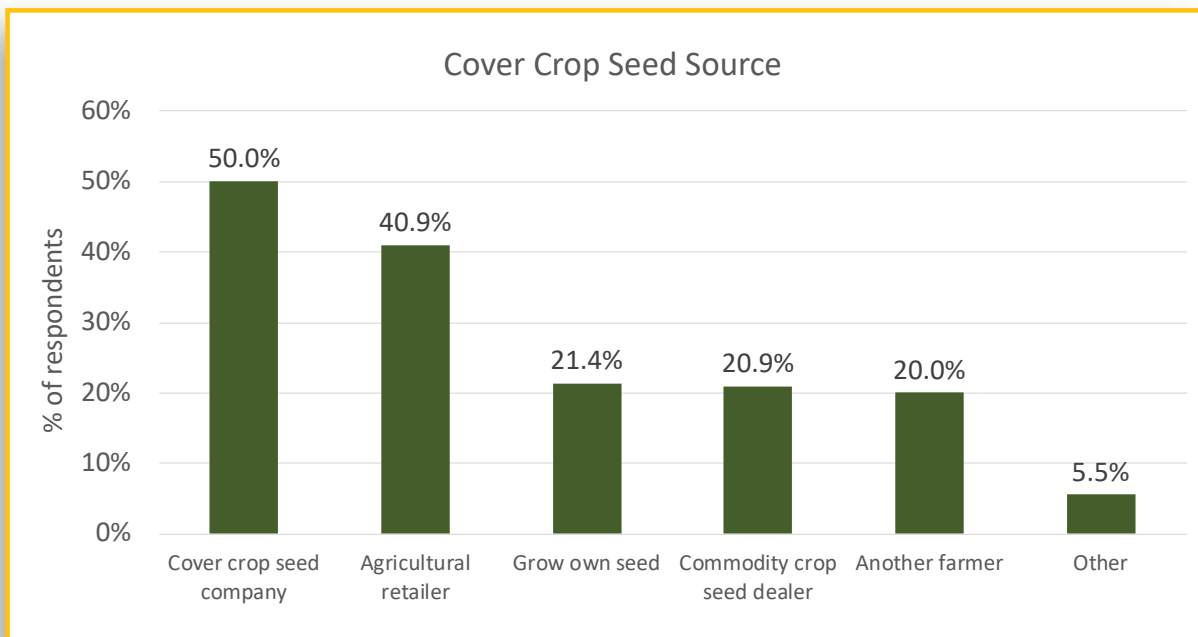
COVER CROP SEED

Growers of cover crop seed, represented by the American Seed Trade Association (ASTA), have supported the National Cover Crop Survey since 2014. The industry looks to the results to gauge interest in cover crops, track trends in species and practices, and predict the timing of farmer demand.

SEED SUPPLY CHAIN

Retail channels dominate cover crop seed sales. Half (50%) of 560 respondents reported purchasing cover crop seed from a company specializing in cover crop seed sales, while 41% purchased theirs at an ag input retailer. Twenty-one percent purchased cover crop seed from a commodity seed dealer, 20% from another farmer, and 21% reported growing their own seed, a huge difference from the 7.9% of 2019-2020 respondents who grew their own. (Responses add up to more than 100% because respondents were allowed to choose as many points of sale as they wished.)

Writing into the “other” option, some specified dealerships or companies, while a couple reported buying seed marketed as human food, one mentioned Pheasants Forever and another one an Extension project, and one reported collecting some seed in the wild.

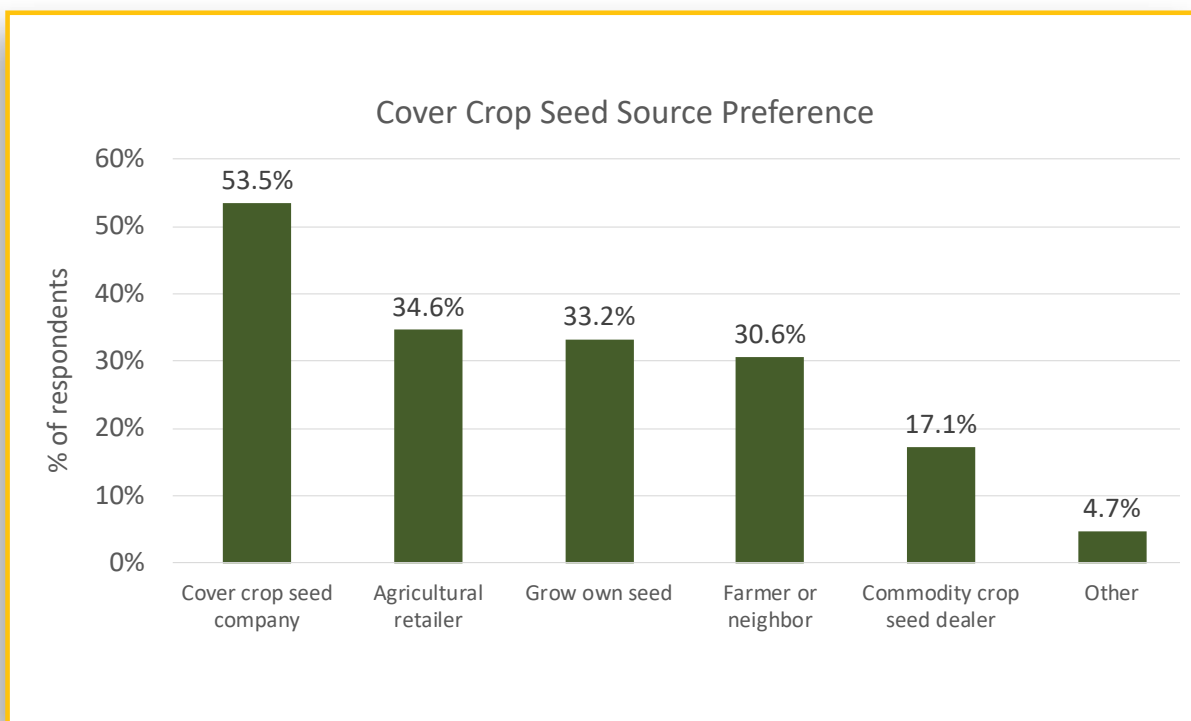


n = 560

SEED SUPPLY CHAIN

In all, cover crop users seem happy with the marketing channels, with cover crop specialists leading the 555 replies to “where would you prefer to purchase your cover crop seed in the future” with 54% and ag input dealer coming in second at 35%, down from the 40% who buy from them now. Commodity seed dealers’ future share could drop, as 17% of respondents say they would like to buy cover crop seed from commodity seed dealers, vs. 21% of current sales.

Though buying quality seed through a retail channel currently dominates the cover crop market, respondents see a future with more home-grown seed, as 33% ticked “grow my own seed” (a substantial increase over the 22% who currently do) and 30% would like to buy from a farmer or neighbor.



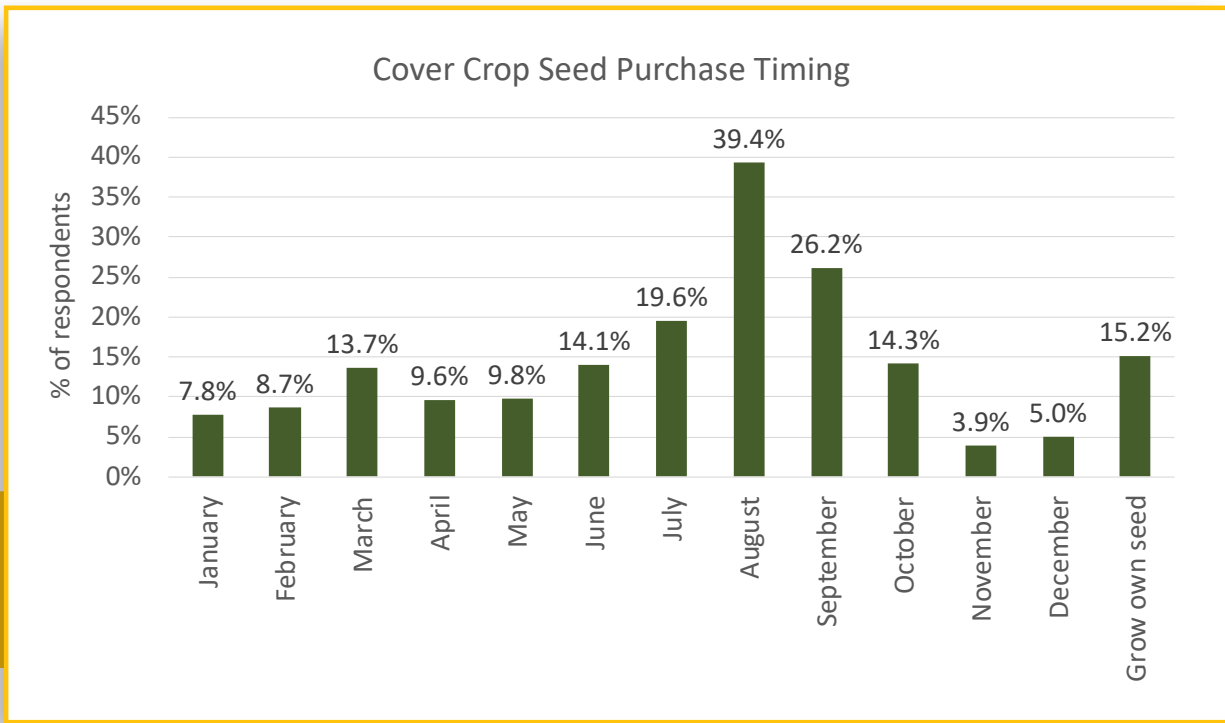
n = 555

Availability of cover crop seed appears to be fairly strong, with some room for improvement—327 of 560 respondents (58%) reporting that they have not faced any challenges in obtaining their preferred species of cover crop seed, only 7% (39 respondents) saying it is regularly a challenge, and 35% (194) saying they occasionally face challenges.

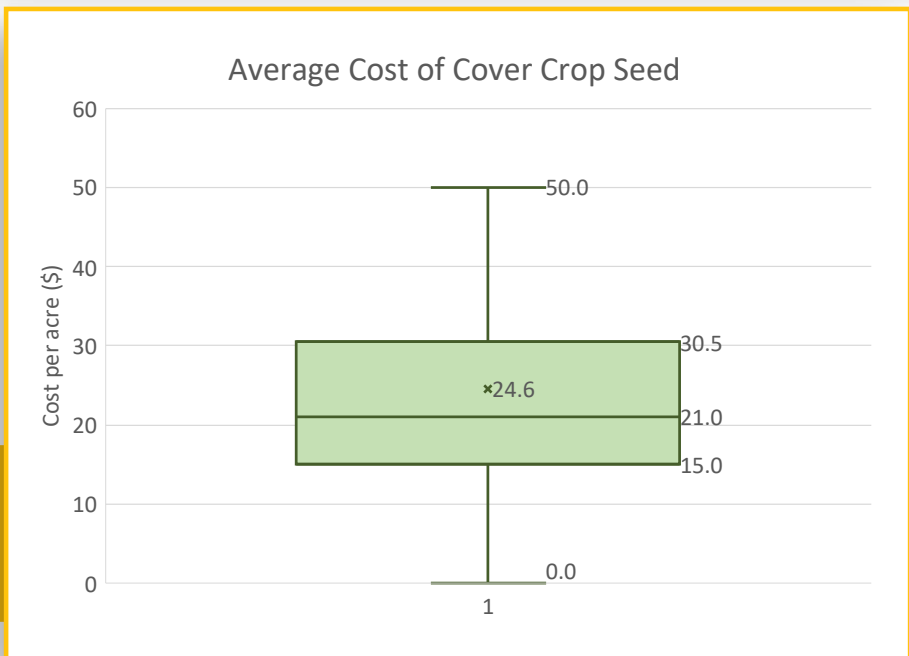
SEED SUPPLY CHAIN

According to cover crop users in this year's survey, purchases of cover crop seed began to grow in June, presumably as wheat harvest started in the South and Southern Plains, and peaked in August with 39% of the farmers reporting that as the month they buy the most cover crop seed. The demand curve tapers off through September and October, reaching its nadir of 3.9% in November. After 5% of sales in December, sales grow slowly in January and February (7.8% and 8.7%, respectively) before a small peak in March at 13.7% followed by a return to sub-10% sales in the busy spring months of April and May. Fifteen percent of respondents reported that they grow their own cover crop seed.

n = 561



n = 513

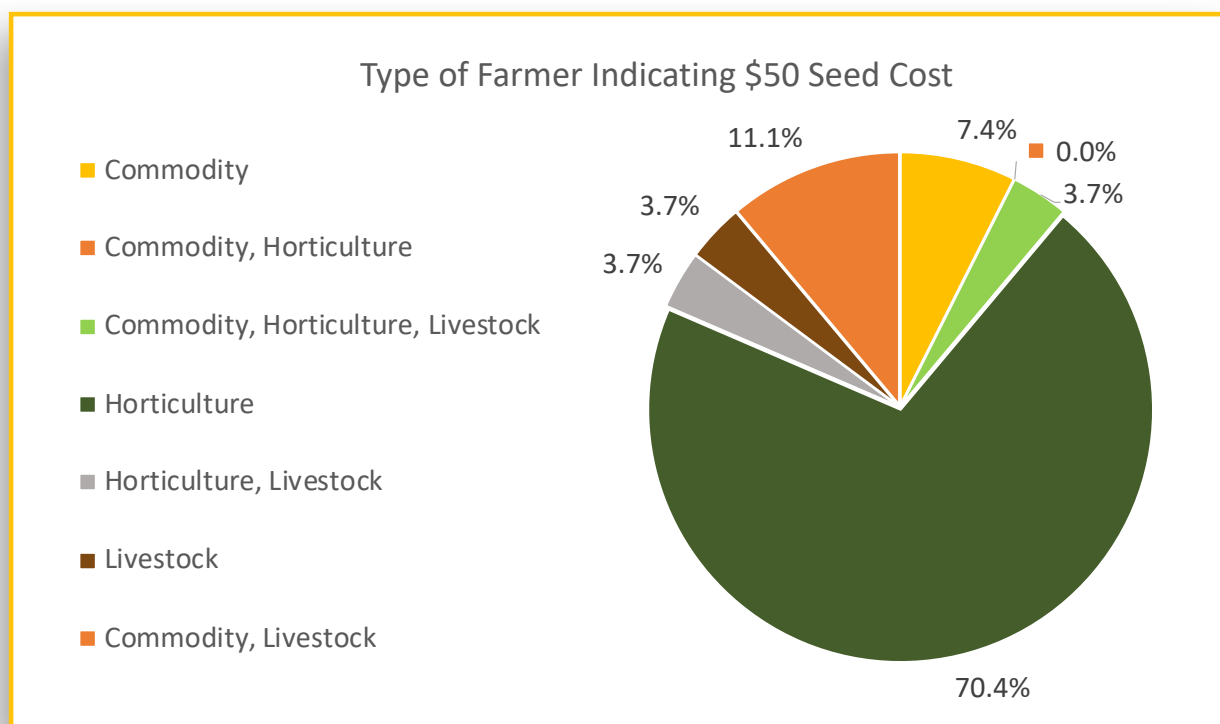


Among 513 growers, the average cost of cover crop seed—capped by the answer slider at \$50 per acre—was a mean of \$24.60 and a median of \$21.00. Fifty-four people selected the top value of \$50 per acre, indicating that some may have made greater expenditures. Future surveys will likely have a higher limit.

SEED SUPPLY CHAIN

Seed costs were significantly higher among horticulture crop growers than commodity crop growers. Horticulture crop growers reported an average seed cost of \$31.59 per acre, while commodity crop producers reported paying an average of \$21.74 for their cover crop seed.

Horticulture crop growers or vegetable farmers represented 70% of the respondents (38 of 54) reporting cover crop seed costs of \$50 or more, accompanied by 8% (4 respondents) who included horticulture or vegetables in their cash crop mix. Commodity crop growers accounted for 7% (4 respondents) of the top-cost purchasers and commodity/livestock producers comprised 11% (6).



n = 54

Quality is important to the majority of today's cover crop seed purchasers. Of 557 cover crop seed buyers, 319 (57%) report always seeing or requesting a seed tag or analysis, 148 (27%) sometimes seeing or requesting a seed tag or analysis, and 90 (16%) never spotting or looking for documentation of quality.

Though the respondent pool has been different from survey to survey and we cannot infer statistical trends from data, overall interest in seed tags or analysis appears to be growing. In the 2019-2020 survey, 49.5% of the respondents always looked for one, a rate similar to the 48% reported in the previous 2016-2017 survey.

GROWING COVER CROP SEED

Of 561 respondents, 22% (123) reported growing their own cover crop seed for use on their operation, and 4.1% (23) grew cover crop seed for sale.

Of the 415 (74%) who answered “no” to growing cover crop seed, 412 answered a question gauging their interest in someday growing cover crop seed themselves. Of those, 188 (46%) reported that they were not interested in growing cover crop seed in the future, 122 (30%) said they were mildly interested, 66 (16%) were moderately interested, and 36 (8.7%) reported high interest.

Eighty-three growers provided answers to an open-ended question on what they would need to learn in order to produce cover crop seed. The strongly predominant information needs related to harvest, cleaning, and seed saving, followed by sowing and in-season management.

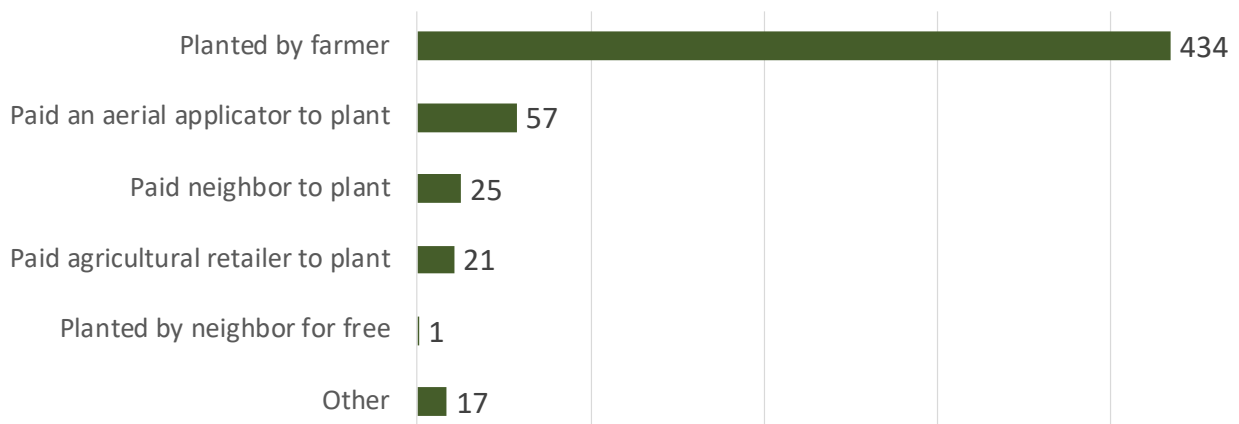
OF 557 COVER CROP SEED BUYERS, 319 (57%) REPORT ALWAYS SEEING OR REQUESTING A SEED TAG OR ANALYSIS



SEEDING COVER CROPS

The vast majority of survey respondents seed their own cover crops: 434 (78%) of 555 respondents who were asked to select their primary method of planting cover crops on their farm. A very distant second was 57 growers (10%) who paid an aerial applicator, 25 (4.5%) who paid a neighbor or friend to plant covers, 21 (3.8%) who paid an ag retailer to do the job, and 17 (3%) who selected “other,” most noting that they split the work between their own seeding and hired applicators, and a couple pointing to soil conservation districts, tenants or farm employees. One respondent (less than 1%) had a neighbor or friend plant cover crops for free.

Cover Crop Planting Approach

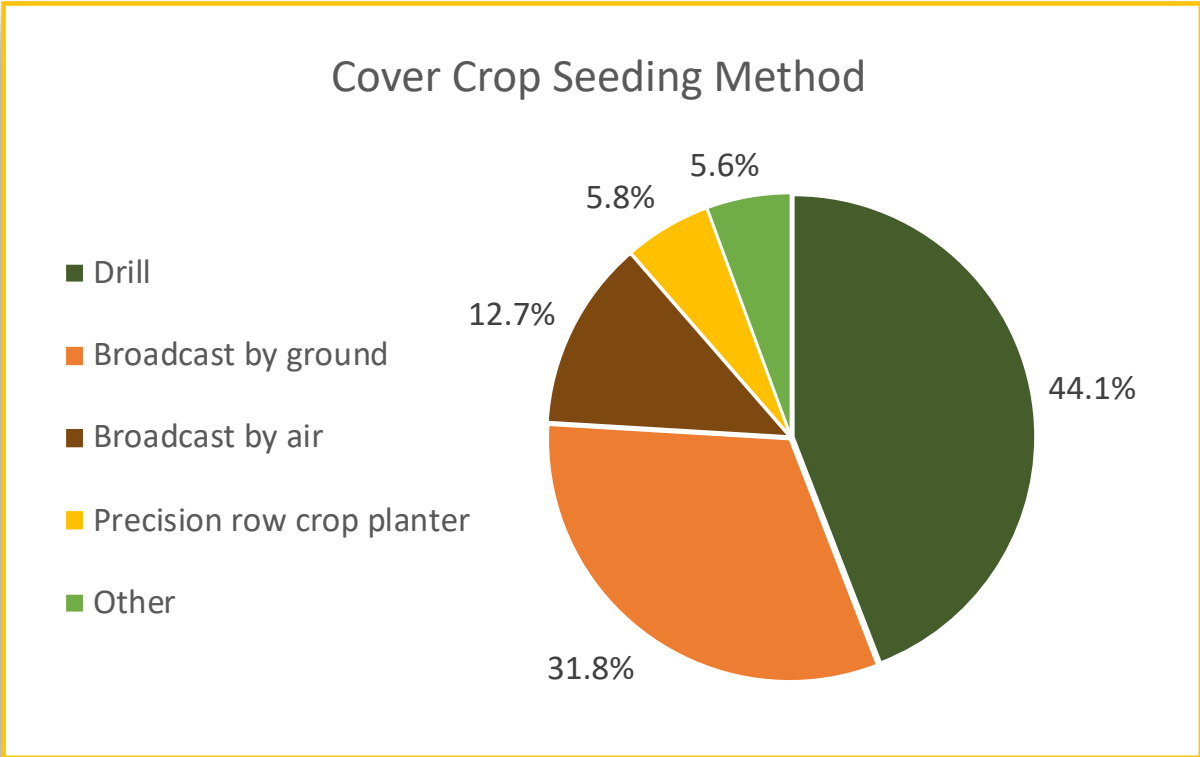


n = 555

When it comes to the method of seeding, drilling (57%) and ground broadcast (53%) dominate handily among the 552 respondents. Broadcast by air was reported by 21%, and a precision row crop planter by 8%. Eight percent selected “other,” though many of the write-in answers used synonyms or brand names for drills or planters. A few mentioned vertical till implements modified with seeders, 9 noted that they planted by hand, and 1 used a drone.



SEEDING COVER CROPS CONT'D



n = 553

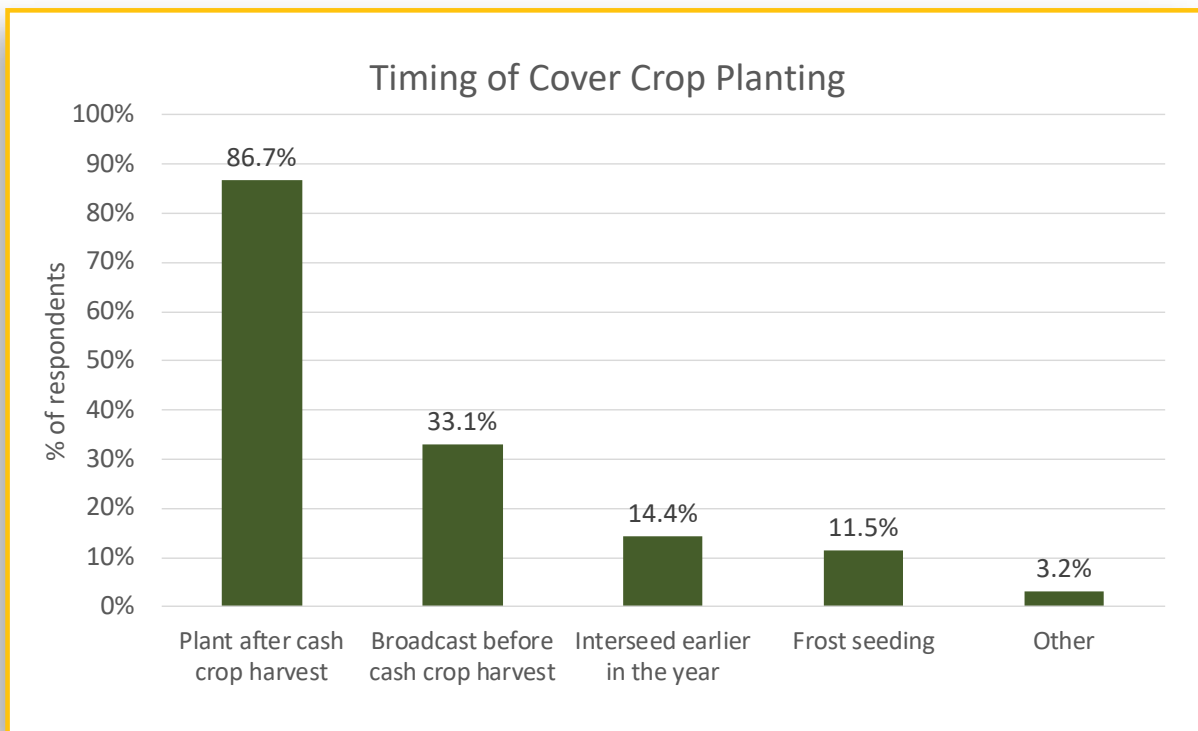
Respondents were asked to indicate when they typically plant their cover crops, in percent of total acreage for each timing window. Ideally, the combination of these answers would total 100%, but human error led to a wide range of totals. Responses regarding timing of planting were retained from 375 respondents whose answers totaled 90 to 110%, indicating that they tried to provide an accurate account of the proportion of their seeding practices.



SEEDING COVER CROPS CONT'D

Of these, 87% reported planting cover crops after cash crop harvest. Quite a few growers are working to extend the cover crop growing season by seeding covers while cash crops are still in the field—33% said they broadcast cover crop seed before cash crop harvest, and 14% interseeded earlier in the year.

Three percent chose “other.” Among those explanations were unusual approaches like letting cash crops re-seed to create a cover; fallowing with a cover crop; using covers on prevent-plant acres; planting covers after grazing a field; and permanent systems, such as planting cash crops into a perennial sod of white clover or planting covers between tree crops.



It is interesting to note that planting covers after cash crop harvest is not only the most common approach, but also that those who use that timing reported applying the practice on an average of 84% of their cover cropped acreage. Other timings appear more experimental—the cover crop users who broadcast cover crop seed into a standing crop reported the practice on 54% of their acreage, interseeding was conducted on an average of 33% of the practice users' acreage, and frost seeding on 25%.



TERMINATING COVER CROPS



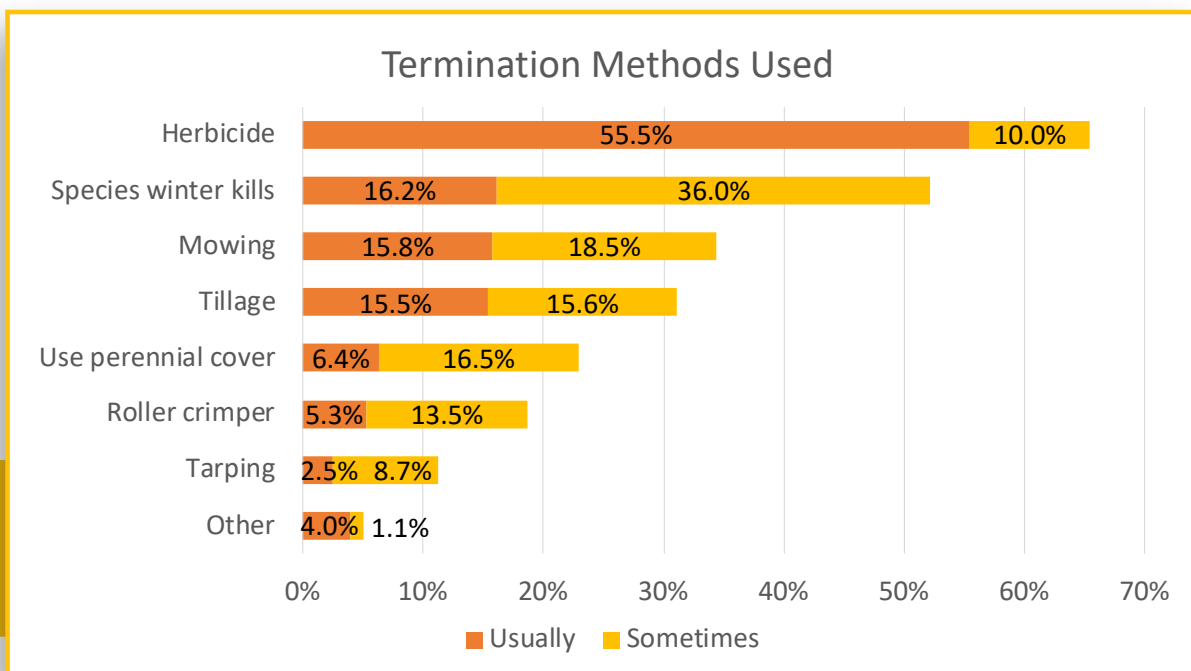
The method of terminating cover crops can be influenced by species, weather, equipment, subsequent cash crop, and other factors. It can also have significant impacts on the degree of kill, cost, and profitability.

Among 550 respondents, spraying herbicide was the most popular termination method, with 56% reporting that they usually spray and 10% saying they sometimes use the approach. Winter kill was next most-popular in total (52% vs. 65%), with 16% usually relying on it and 36% sometimes letting cold temperatures bring the cover crop down.

Next came mowing, with 16% usually and 19% sometimes, followed by tillage (16% usually and 16% sometimes). A roller/crimper was used by 5.3% usually and 13.5% sometimes, while blocking light and moisture with a plastic tarp was usually employed by 2.5% and sometimes used by 8.7%.

No termination or perennial cover was reported by 6.4% usually and 17% sometimes.

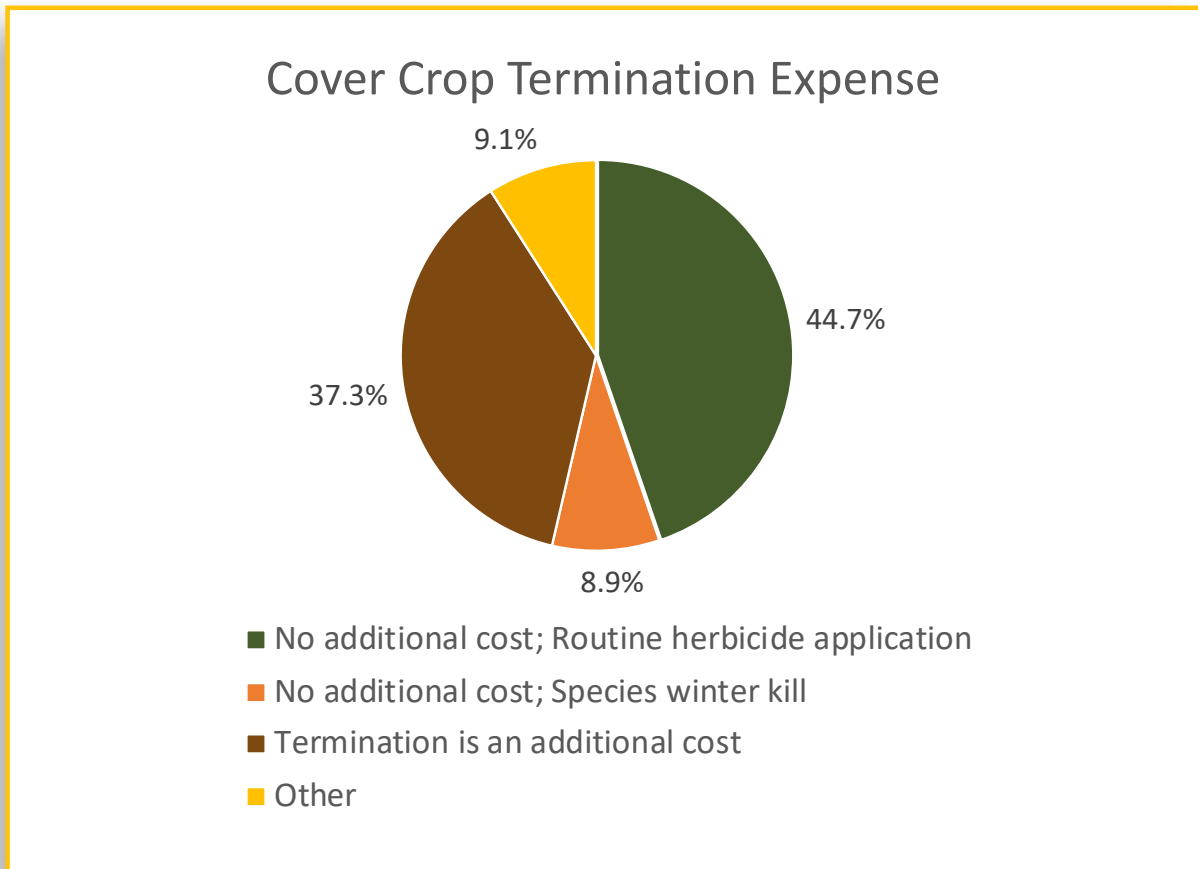
Other approaches, selected by 5% of the respondents, was strongly dominated by grazing, with some mentions of pulling or crimping by hand, as well as baling, or smothering with mulch or burlap rather than tarps.



n = 550

TERMINATING COVER CROPS CONT'D

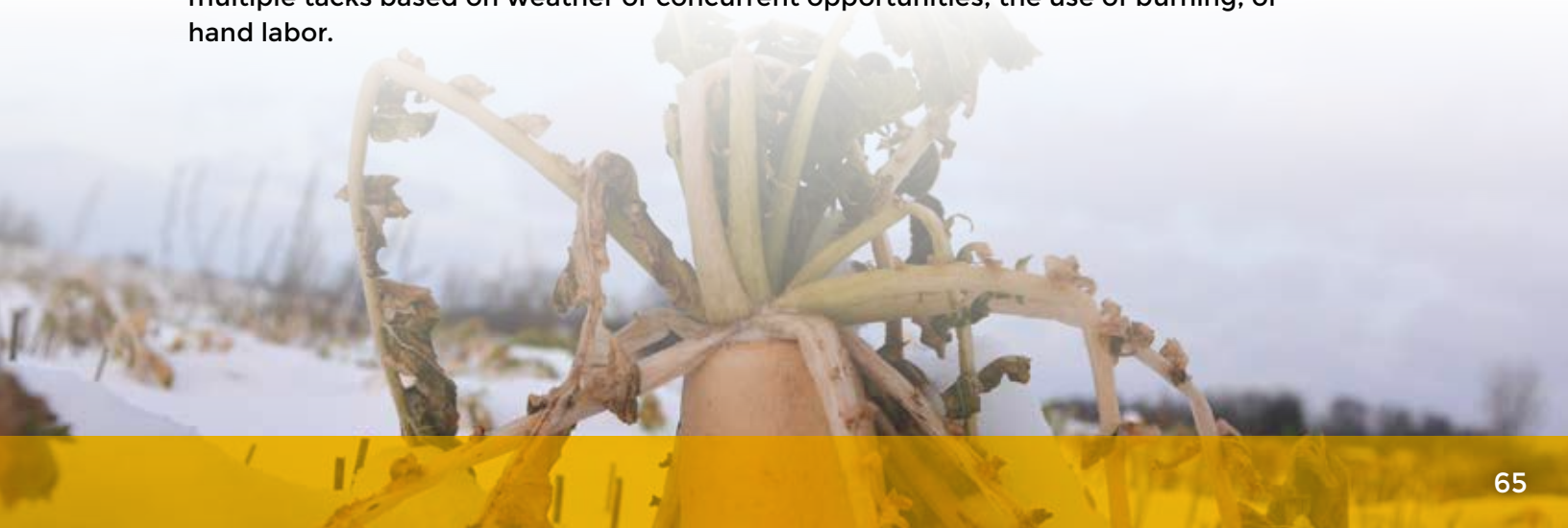
Termination was only reported as an extra cost by 37% (206 of 551 farmers); the largest proportion, 45% (247) said their termination spray was combined with their usual spring burndown. The remainder were evenly split (8.9% apiece) between winter kill and “other.”



n = 551

Of 202 who reported that termination was an extra cost for them, 95 (47%) said additional herbicide represented the extra expenditure, while 40 (20%) cited an extra mowing pass and 31 (15%) an extra tillage pass. Twelve (5.9%) marked the cost of an additional pass with a roller/crimper.

“Other” was chosen by 24 (12%), and write-in explanations included discussions of taking multiple tacks based on weather or concurrent opportunities, the use of burning, or hand labor.



HERBICIDE RESISTANT WEEDS



SOURCE: UNIVERSITY OF ILLINOIS

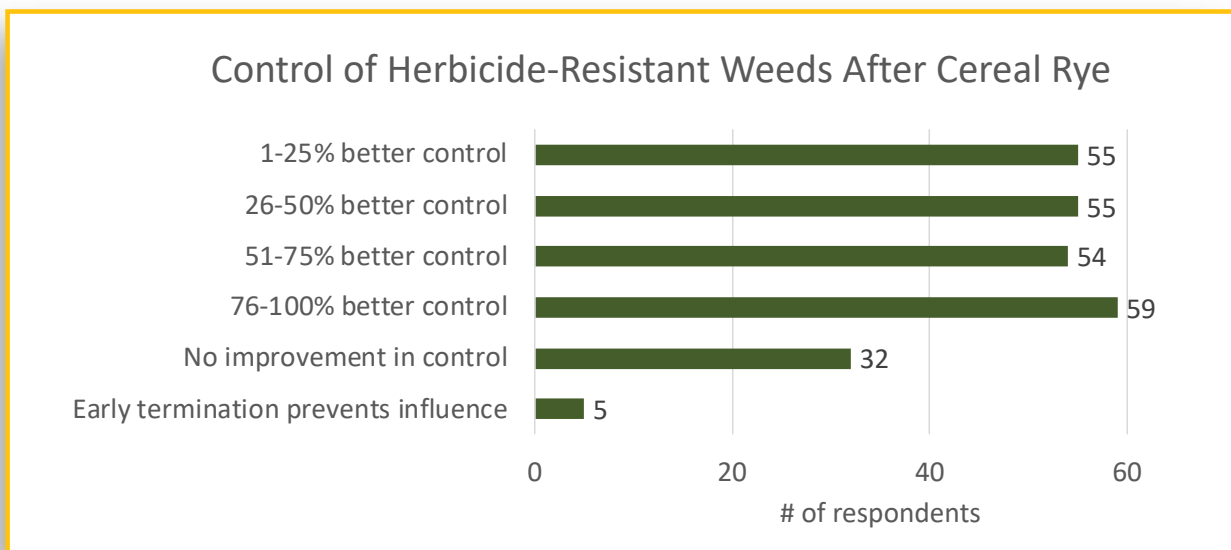
Agronomists often point to cover crops—notably cereal rye—as a cultural tool that can be managed to help farmers control herbicide resistant weeds. Since the 2015-2016 SARE/CTIC/ASTA survey, we have been asking cover crop users about their experience with cover crops and herbicide resistant weeds.

In the current survey, 326 of 549 respondents (59%) reported that they had resistant weeds on their farm, while 223 (41%) said they did not.

Waterhemp was, by far, the most commonly listed species in the open-ended answer box, where 226 growers listed one or more species of resistant weeds in their fields. Waterhemp was mentioned by 140 (62%), followed by marestalk/horseweed (75 mentions, or 33%), and two more pigweed relatives of waterhemp: pigweed (redroot or unspecified, totaling 22 or 9.7%) and Palmer amaranth, cited by 19 (8.4%). Giant ragweed (17/7.5%) and ragweed (10, or 4.4%) completed the list of double-digit mentions, followed by a smattering of other tough weeds in the single digits.

Asked whether they had observed better control of herbicide resistant weeds following their cereal rye crop—that had achieved a good stand and experienced spring growth—223 of 260 respondents (86%) chose an affirmative answer. The largest proportion, 59 growers (23%) reported a 76 to 100% better control following a good cereal rye cover crop, while 54 (21%) said they saw 51 to 75% better control and an almost equal number, 55 (21%), each selected 26 to 50% improvement or 1 to 25% better control of resistant weeds.

Thirty-two (12%) said they saw no difference in control of resistant weeds, and 5 (1.9%) reported that they terminate their cereal rye cover crop too early to see a difference in weed control. In addition to those 260 growers, 59 farmers selected “N/A.”

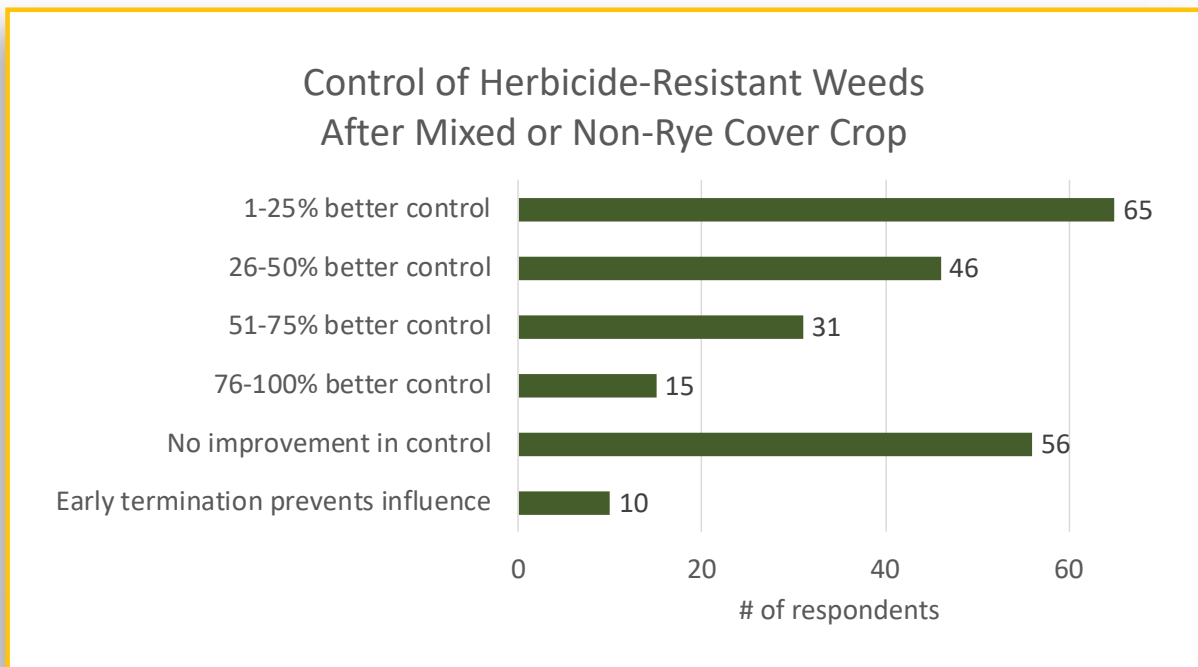


n = 260

HERBICIDE RESISTANT WEEDS CONT'D

The 2022-2023 survey also asked whether growers observed improvements in control of herbicide resistant weeds following a non-rye or mixed cover crop stand. In all, 56 of 223 (25%) reported observing no difference in control. The highest-ranking answer was 65 cover crop users (29%) reporting that they saw an improvement of 1 to 25%, and the rest followed in order: 46 (21%) saw 26 to 50% better control, 31 (14%) saw 51 to 75% better control, and 15 (6.7%) witnessed improvements in control of herbicide resistant weeds of 76 to 100%.

Ten growers (4.5%) said they terminated their cover crops too early to affect weed control in the spring. Finally, answers from 65 additional growers were not counted for this question because they selected the "N/A" option.



n = 223





PLANTING GREEN

As noted in the Corn and Covers section above, “Planting green”—seeding a cash crop into a living or just-terminated cover crop—has been the subject of a great deal of interest and research in recent years. The efficiency, formation of a weed-controlling mulch, soil moisture management (either drawing up excessive moisture through cover crop growth or trapping scarce moisture beneath a canopy), and extra days of biomass formation promise a range of benefits. On the other hand, good termination is a must to prevent competition with the cash crop.

Questions on planting green have been included in the SARE/CTIC/ASTA National Cover Crop Survey since 2016–2017. At that time, 39% of the cover crop users surveyed had tried or continued to plant green.

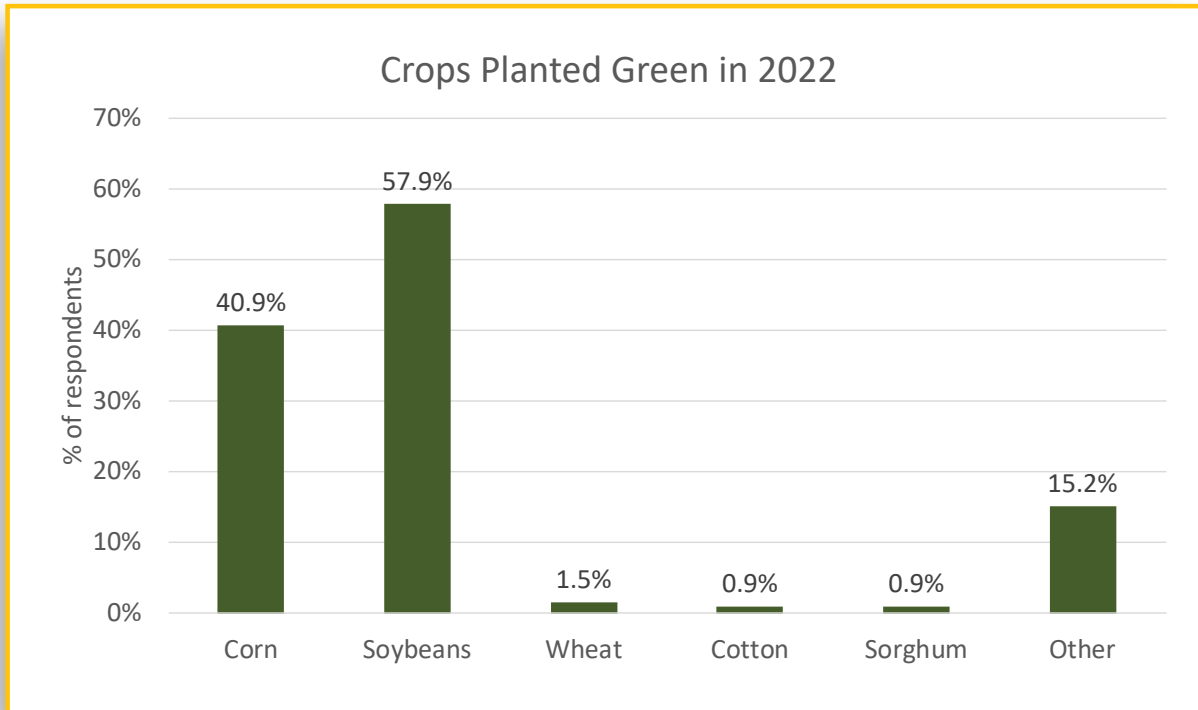
Planting green was also the subject of several questions in the 2019–2020 National Cover Crop Survey. That year, which was marked by an extremely wet spring that interfered with cover crop termination, 52.5% of the respondents reported planting green somewhere on their operation. (That year’s questionnaire did not ask them to specify the cash crops that were planted green.)



In the 2022–2023 survey, 331 of 551 (61%) of the cover crop users reported planting green somewhere on their operation (note that this is a significantly higher percentage than the 38% of cover crop users who said they planted green specifically with corn earlier in the survey). Among 328 of those growers who went on to answer a follow-up question on which cash crops they planted green—selecting as many as were appropriate—58% planted soybeans into green cover crops, 41% planted corn, and 1.5% planted wheat. Cotton and sorghum both rated 0.9% responses, though the number of growers of those commodities responding to this year’s survey was very small.

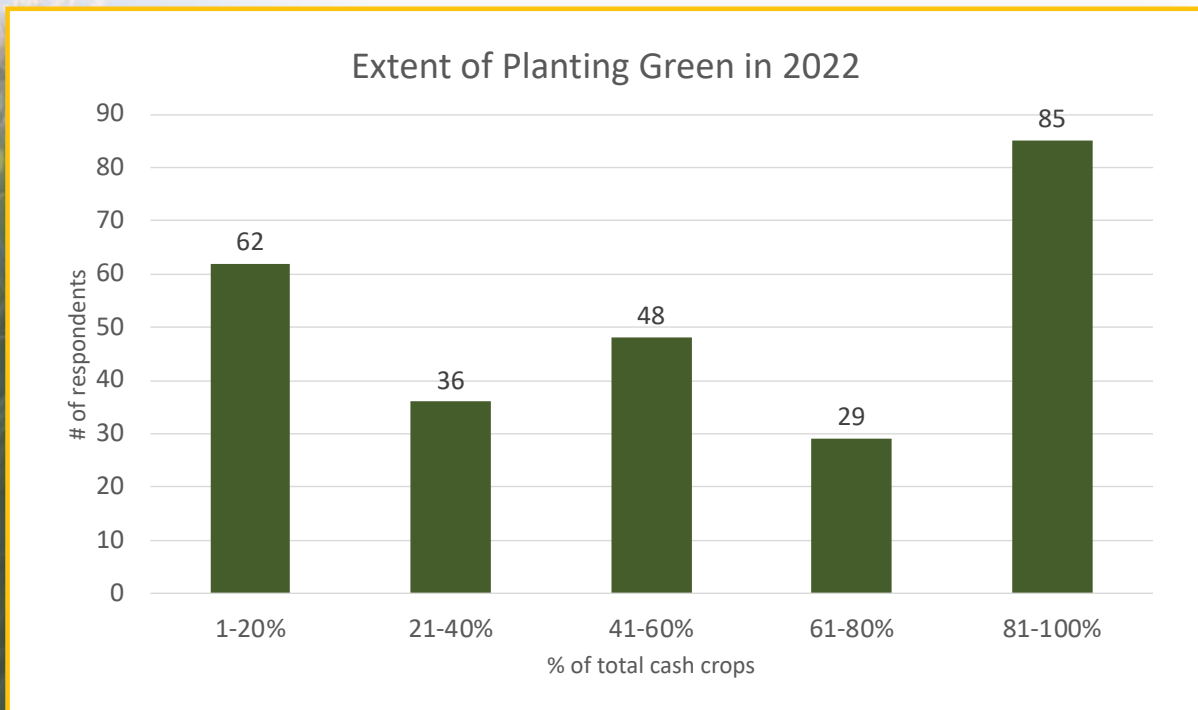
A range of other crops were listed by 15% of the respondents. The vast majority were horticultural crops, including various vegetables, fruits, and flowers. Pasture, rye/crimson clover, buckwheat, sudangrass, and tall fescue all received a mention. “You can plant some annuals right next to covers that are dying or will be terminated,” wrote one grower. “Still benefits just inches away.” Seventeen percent reported that they did not plant green in 2022.

PLANTING GREEN CONT'D



n = 328

While planting green seems to be gaining ground, one-third (33%) of the 260 respondents who planted green in 2022 and answered the question—committed to the practice on 81 to 100% of their cash crops. The next-largest group (62, or 24%) planted green with 1 to 20% of their cash crops, while 36 (14%) planted 21 to 40% of their cash crops into green covers, 48 (18%) planted green with 41 to 60%, and 29 (11%) used the practice on 61 to 80% of their cash crops.



n = 260

PLANTING GREEN CONT'D

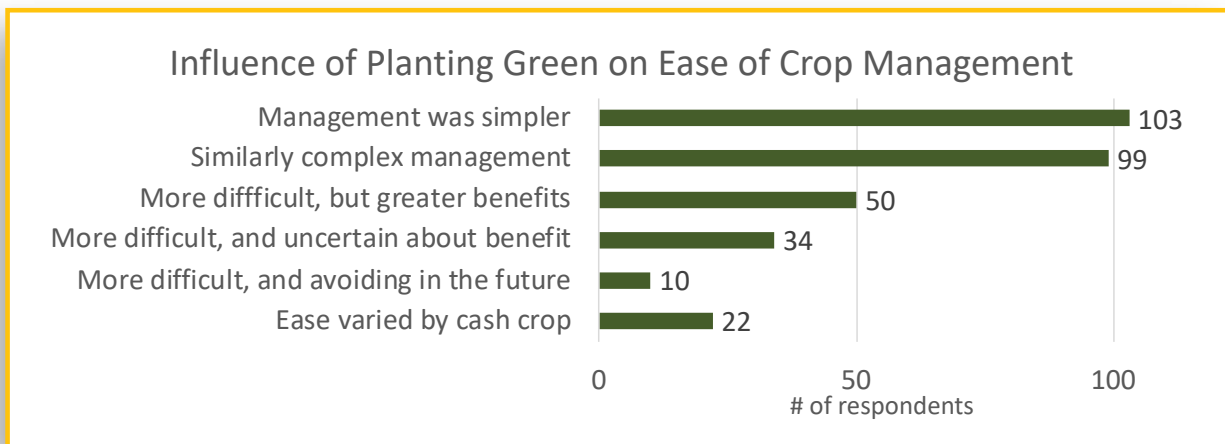
Though the largest number of respondents—122 of 324, or 38%—had just 1 to 2 years of experience planting green in 2022, 105 (32%) reported 5 or more years of experience with the practice, and 97 (30%) said they had been planting green for 3 or 4 years.

This year's survey asked growers who planted green to describe the practice's impact on their management. The largest number, 103 of 318 (32%), selected the multiple-choice answer, "It made management simpler." The next-largest group chose the statement that management of planting green is similarly complex to earlier termination, while 50 (16%) agreed with a statement that planting green made management more difficult, but the benefits outweighed the challenges.

Thirty-four respondents (11%) said difficulties managing planting green had them evaluating whether or not the benefits outweighed the challenges, and just 10 (3.1%) said planting green made management more difficult and they would avoid the practice in the future.

Another 22 (6.9%) said management complexity varied by crop. Many noted that soybeans were significantly easier to plant green, and pointed to corn's need for more sun and nitrogen early in the growing season. Some reported that they are still experimenting with planting and termination dates, and one noted that planting green invited a severe infestation of voles.

One grower summed up the experience by writing: "It depends on far too many variables such as soil type, moisture conditions, weather conditions, soil temps, weather forecast after planting. We need to stop making broad generalities, and sweeping statements!"



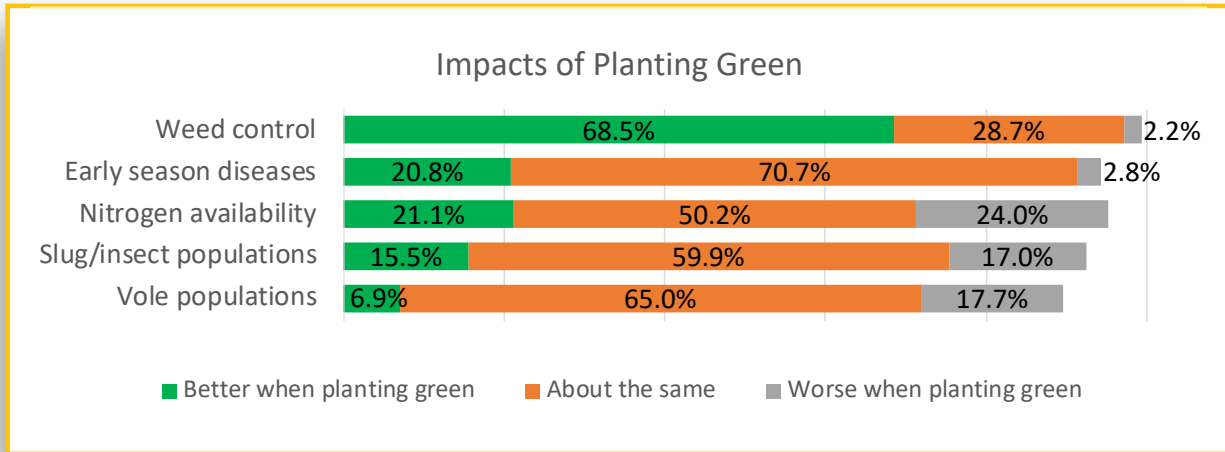
n = 318

The largest benefit of planting green identified by respondents in this year's survey was weed control, which 69% of the cover crop users who planted green and answered the question noted was better. Another 29% said weed control was about the same when planting green, and 2% said it was worse.

Both early season diseases and nitrogen availability improved with planting green, according to 21% of respondents. In the early season disease question, 71% said they were about the same in planting green fields, while 2.8% said they were worse. For nitrogen availability, 50% reported equal results with planting green, while 24% said N availability was worse in fields planted green.

PLANTING GREEN CONT'D

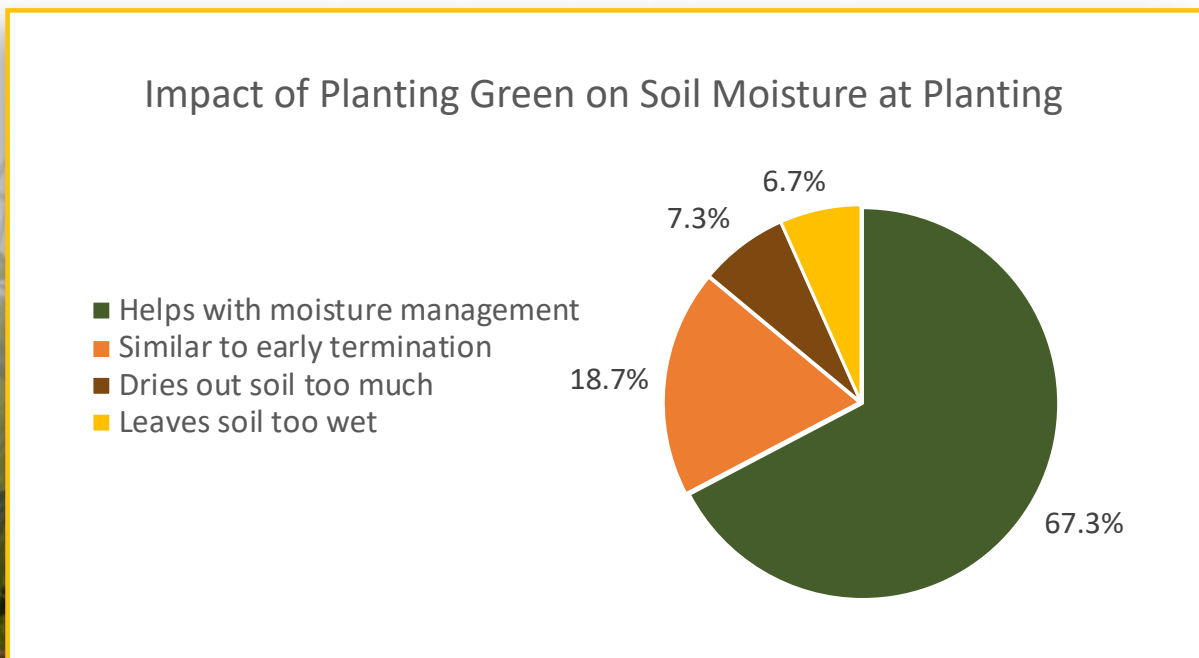
Slug and insect populations saw 16% of respondents reporting better results after planting green and 17% saying they were worse, with 60% saying slugs and insects were about the same. Voles showed the greatest negative feedback, with 7% of growers saying they were better after planting green, 18% reporting that voles were worse, and 65% saying they were about the same.



n = 317

(Not all sub-questions were answered, so totals do not all reach 100%)

Moisture management followed closely behind weed control in terms of the benefits of planting green. Of 315 farmers who used the practice, 212 (67%) said planting green helps with moisture management. The next-largest contingent, 59 growers (19%), said moisture at the time of planting green is similar to fields in cover crops terminated before planting. Too wet and too dry garnered almost equal shares: (7.3%) said planting green typically dries out the soil too much, and 21 (6.7%) said it typically leaves the soil too wet.



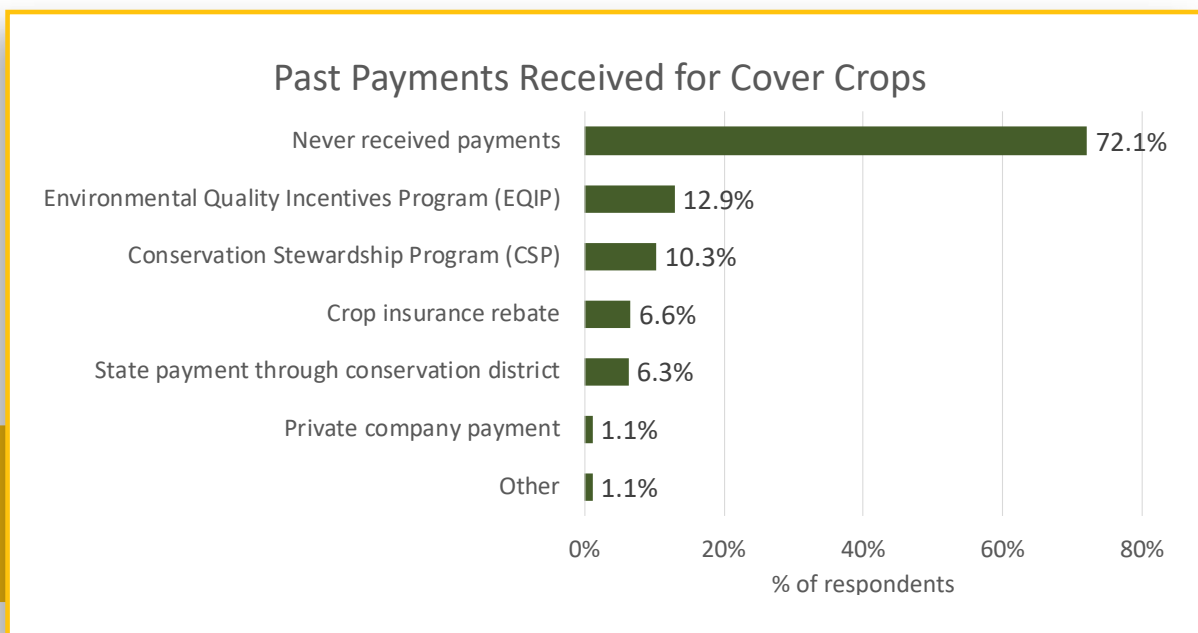
INCENTIVES AND PAYMENTS

Because of its geographic breadth, the SARE/CTIC/ASTA National Cover Crop Survey provides a 30,000-foot look at the cover crop incentive payment landscape, which can help shed light on funding sources that are helping put practices on the ground.

Among 547 cover crop users participating in this year’s survey, 51% reported that they did not receive any payment for planting cover crops in 2022.

Of those growers who did not receive payments in 2022 for planting cover crops, 72% reported that they have never received payments for cover crops. Thirteen percent had received Environmental Quality Incentives Program (EQIP) payments from the U.S. Department of Agriculture Natural Resources Conservation Service (NRCS) in the past, and 10% had participated in NRCS’s Conservation Stewardship Program (CSP) in prior years. About 6% received payments at some point of state money through local soil and water conservation districts, and 6.8% had received a crop insurance rebate. Just 1.1% had received money from a private company’s cover crop or regenerative practices program in the past.

Writing in the “other” blank, one grower named the state of Indiana as a past funder, another pointed to county funds, and one wrote, “many years ago, there was a cost share program. This really needs to be re-instated. Long Over-due!!”



n = 272

INCENTIVES AND PAYMENTS CONT'D

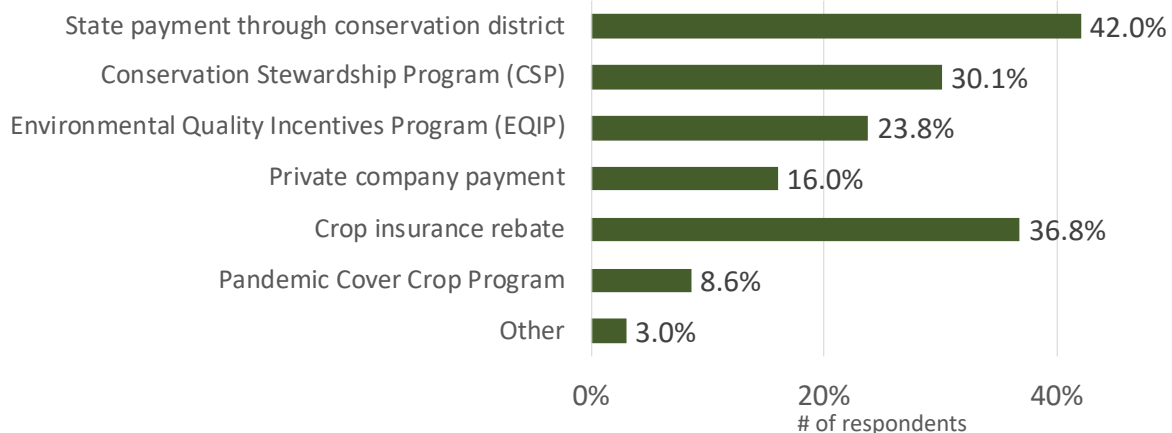
Federal, state, and private incentive programs continue to impact cover crop use.

Among the 269 growers who reported that they received payments in 2022—and were allowed to select all sources that applied to their operations—42% received state funds through a local soil and water conservation district and 37% received a crop insurance rebate.

Conservation Stewardship Program (CSP) payments from the NRCS were received by 30%, while NRCS Environmental Quality Incentives Program (EQIP) payments encouraged 24%. Payments from private companies to plant cover crops or use regenerative practices were received by 16%, the federal Pandemic Cover Crop Program reached 8.6%.

Most of the other sources cited by 3% of the respondents included incentives from watershed groups, a grassland reserve program, a pollinator project through Project Apis m., payment for participating in a state nitrogen study, and a carbon program. One grower wrote, “I have never received a payment for planting covers. Most programs were too restrictive/simplistic or had too long of a lead time, limiting management flexibility.”

Type of Payment Received in 2022



n = 269

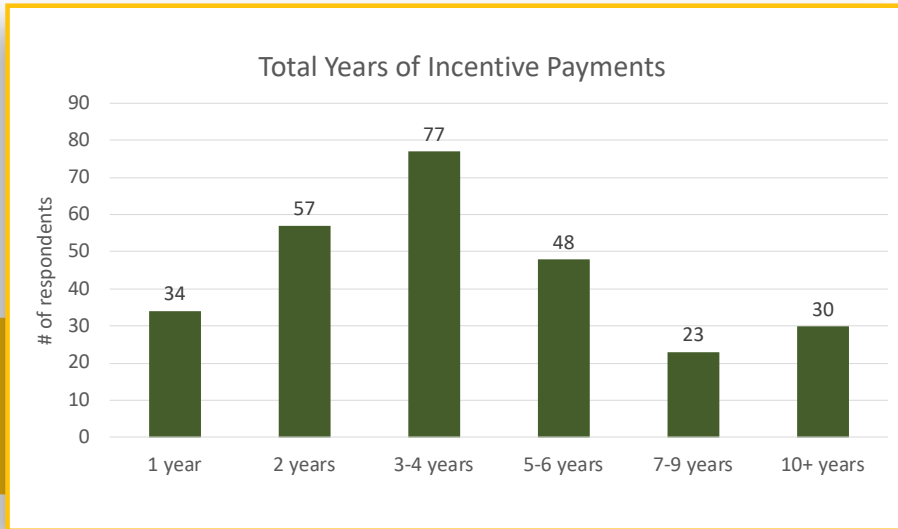
Growers made significant commitments to participate in cover crop incentive programs. Among 264 growers who had received payments, the percentage of their acreage enrolled in incentive programs ranged from 38% to 100%, with a median of 64% and a mean of 63.1%.

The largest number of growers who received payments in 2022 for planting cover crops—77 of 269 respondents (29%) reported having received payments for 3 to 4 years. The next-highest proportion was 57 (21%) with 2 years of payments, followed by 48 (18%) with 5 to 6 years, 34 (13%) with 1 year of payments. Twenty-three (8.6%) had received payments for 7 to 9 years, and 30 (11%) for 10 or more years.

INCENTIVES AND PAYMENTS CONT'D

Growers made significant commitments to participate in cover crop incentive programs. Among 264 growers who had received payments, the percentage of their acreage enrolled in incentive programs ranged from 38% to 100%, with a median of 64% and a mean of 63.1%.

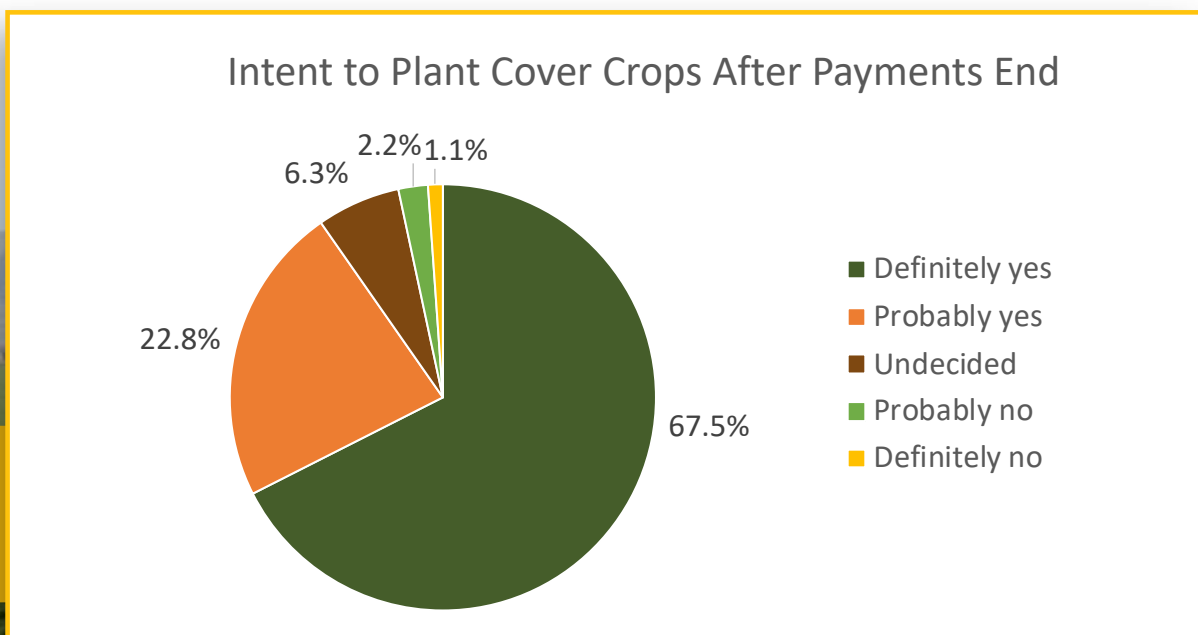
The largest number of growers who received payments in 2022 for planting cover crops—77 of 269 respondents (29%) reported having received payments for 3 to 4 years. The next-highest proportion was 57 (21%) with 2 years of payments, followed by 48 (18%) with 5 to 6 years, 34 (13%) with 1 year of payments. Twenty-three (8.6%) had received payments for 7 to 9 years, and 30 (11%) for 10 or more years.



Perhaps the most encouraging result of the payments section of the survey, as has been the case in previous years, is the overwhelming interest among cover crop users to continue planting cover crops even after incentive payments end.

n = 269

In all, 90% of the growers who received 2022 payments answered positively to the question, "Do you plan to use cover crops after payments end?" 181 (68%) chose "definitely yes" and 61 (23%) selected "probably yes." Three growers (1.1%) responded "definitely no" and 6 (2.2%) "probably no," while 17 (6.3%) said they were undecided.



n = 270

SOIL CARBON PROGRAMS

In the 2022-2023 survey, we introduced questions on private sector carbon markets, eager to explore a possible funding opportunity that could help incentivize long-term cover crop use. As noted in the Payments section, private corporate money, such as carbon markets, has not yet captured a large share of the incentives system.



Among cover crop users responding to the survey, 91.5% (505 of 552) growers reported that they had not signed up with a private sector carbon program as of early 2023, and 8.5% (47) had. Of those that had enrolled in a carbon program, about half (22 of 47, or 47%) had signed up in 2022, 10 (21%) in 2021, and 7 (15%) in 2020. Six early adopters (13%) had been enrolled since 2019 or earlier.

Those 47 growers had enrolled a mean of 680.6 acres in carbon programs, with commitments ranging from 165 to 1,032 acres. Two wrote in that they had committed all of their acres. Cover crops are used on the enrolled acreage by 96% of the respondents, no-till by 85%, and nutrient management by 55%. “Other practices” were identified by 2 growers, or 4.5%—one noted that “letting cover crops live longer” was part of the contract.

Among growers who did not participate in a private carbon program, reasons for reluctance were varied. The most common reason not to participate—selected in a “choose all that apply” multiple-choice list—was lack of familiarity with carbon markets, picked by 36% of the 498 respondents. Concerns about long-term commitments (33%) and insufficient payments (32%) were nearly equal in scope, and indecision about which program to pick was holding 29% back.

Eligibility was a hurdle noted by 25%. That is not an uncommon concern among early adopters of cover crops and other conservation technologies, as carbon programs tend to emphasize additionality—bringing carbon-sequestering practices to new acres. A significant number of write-in answers expressed frustration with eligibility requirements that deny participation to farmers who are already using cover crops and/or no-till or are too small.

Complex requirements for participation turned off 20% of the growers in this group, and unpredictable payments were an obstacle for 14%. Looking beyond specific hurdles, 19% of the respondents indicated that they have no interest in participating. While some of the growers writing in answers indicated that they did not want to share their financial data, several others expressed philosophical issues with the practice of carbon credit markets, including several who noted that they did not want their stewardship efforts to allow other businesses to pollute.

RESEARCH PRIORITIES

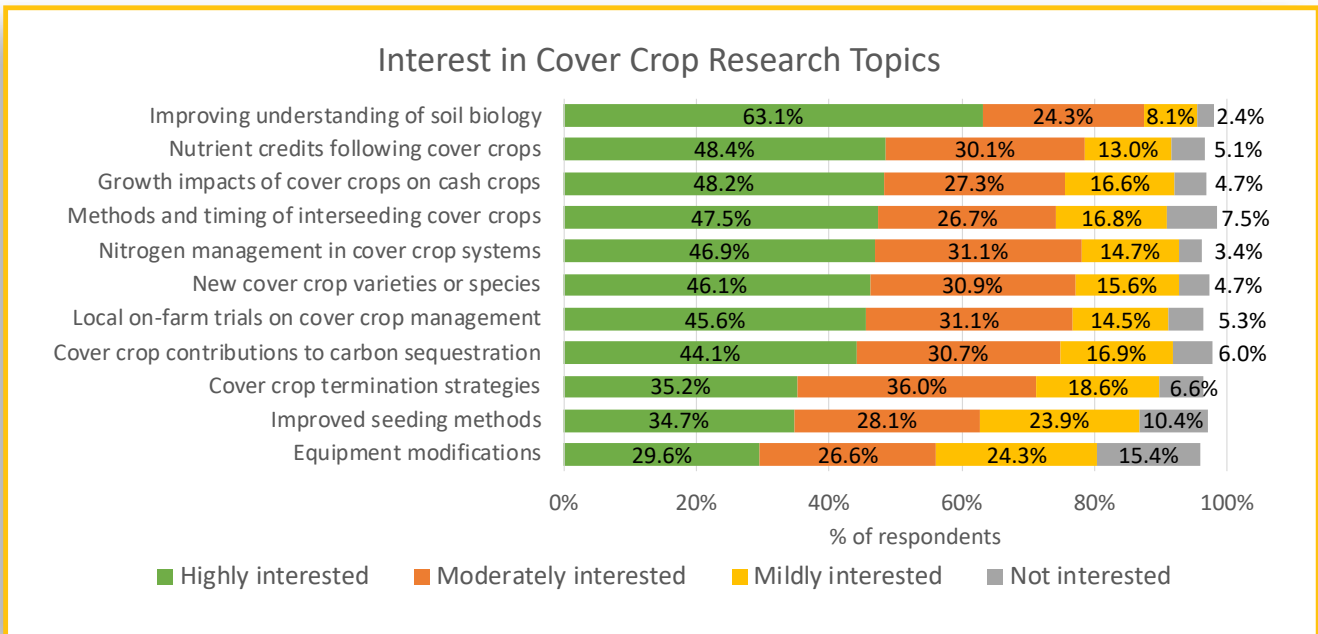
The final question for cover crop users was designed to point the research community toward avenues of inquiry that answer farmers' most pressing questions on cover crops.

Five hundred thirty-one growers weighed in on a list of possibilities, indicating the importance of each topic. Not surprisingly, given the importance of soil health as a goal of most cover croppers in the survey, the top research interest among growers was "Improving understanding of soil biology," indicated as highly interested by 63% and moderately interested by 24% for a total of 87% of growers.

Three other subjects tied for "highly interested" votes at 48% apiece: nutrient credits following cover crops, growth impact of cover crops on cash crops, and overseeding cover crops during the growing season. Nitrogen management in cover crop systems was just behind with 47% of growers highly interested, and new cover crop varieties/species is of high interest to 46%.

Even the lowest-scoring lines of research—equipment modifications for planting cash crops into cover crop residue, faster/cheaper seeding methods, and cover crop termination strategies—still attracted high interest from about 3 of 10 growers in the survey.

Cover crop users are clearly a community eager for information.

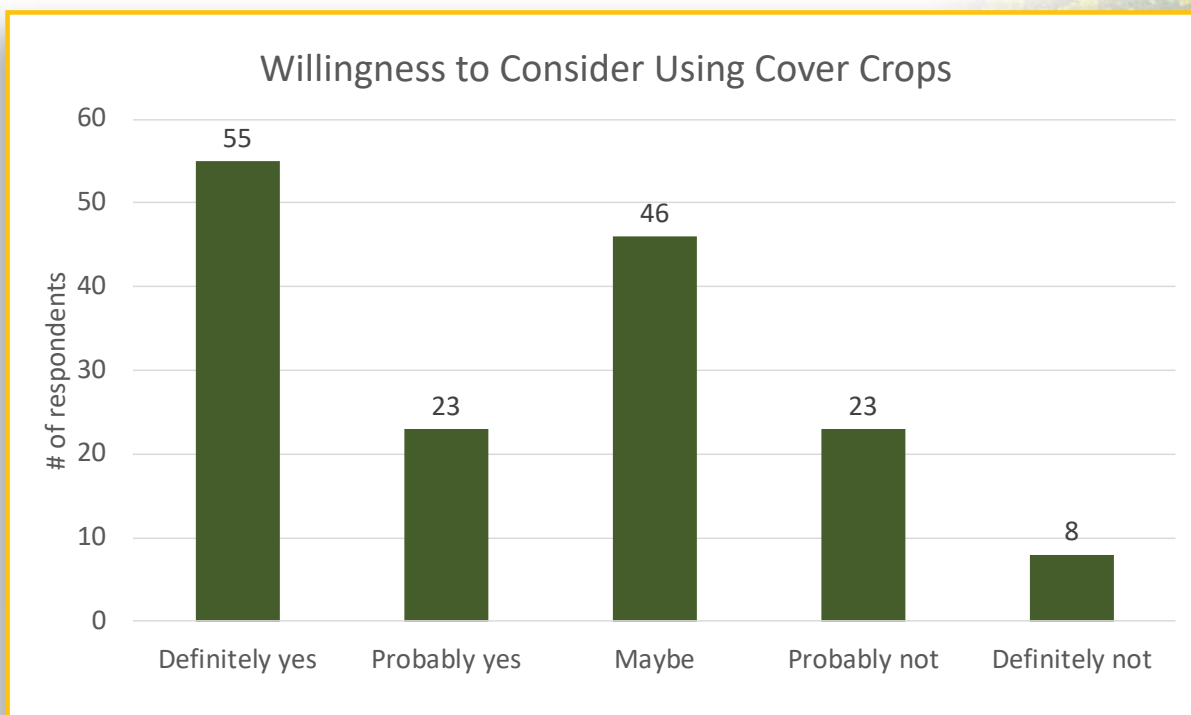


n = 531

NON-USERS

Despite choosing not to plant cover crops, the majority of non-users expressed a willingness to consider trying them (or trying them again). Of the 155 respondents to the question, “Are you open to considering using cover crops on your farm?” 55 (35%) said “definitely yes,” 23 (15%) said “probably yes,” and 46 (30%) said “maybe,” for a total of 80% positive response. Twenty-three (15%) replied “probably not,” and 8 (5%) chose “definitely not.”

Those responses point to a significant amount of room for growth of cover crop adoption in the future.



n = 155

CONCERNS & OPPORTUNITIES



Non-users of cover crops were asked to respond to a list of negative statements about cover crops and indicate how much they were concerned about each issue on their farms. An interesting pattern emerged.

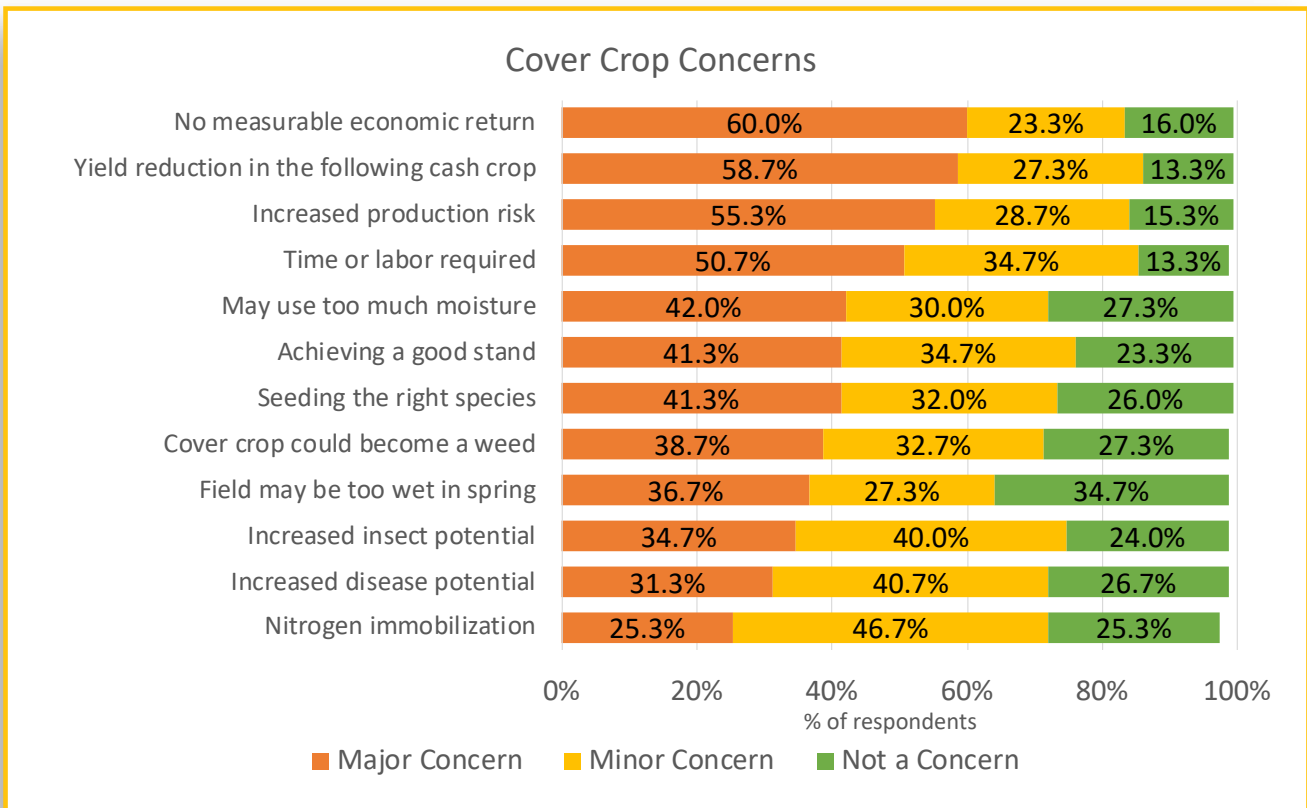
The statements that elicited the highest percentage of respondents saying they were a “major concern” were economic: “no measurable economic return” was a major concern of 60% and a minor concern of 23%, while “yield reduction in the following cash crop” was noted as a major concern by 59% and a minor one by 27%. Following close behind, “increasing overall production risk” was identified by 55% as a major concern and 29% as a minor concern.

CONCERNS & OPPORTUNITIES

The time/labor required for planting and managing cover crops was fourth highest for “major concern” at 51%; but adding its score as a minor concern by 35% of the respondents made it equal in overall worry to yield reduction. It is interesting to note that in past surveys, time/labor was generally the top concern among non-users.

The next block of concerns centered around specific management issues. Concern that the cover crop would use too much moisture was major for 42% and minor for 30%, achieving an acceptable stand was flagged by 41% as major and 35% as minor, and selecting the right species for their operation was a major concern of 41% and minor for 32%.

The last set of concerns revolved around worries that cover crops would create specific problems the following season. Thirty-nine percent of non-users feared that their cover crop could become a weed in the spring, while 27% saw that as a minor concern, and 37% worried that the cover crop could prevent the field from drying out in the spring, a minor concern of 27%. Increased insect potential was major for 35% and minor for 40%, increased disease potential a big worry for 31% and a small one for 41%, and nitrogen immobilization was the least worrisome, with 25% labeling it a major concern and a significant 47% noting it was a minor one.



CONCERNS & OPPORTUNITIES

Farmers also had an opportunity to write in specific responses under “other.” Some, like slugs, voles, or deer, augment the concerns over insect infestations. Timing concerns could be considered a specific offshoot of “achieving an acceptable cover crop stand.” The largest group of free-response answers revolved around cost—specifically seed cost or the cost of equipment needed to seed or manage cover crops.

In all, the concerns ranked or listed by non-users of cover crops can guide research and communication efforts in the future. Understanding the worries of non-users, gathering data on whether those concerns are warranted, and providing the education and tools to help address them on the farm could help convince farmers—the majority of whom have expressed a willingness to try cover crops—that they could succeed with the practice.

The 2022 survey asked respondents to rate how helpful a series of approaches would be in encouraging them to try cover crops.

The approach rated most helpful among the 144 non-users was, in fact, information to help determine whether cover crops will provide a positive economic return, which was selected by 44% as very helpful and 19% as moderately helpful. Interestingly, information received the lowest number of votes (8%) in the “not helpful” category, indicating a generally high appetite for data and insight. Farther down the list, 24% of the respondents agreed that “local farm tours that show how cover crops work in my area” would be very helpful and 15% rated them moderately helpful.

Cost-share or incentives to offset planting costs came in at number two, with 40% naming it very helpful and 19% moderately helpful. A similarly economic solution, payments for storing soil carbon, was the fourth-rated means of encouragement, with 28% saying it would be very helpful and 13% rating it moderately helpful; at the same time, carbon credits received the highest percentage of “not helpful” ratings, at 24%.



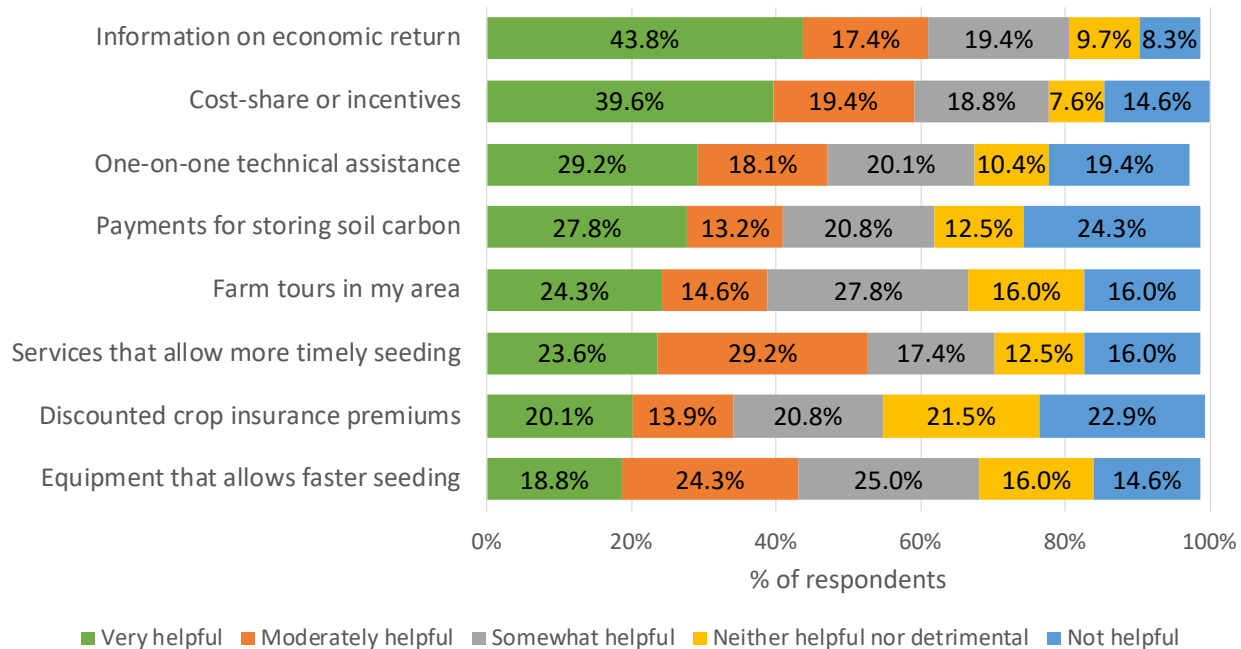
CONCERNS & OPPORTUNITIES

Between the two economic approaches was one-on-one technical assistance to select, plant, or manage cover crops, noted as very helpful by 29% and moderately helpful by 18%.

Services that could allow more timely cover crop seeding received 24% very helpful and 29% moderately helpful reviews, a combination that raised this statement to the third-ranking approach for both positive responses taken together. New equipment or methods that could speed seeding added up to an attractive approach (19% very helpful, 24% moderately helpful), and discounted crop insurance premiums garnered 20% very helpful and 14% moderately helpful votes.

Free-response answers ranged from requests for information (a guide for cover crops in small spaces, research results on spring strip till, plant density guidelines for USDA-approved waterways) to economic wishes (“find me a cover crop that can produce something I can sell,” “grants”) and inputs like local sources for cover crop seed to eliminate shipping costs.

Perceived Helpfulness of Possible Resources



n = 144

NON-USER BELIEFS

Another approach to examining the beliefs and motivations of non-users of cover crops was presenting them with a series of statements and asking them to indicate their level of agreement with each.

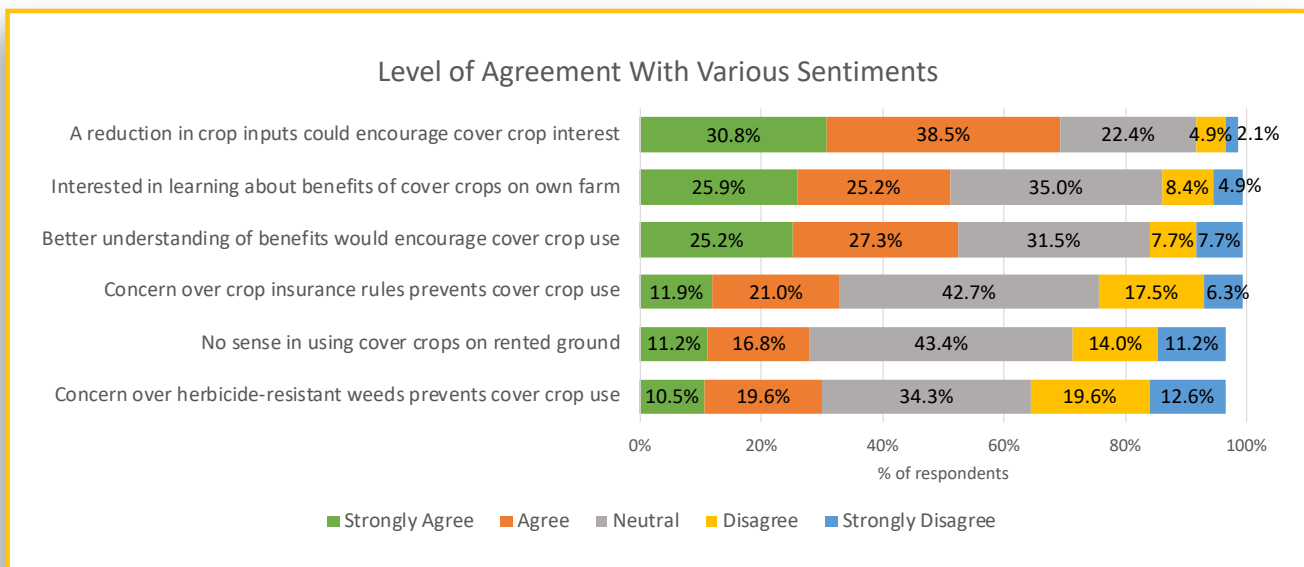
The most agreed-with comment was: “If cover crops could help me reduce crop inputs, I would be more interested in using them on my farm,” with 31% of the 144 respondents selecting “strongly agree” and 39% choosing “agree.” Very few non-users disagreed with this statement: just 5% chose “disagree” and 1% “strongly disagree.” This statement received the lowest proportion of neutral votes, from 22% of the respondents who answered.

The hunger for information was confirmed in this section, with 26% strongly agreeing and 25% agreeing with the statement, “I am interested in learning more about how cover crops can benefit my farm.” Just 8% disagreed and 5% strongly disagreed, while 35% chose the neutral reaction. Clearly, information is eagerly sought by many non-users.

A similar statement scored very similarly: 25% strongly agreed and 27% agreed with: “If I better understood how cover crops would benefit my farm, I would be more likely to use cover crops.” Disagreement elicited 8% of each “disagree” and “strongly disagree, and 32% were neutral.

The last two statements explored economic issues. “The crop insurance rules make me nervous about trying cover crops on my farm” received strong agreement from 12% and agreement from 21% of the non-user respondents and the largest pool of “disagree” ticks, at 18%. Six percent strongly disagreed, and 43% felt neutral toward the statement.

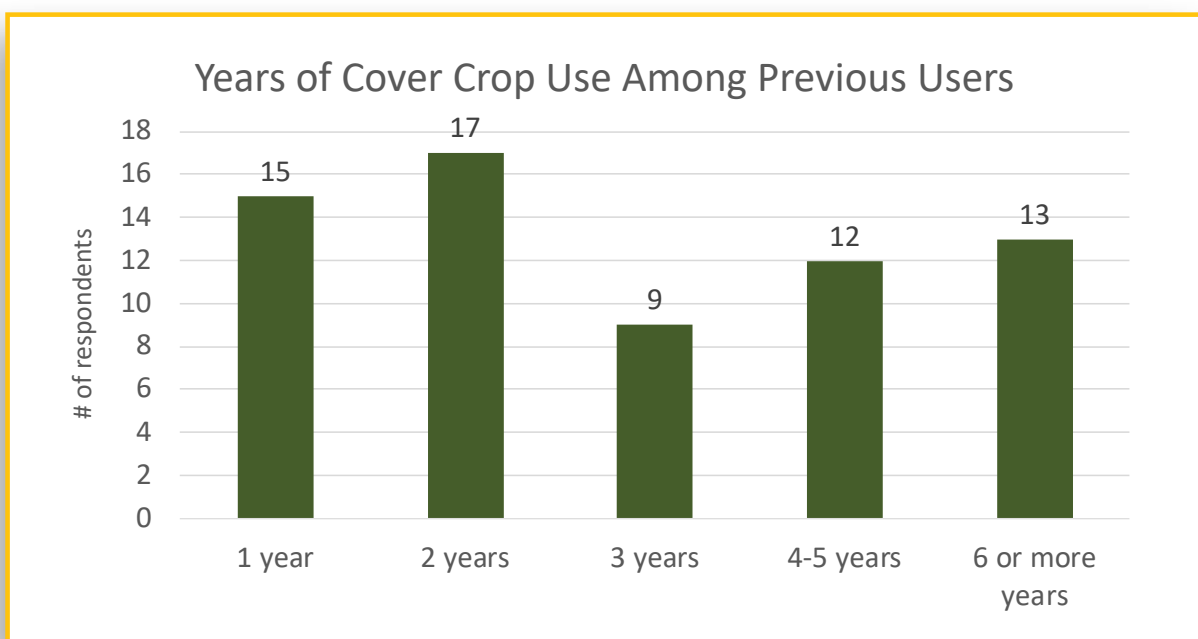
Just as renting land did not correlate as strongly as expected with non-use of cover crops, the lowest level of agreement (11% strongly agreed and 17% agreed) was with the statement, “It does not make sense for me to use cover crops on land that I rent.” This statement received the highest neutral score at 43%, and the highest overall level of disagreement, with 14% disagreeing and 11% strongly disagreeing.



PREVIOUS COVER CROP USERS

Among the most pressing questions among researchers and promoters in the conservation agriculture sector are why farmers try cover crops and then stop planting them. In this report, we isolate data provided by non-users who reported that they had used cover crops in the past, in an effort to gather insight on why they chose not to continue the practice.

Of 66 respondents in that category, 15 (23%) reported discontinuing cover crops after one year and 17 (26%) stopped after two years. The smallest proportion (9 farmers, or 14%) stopped planting cover crops after 3 years, 12 (18%) after 4 to 5 years, and a surprising 13 (20%) planted cover crops for six or more years before ending the practice.



n = 66

Among non-users who had planted cover crops in the past, nearly two in three (41 of 65 farmers answering the question, or 63%) said they had received an incentive payment for planting cover crops, and the balance—24, or 37%—reported that they had not.

Twenty-four of the non-users who had planted cover crops in the past provided answers to the question, “which program(s) were you enrolled in?” Respondents could choose more than one answer.

Both the USDA-Natural Resources Conservation Service’s Environmental Quality Incentives Program (EQIP) and the service’s Conservation Stewardship Program (CSP) were tapped by 11 (46%) of the respondents, while state programs administered by local soil and water conservation districts were used by 4 (17%), and 1 respondent (4%) each selected payment from a private company and “other” (which was identified by write-in answer as the US Environmental Protection Agency’s Section 319 grant program).

CONCLUSION

National Cover Crop Survey—after years of uncertainty brought on by Covid, drought, and economic worries—told an optimistic story. Growers of cover crops perceive value in the practice and apply it in a wide range of ways across a wide range of crops. They are eager for information and confident in what they see in their on-farm experiments.

Non-users are not dead-set against cover crops by any means, but they want information to help them build confidence that cover crops will work in their conditions and systems. Research, communications, incentive programs, and farmer-to-farmer sharing will be important factors in addressing their concerns in the years ahead.

FOR MORE INFORMATION ON COVER CROPS, VISIT:

<https://www.sare.org/resources/cover-crops/>

https://www.ctic.org/projects/CTIC_Projects/CoverCropMath

<https://www.betterseed.org/cover-crops/>

<https://cra.missouri.edu/topics/cover-crops/>

<https://farmersforsoilhealth.com/>

FOR COPIES OF PAST NATIONAL COVER CROP SURVEY REPORTS, VISIT:

https://www.ctic.org/data/Cover_Crops_Research_and_Demonstration_Cover_Crop_Survey