A photograph of a field with green cover crops growing in rows between rows of dry, golden-brown corn stalks. The sky is overcast and grey.

2020 Prairie Cover Crop Survey Report

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October 2021



Summary

Cover crops have the potential to bestow numerous agronomic, environmental, and economic benefits on Prairie farms. However, they are often viewed with skepticism by local farmers, in part due to the limitations of the Prairie climate. The recent uptake in cover crop use by farmers in neighbouring American States and in Eastern Canada has encouraged an increasing number of Prairie farms to experiment with cover crops. This makes it an important time to hear from farmers about their needs for research and knowledge transfer. Farmers want to know how to use cover crops to meet their goals. Policy makers need information to design conservation BMP programs to meet environmental targets. Lack of information has been a major hurdle for farmers interested in adopting the practice and for developing policy to support cover crop use. To help fill these knowledge gaps the 2020 Prairie Cover Crop Survey was developed to provide information to farmers, agronomists, researchers, policy makers, and government organizations that will play an important role in the future of cover crops for the Canadian Prairies. A total of 281 early adopters of cover crops took part, growing 102,539 acres of cover crops across every major agricultural region of the prairies. The majority of farms (81%) responded that they have observed benefits from growing cover crops, with 54% of farms stating that they have seen improved soil health with cover cropping. Most farms that responded (71%) observed benefits within three years of adopting cover crops. Farms also identified common challenges that they faced while adopting cover crops. The most common problems were related to the prairie climate, with 30% of farms experiencing problems with the short growing season, and 27% having problems with establishment due to the lack of moisture in the fall. Despite these problems, only 4% of farms that responded reported that cover crops resulted in a drop in their farm profit. A much higher 24% identified that cover crops resulted in no change to their profit, and a further 24% identified that they saw an increase in farm profit. A substantial proportion of respondents (47%) were not able to identify the impact that cover crops had on farm profit. For this reason, it may be too early in the adoption process to determine how cover crops are influencing farm profit across the Prairies. Farms that responded identified payments for storing carbon, tax credits, and payments from conservation or watershed groups as popular methods that would enable cover crop use. This survey clearly identifies the extent, benefits, and common problems of cover crops during this early adoption phase in the Canadian Prairies. It also draws attention to potential methods to support farms currently growing or thinking about growing cover crops on the Canadian Prairies.

Acknowledgements

This survey project would not have been possible without Prairie farmers. We asked you to add your voice to this project so that we could tell the story about what is happening with cover crops on the Canadian Prairies, and there was a lot to tell. When there is so much to do each day and many other surveys asking for your opinions, thank you for taking the time to partner with us in this project.

Many organizations and individuals partnered with us to spread the word about this survey. This enabled us to reach early adopters growing cover crops in every corner of the Canadian Prairies. Thank you for taking the time to call your neighbour, send an email, add the survey notice to your newsletter, publish a story about the survey, or retweet a post. It was exciting to experience the strength of networks in the agricultural community throughout this project. We can accomplish so much when we work together. Thank you for making time to help make this project a success.

Funding for this project was provided by General Mills and Manitoba Agriculture and Resource Development through the Manitoba Ag Action Program.

The maps in our report were prepared by Myra Van Die.

Where to find this report

You can access a copy of this report at the University of Manitoba Agriculture & Food Knowledge Exchange website: <https://umanitoba.ca/agricultural-food-sciences/make/make-ag-food-resources#crops>

How to reference this report

Morrison, C.L., and Y. Lawley. 2021. 2020 Prairie Cover Crop Survey Report. Department of Plant Science, *University of Manitoba*. <https://umanitoba.ca/agricultural-food-sciences/make/make-ag-food-resources#crops>

Introduction

What are cover crops?

A **cover crop** is grown to cover the soil, at times when the soil would otherwise be left bare. This mimics natural ecosystems in which plants continuously grow when the ground is not frozen. For this research focused on the Canadian Prairies, we defined a cover crop as a crop that is planted primarily to provide soil health and other agronomic benefits that is not harvested as a major cash crop. Cover crops that are grazed as annual forage were counted as a cover crop in our definition.

Cover crops take two main forms in the Canadian Prairies. The first is a crop grown to provide cover during the **shoulder season** between cash crop harvest and the planting of the next cash crop. These cover crops are commonly seeded after cash crop harvest in the fall. However, they may also be established as an intercrop at any time during the lifecycle of the cash crop. Cover crops can also take the form of a **full season** cover crop, where a cover crop is grown to provide soil cover over a full growing season, either in the place of a cash crop, or in between rows of perennial crops. Farmers may grow a full season cover crop after an extreme weather event has destroyed a cash crop, to manage problem soils (such as salinity), to replace summer fallow, for green manure, or as an annual forage source in a grazing system.

Why are cover crops important?

Maintaining groundcover year-round provides greater protection from soil and wind erosion and provides food for soil microbes during periods when they may otherwise have been left “hungry”. Plants capture solar energy and fix carbon from the atmosphere that can be returned to the soil, building soil organic matter. This increase in soil organic matter alongside the presence of cover crop roots can assist in the building of stable soil aggregates and increase soil structure and water infiltration.

It is hypothesized that cover crops could play a role in increasing the profitability and resiliency of Prairie farms by increasing yield, nutrient cycling, and water use efficiency. Cover crops may also play a role in nutrient management by reducing fertilizer costs when using legumes that fix nitrogen, or by growing cover crops that can scavenge excess nitrogen left in the soil after cash crop harvest that may otherwise be lost. Cover crops may also provide another “tool” for tackling weed, pest, and disease pressures, especially at a time of increasing resistance to crop control products.

Why is this research important?

Cover crops are often viewed with scepticism by Prairie farmers due to the limitations of the short growing seasons and the unpredictable weather patterns in the region. Early adopters are adapting cover crops to Prairie cropping systems and to local environmental conditions. The recent uptake in cover crop use by farmers in neighbouring US states and in Eastern Canada has encouraged an increasing number of Prairie farmers to experiment with cover crops. However, there remains a lack of information on how farmers in the Prairies are using cover crops.

It is an important time to hear from farmers about their needs for research and knowledge transfer. Farmers want to know how to use cover crops to meet their goals. Policy makers and extension providers want information to best assist farmers and design policy to meet environmental targets. Lack of information has been a major hurdle for farmers interested in adopting the practice, and for the development of policy surrounding cover crops. To help fill these knowledge gaps the 2020 Prairie Cover Crop Survey was developed to provide information to farmers, agronomists, researchers, policy makers, and government organizations that will play an important role in the future of cover crops in the region.

Objectives

The 2020 Prairie Cover Crop Survey had six major objectives:

1. Understand the current extent of cover cropping on farms in the Canadian Prairies
2. Identify how cover crops are being used on Prairie farms
3. Understand why farms are using cover crops
4. Determine what benefits farms have experienced
5. Determine what problems farms have experienced
6. Identify what could enable Prairie farms growing cover crops

Methods

The 2020 Prairie Cover Crop Survey was designed to be taken by farms that grew cover crops during the 2020 growing season. Farms of all types and sizes in Manitoba, Saskatchewan, and Alberta were invited to take part. The survey contained questions about the cover crops grown, their agronomy, the benefits and the problems farmers have experienced. Questions were also asked about what farmers think could be done to support those using cover crops as well as about farm types and size.

The survey accepted respondents between October 2020 and April 2021. A significant campaign was employed to ensure that the survey obtained responses from a wide range of farms from as many locations across the Prairies as possible.

Extensive use of social media was used during the campaign, especially Twitter and Facebook. Facebook posts were made on agricultural and community Facebook groups across the Prairies. These groups varied in size from dozens to tens of thousands of members and ensured participation from all corners of the Prairie provinces. This resulted in 31% of farms identifying that they heard about the campaign through Facebook (Table 1). Twitter was also used extensively, and stakeholders were encouraged to tweet the survey link to encourage participation. Some of these tweets were viewed thousands of times. Approximately 20% of farms that responded heard about the survey project through Twitter.

Farms were also contacted through an existing network that took part in the 2019 Prairie cover crop survey with 27% of farms finding out about the 2020 survey in this way.

Dozens of farming and environmental organizations, agronomists, and seed companies were engaged, as well as provincial and federal governments and all stakeholder groups who were able to assist in the promotion of the survey project. Many farm associations were contacted and agreed to assist in the promotion of the survey to their members. In total, 11% of farms that responded heard about the survey in this way.

Effort was made to reach farms through the media. Interviews and appearances in local, provincial, or national newspapers, magazines, and radio stations were made. The media organizations were both general interest and agricultural publications. Of the farms that participated, 5% heard about the project from newspapers, 2% from magazines, 1% from podcasts, and 1% from radio.

Table 1: Percent and number of farms that heard about the 2020 Prairie Cover Crop Survey through different networks (N = 281). Note that for this question, farms were asked to select all answers that applied from a list, and so may have selected two or more answers.

Where Farms Heard About Survey	Percentage of Farms That Responded	Number of Farms That Responded
Facebook	31%	86
Took 2019 survey	27%	76
Twitter	20%	56
Farm organizations	11%	32
University of Manitoba	8%	22
Newspaper	5%	14
Field day or meeting	4%	10
Another farmer	4%	10
Magazine	2%	7
Web search	2%	5
Agronomist	1%	4
Podcast	1%	3
Seed supplier	1%	3
Radio	1%	2

How many farms responded

One of the fundamental goals of the 2020 Prairie Cover Crop Survey was to learn how many farms have already started growing cover crops as well as to get an estimate of the number of acres where cover crops were grown. In total 281 farms responded to the 2020 survey. Most farms that responded grew a full season cover crop (81%), and 47% grew a shoulder season cover crop.

Table 2: Percent and number of farms that responded to the 2020 Prairie Cover Crop Survey by cover crop type and province (N= 281). Note some farms that responded grew both a shoulder and a full season cover crop.

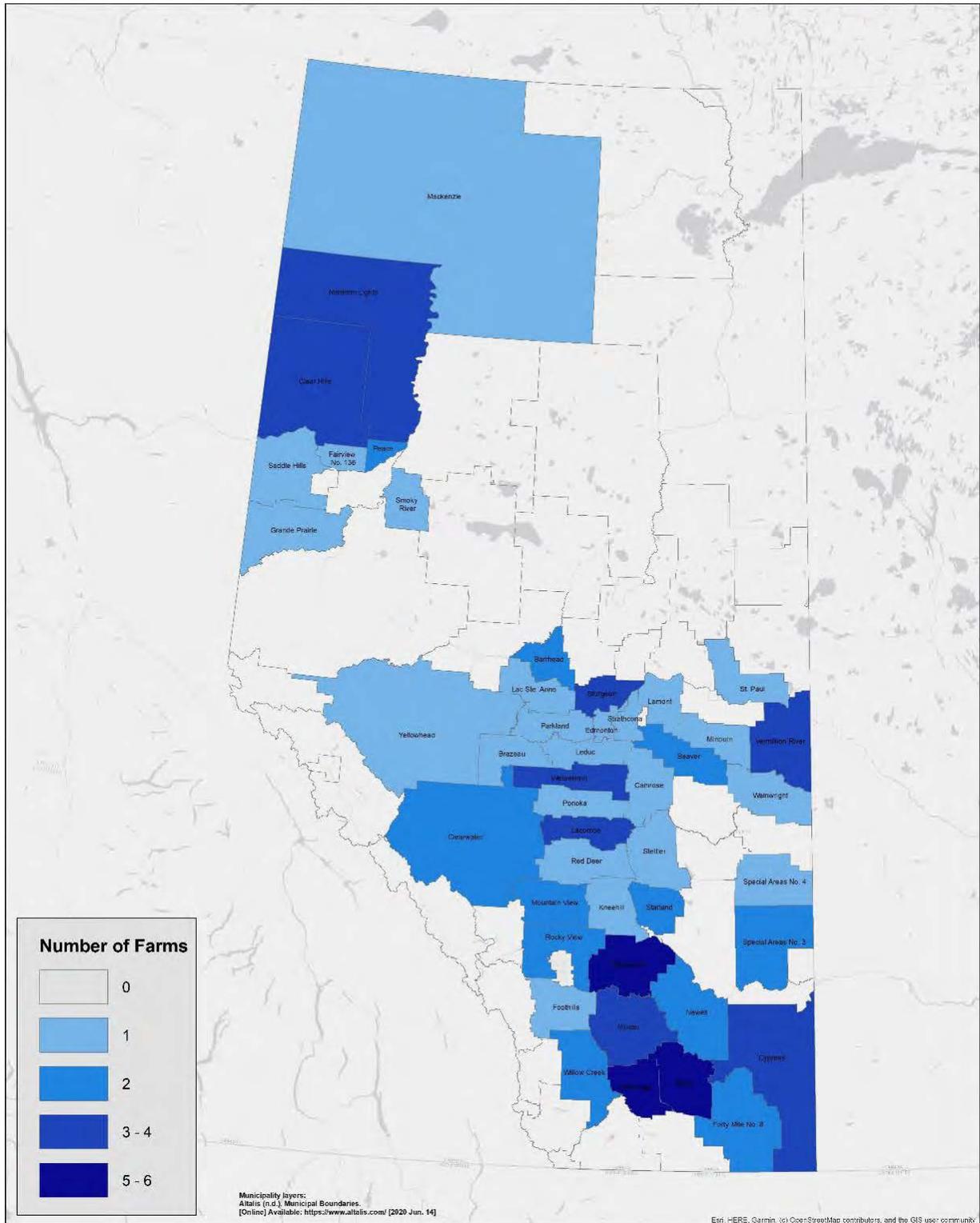
Province	Cover Crop Type					
	Shoulder	Full	Total	Shoulder	Full	Total
	Percentage of Farms That Responded			Number of Farms That Responded		
Alberta	37%	84%	31%	32	72	86
Saskatchewan	41%	80%	32%	37	72	90
Manitoba	60%	81%	37%	63	85	105
Total	47%	81%	100%	132	229	281

Cover crop distribution

Farms that responded were relatively evenly distributed between Manitoba (37%), Saskatchewan (32%) and Alberta (31%).

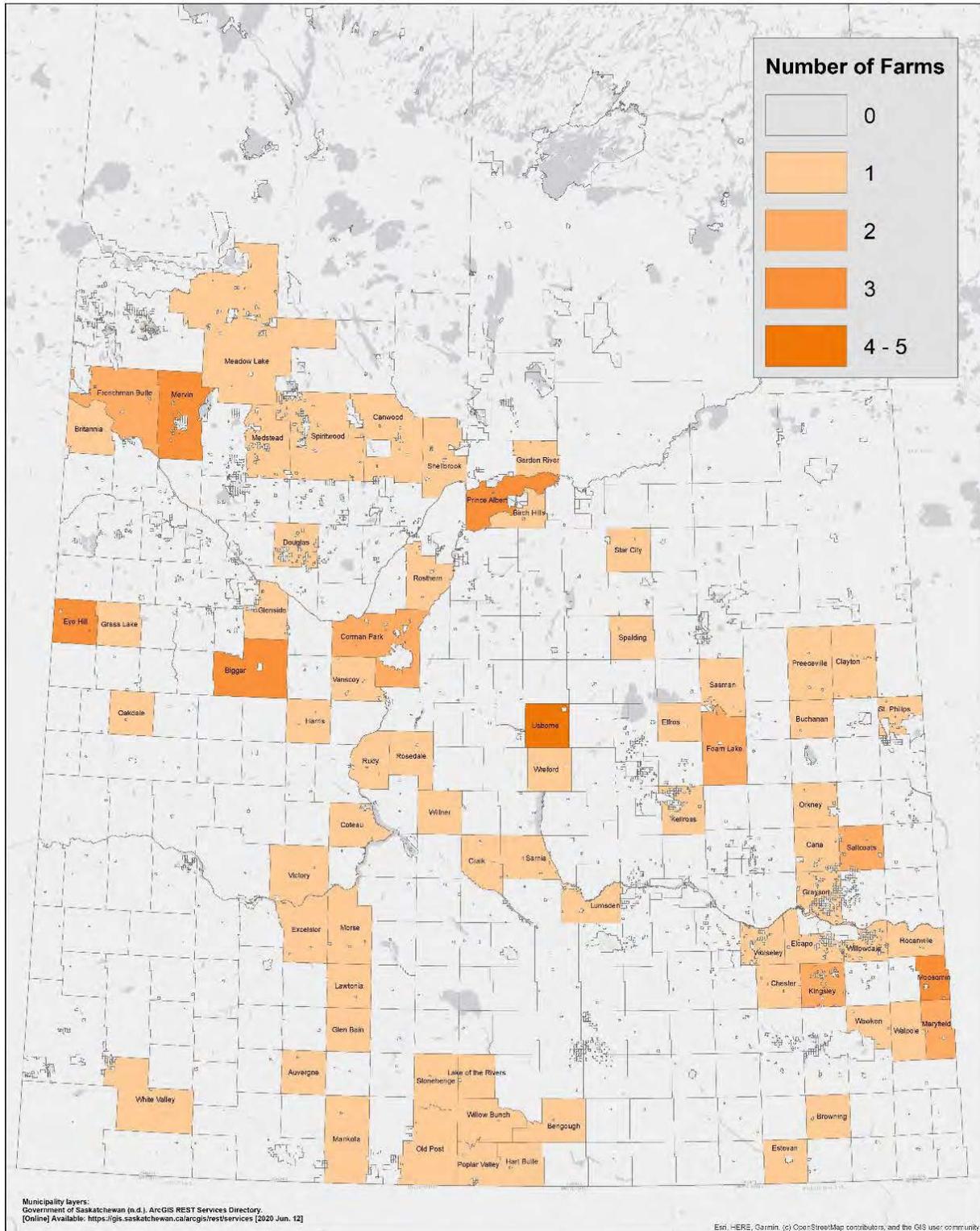
This survey found that cover crop use was not limited to one area of the Canadian Prairies. Cover crops were grown as far north as the Peace River Valley in Alberta, as far south as the US border, and included some of the driest regions of Alberta and Saskatchewan (Maps 1-3). Farms were located within 45, 71, and 62 rural municipalities in Alberta, Saskatchewan, and Manitoba, respectively.

2020 Cover Crop Survey - Alberta



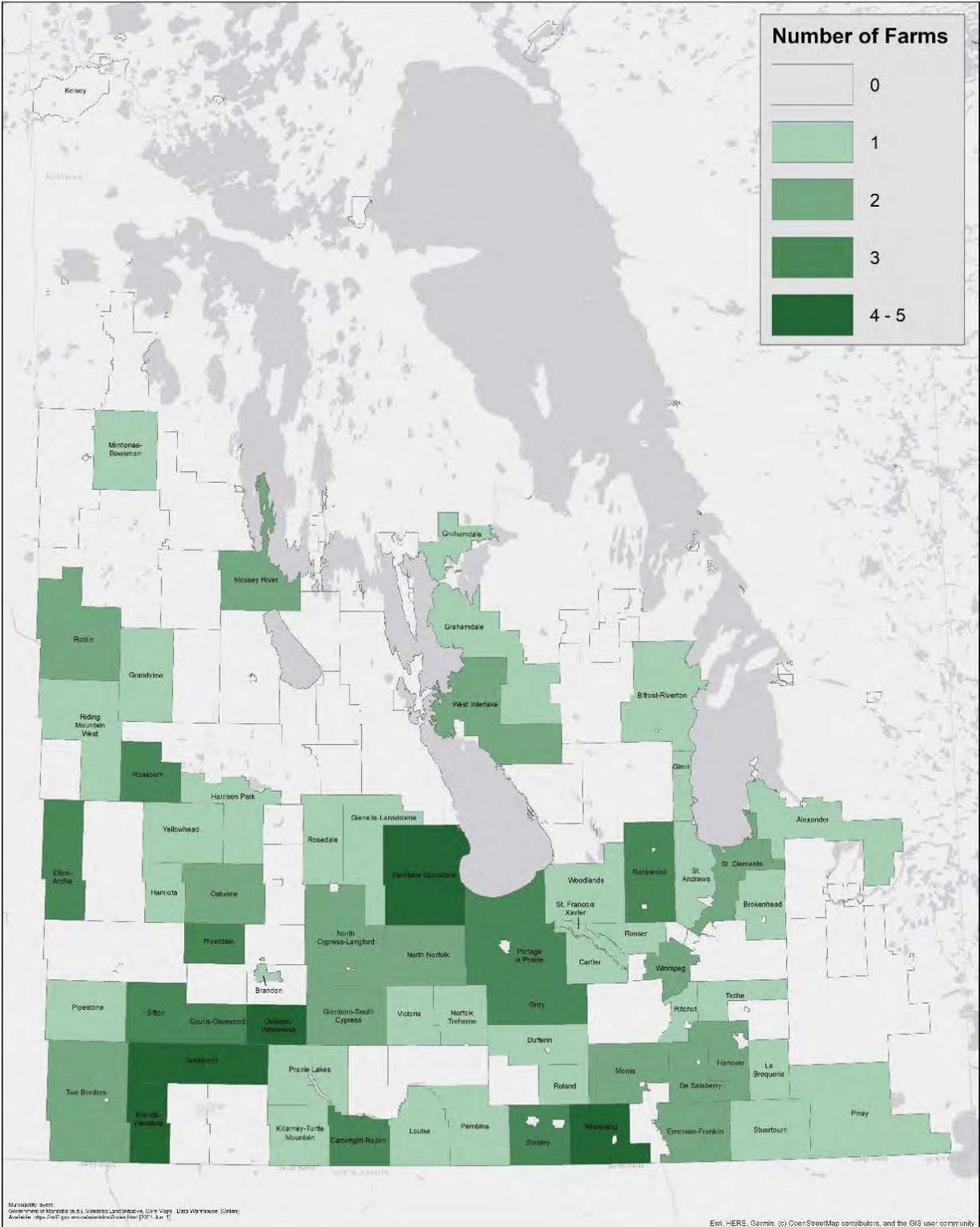
Map 1: Number of farms in Alberta that responded by county, special area, or municipal district (N = 86). Note that for this question some farms identified more than one county where they grew cover crops.

2020 Cover Crop Survey - Saskatchewan



Map 2: Number of farms in Saskatchewan that responded by rural municipality (N = 90). Note that for this question some farms identified more than one municipality where they grew cover crops.

2020 Cover Crop Survey - Manitoba



Map 3: Number of farms in Manitoba that responded by rural municipality (N = 105). Note that for this question some farms identified more than one municipality where they grew cover crops.

How much did respondents grow?

The 281 farms that responded to the survey reported growing 102,539 acres of cover crops in 2020. Just over half of these cover crop acres were shoulder season (55%), and 45% of cover crop acres were devoted to full season cover crops.

Farms that responded from Manitoba grew the most acres, accounting for 46% of cover crop acres reported, followed by Saskatchewan (31%), and Alberta (23%). Farms that responded in Manitoba had a higher percentage of their cover crop acres being devoted to shoulder season cover crops, followed by farms in Saskatchewan. Farms in Alberta devoted the lowest number of acres to shoulder season cover crops. When looking at full season cover crops this trend was reversed, with farms in Alberta having a higher percentage of cover crop acres being full season, followed by Saskatchewan, and then Manitoba.

Table 3: Percent and number of acres of cover crops grown on farms that responded by cover crop type and province (N = 281).

Province	Cover Crop Type					
	Shoulder	Full	Total	Shoulder	Full	Total
	Percentage of Farm Acres			Number of Acres		
Alberta	37%	63%	23%	8,627	14,776	23,403
Saskatchewan	55%	45%	31%	17,281	14,265	31,546
Manitoba	64%	36%	46%	30,256	17,335	47,590
Total	55%	45%	100%	56,163	46,376	102,539

Characteristics of farms that responded to the survey

How long have farms been growing cover crops?

Farms were asked if cover crops had been grown before the 2020 growing season. Of the farms that responded to the survey in 2020, 82% had previously grown a cover crop, with the most common length of time that farms have been growing cover crops being between 3 and 5 years (36%).

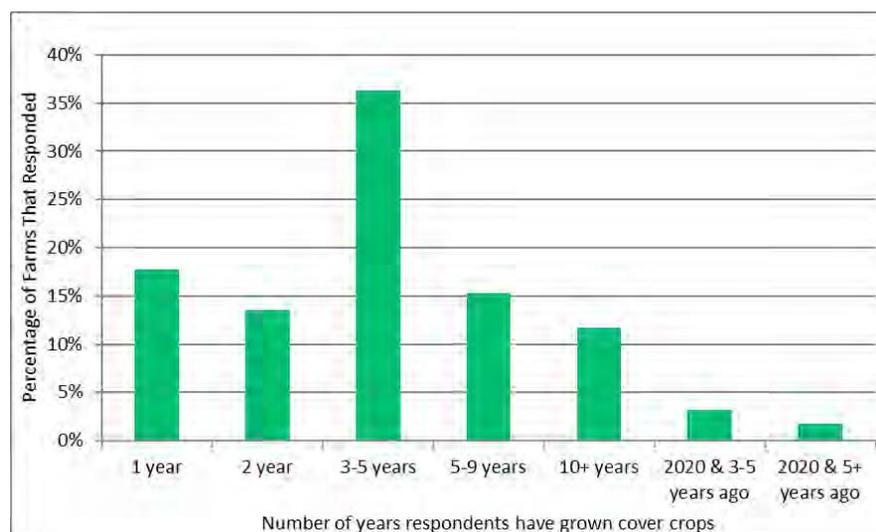


Figure 1: Number of years respondents have grown cover crops (N = 281).

Farm type

Respondents were asked to characterize their farm type by selecting multiple characteristics from a list. Respondents identified as having many different characteristics, with the majority (62%) identifying as livestock, and 56% identifying as annual grain. Other common farm types were regenerative (37%), perennial (32%), organic (26%), and intercropper (21%).

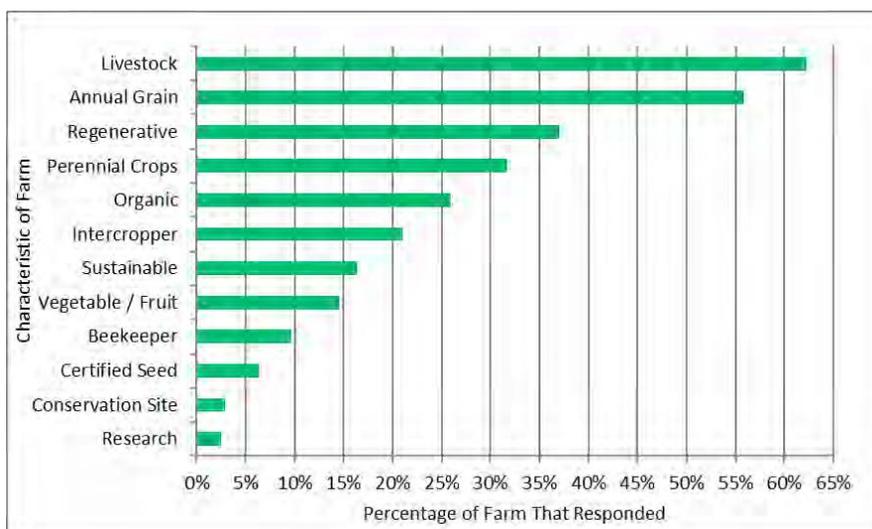


Figure 2: Characteristics of farms that responded that grew cover crops in 2020 (N = 281). Note that for this question farms were asked to select all answers that applied from a list and may have selected two or more answers.

Livestock species

Over half of the farms that responded (54%) had beef cattle as part of their farm operation. Only 29% of farms that responded did not have any livestock on their farm. Other common livestock species were chickens (eggs 16%, meat 12%), horses (16%), and pigs (13%).

Table 4: Percent and number of farms that responded with and without livestock, broken out by the different types of livestock species that were part of the farm operation (N = 281). Note that for this question, farms were asked to select all answers that applied from a list, and so may have selected two or more answers.

Livestock Species	Percentage of Farms That Responded	Number of Farms That Responded
Cattle (Beef)	54%	151
No livestock on farm	29%	81
Chickens (Eggs)	16%	46
Horses	16%	46
Pigs	13%	37
Chickens (Meat)	12%	35
Bees	10%	27
Sheep	9%	25
Turkeys	5%	13
Cattle (Dairy)	4%	12
Bison	4%	10
Ducks	2%	7
Goats	2%	7
Geese	2%	5
Deer or Elk	1%	4

What crops do these farms grow?

Early adopters were asked to identify which crops were grown on the farm. The most commonly grown crops were: oats (48%), spring wheat (48%), barley (47%), canola (38%), and peas (38%). Farms also grew forages that were characterized as perennial forages (36%), alfalfa (26%), or other annual forages (24%).

Table 5: Percent and number of farms that responded as growing different cash crops (N = 281). Note that for this question, farms were asked to select all answers that applied from a list, and so may have selected two or more answers.

Top 15 Cash Crops	Percentage of Farms That Responded	Number of Farms That Responded
Oats	48%	135
Spring Wheat	48%	134
Barley	47%	131
Canola	38%	107
Peas	38%	106
Forage (Perennial)	36%	101
Alfalfa	26%	73
Forage (Annual)	24%	68
Fall Rye	23%	66
Flax	22%	61
Corn (Grazing)	13%	37
Soybean	13%	37
Lentils	11%	31
Corn (Silage)	10%	27
Winter Wheat	9%	24

Farm size

Farms of different sizes responded to the survey. They ranged in size from only a few acres to farms of more than 10,000 acres. The most commonly occurring farm size was between 1,000 and 1,999 acres.

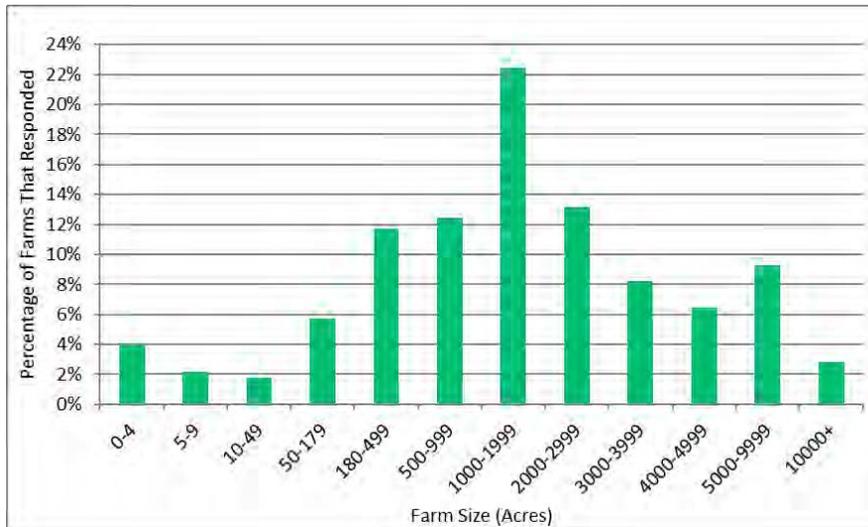


Figure 3: Size of farms that responded in acres (N = 281).

Were farms that responded organic?

Most farms that responded to the survey were not organic (62%). Only 26% of farms were certified organic on either all (16%) or part (9%) of their operation, with a further 13% not certified as organic but using organic management practices.

Table 6: Percent and number of farms that responded by organic designation (N = 281).

Organic Designation	Percentage of Farms That Responded	Number of Farms That Responded
Not organic	62%	175
Organic management	13%	37
Certified organic: All	16%	44
Certified organic: Some	9%	25

Tillage practices

Most farms that responded (80%) used reduced till or no till with the remaining 20% utilizing conventional tillage.

Table 7: Tillage system practiced on farms that responded. The table depicts the percentage and number of farms that responded in each category (N = 281).

Tillage Regime	Percentage of Farms That Responded	Number of Farms That Responded
No Till	33%	92
Reduced / Minimum Till	48%	134
Conventional Till	20%	55

Land ownership

The majority of farms that responded owned more land than they rented (69%). Only 8% of farms that responded rented most of their farmland.

Table 8: Proportion of farm land owned or rented on farms that responded. The table depicts the percentage and number of farms that responded in each category (N = 281).

Proportion of Farm Land Owned	Percentage of Farms That Responded	Number of Farms That Responded
All owned	32%	90
Most owned	37%	103
50 / 50	22%	63
Most rented	7%	21
All rented	1%	4

Cover Crop Agronomy

Proportion of farm devoted to cover crops

Most farms that responded were growing cover crops on a small proportion of their land, with 67% of farms growing cover crops on between 0 - 39 % of their total land area.

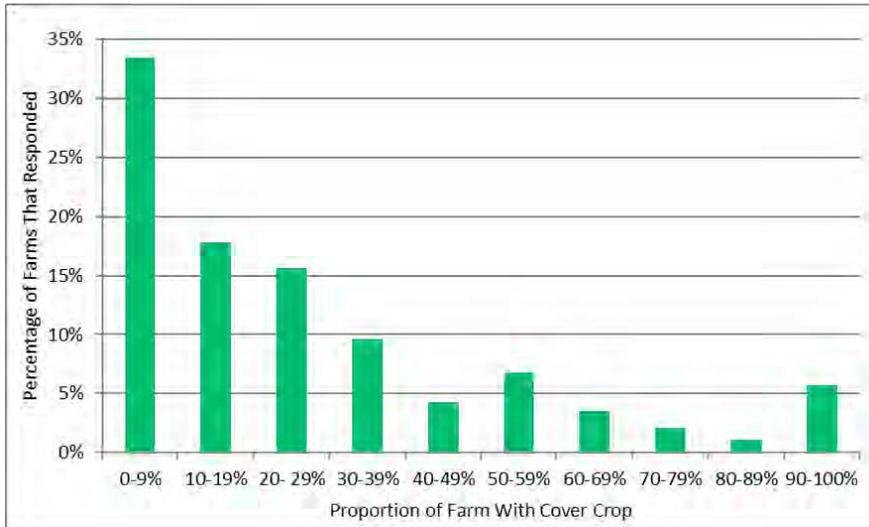


Table 4: Proportion of farm devoted to growing cover crop on farms that responded. The table depicts the percentage and number of farms that responded (N = 281).

Cover crop species

By far the most common cover crops grown by farms that responded were clover, grown by 57% of respondents, and oats (52%). Other popular cover crop species were peas (41%), hairy vetch (37%), and radish (36%). Of the top 15 most commonly grown cover crops by farms that responded, five were annual grasses, four were legumes, and two were brassicas. Most species grown by respondents were regarded as cold season. Only three of the top 15 (millet, sunflower, and buckwheat) were warm season species and they represent the 12th, 13th, and 14th most commonly grown cover crops, respectively.

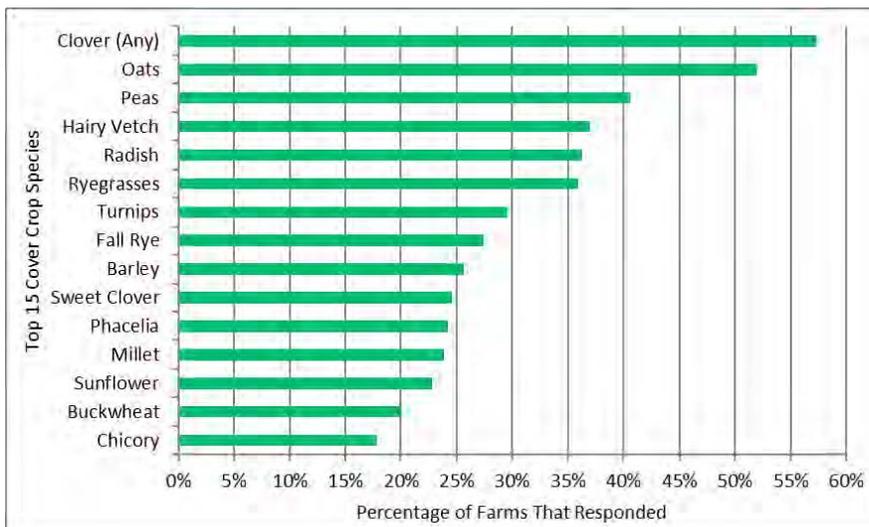


Figure 5: Top 15 cover crop species grown by farms that responded (N = 281). Note that for this question farms were asked to select all answers that applied from a list, and so may have selected two or more answers.

Cash crops grown before cover crop

There is a large diversity of crops grown on Prairie farms. Finding a window in the rotation to grow cover crops can be a challenge due to the short growing season on the Prairies. We were interested to learn which crops were being grown before cover crops to understand the best windows in the rotation identified by early adopter farms. The most common cash crop that was grown before cover crops among farms that responded were annual cereal crops, with barley (23%), spring wheat (22%), oats (21%) being the most popular among respondents. Cereals were followed by peas (13%) and canola (12%). Of the farms that responded, 11% selected that their cover crop did not follow a cash crop. This could be for several reasons, including the farm grows a cover crop in the same location every year, or the cover crop was grown after fallow.

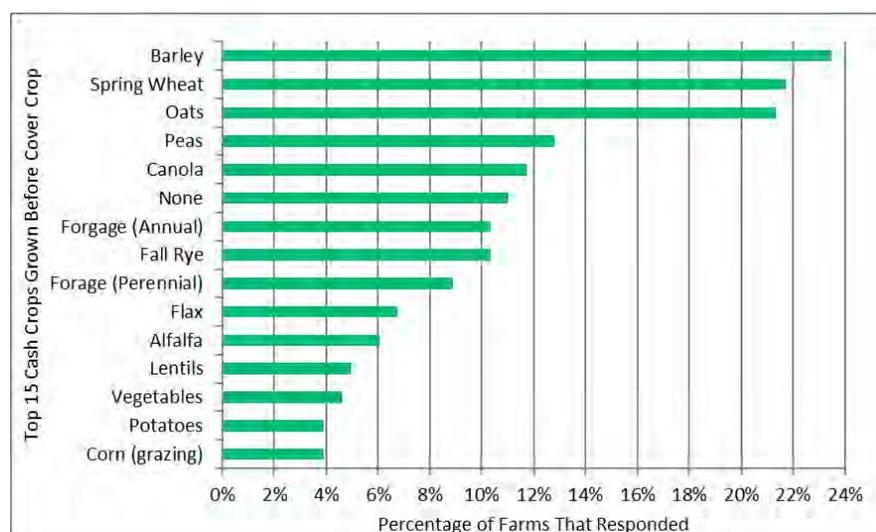


Figure 6: Top 15 cash crops grown before cover crops by farms that responded (N = 281). Note that for this question farms were asked to select all answers that applied from a list, as farm may have grown more than one crop type prior to cover crops in 2020.

How cover crops were planted

The most common method of planting cover crops was by air seeder, used by 49% of farms that responded. This was followed by seed drill, used by 37% of farms. A sizable 26% of farms used a broadcaster to plant cover crops. Cover crop seeding was achieved using tillage equipment for 9% of farms, suggesting that some farms are trying to incorporate cover crop seeding with other field activities, such as residue management and seed bed preparation.

Table 9: Method of planting for cover crops grown by farms that responded. The table depicts the percentage and number of farms that responded in each category (N = 281). Note that for this question, farms were asked to select all answers that applied from a list, and so may have selected two or more answers.

Method of Planting	Percentage of Farms That Responded	Number of Farms That Responded
Air Seeder	49%	139
Seed drill	37%	104
Broadcaster	26%	74
With tillage	9%	24
Hand Seeded	5%	13
Planter	2%	7
Airplane	1%	2

Number of species in cover crop

Among farms that responded, simpler cover crop mixes were more common than complex mixes. A single cover crop species was the most common, grown by 30% of farms. Nonetheless, many farms grew cover crops with a large variety of species, with 11% of farms growing more than 12 species in their cover crop mix.

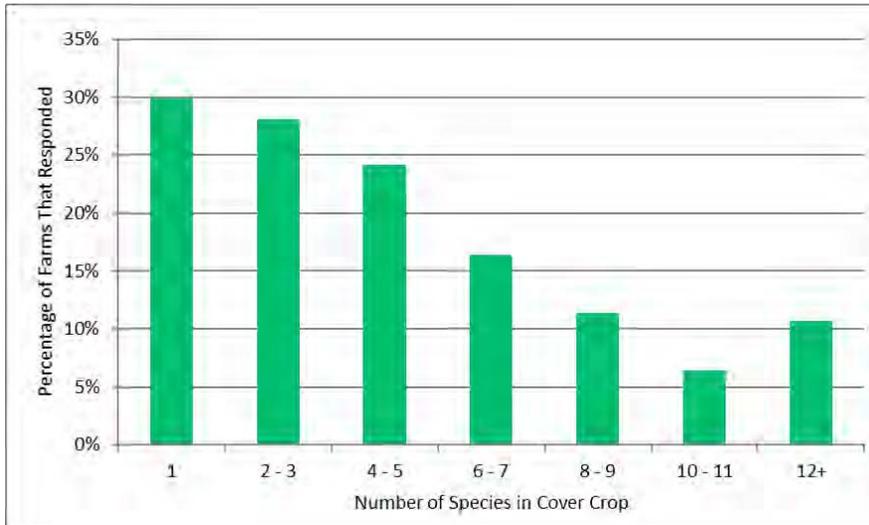


Figure 7: Number of species in cover crop (N = 281). Note that for this question farms were asked to select all answers that applied from a list, as farm may have grown more than one cover crop in 2020.

Diversity of cover crops over time

Most farms on the Prairies growing cover crops can be described as early adopters. It is hypothesized that early adopters are more likely to begin with simple cover crop mixes and move to more complex mixes over time as their experience with cover crops increases. A large proportion (45%) of farms that responded increased the number of species of cover crops they grew over time, and 27% indicated that they did not change the number of species of cover crops. Only 5% of farms that responded reported that they decreased the number of species of cover crops that they grow over time. This appears to support the hypothesis that early adopter farms increase species diversity in their cover crop mix over time. However, it is important to note that many of the farms have been growing cover crops less than five years, and this trend may change with time.

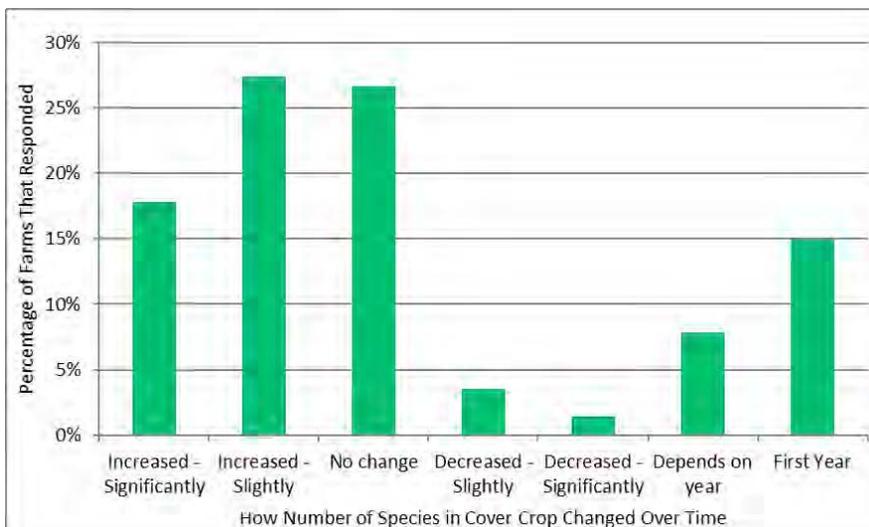


Figure 8: Change in the number of species in cover crops over time on farms that responded (N = 281).

How farms that responded terminated cover crops

The most common method of cover crop termination used on farms was grazing, utilized by 46% of farms that responded. Several other methods were also used for cover crop termination including selecting cover crops that would winter kill (37%), as well as using tillage (30%) and herbicides (21%).

Table 10: Method of termination for cover crops grown by farms that responded. The table depicts the percentage and number of farms that responded in each category (N = 281). Note that for this question, farms were asked to select all answers that applied from a list, and so may have selected two or more answers.

Method of Termination	Percentage of Farms That Responded	Number of Farms That Responded
Grazing	46%	129
Winter Kill	37%	104
Tillage or Incorporation	30%	85
Will not terminate	24%	68
Herbicide	21%	58
Mowing	16%	45
Roller crimping	5%	13
Tarp, mulch or black plastic	1%	3

Did the cover crop start as an intercrop?

Farms establish cover crops in a variety of ways and at different times of the year to fit into their rotation. This survey found that only 20% of farms are planting their cover crop in the fall after they harvested a cash crop. Many farms are establishing their cover crops as an intercrop either at the same time as their cash crop (37%) or by broadcasting their cover crop into their cash crop at some point during the growing season (14%). The use of intercropping to start cover crops may be as a response to the short growing season experienced on the Prairies. Intercropping may also be an adaptation in response to the lack of reliable fall moisture experienced in many parts of the Prairies that can limit cover crop establishment after harvest. Many farms responded that they planted their cover crop instead of a cash crop (38%), or in a place where a cash crop was not growing. (i.e. as a full season cover crop).

Table 11: Cover crop establishment and use of intercropping. The table depicts the percentage and number of farms that responded (N = 281). Note that for this question, farms were asked to select all answers that applied from a list, and so may have selected two or more answers.

	Percentage of Farms That Responded	Number of Farms That Responded
Not intercropped – planted instead of cash crop	38%	108
Intercropped – seeded with cash crop	37%	103
Not intercropped – seeded after harvest	20%	57
Intercropped – broadcast into cash crop	14%	38
Not intercropped – where cash crop never grew	11%	32

Where farms sourced cover crop seed

Although it is more common for Prairie farms that responded to the survey to source their seed from a company that specializes in the sale of cover crop seed (53%), many farms are either sourcing their seed from another farmer (31%) or were growing their own seed (31%).

Table 12: How farms that responded sourced cover crop seed. The table depicts the percentage and number of farms that responded in each category (N = 281). Note that for this question, farms were asked to select all answers that applied from a list, and so may have selected two or more answers.

Where Farm Sourced Seed	Percentage of Farms That Responded	Number of Farms That Responded
Specialist cover crop dealer	53%	148
Another farmer	31%	88
Grew own seed	31%	86
Agricultural input retailer	29%	82
Commodity crop dealer	17%	47

Cost of cover crop seed

The amount paid for cover crop seed by farms that responded to the survey varied greatly, with 10% paying less than \$5 per acre for cover crops, growing their own seed, or sourcing the seed for free, and 4% paying more than \$70 per acre. However, the most common amount spent by farms on cover crop seed per acre is in the region of \$5 - \$30 per acre.

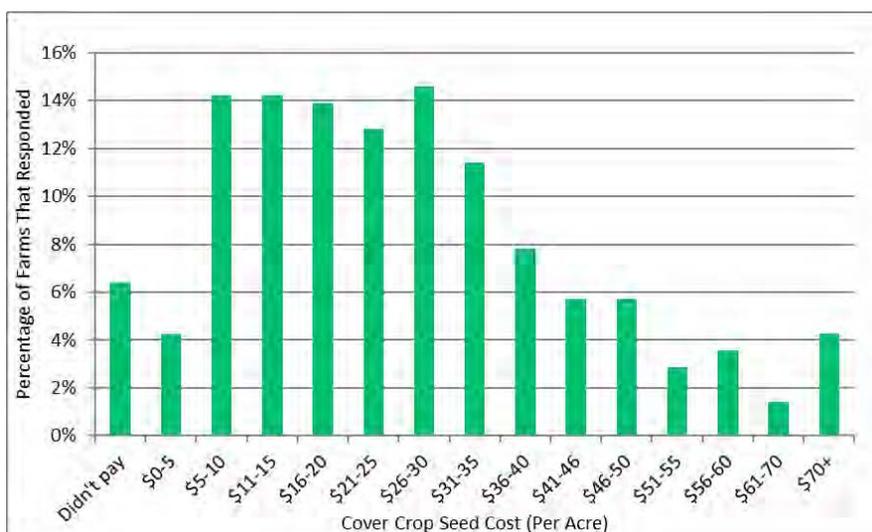


Figure 9: What farm paid for cover crop seed per acre (N = 281). Note that for this question, farms were asked to select all answers that applied from a list, and so may have selected two or more answers.

Motivations, Benefits, and Challenges

Why farms grew cover crops

Farms grow cover crops to meet specific goals. These goals can vary greatly depending on the realities of an individual farm. These goals are the basis from which farms decide on a cover crop and how they will be managed. The most common reasons identified as to why cover crops were grown by respondents on Prairie farms were to build soil health (80%) and to increase soil organic matter (76%). Other common responses included growing cover crops to keep living roots in the soil (65%), feeding soil biology (65%), and adding nitrogen (57%).

In addition to the 15 most common reasons why farms that responded grew cover crops shown in Figure 10, there were four other reasons farms were asked to select from which did not make the top 15. These were to manage soil problems such as excess salinity (25%), for pest or disease control (16%), for crop establishment (15%), and the least commonly selected reason was to improve soil trafficability (10%).

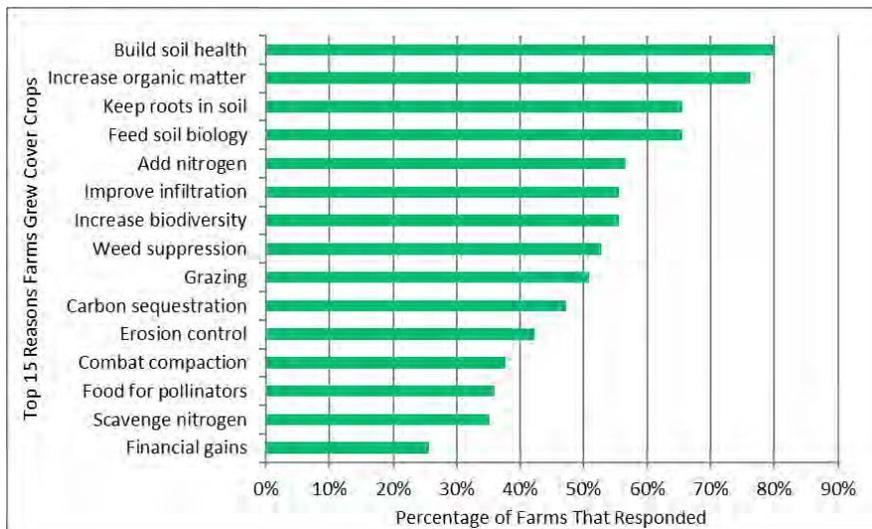


Figure 10: The top 15 reasons why farms that responded grew cover crops (N = 281). Note that for this question farms were asked to select all answers that applied from a list, and so may have selected two or more answers.

Benefits experienced with cover crops

Respondents were asked to identify the benefits that have been observed from using cover crops. The majority of farms (81%) that responded reported seeing benefits from growing cover crops, with most farms (68%) reporting seeing improved soil health. Other common benefits observed by farms that responded were increased biodiversity (48%), increased soil organic matter (46%), less erosion (41%) and increased water infiltration (38%).

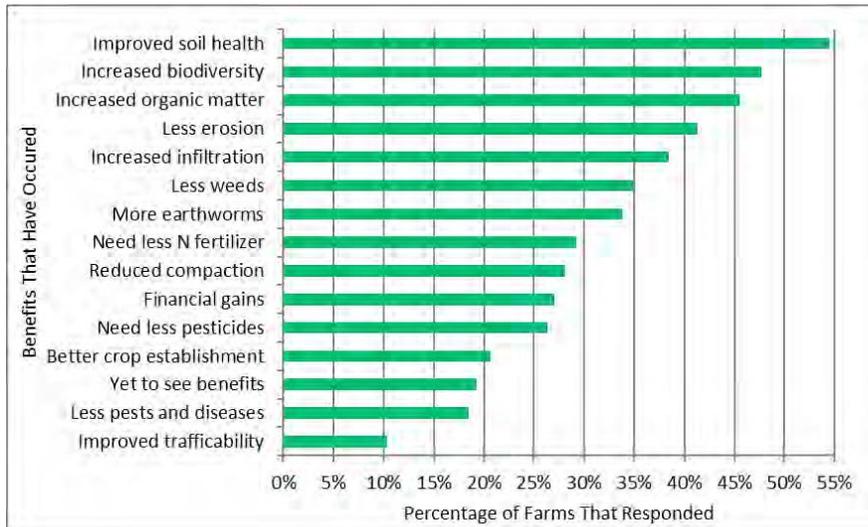


Figure 11: Benefits that have occurred with growing cover crops for farms that responded (N = 281). Note that for this question farms were asked to select all answers that applied from a list, and so may have selected two or more answers.

How long it took for farms to observe benefits

One of the most frequently asked questions surrounding cover crop use on the Prairies is how long does it take to see benefits when using cover crops, and so the 2020 Prairie Cover Crop Survey asked farms how many years it took to see benefits. Farms that responded reported that benefits from cover crops occurred relatively quickly. The majority of farms (71%) saw benefits from growing cover crops within three years. Over 35% of farms that responded saw benefits from growing cover crops within 1 year. It should be noted that many of the farms that responded (19%) have not seen benefits from growing cover crops, and many in this group grew their first cover crop in 2020.

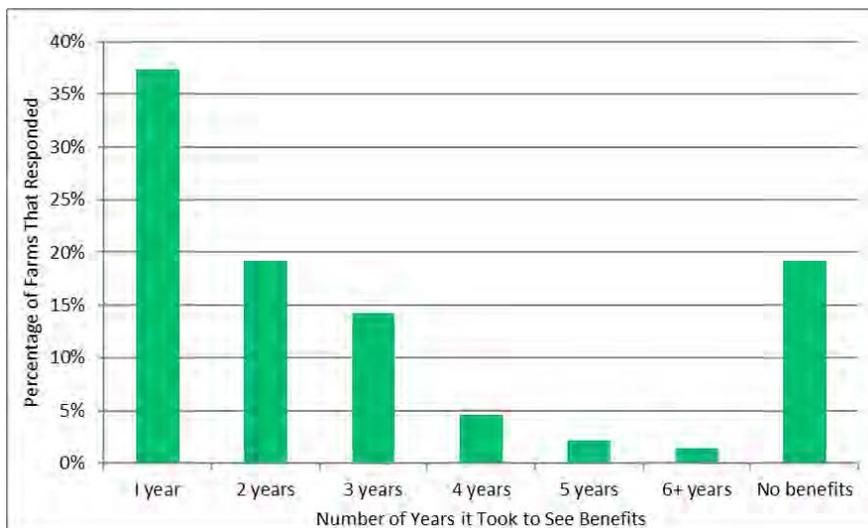


Figure 12: Number of years it took for farms that responded to see benefits (N = 281).

Challenges experienced with cover crops

It is crucial that any investigation into cover crop use on the Prairies not only draws attention to the benefits of cover crops but also to the challenges and risks associated with cover crop use. By measuring the risks associated with cover crop use on the Prairies, farms can gain an important insight into what risks they may encounter and be able to take an informed approach for growing cover crops and have a better idea of how to mitigate problems if they arise. Identifying the most common problems farms are facing growing cover crops also directs researchers and policy makers to the areas of greatest need for assisting farmers in their cover crop use.

The majority (87%) of farms that responded have experienced at least one problem over the years they have been growing cover crops. As expected, the most common problem experienced by the Prairie farms that responded was the short growing season (30%), followed by the lack of moisture available for cover crop establishment in the fall (27%). Similarly, 17% of farms reported an issue with the late harvest of cash crops prevented the planting of cover crops. The additional costs of growing cover crops (25%) and the impact of cover crop on herbicide choice (21%) were also common problems identified by respondents.

In addition to the 15 most common problems identified by farms that responded that are listed in Figure 13, there were eight other notable challenges which were selected by 5% or more of farms that responded. These were lack of support from agronomists (10%), less moisture for subsequent cash crops (9%), not able to terminate cover crop at correct time (9%), farm didn't know where to get started (9%), control of cover crop residue (8%), opinions of other farmers (8%), soil was too wet to plant/ maintain/or terminate cover crop (7%), and allelopathy (6%).

Interestingly, not one farm out of the 281 that responded selected the option "the old system worked better." This could be seen as one of the strongest indicators that the farms that responded are confident cover crops have a place on their farms.

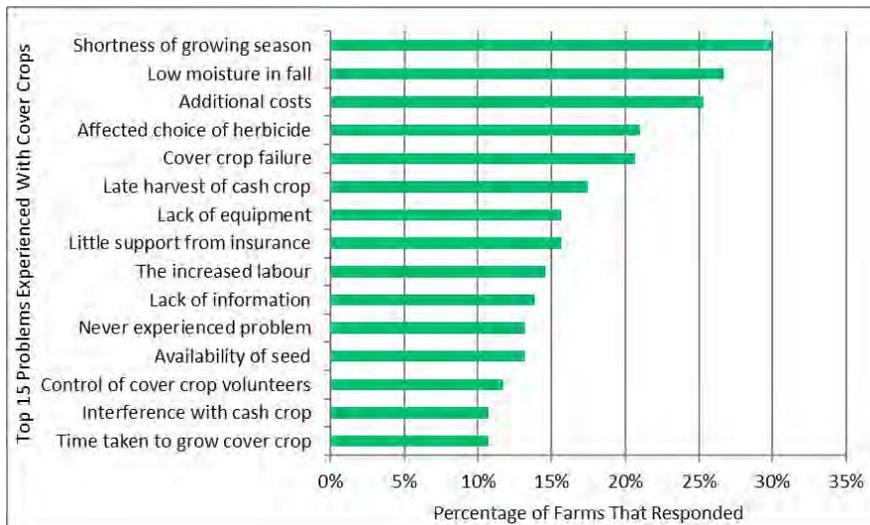


Figure 13: The top 15 problems experienced when growing cover crops for farms that responded (N = 281). Note that for this question farms were asked to select all answers that applied from a list, and so may have selected two or more answers.

How cover cropping influenced farm profit

The impact of cover crops on profitability is an important question. In this survey, a sizable proportion (24%) of farms that responded identified they saw an increase in farm profit, and 24% identified that cover crops resulted in no change to their profit. Only 4% identified that their farm had seen a reduction in their farm profit with cover cropping. Although at first glance these suggest that cover crops may be having a neutral or even positive influence on farm profit on the Prairies, it is important to note that a significant proportion (47%) of respondents were not able to identify the impact of cover crops on farm profit. These farms either did not know how cover crops influenced farm profit, identified the impact varied with year, or that it was their first year growing cover crops and hence in their opinion it was too early to say. For this reason, it may be too early to determine how cover crops are influencing profit on Prairie farms and this is an important area for future research and extension.

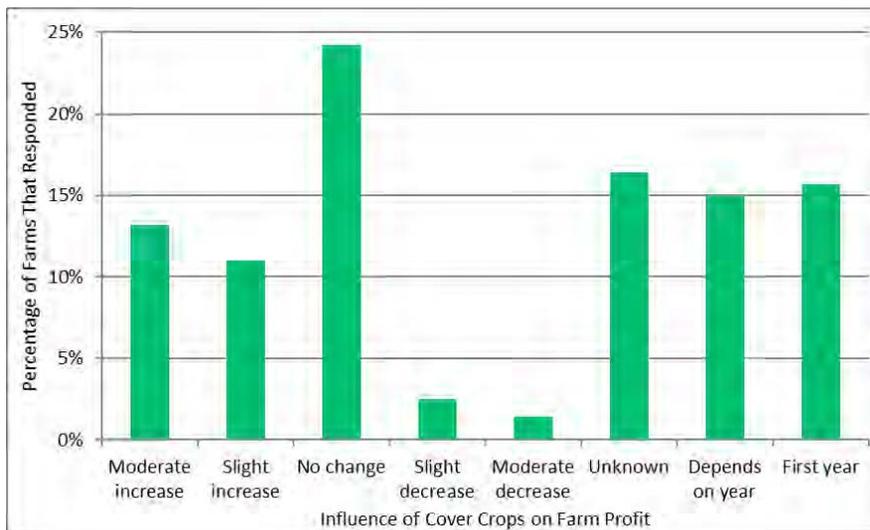


Figure 14: Influence of cover crops on farm profit for farms that responded (N = 281).

How cover cropping influenced tillage

Growing cover crops may impact the use of tillage in different ways. Using cover crops may reduce tillage as they are often growing at the time of year when tillage is typically practiced, such as the fall or spring. In contrast, the use of tillage could also increase if used for cover crop termination. Tillage can be associated with negative soil health outcomes, including an increased risk of erosion and loss of soil carbon. Therefore, it is important when assessing the positive and negative influences of cover crop use on the Prairies to understand how the use of cover crops influenced tillage. Of the farms that responded to the survey, the largest proportion of respondents (40%) identified that tillage had decreased on their farms. A lower percentage of respondents (28%) identified cover crops had no impact on the use of tillage on their farm. Only 10% identified that their farm had increased the use of tillage used on the farm when using cover crops. This suggests that using cover crops may not increase the use of tillage on Prairie farms.

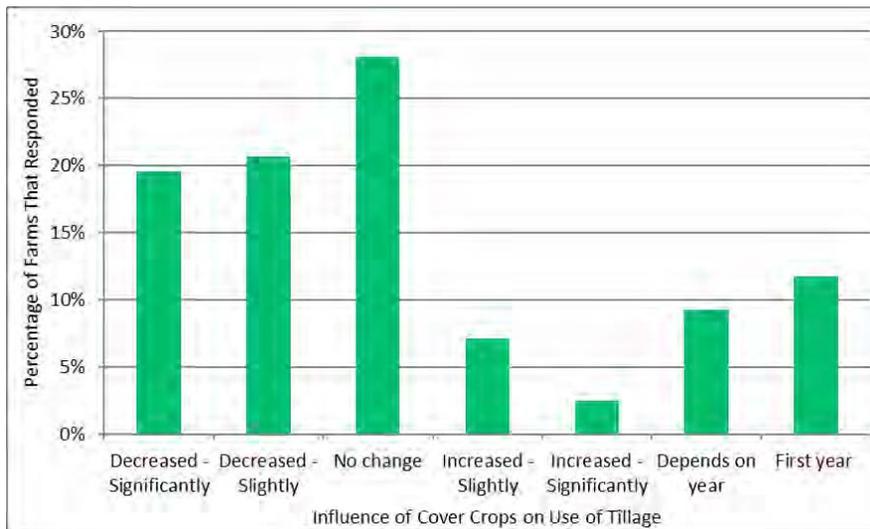


Figure 15: Influence of cover crops on the use of tillage on farms that responded (N = 281).

Change in cover crop acres over time

Most farms on the Prairies growing cover crops can be described as early adopters. It is hypothesized that many of these early adopters initially trial cover crop use on a small proportion of their farm acres, and over time increase acres if they determine cover crops have a place on their farm. It is important to measure if farms increase or decrease cover crop use over time, as a trend in either direction may indicate the level of confidence respondents have for cover crops on their farms. A farm is hypothesized to increase or have no change in cover crop acres if the farm is confident that cover crops have a place on their farm. A slight majority (51%) of farms that responded increased the number of acres of cover crops they grew over time, and 19% identified no change in cover crop acres. Only 2% of respondents reported that their farm decreased cover crop acres over time. This is an indication that Prairie farms that responded to the survey see a fit for cover crops by continuing their use on the farm.

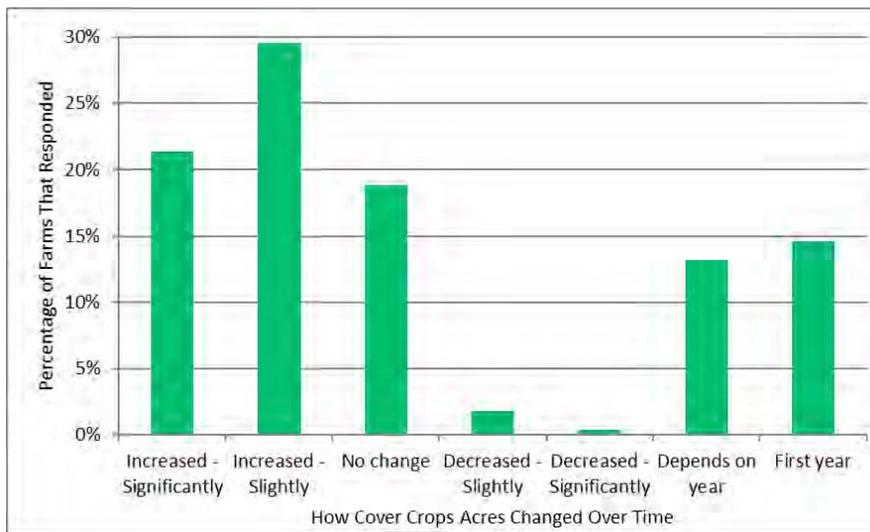


Figure 16: Change in cover crop acres over time on farms that responded (N = 281).

Where farms get information

An important part of the dissemination of any new practice is how farmers access information. It was therefore important that the survey included a question which asked farms where they source information regarding cover crops and farming in general. This can help identify effective channels for disseminating extension information about cover crops.

Early adopters on the Prairies are innovators. It has been hypothesized that due to limited local information about cover crops, that Prairie farms have been relying on networking with other successful farms that have adopted cover crops and then learning and adapting based on their own experiences with growing cover crops. This survey of early adopters supports this hypothesis, with the most common source of information for farms that responded to the survey were other farmers (67%) followed by their own experience (58%).

Other common sources of information include podcasts / video (57%), social media (41%), scientific research (40%), and extension (20%). Some farms (22%) are accessing information about cover crops from industry, and 22% from a certified agronomist.

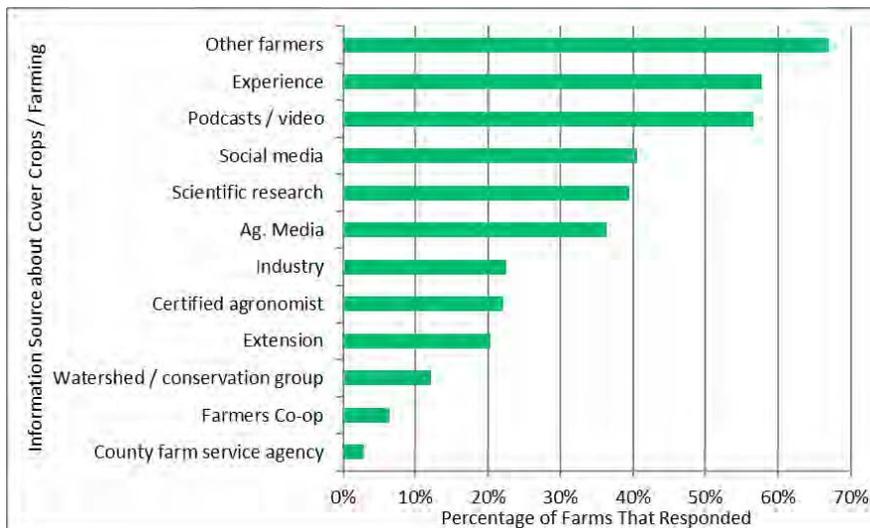


Figure 17: Where farms get information on cover crops and farming in general (N = 281). Note that for this question farms were asked to select all answers that applied from a list, and so may have selected two or more answers.

Enabling cover crop use

One of the major goals of the 2020 Prairie Cover Crop Survey was to determine what measures could be taken to support farms that are adopting cover crops or even enable farms to increase their cover crop acres. The survey responses indicate that payments for storing carbon (59%) and tax credits for planting cover crops (55%) would enable the farms that responded to continue using cover crops or even increase their acres. Similarly, 38% of farms that responded indicated that payments from conservation or watershed groups would enable cover crop use.

Additional information was also identified as a need to enable cover crop use. Several respondents identified more research specific to the Prairies (39%), greater access to technical assistance on how to decide, plant, grow, maintain and terminate a cover crop (32%), greater access to information on cover crop agronomy (30%), scientific data supporting cover crop use (27%), local farm tours (23%), and creation and membership of a local network of cover croppers (15%) would enable cover crop use on farms.

Two responses related to crop insurance were identified by respondents. They include discounted crop insurance premiums for growing cover crops (25%) and 25% of farms that responded identified that acceptance of cover crops by crop insurance would enable cover crop use.

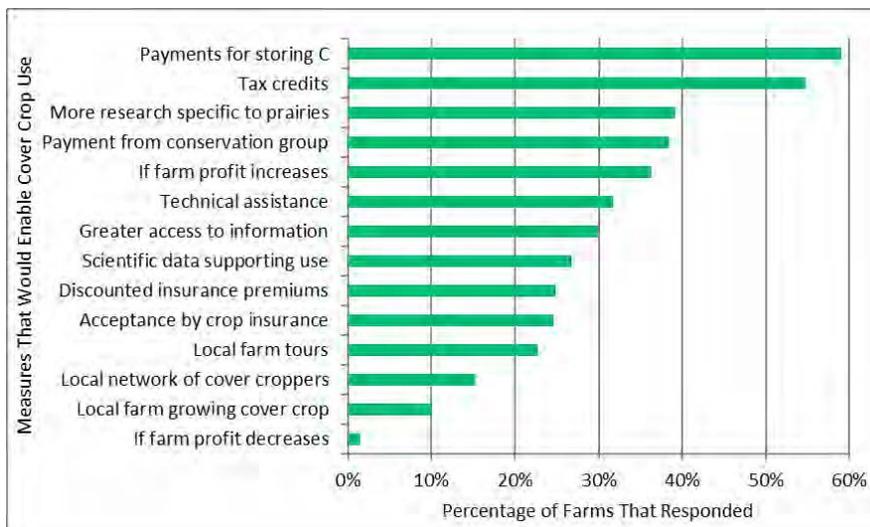


Figure 18: Measures that would enable cover crop use for farms that responded (N = 281). Note that for this question farms were asked to select all answers that applied from a list, and so may have selected two or more answers.



Major Findings

In total, 281 early adopters took part in the 2020 Prairie cover crop survey growing 102,539 acres of cover crops across every major agricultural region of the Prairies. This highlights that cover crops are becoming established in the Prairies and it is possible to grow cover crops in a wide range of locations and environments across the three Prairie Provinces. The survey also emphasizes the diversity of farms utilizing cover crops on the Prairies and how they are being grown in many ways to reach many different goals.

The survey revealed that 81% of farms that responded have observed at least one benefit from growing cover crops, with the most common benefit - improved soil health - being experienced by 54% of farms. Most farms (71%) identified that they had observed benefits within three years of growing cover crops.

Despite these benefits, the survey also identified common challenges that farms faced when adopting cover crops. The most commonly observed problems were related to the Prairie climate, with 30% experiencing problems with the short growing season, and 27% having problems with cover crop establishment due to the lack of moisture in the fall.

Despite these problems, only 4% of farms that responded reported that cover crops resulted in a drop in their farm profit. A much higher 24% identified that cover crops resulted in no change to their profit, and a further 24% identified that they saw an increase in farm profit. A significant proportion of respondents (47%) were not able to identify the influence that cover crops had on farm profit. For this reason, it may be too early in the adoption process to determine how cover crops are influencing farm profit across the Prairies and this is an important area for future research and extension.

Survey responses indicate that financial incentives may be the most effective method for enabling farms to continue using cover crops. These incentives could include payments for storing carbon (59%) and tax credits for planting cover crops (55%). Similarly, 38% of farms that responded indicated that payments from conservation or watershed groups would enable increased cover crop use. Greater access to information, more scientific research, and technical assistance were also identified as needs to enable cover crop adoption on the Prairies.