Cost-Share Program Analysis

Cover Crops and Soil Testing

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The Reducing Barriers to BMP Adoption – Soil Testing and Cover Crops is a three-year applied research initiative that began in 2019. The initiative supports improving soil health, productivity, and water quality on farms across Ontario. The Ontario Ministry of Agriculture, Food and Rural Affairs identified the need for the project and the Ontario Soil and Crop Improvement Association is delivering it. This project is funded by the Canadian Agricultural Partnership, a five-year federal-provincial-territorial initiative.

This report is an inventory of all cover crop and soil testing cost-shared projects that have been administered by OSCIA in the last ten years. It should be treated as a living document, and added to, as fiscal years and new programs are delivered.

Introduction

Government funding incentives have been available through various cost-share programs to implement Best Management Practices (BMPs) to improve soil health and water quality. In combination with education, peer mentoring and technical resources, cost-share can help to encourage the adoption of BMPs over the long-term.

BMPs such as cover cropping and soil testing are important practices that should be routinely implemented. Soil testing is an essential part of managing long-term soil fertility, and routine soil records are required to assess whether nutrient levels are changing or being maintained. Cover crops are also considered fundamental to sustainable cropping systems. They help to stabilize and maintain the soil during the non-growing season when bare soils are at high risk for erosion.

The Ontario Soil and Crop Improvement Association (OSCIA) has played a key role in the delivery of agricultural stewardship programming in Ontario since the late 1980s. OSCIA delivers multiple environmental cost-share programs for various federal departments, provincial ministries, and not-for-profit agencies across the province. Through financial administration of these programs, thousands of BMP projects have been supported, including cover crops and soil testing activities. Cover crops are funded as a stand-alone Project Category, while soil testing has been incentivised through the requirements of either a Nutrient Management Plan (NMP) or a Crop Nutrient Plan (CNP). Through delivery of these programs, a wealth of cost-share data was collected and can now be assessed to study these BMP activities over the last ten years.

Objectives

The primary objective of this report is to establish a baseline inventory of cover crop and soil testing projects supported with cost-share funding. A preliminary behavior change survey was also developed and delivered to evaluate the adoption of cover crops after participation in OSCIA cost-share programs. This data will help to support future applied research that aims to better understand the mechanisms driving long-term adoption of routine on-farm stewardship practices.

Objective	Description	Page
Program Analysis	Perform an extensive data analysis of OSCIA-delivered programs within the **past 10 years** to determine participation levels for cost-shared soil testing and cover crop planting projects: • *Determine number of projects/program/year (or intake)* • *Total costs and average costs/program/year* • *Total acreage and average acreage/program/year*	
	Summarize the requirements for participation and the restrictions/limitations to participation	3
Farmland Health Check-Up	Review FHCU data (for soil testing and cover crops) to analyze producer participation history through cost-share programs	23 - 25
Cover crop survey	Deliver a simple, electronic survey to past cost-share participants to determine a better understanding of post-cost-share behaviour	30 - 34

A variety of data has been collected to administer these programs. Through completion of this program analysis, every effort was made to include the most accurate data, and up-to-date information. Some data limitations (i.e. missing data) prevented a more fulsome analysis for selected metrics (i.e. certain program years, number of acres etc.).

Methodology

This report used a similar methodology as described in the Lake Simcoe Retrospective Analysis Report (OSCIA, 2018). It should be noted that current data management systems and procedures are fairly rigorous and well documented. Merit-based programs require cost items and descriptions on the application forms to be absolutely clear and specific (i.e. to ensure competitive evaluation). However, for older programs using the first-come, first-serve approach (2013 and prior), there were numerous data integrity issues (outlined below). Procedures were not well documented for these program years, as well, the supported Project Categories were far less streamlined.

While it is relatively straightforward to assess cover crops, it has taken much effort to identify soil testing projects, and in some cases, requiring a line by line review of project descriptions. Other challenges that impacted a fulsome analysis include missing and/or incomplete data fields. While some programs documented the number of acres consistently, other programs (and in some cases, certain program years or intakes), did not. Some data fields were collected as a range of values (i.e. 50 – 101 acres), instead of a specific number (i.e. 124 acres). Therefore, averages based on the number of reporting projects, were used to estimate total values in those cases. In addition, different programs utilized different data entry procedures, so there is inconsistency between data sets.

While somewhat disappointing, these are the realities of using cost-share data (which is collected specifically for program administration purposes) and not for in-depth analyses. In recent years, OSCIA has recognized these limitations, and has worked in collaboration with funding partners to enhance data collection procedures, while at the same time acknowledging the burdensome paperwork that comes with more extensive data collection (paper or digital).

Programs Evaluated

Funding Framework	Program	Acronym
Growing Forward	Canada-Ontario Farm Stewardship Program	COFSP
	• Lake Simcoe Agricultural Stewardship Program • Ontario Drinking Water Stewardship Program • Greenbelt Farm Stewardship Program • Lake Simcoe Farm Stewardship Program • Species at Risk Farm Incentive Program	LSASP ODWSP GFSP LSFSP SARFIP
Growing Forward 2	Growing Forward 2	GF2
Great Lakes Agricultural Stewardship Initiative	Farmland Health Incentive Program	FHIP
	Priority Subwatershed Program	PSP
Soil Health Incentive Program		SHIP
Canadian Agricultural Partnership	Lake Erie Agriculture Demonstrating Sustainability	LEADS
	Canadian Agricultural Partnership	CAP

Data Sources

The OSCIA in-house data management system (SOIL) was used to download program datasets for this report. A custom report was generated for data stored in older databases (those prior to 2013),

as well as for the Farmland Health Check-Up, a unique but comprehensive database that stores all of the answers from the workbook. Copies of program brochures and select application forms from library archives were also reviewed (when available).

Data Verification

The datasets were filtered to isolate cover crop projects and any planning project that likely would have included soil testing as an eligible cost expenditure (NMS, NMP, CNP). While cover crops were relatively straightforward to isolate, additional steps were taken to identify soil testing projects. The planning BMPs were filtered to exclude projects that did not include a formal plan. These Project Categories sometimes funded engineering plans and diagrams, with no soil testing activities, therefore these projects were not included. Furthermore, there were cases where some applications were categorized as a formal plan (NMS, NMP or CNP), but did not actually include formal plan costs (i.e. engineering plan). These were not used and simply treated as a misfile. PIF filters were used (when available) to isolate projects with a formal plan.

Project Status

The shortlist of projects was filtered to exclude statuses that were not required or applicable to the analysis (not complete). Only complete milestones were used for this analysis, meaning that CAP and LEADS Year 2 projects were not included because many had not yet submitted a claim.

Duplicate Records

In the DMS database, duplicate records were identified. Duplication of application numbers occurred when a project received funding from more than one funding source. In these cases, records were merged (PivotTable) to prevent duplication of project numbers and measures in grouped analyses (e.g. acres, project costs etc.). Datasets were collated into a single spreadsheet for each BMP.

Organizational Memory

It should also be mentioned that this analysis required an excellent understanding of OSCIA databases, collection and validation methods (across various programs), and procedures (i.e. application reviewing), of which the Consultant has extensive experience. It can be very time consuming to review program materials for eligibility (i.e. iterations of Program brochures across ten years). Ideally this information would be recorded in a central document for quick reference, or at least archived in a central location for future reference (particularly for specific BMP restrictions and/or limitations). In some cases, the Consultant utilized her expertise as a past employee of OSCIA in the delivery of these programs, to make decisions about data integrity in this report. Therefore, it is not possible to document all of this knowledge into a detailed methodology.

Restrictions and Limitations

A summary of restrictions and limitations pertaining to cover crop participation is shown in Table 1. Recall that for CAP and LEADS, only the first program year was assessed in this report. Therefore, any changes made to Year 2 are not factored. *GF2* limited the number of cover crop acres (to align with FHIP) during concurrent program years. However, the Project Information Forms (PIFs) did allow producers to select more than 200 acres for the following question: *how many acres will be impacted by this project?* GF2 did not specifically collect the number of acres *planted* for cover crops, so averages were used in those analyses. For soil testing activities, the restrictions and limitations are summarized on page 26.

Table 1: Cost-Share Program Limitations and Restrictions for Cover Crops

Program[1]	Type	Rates	Funding Limits	Bonus	EFP	Acres	Ineligible Costs
CAP	Merit	50%	$8,000	No	4th EFP Action Plan	No Limit	Alfalfa, winter wheat; bin run seed; repeat costs on same field
LEADS	Merit (FHCU)	45%, 55%, 65%	$20,000	Yes			
FHIP 2015	First-come, first-serve	30%, 35%, 50%, 60%	$5,000, $10,000, $20,000	Yes	3rd or 4th Edition EFP Certificate	200 Acres	Red clover, alfalfa, wheat; bin run seed; repeat costs on same field
FHIP 2016	Merit (FHCU)	35%, 50%, 60%	$10,000, $15,000, $25,000				
FHIP 2017		35%, 40%, 50%	$5,000, $10,000, $20,000				
SHIP	Merit (FHCU)	35%, 40%, 50%	$5,000, $10,000, $20,000	No			
GF2	Merit	35%	$10,000		3rd or 4th EFP Action Plan		Red clover or alfalfa
PSP	Per Acre First-come, first-serve	60% - 80%, $25 per acre payments	N/A		Not specified	No Limit	Commodity seed
COFSP	First-come, first-serve	30% - 75% (top-up)	Not specified		EFP Letter of Review		

Additional Notes:

- FHIP 2015 offered a 30% funding level to producers that did not have a FHCU, allowing for a first-come, first-serve entry option
- Merit-based programs utilizing the EFP Action Plan Review must indicate a 1 or 2 Rating for Cover Crops
- FHIP and LEADS are the only programs that offered additional bonus dollars through a Pollinator and/or Systems Bonus (both 5%)
- COFSP which was administered during the Growing Forward Framework and did not stipulate a limit on cover crop acres
- The Priority Subwatershed Program (available to producers in the Conservation Authorities of ABCA, UTRCA, LTRCA and ERCA) was the only program that utilized the **per acre payment** approach to incentivize cover crops (at a rate of $25/acre)
- Cost-share funding to establish red clover was not supported between 2014 and 2019
- SHIP, FHIP and LEADS required completion of a Farmland Health Check-Up (with the exception of FHIP 2015)

[1] CAP and LEADS are reviewed for Year 1 only (2018-2019)

Quick Reference Sheet: Cover Crops

2008-2009 to 2018-2019

Summary Statistics		Measure
Totals	Total Number of Cover Crop Projects	712
Investment in Cover Crops	Total Producer Investment	$3,300,536
	Total Cost-Share	$1,342,290
Average Costs Per Project	Average Claim Cost	$4,636
	Average Cost-share Payment	$1,885
Number of Acres Established	Percentage of Projects that Reported Acres	64%
	Average Number of Acres Per Project	169
	Total Estimated Acres Established	130,296
Type of Funding Models	Total Number of Projects using competitive merit-based evaluation	319
	Total Number of Projects using the first-come, first serve approach	387
	Total Number of Projects using the per acre payment approach	6
Farmland Health Check-Up	Percentage of Farmland Health Check-Ups reporting cover crop use	51%
	Percentage of producers that completed a Farmland Health Check-Up and went on to apply for cost-share funding to establish cover crops	24%

Cover Crop Investment, Averages and Acres[2]

Fiscal Year	Number of Projects	Eligible Claim Cost	Payment Amount	Average Claim Cost	Average Payment Amount	Estimated Acres
2008-2009	93	$288,020	$144,099	$3,097	$1,549	15,717
2009-2010	74	$283,170	$94,305	$3,827	$1,274	13,542
2010-2011	125	$424,182	$133,410	$3,393	$1,067	22,875
2011-2012	63	$214,343	$63,696	$3,402	$1,011	11,529
2012-2013	12	$57,932	$22,395	$4,828	$1,866	2,196
2013-2014	19	$114,877	$24,471	$6,046	$1,288	3,477
2014-2015	8	$35,088	$9,763	$4,386	$1,220	1,464
2015-2016	84	$489,513	$178,238	$5,828	$2,122	15,372
2016-2017	74	$328,857	$193,237	$4,444	$2,611	13,542
2017-2018	99	$477,381	$190,666	$4,822	$1,926	18,117
2018-2019	61	$587,172	$288,013	$9,626	$4,722	11,163
Total	**712**	**$3,300,536**	**$1,342,290**	**$4,636**	**$1,885**	**130,296**

[2] Costs for each year have been normalized using Consumer Price Index (CPI) inflation rates, as provided by the Bank of Canada's Inflation Calculator.

Cover Crops Summary

Cost-share funding to support the establishment of cover crops has been available to producers throughout Ontario in each fiscal year since 2008. While COFSP[3] and *GF2* are province-wide opportunities, targeted geographies (i.e. southwestern Ontario etc.) have benefited through programs associated with the Farmland Health Check-Up, among others. Appetite for funding has varied, as programs evolved and the benefits of cover crops became more widely discussed.

As shown in Figure 1, over 700 cover crop projects have been supported, of which 50% were completed prior to the start of *GF2*. The highest participation over this period was seen in 2011, while the lowest participation occurred between 2012 and 2015. This was a transition period for program delivery, as the traditional first-come, first-serve model was phased out, in favour of a competitive model which sought to support only the most impactful projects. As merit-based programs were introduced, the application process changed significantly, and OSCIA program representatives were no longer available to help producers fill out their application forms. As well, additional eligibility restrictions were introduced to support farms that had not yet adopted BMPs, while producers that had already established cover crops were not eligible to participate, (depending on how many times they had established cover crops in the preceding five years).

When the Farmland Health Check-Up program was introduced, there was a resurgence in participation. Indeed, there was also quite a lot of buzz in the community about cover crops, but something can be said about the way these programs marketed soil health opportunities to producers. Soil health was certainly the focus of GLASI, while *GF2* was a much larger program where cover crops were not specifically promoted. During the last funding framework (2013 - 2018), nearly 70 percent of cover crop projects were supported by the Farmland Health Incentive Program.

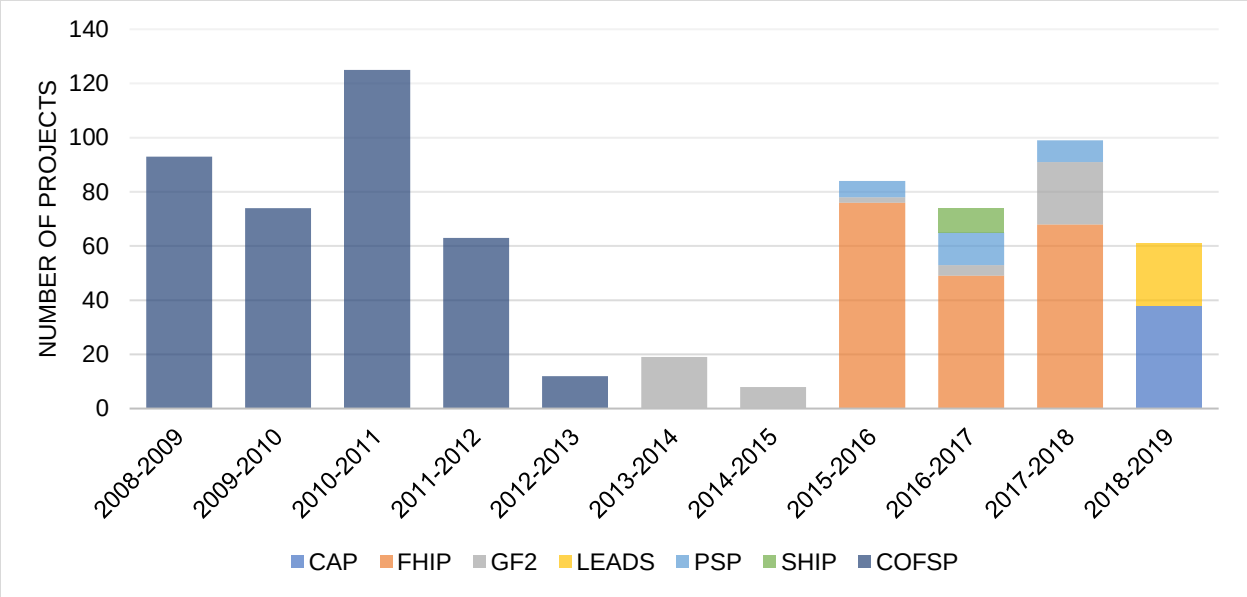

Figure 1: Number of Completed Cover Crop Projects by Major Funding Source

As shown in Table 2, over 1.3 million in cost-share dollars has been paid out to support the establishment of cover crops, while producers have invested 3.3 million dollars. To compare

[3] In Figure 1, program opportunities during Growing Forward (GF) and the Agricultural Policy Framework (APF) were grouped together under COFSP. Many projects received more than one funding source (i.e. COFSP and LSFSP, COFSP and SARFP, or even two instalments of COFSP funding). In total, the breakdown of COFSP funding is as follows: COFSP 64%, LSFSP 4%, while COFSP and either SARFIP or LSFSP represented 33% of projects.

normalized values across the ten-year period, costs were adjusted based on the Consumer Price Index. The average project cost (at claim) was $4,600, while the average cost-share payment was $1,900 (both values have been rounded to the nearest one hundred). Cost-share rates have also varied, but they do not seem to correlate to participation. For example, in 2011 which saw the highest participation, the average cost-share rate was at the lower end (35-40%).

Table 2: Cover Crop Payments and Averages (2008 – 2019)

Fiscal Year	Number of Projects	Eligible Claim Cost	Payment Amount	Average Claim Cost	Average Payment Amount	Average Cost Share Rate
2008-2009	93	$288,020	$144,099	$3,097	$1,549	70%
2009-2010	74	$283,170	$94,305	$3,827	$1,274	40%
2010-2011	125	$424,182	$133,410	$3,393	$1,067	40%
2011-2012	63	$214,343	$63,696	$3,402	$1,011	30%
2012-2013	12	$57,932	$22,395	$4,828	$1,866	70%
2013-2014	19	$114,877	$24,471	$6,046	$1,288	35%
2014-2015	8	$35,088	$9,763	$4,386	$1,220	35%
2015-2016	84	$489,513	$178,238	$5,828	$2,122	40%
2016-2017	74	$328,857	$193,237	$4,444	$2,611	60%
2017-2018	99	$477,381	$190,666	$4,822	$1,926	45%
2018-2019	61	$587,172	$288,013	$9,626	$4,722	55%
Total	712	$3,300,536	$1,342,290	$4,636	$1,885	40%

Costs for each year have been normalized using Consumer Price Index (CPI) inflation rates, as provided by the Bank of Canada's Inflation Calculator. Cost-share rates were rounded to the nearest multiple of five. Field based projects (FHIP, LEADS) are represented as a single project in the 'Number of Projects' column.

Costs to establish cover crops have increased, although not substantially (even after adjusting for inflation). It is not possible to review the specific claim costs, as digitization procedures were not consistent across all program years. In fact, specific cost items are entered as they are listed on the claim form (with limited to no validation performed), and it is therefore not possible to analyze or compare specific costs items across years to identify patterns in seed (single/multi-species), establishment (planting costs) and/or in-kind costs. For example, cost items such as "cover crop seed" or "Invoice 2" or "ag retailer oats" simply do not allow for deeper analyses.

Table 3: Percentage of Cover Crop Projects that claimed In-kind

Program	Percentage of Projects	Maximum In-Kind Contribution
GF2	63%	The total value of the in-kind contribution must not exceed 15 percent of the approved eligible project cost
FHIP	80%	The applicants in-kind labour, up to a maximum of $1,500, may be considered eligible for cost-share
CAP	68%	The maximum cost-share payment for in-kind labour and equipment is $2,000
LEADS	87%	The maximum cost-share payment for in-kind labour and equipment is $2,000

For most recent programs, we can review the number of cover crop projects that claimed in-kind in addition to the standard capital costs. As shown in Table 3, producers claimed in-kind expenditures more often in FHIP and LEADS, than they did in *GF2* or CAP. In-kind was calculated slightly differently across these programs. Producers were able to secure additional cost-share dollars for in-kind hours using the FHIP approach. However, it is not known why there is a difference between LEADS and CAP when the in-kind policy is the same. Regardless, this does indicate that a majority (75 percent) of projects include in-kind expenditures in their cost-share application for cover crops.

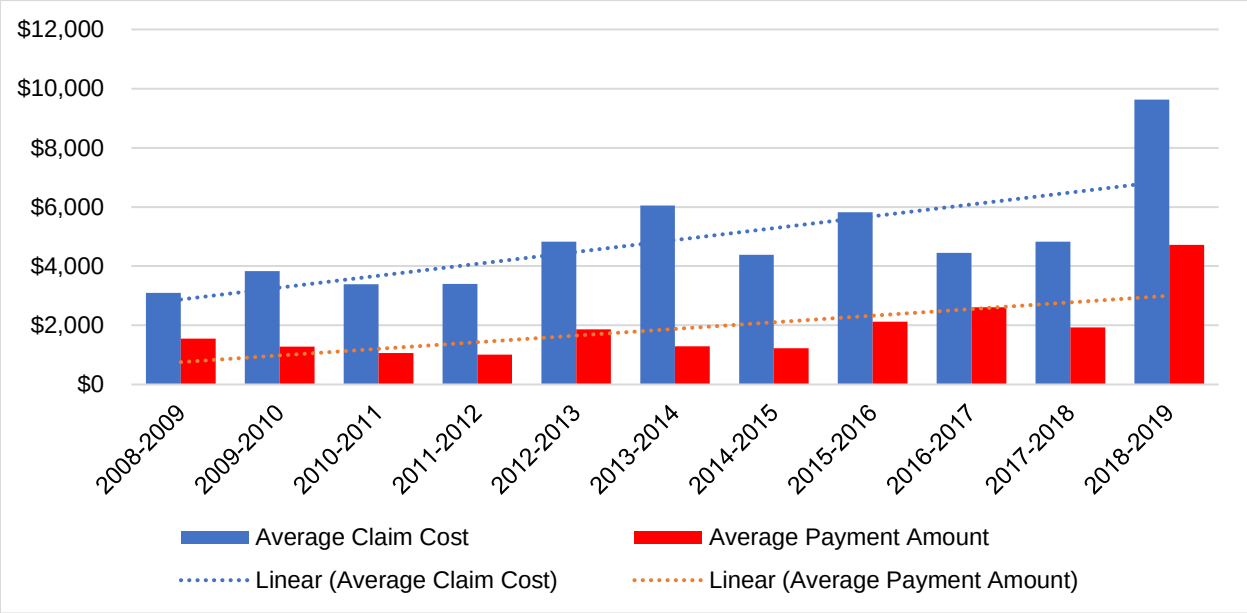

Figure 2: Average project and claim cost by fiscal year (normalized)

As shown in Figure 2, the average project costs (at claim) with cost-share payments are graphed for each fiscal year. As already mentioned, cover crops are becoming more expensive, and there are several possible factors contributing to this.

In COFSP records (2008-2013), limited information about the type of cover crop species was collected. While many of the records did not contain enough information to complete a full assessment, there were at least 220 projects (out of 367) that mentioned a “single” cover crop species, representing 60 percent of projects. This compares to FHIP, where in 2017-2018, 75 percent of projects used a multi-species mix. Planting multi-species mixes are more expensive. Also, between 2008 and 2013, red clover was mentioned as the single cover crop in 25% of projects. In recent programs, red clover was not eligible (unless it amounted to less than 10% of a mix). Another impact to costing, is the limit of acres stipulated by the programs. While there were acreage limits in COFSP, FHIP did employ a 200-acre maximum. This was also the case for select years in *GF2* that were offered in concurrent fiscal years with FHIP. These limits impacted the final cost-share payment for projects that exceeded 200 acres, as they were pro-rated accordingly.

As shown in Figure 3, program limits have also impacted the extent to which cover crops have been established. When limits to acres were removed, the number of acres established per project increased (i.e. compare FHIP to LEADS). While 59% of FHIP projects were establishing acres in the range of 101 to 200 acres, 30% of LEADS projects were planting more than 200 acres per project.

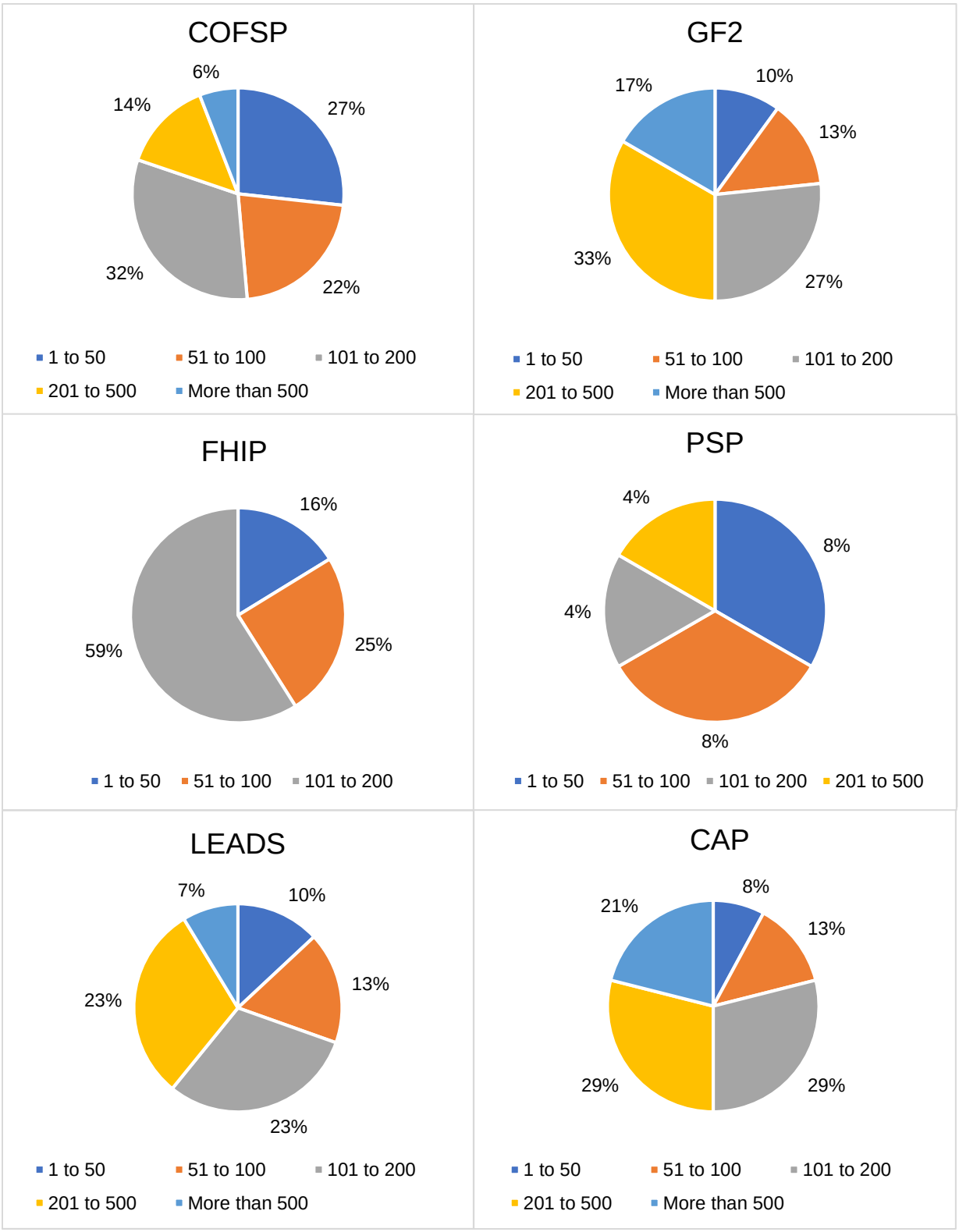

Figure 3: Percentage of Cover Crop Projects by Reported Acres

A detailed breakdown for each major funding source will be explored in the following pages.

Growing Forward

Included in the Growing Forward Framework (2008.04 – 2013.03) was a suite of provincial and federal programs, some geographically targeted, that offered cost-share by the conventional, first-come, first-serve approach (Table 4). Additionally, some programs were designed as "top up" initiatives, where a single project application could receive funding from multiple sources.

Table 4: Growing Forward Framework Program Opportunities

Framework	Program	Acronym	Cost-share Rate
Growing Forward	Canada-Ontario Farm Stewardship Program	COFSP	50% base
	Greenbelt Farm Stewardship Program	GFSP	25% top-up
	Lake Simcoe Agricultural Stewardship Program	LSASP	40% base
	Ontario Drinking Water Stewardship Program	ODWSP	25% top-up
	Lake Simcoe Farm Stewardship Program	LSFSP	30% - 75% base & top-up
	Species at Risk Farm Incentive Program	SARFIP	40% base and top-up

Farms located in the targeted geographies (i.e. Lake Simcoe Watershed) were eligible to access additional "top up" funding, when available (this varied year to year). Unlike present day programs, where eligibility is largely determined by the practice being new to the farm operation, there were limited restrictions on repeat projects in Growing Forward. A number of participants accessed funding for cover crops more than two times. However, it is not known if the practice was maintained routinely after the farm operation completed their project[4].

In Growing Forward, 367 cover crop projects were completed by 265 unique farm operations. While the majority of producers completed a single project, 27 percent completed two or more projects over the five years. On average, each farm operation completed 1.4 cover crop projects during this period (2008-2013). There were nine projects that received 100 percent cost-share as a result of special funding made available to producers in the Lake Simcoe watershed. Most projects received between 30 and 75 percent cost-share.

Table 5: Summary of Final Claim Costs and Cost-Share Payment

Year	Number of Completed Projects	Total Eligible Claim Cost	Payment Amount	Average Claim Cost	Average Payment Amount	Acres Impacted	Number of Reporting Projects	Average Acres
2008	93	$288,020	$144,099	$3,097	$1,549	10,689	84	127
2009	74	$283,170	$94,305	$3,827	$1,274	11,511	43	268
2010	125	$424,182	$133,410	$3,393	$1,067	18,858	96	196
2011	63	$214,343	$63,696	$3,402	$1,011	9,812	53	185
2012	12	$57,932	$22,395	$4,828	$1,866	1,646	12	137
Total	367	$1,267,647	$457,904	$3,454	$1,248	52,516	288	183

Costs for each year have been normalized using Consumer Price Index (CPI) inflation rates, as provided by the Bank of Canada's Inflation Calculator.

As shown in Table 5, over 450 thousand in cost-share dollars was paid out to support the establishment of cover crops, while producers invested nearly 1.3 million dollars during this period. Costs were adjusted based on the Consumer Price Index (CPI) to compare normalized values in

[4] The numbering system used to code farm operations in OSCIA's in-house data management system (DMS) was updated after Growing Forward ended. It is not possible to compare producer history across the ten years, only within each funding framework that utilized the same enrolment system.

today's dollar value (inflation). The average project cost (at claim) was $3,400, while the average cost-share payment was $1,300 (these values were rounded to the nearest one hundred).

It is not known what proportion of these costs were attributed to capital costs (seed and establishment) or in-kind (producer labour) because this information was not collected in the database reliably. Overall, there were slightly more cover crop projects completed with cost-share assistance during Growing Forward than compared to other programs reviewed in this report. This suggests that cover cropping has already been tried by many producers that engage with cost-share funding assistance programs. It does reveal a somewhat stagnant appetite for cost-share through the lens of the entire ten-year period, especially when compared to more recent program opportunities and the plethora of cover crop research and engagement employed in recent years by many industry partners and associations, including OSCIA. It is important to remember that these numbers do not consider program participation through other avenues at the time, such as Conservation Authorities etc.

It was not required for producers to provide the number of acres planted, although this was encouraged, and 78 percent did voluntarily provide this information with the claim form (with the help of OSCIA program representatives). Based on the numbers provided, the average number of acres planted per project was 183. We can therefore estimate that over 67,000 acres were planted between 2008 and 2013 (based on a project average of 183 acres per project). This is interesting to note as the program did not stipulate limits to the maximum number of acres that could be cost-shared. The range of acres planted per project, varied widely, from as low as 1.5 acres to as many as 5,000 acres on a single project application.

Growing Forward 2

GF2 was a five-year commitment by Canada's federal, provincial and territorial governments to encourage innovation, competitiveness and market development, adaptability and industry sustainability in Canada's agriculture, agri-food and agri-based bio-products sector. *GF2* built on the success of Growing Forward and the Agricultural Policy Framework, but introduced new application procedures that prioritized funding towards the most impactful projects (i.e. level of environmental risk, degree of risk reduction, conservation practices employed etc.).

Applicants were required to provide additional information to support their project (i.e. merit-based application evaluation criteria, etc.). This became a more involved process compared to the previous first-come, first serve opportunities utilized support from OSCIA program representatives (i.e. helping producers to fill out application and claim forms, etc.).

GF2 Eligibility Limitations and Restrictions				
Cover crops **had to be identified as an action** in the verified 3rd or 4th Edition EFP Action Plan, with the proposed project effectively moving a "1" or "2" to a "3" or "4" (best) rating	A farm operation could not have grown cover crops of any kind in the last five years of applying. ***Repeat projects were also not eligible***, regardless of the cover crop species or farm location	Eligible cover crop activities and expenditures included seed (excluding Red clover or alfalfa) and establishment costs to a **maximum of 200 acres**	Valid Farm Business Registration Number (FBRN)	Premise Identification Number (PID)

Table 6: Summary of Final Claim Costs and Cost-Share Payment

Year	Number of Completed Projects	Total Eligible Claim Cost	Payment Amount	Average Claim Cost	Average Payment Amount
2013-2014	19	$116,544	$24,826	$6,134	$1,307
2014-2015	8	$35,592	$9,902	$1,873	$521
2015-2016	2	$8,697	$2,922	$458	$154
2016-2017	4	$10,450	$3,335	$550	$176
2017-2018	23	$168,046	$49,746	$8,845	$2,618
Total	**56**	**$339,329**	**$90,732**	**$3,572**	**$955**

Costs for each year have been normalized using Consumer Price Index (CPI) inflation rates, as provided by the Bank of Canada's Inflation Calculator.

As shown in Table 6, $90,000 was paid out to support the establishment of cover crops in GF2, while producers invested $330,000. Costs were adjusted based on the Consumer Price Index (CPI) to compare normalized values in today's dollar value (inflation). The average project cost (at claim) was $3,600, while the average cost-share payment was $955 (these values were rounded to the nearest one hundred). Projects were funded at a single Funding Level, 35%.

As shown in Figure 4, competition from other programs likely impacted cover crop participation starting in 2015 (i.e. the launch of FHIP and the Farmland Health Check-Up). However, during Program Year 2 (2014), participation in cover crops was already low.

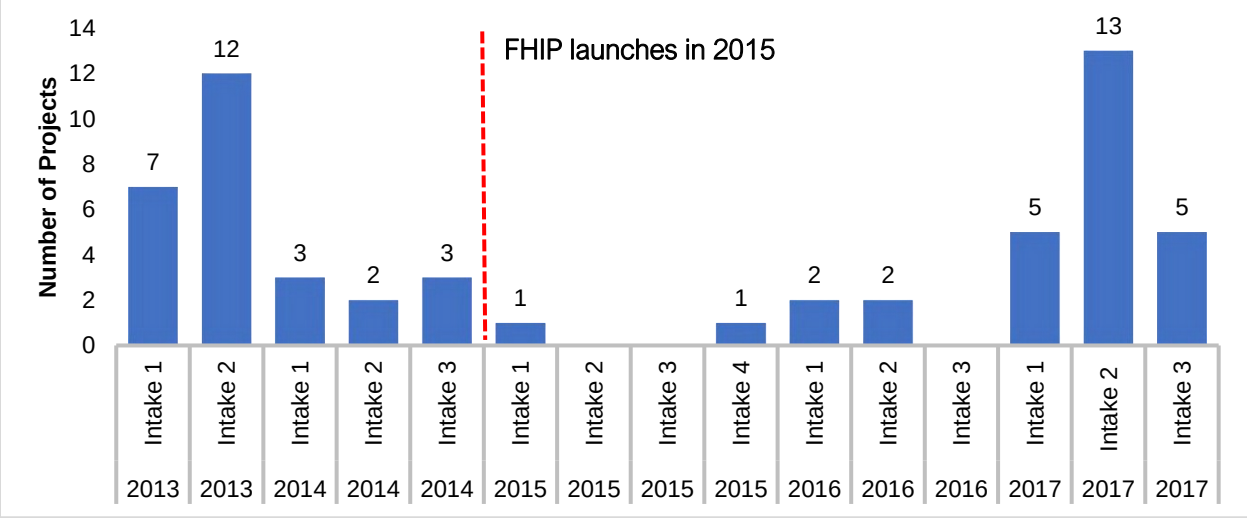

Figure 4: Number of Completed Cover Crop projects by GF2 Intake

While 56 cover crop projects were completed, it should be noted that an additional 33 projects were declined due to having a low score. The majority of low score projects occurred during the final intake of the program (2017). For those applications that did not meet the established scoring threshold, it may be useful to review those criteria in future BMP analyses. Understanding why producers may have been unable to demonstrate a competitive project, could help in the design of future programs (particularly in removing barriers).

Although there was some engagement with cover crop funding in GF2, it certainly did not demonstrate growing interest for funding in this Project Category (at least in this program).

Priority Subwatershed Program

The objective of PSP was to evaluate the effectiveness of a focused stewardship approach, delivered within a defined priority subwatershed area.

Selected subwatersheds were offered funding to help farmers implement cover crops, these included:

- Upper Thames River Conservation Authority (UTRCA) – 10 projects
- Lower Thames Valley Conservation Authority (LTVCA) – 10 projects
- Ausable Bayfield Conservation Authority (ABCA) – 5 projects
- Essex Region Conservation Authority (ERCA) – 1 project

Participating farms had to be willing to allow on-going monitoring of the BMP(s) on their farm for at least three years. Funding was allocated on a continuous basis, and projects were not evaluated based on whether the BMP was new to the farm operation. While some Conservation Authorities used a cost-share rate structure, others used the per acre payment approach (Table 4).

Eligibility Requirements and Limitations		
Be located within the geography of the priority subwatershed	Have a valid Farm Business Registration Number (FBRN)	Have a Premise Identification Number (PID)
Participation in other OSCIA delivered programs **did not** impact the eligibility or the contribution amount for a PSP project		

While a per acre system was offered for ABCA and ERCA farmers, the majority of projects delivered in PSP were funded using the standard cost-share rate structure (Table 7). Many farms took advantage of the 80% rate for establishing multi-species cover crop mixes, further project details relating to the project design and/or justifications can be found in the subsequent Annual Reports.

Table 7: Number of Projects by Cost-Share Level

Cost-Share Level	Rate	Number of Total Projects	Percentage of Total Projects	Payment Amount
1-2 Species Mix	60%	7	27%	$6,357
3-7 Species Mix	70%	1	4%	$809
8+ Species Mix	80%	12	46%	$26,356
Per Acre	$25 /acre	6	23%	$36,145
Total	NA	26	100%	$69,667

Table 8: Summary of Final Claim Costs and Cost-Share Payment

Year	Number of Completed Projects	Payment Amount	Average Payment Amount	Acres Established	Number of Reporting Projects	Average Acres
2015-2016	6	$17,221	$2,870	-	-	
2016-2017	12	$45,345	$3,779	494	4	124
2017-2018	8	$12,662	$1,583	138	2	69
Total	26	$75,228	$2,744	632	6	97

Costs for each year have been normalized using Consumer Price Index (CPI) inflation rates, as provided by the Bank of Canada's Inflation Calculator.

As shown in Table 8, $75,000 in cost-share dollars was paid out to support the establishment of cover crops in PSP. Costs were adjusted based on the Consumer Price Index (CPI) to compare normalized values in today's dollar value (inflation). The average cost-share payment was around $2,700 per project (value was rounded to the nearest one hundred). It was not possible to calculate the average claim cost because the final claim project allocations were not retrievable in the database. Additionally, the number of acres at project completion were only entered for six projects. We can estimate the total acres planted across the program by using an average of 97 acres per project (based on the six reporting projects). It is estimated that 2,500 acres were planted across the four subwatersheds, the majority in UTVCA and LTRCA.

Farmland Health Incentive Program

The Farmland Health Incentive Program (FHIP) offered financial support to implement select BMPs including cover crops. The program supported actions with the greatest potential to impact the landscape, accomplished by assessing field-specific conditions and practices in the Farmland Health Check-Up workbook. As a merit-based program, FHIP's primary objective was to address soil health and reduce edge of field phosphorus loss to help improve the health of the Great Lakes. FHIP ran concurrently alongside PSP, and was seen as successful in driving adoption of soil health tailored BMPs on the farm landscape in southwestern Ontario.

Eligibility Requirements and Limitations					
Be located within the geography of the GLASI Target Area	Have completed a Farmland Health Check-Up	A farm operation could not have grown cover crops of any kind in the last five years of applying.	Have a peer-reviewed 3rd edition EFP or verified complete 4th edition EFP and Action Plan	Have a Premise Identification Number (PID)	Have a valid Farm Business Registration Number (FBRN)
Area: Lake Erie and Lake St. Clair watersheds and/or the Lake Huron southeast shores watershed					

Cost-share Funding Levels were adjusted periodically between fiscal years, and followed a three-level approach (High Priority, Recommended, and General). Funding levels were determined by the ratings and priorities identified by CCAs on the completed BMP tables in the workbook. High Priority was more difficult to qualify for, as the challenge had to be rated as fair or poor. In the final year of the program, only farmers with a rating of poor could qualify for the High Priority funding level. Only new practices could be funded, so only farmers that had not established cover crops of any kind in the last five years were eligible to participate (as identified on the Farmland Health Checkup). Additionally, projects were limited to establishing a maximum of 200 acres.

Table 9: Summary of Final Claim Costs and Cost-Share Payment

Year	Number of Completed Projects	Total Eligible Claim Costs	Payment Amount	Average Claim Cost	Average Payment Amount	Acres Reported	Number of Projects Reporting Acres	Average Acres Per Farm
2016	122 (76)	$464,380	$158,591	$2,639	$2,087	N/A	-	-
2017	97 (49)	$236,792	$129,193	$4,832	$2,637	6,402	49	131
2018	128 (68)	$297,818	$128,550	$4,380	$1,890	8,946	67	134
Total	**347 (193)**	**$998,990**	**$416,334**	**$3,950**	**$2,205**	**15,348**	**116**	**132**

Costs for each year have been normalized using Consumer Price Index (CPI) inflation rates, as provided by the Bank of Canada's Inflation Calculator. Numbers in (brackets) indicate the number of field-based projects. A single field may have received different funding based on the recommendations and risks identified in the Check-up.

Further program details relating to funding levels can be found in the subsequent Quarterly, Annual and Final Program Reports for GLASI.

As shown in Table 9, nearly $500,000 was paid out to support the establishment of cover crops in FHIP, while producers invested nearly 1 million dollars. Costs were adjusted based on the Consumer Price Index (CPI) to compare normalized values in today's dollar value (inflation). The average project cost (at claim) was $3,900, while the average cost-share payment was $2,200 (these values were rounded to the nearest one hundred).

It became mandatory in the final two years of the program to report the number of acres established with the submission of the final claim. We can estimate the total number of acres planted by using 132 acres per project (based on 116 reporting projects). It is therefore estimated that 25,400 acres were planted in Southwestern Ontario over the three-year period FHIP was delivered.

Lake Erie Agriculture Demonstrating Sustainability (LEADS)

LEADS is the successor of FHIP, and continues to support the implementation of BMPs on farms within the Lake Erie and Lake St. Clair watersheds. The objective remains to improve soil health while addressing nutrient reduction targets. LEADS is a merit-based cost-share program, with funding levels determined by the level of risk identified in the Farmland Health Check-Up. The structure and format of the program is very similar to FHIP, but some of the specific restrictions to cover crop funding have been relaxed in the second year (i.e. red clover, etc.).

Eligibility Requirements and Limitations					
Be located within the geography of the LEADS Target Area	Have completed a Farmland Health Check-Up	A farm operation could not have grown cover crops of any kind in the last five years of applying.	Have a peer-reviewed 3rd edition EFP or verified complete 4th edition EFP and Action Plan	Have a Premise Identification Number (PID)	Have a valid Farm Business Registration Number (FBRN)
Area: Lake Erie and Lake St. Clair watersheds					

Cost-Share Funding follows a three-level approach (Base, Moderate and High). Funding levels are determined by the risk rating identified in the Farmland Health Check-Up workbook. Very few projects qualify for the High Priority Funding Level because the risks need to be rated as poor. Again, only new practices could be funded, so farmers that had previously participated in past OSCIA delivered programs were not eligible to participate. Limits to acres were removed in LEADS.

Further program details relating to funding levels can be found in the subsequent Quarterly, Annual and Final Program Reports for LEADS. Year two of the program was not reviewed because not all the claims had been submitted and/or evaluated upon completion of this report.

Table 10: Summary of Final Claim Costs and Cost-Share Payment, 2018-2019

Number of Completed Projects	Total Eligible Claim Costs	Payment Amount	Average Claim Cost	Average Payment Amount	Acres Reported	Number of Projects Reporting Acres	Average Acres Per Farm
23 (56)	$207,511	$113,064	$9,022	$4,916	5,167	23	224

Numbers in (brackets) indicate the number of field-based projects. A single field may have received different funding based on the recommendations and risks identified in the Check-up.

As shown in Table 10, over $100,000 was paid out to support the establishment of cover crops in LEADS, while producers invested over $200,000. The average project cost (at claim) was $9,000, while the average cost-share payment was $5,000 (these values were rounded to the nearest one hundred). A total of 5,167 acres were reported to have been established, representing about 224 acres per project. This is a significant increase to levels seen in FHIP as LEADS no longer limited projects to 200 acres.

Canadian Agricultural Partnership

As the successor to *GF2*, the Canadian Agricultural Partnership (CAP) is a five-year federal-provincial-territorial initiative to strengthen the agriculture, agri-food and agri-based products sector, and increase its competitiveness, prosperity and sustainability. To support water quality improvements in Lake Erie as part of the Canada-Ontario Lake Erie Action Plan, BMPs supporting phosphorus loss reductions are supported, including cover crops. CAP is available province-wide.

Eligibility Requirements and Limitations			
Cover crops **have to be identified as an action** in the verified 4th Edition EFP, with the proposed project effectively moving a "1" or "2" to a "3" or "4" (best) rating	Cover crops **must not be a routine practice**, they cannot have been established **more than three times** over the last five years	Have a Premise Identification Number (PID)	Have a valid Farm Business Registration Number (FBRN)

Year two of the program was not reviewed because not all the claims had been submitted and/or evaluated upon completion of this report.

Table 11: Summary of Final Claim Costs and Cost-Share Payment, 2018-2019

Number of Completed Projects	Total Eligible Claim Costs	Payment Amount	Average Claim Cost	Average Payment Amount
38	$366,747	$168,614	$9,651	$4,437

As shown in Table 11, over $166,000 was paid out to support the establishment of cover crops in CAP, while producers invested nearly $350,000 dollars. The average project cost (at claim) was $9,700, while the average cost-share payment was $4,400 (these values were rounded to the nearest one hundred). Project metrics including the specific number of acres established at claim were not collected. However, the intended range of acres to be planted is collected on the Project Information Form, and as shown previously in Figure 3, the majority (80%) of projects planted more than 100 acres per project. In fact, 50% of projects established more than 200 acres per project.

Geography Considerations

Funding to support cover crops has been available yearly over the ten-year period reviewed in this report. While some programs have been available province-wide, others have been geographically targeted. Indeed, spatial targeting of programs has allowed certain geographies to benefit with additional funding. However, there are always farmers that choose not to participate. It is interesting to see the changes when comparing participation between funding frameworks.

This was the effort of Table 12, which compares participation trends on a percent change basis between counties. Two eras of programming were compared, the pioneering first-come, first-serve suite of programs (i.e. COFSP) and the merit-based opportunities that came with GF2 and GLASI. One would expect to find an increase in participation in geographies where multiple program opportunities were available. However, that is certainly not the case for Chatham-Kent and

Middlesex, both of which have seen significant declines in cover crop participation between funding eras. However, other counties have seen substantial increases, such as Wellington, Perth and Oxford. There are many interesting trends in this chart, across the many unique geographies that make up the Ontario agricultural landscape. It does speak to the fact that behavior change, through the lens of cost-share programming has significant spatial influences.

Table 12: Percent Change in Cover Crop Program Participation

County	Number of Projects		Percent Change
	2008-2013	2013-2019	
Algoma	-	1	-
Brant	1	2	100%
Bruce	9	21	133%
Chatham-Kent	98	30	-69%
Dufferin	3	5	67%
Durham	4	5	25%
Elgin	12	28	133%
Essex	27	33	22%
Grey	3	9	200%
Haldimand	2	5	150%
Halton	1	1	No change
Hamilton	2	2	No change
Huron	20	37	85%
Kawartha Lakes	-	3	-
Lambton	24	16	-33%
Lanark	3	1	-67%
Leeds & Grenville	1	1	No change
Lennox & Addington	-	1	-
Middlesex	69	29	-58%
Niagara	11	2	-82%
Nipissing	1	1	No change
Norfolk	5	9	80%
Northumberland	-	5	-
Ottawa-Carleton	-	2	-
Oxford	5	16	220%
Peel	6	1	-83%
Perth	8	24	200%
Peterborough	4	3	-25%
Prescott & Russell	4	4	No change
Simcoe	28	12	-57%
Stormont, Dundas & Glengarry	-	2	-
Waterloo	4	2	-50%
Wellington	2	23	1050%
York	10	7	-30%
Total	**367**	**343**	-7%

Cover Crop Survey

To better understand the behavior change of farmers regarding BMP adoption after cost-share participation, a survey was delivered. Unfortunately, OSCIA did not receive approval from the Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA) to directly contact producers from OSCIA program records[5]. The survey was instead shared on OSCIA social media channels (i.e. Twitter), while a paper version was distributed at OSCIA's Annual General Meeting.

To ensure respondents were eligible to complete the survey (farmers must have received cost-share to establish cover crops), a pre-survey qualifier question was added. Out of the 60 respondents that participated, only 31 were eligible to complete the survey. Nearly half of all respondents indicated they received funding through FHIP and *GF2*, while the other half indicated participation in current programs including Partnership and LEADS.

Which programs did you receive cost-share from (check all that apply)?

Program	Number of Responses	Percentage of Responses
Growing Forward 2 (GF2)	8	40%
GLASI: Farmland Health Incentive Program (FHIP)	9	45%
GLASI: Priority Sub-watershed Program (PSP)	2	10%
Canadian Agricultural Partnership (CAP)	6	30%
Lake Erie Agriculture Demonstrating Sustainability (LEADS)	5	25%

Table 13: Barriers to Project Implementation

	Were there any program rules that impacted how you implemented your cover crop project?
1	Overwintering cover crops was something I never tried before but the program required it, now its a common practise on our farm
2	Farmland Health Check-Up
3	I prefer to use red clover but it was not permitted as an option in the early programs
4	Cover crops had to remain in place until April of the following year. Harvesting for forage was not allowed. Otherwise we would have made hay from it.
5	Because of the time lag in having projects approved, it is sometimes hard to get seed delivered ahead of time, to have it available for planting after rainfall, post wheat harvest
6	Have not received final payment yet but I believe I will shortly. One program rule impacted greatly, I couldn't use grain grown on my own farm and get paid for it. We should be able to use our own grain for seed and get compensated for it.
7	Multi species .... just have cover who cares how many species...let's get something growing on all acres ...strait oats are better than nothing
8	Lied on form because previous usage of cover crop would have made me ineligible for funding
9	Yes. Not allowing grazing or producing of cattle feed
10	Yes, we planned to use bin-run winter wheat as a cover crop following cash crops harvested in Sept/Oct. This was not eligible for funding because: 1. It is a commodity crop. 2. We grew it ourselves. It should be eligible. Did not seed those acres

Ten responses were received to the question posed in Table 13, which asked if there were any program rules that impacted the implementation of the project. Respondents identified program specific barriers such as red clover and bin run seed, or grazing disqualifiers. Others highlighted the wait times between receiving program approval and the availability of seed. One respondent

[5] Canada's Anti-Spam Legislation (CASL) does not apply to surveys or market research. As long as an electronic message does not contain commercial content, then CASL does not apply.

indicated they were dishonest on the form regarding past cover crop usage, in order to qualify for funding. It may be helpful to review the Final Report Surveys collected during GF2 to assess the identified project barriers that would have been documented for cover crops. This was a mandatory survey, so all 56 cover crop projects funded in GF2 would likely have a Final Report survey.

The majority of respondents (90%) indicated they continued to plant cover crops on their farm in the years following their cost-share project. While 80 percent of respondents indicated they planted with specific rotations, ten percent indicated they planted cover crops on all rotations. Ten percent did not continue to establish cover crops on their farm after the project. Respondents indicated that time, cost, weather, and lack of appropriate planting equipment (i.e. not till corn planter), as well as bin-run seed restrictions were barriers that prevented them from regularly establishing cover crops.

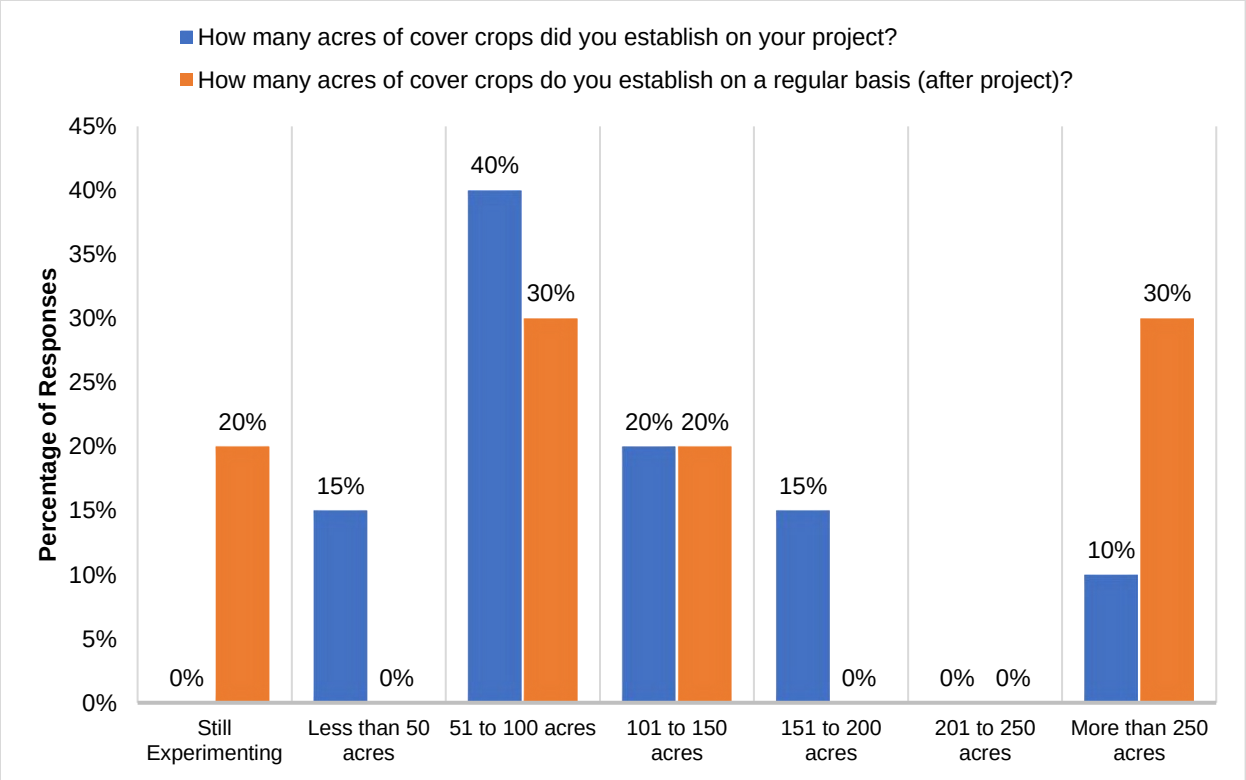

Figure 5: How many acres of cover crops were established?

As shown in Figure 5, many respondents indicated they continued to plant cover crops, with some going on to plant more acres than they did in the initial project (i.e. more than 250 acres). There were also respondents that continued to experiment with cover crops as well. This may relate to the factors impacting establishment, as shown in Figure 9. Overall, this indicates that cost-share programs were successful in driving BMP adoption at the small scale (i.e. continuing to experiment) and the large scale (i.e. increasing the number of cover crop acres established across the farm).

As well, many of the respondents indicated they were also establishing cover crops on rented land in addition to there owned farmland (Figure 6). Overall, about 36 percent of cover crops were established planted on rented acres, while 64 percent on owned land.

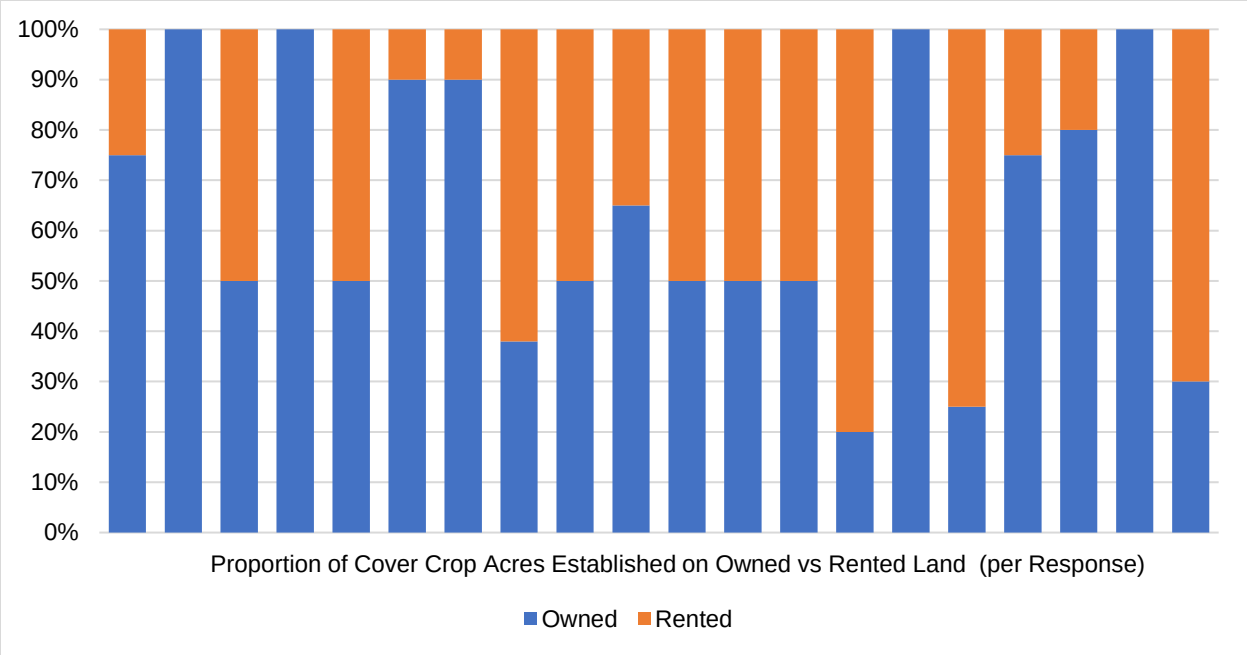

Figure 6. What percentage of your owned and or rented farmland is this? (i.e. 25% etc.)

As shown in Figure 7, the majority of respondents (65%) indicated that funding is a significant factor in their decision to use cover crops regularly. In fact, 30 percent strongly agreed while 30 percent were in positive agreement with the statement: *Is funding a significant factor in establishing cover crops regularly?* A very small number of respondents disagreed that funding was significant, while 35 percent were neutral.

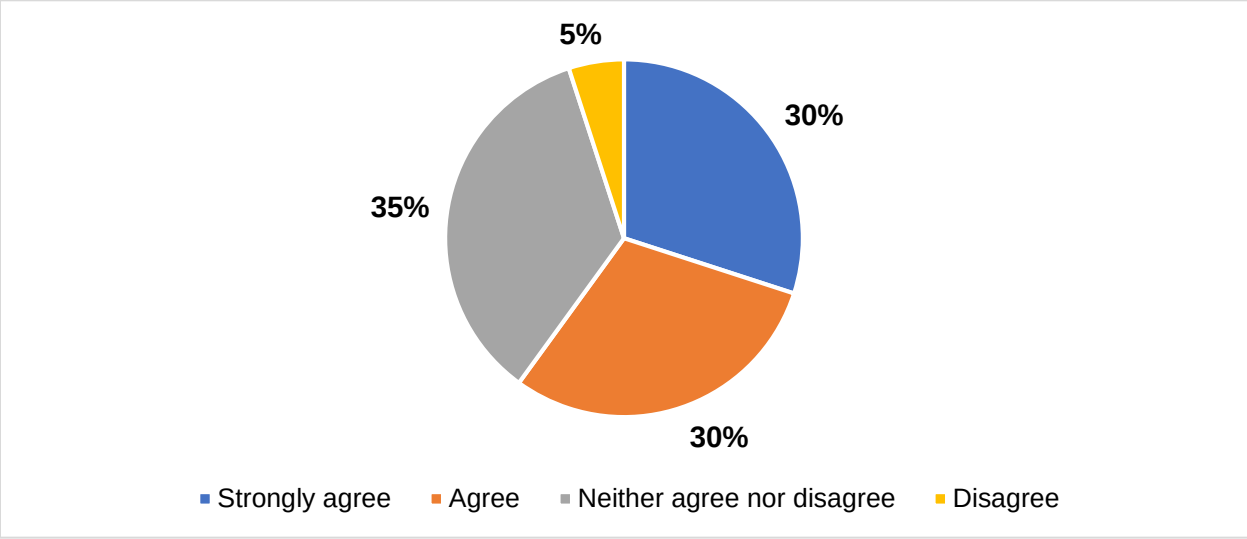

Figure 7. Is funding a significant factor in establishing cover crops regularly?

Respondents were also asked how long they have been using cover crops, 30 percent (2-3 years), 30 percent (4-5 years), 25 percent (8+ years) and 15 percent (6-7 years). None of the respondents selected “Less than 1 year”, indicating that establishing cover crops has been at least, a repeated practice since completion of their cover crop project.

There are also many factors that influence cover crop decisions on the farm. As shown in Figure 8, cost-share funding was identified as the largest factor, while more knowledge about cover crop benefits and species were strong factors also. While a few respondents indicated free technical assistance was a factor, no one selected paid technical assistance.

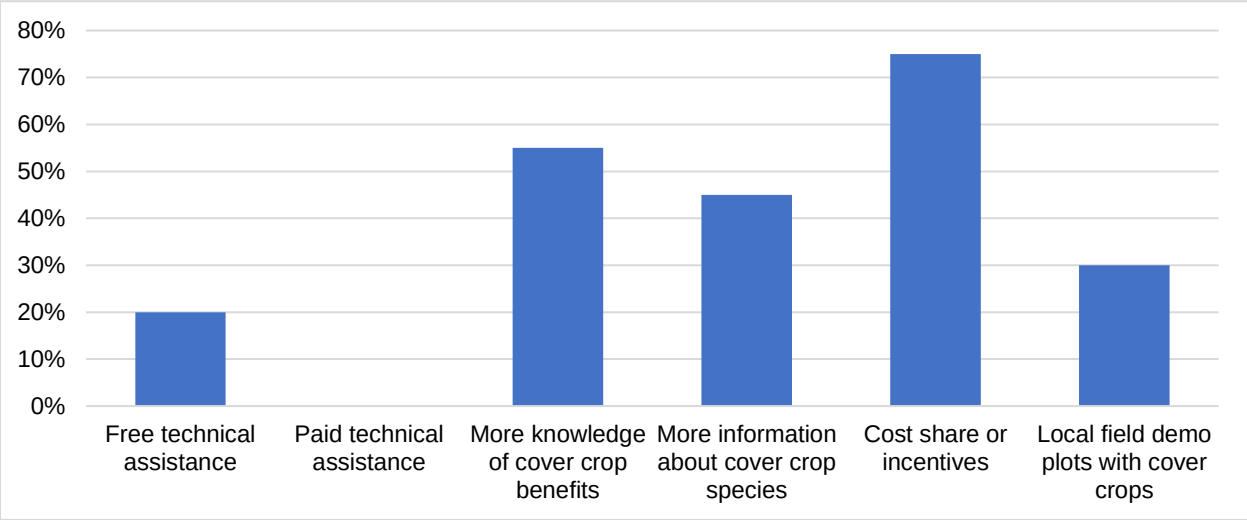

Figure 8. What factors influence your cover crop decisions? (check all that apply)

As mentioned earlier, for those respondents that indicated they did not use cover crop regularly, Figure 9 summarizes the factors impacting their decision. By and large, time and labour concerns was the largest factor. This was also followed by economic concerns and moisture impacts. Also, interesting to note, was the issue of no longer being eligible for funding. OSCIA delivered programs are designed to support new practices only, and so farmers that have already established cover crops at least three times in the last five years, are no longer eligible.

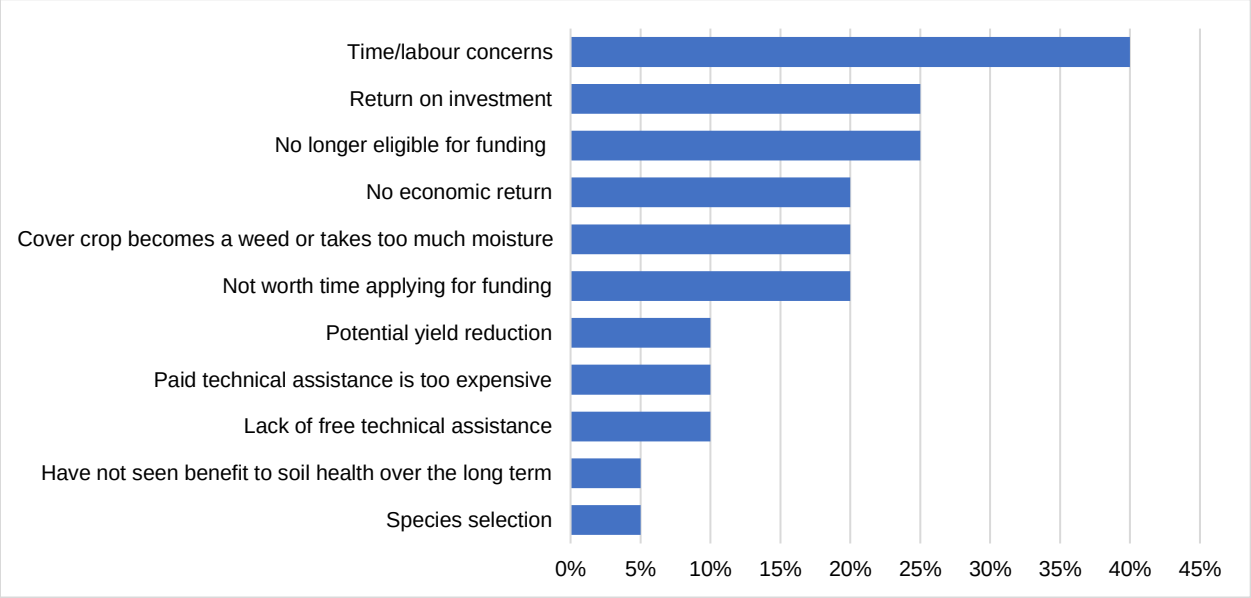

Figure 9. If you do not regularly use cover crops, please state why (check all that apply)

Respondents were also asked to indicate where they received technical assistance to plant cover crops (Figure 10). Most seek out Certified Crop Advisors for technical assistance, followed by their

local Ag retailer or co-op, and then Conservation Authority. Twenty five percent of respondents indicated they did not receive technical assistance when establishing cover crops.

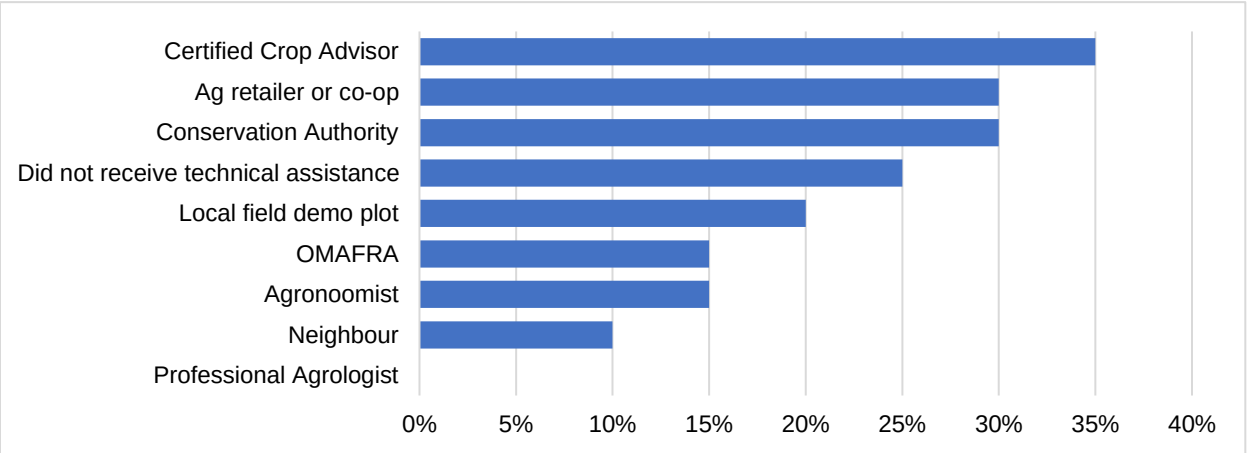

Figure 10. Did you receive technical assistance to plant cover crops? (check all that apply)

To close out the survey, respondents were given a final opportunity to provide additional commentary about establishing cover crops with cost-share funding assistance (Table 14). Respondents indicated a variety of concerns, many indicated knowledge transfer limitations (what are the benefits, what species should they plant etc.) while researching for information online. Funding was also an issue, with one respondent indicating that having a cost-benefit measure would be helpful in justifying additional costs with partners. Others indicated that the cost of establishing cover crops is too high for the farmer to bear the entire cost, while per acre payments would be preferential, among other suggestions.

Table 14. Cover Crop Survey Final Comments

Is there anything else you would like to tell us about establishing cover crops with the help of cost-share funding assistance?
So many unknowns about beneficial species and cover crops before planting of the cash crop
The promised funding was denied. Farm health check up lowered eligibility because I had previously had cover crops…Got 50 percent of seed. Nothing for prep and seeding
Cover crops are a high gain strategy for clean water for Ontario. Farmers should not have to bear the entire cost on behalf of Ontario. Cost share should be automatic for all acres of CC across the province
Technicians from conservation authority very helpful, sometimes difficulty getting funding not enough money available for cover crops
Make it 20$/ac
Yes - it would have been beneficial to have someone to speak to about cover crop choices, planting times etc. Most of what we did I read online.
I will be planting different small grains to be used as next year's cover crops (oats, barley, buckwheat, fall rye etc...) as part of my crop rotation. It would be nice if I could get funding for using my own grain. You could use an average selling price of that specific commodity for the year. If I have to buy grain, the process becomes too cumbersome and is not worth it.
Ability to have a cost-benefit measurement to justify additional costs to my partners
Farmer tips like a #covercrophacks of what problems popped up& how they solved them

Cost-share programs have successfully contributed to BMP adoption in both the short and long term. Further research is needed to more fully assess the prevalence of cover cropping on the farm landscape, and to understand whether other educational and incentive systems may be more suitable over the long term.

Soil Testing Summary

Unlike cover cropping, soil testing has not been incentivised as a stand-alone BMP. Soil testing activities have only been supported as part of a formal plan. Consultative soil services (soil sampling and analysis etc.) are supported to conduct a first-time assessment and develop a five-year Nutrient Management Plan (NMS/NMP) or Crop Nutrient Plan (CNP). Ongoing and/or annual consultative services relating to planning and routine sampling are **not eligible**. However, we can still take a deeper look at these planning projects to estimate the proportion of soil testing costs that have been invested by producers through cost-share programs over the last ten years.

The total number of NMP and CNP projects supported through OSCIA cost-share programs is shown in Figure 11. While CNP projects have been incentivised as a standalone BMP for over fifteen years, there were only a handful of CNP projects completed during COFSP (2008-2013).

There was an increase in CNP projects completed through soil health focused programs associated with the Farmland Health Check-Up. This figure also highlights the influence of O. Reg. 267/03 as stipulated in the Nutrient Management Act, however there has been a decrease in the number of NMPs completed in more recent years. The soil health focused programs may be contributing to, or at least motivating producers to adopt planning practices (i.e. testing) in a more regular fashion.

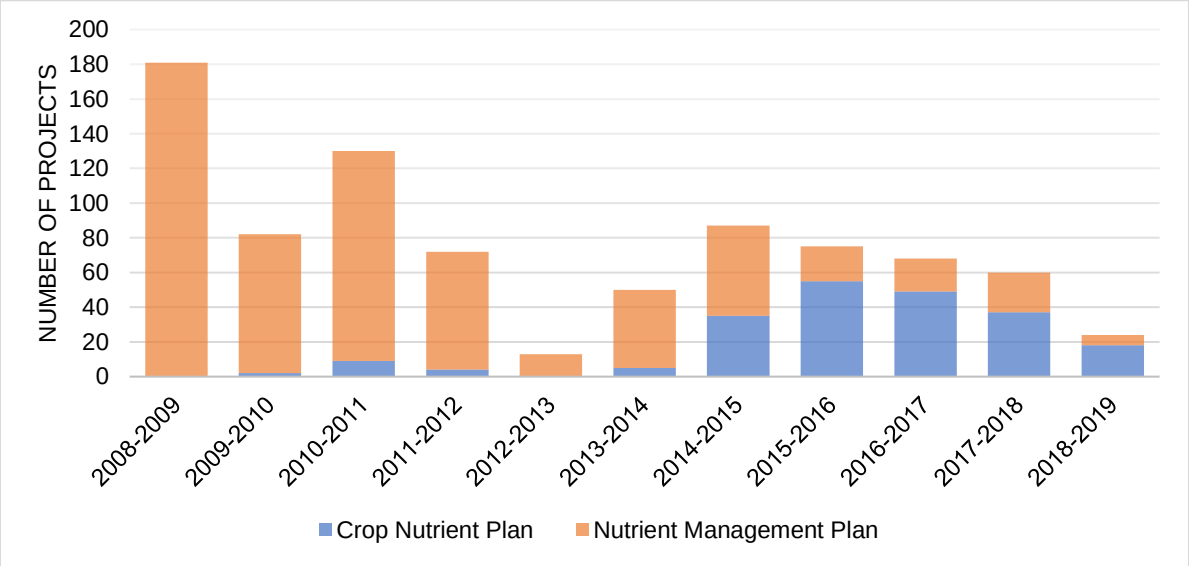

Figure 11: Number of Planning Projects that Required Soil Testing

However, in more recent years, there actually has been a decrease in the number of CNP plans that have been completed with cost-share funding assistance. While there was an uptake during the Farmland Health Incentive Program, that momentum has not been maintained. To illustrate this further, Figure 12 shows the number of CNP projects by major funding source. Note the shift in CNP projects being completed through the GLASI suite of programming beginning in 2015. However, this has declined as the Partnership programing era was introduced.

Both Project Categories (CNPs and NMPs) required soil testing as part of the completion of a formal plan, however they are being completed for different reasons (livestock vs crop systems), and therefore the soil testing parameters are different for each situation. Unfortunately, the cost-share

data is too limited to understand the type of soil testing (nutrients, or more comprehensive) that may have been included as a capital cost for these projects.

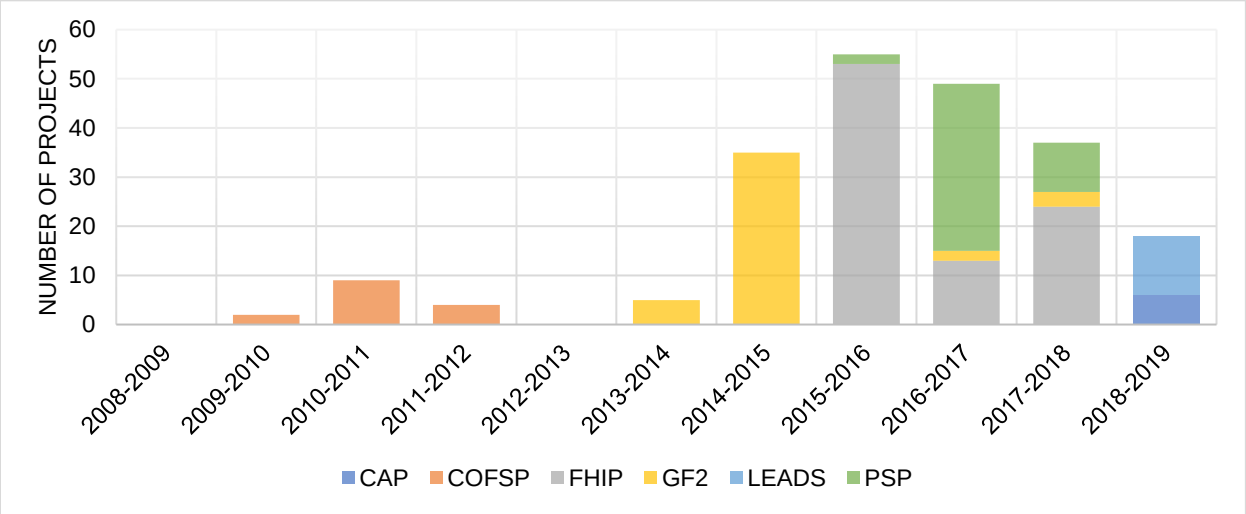

Figure 12: Number of Completed Crop Nutrient Plan Projects by Major Funding Source

As shown in Table 15, 842 planning projects (that included soil testing as a component), were completed between 2008 and 2019, with 25 percent of these being CNPs, and 75 percent NMS or NMPs. These projects were typically funded at the 50 percent Funding Level. Over $2.4 million was invested by producers, while $1.3 million in cost-share was paid out to support the implementation of these formal plans. Costs were adjusted based on the Consumer Price Index (CPI) to compare normalized values in today's dollar value (inflation).

Table 15: Planning Projects Payments and Averages (2008 – 2019)

Fiscal Year	Number of Projects	Eligible Claim Cost	Payment Amount	Average Claim Cost	Average Payment Amount	Average Cost Share Rate
2008-2009	181	$460,404	$227,857	$2,544	$1,259	50%
2009-2010	82	$210,488	$104,448	$2,567	$1,274	50%
2010-2011	130	$344,457	$171,288	$2,650	$1,318	50%
2011-2012	72	$178,367	$85,051	$2,477	$1,181	50%
2012-2013	13	$24,809	$12,376	$1,908	$952	50%
2013-2014	50	$252,389	$116,400	$5,048	$2,328	50%
2014-2015	87	$381,356	$183,465	$4,383	$2,109	50%
2015-2016	75	$167,085	$82,015	$2,228	$1,094	50%
2016-2017	68	$230,255	$134,472	$3,386	$1,978	65%
2017-2018	60	$328,258	$154,127	$5,471	$2,569	50%
2018-2019	24	$148,558	$74,167	$6,190	$3,090	50%
Total	842	$2,442,446	$1,345,666	$3,532	$1,741	50%

Costs for each year have been normalized using Consumer Price Index (CPI) inflation rates, as provided by the Bank of Canada's Inflation Calculator. Cost-share rates were rounded to the nearest multiple of five.

It may be useful to examine the average costs for each plan type separately. This has been done for Table 16 and 17.

For CNPs, 214 projects have been completed, representing over $840,000 in producer investment, and over $426,000 in cost-share. The average project cost (at claim) was $3,900, while the average cost-share payment for a CNP was $2,000 (these values were rounded to the nearest one hundred). These averages are higher than NMP project averages.

Table 16: Crop Nutrient Plan Projects Payments and Averages (2008 – 2019)

Fiscal Year	Number of Projects	Eligible Claim Cost	Payment Amount	Average Claim Cost	Average Payment Amount	Average Cost Share Rate
2008-2009	-	-	-	-	-	-
2009-2010	2	$13,482	$6,486	$6,741	$3,243	40%
2010-2011	9	$63,127	$23,050	$7,014	$2,561	50%
2011-2012	4	$5,236	$2,911	$1,309	$728	50%
2012-2013	-	-	-	-	-	-
2013-2014	5	$18,459	$9,229	$3,692	$1,846	50%
2014-2015	35	$159,116	$78,681	$4,546	$2,248	50%
2015-2016	55	$116,549	$57,656	$2,119	$1,048	50%
2016-2017	49	$152,220	$96,568	$3,107	$1,971	70%
2017-2018	37	$184,045	$84,922	$4,974	$2,295	55%
2018-2019	18	$129,703	$66,611	$7,206	$3,701	55%
Total	214	$841,937	$426,113	$3,934	$1,991	50%

Costs for each year have been normalized using Consumer Price Index (CPI) inflation rates, as provided by the Bank of Canada's Inflation Calculator. Cost-share rates were rounded to the nearest multiple of five.

For NMPs, 628 projects have been completed, representing over $1.8 million in producer investment, and over $900,000 in cost share. The average project cost (at claim) was $3,000, while the average cost-share payment for a CNP was $1,500 (these values were rounded to the nearest one hundred).

Table 17: Nutrient Management Plan Projects Payments and Averages (2008 – 2019)

Fiscal Year	Number of Projects	Eligible Claim Cost	Payment Amount	Average Claim Cost	Average Payment Amount	Average Cost Share Rate
2008-2009	181	$460,404	$227,857	$2,544	$1,259	50%
2009-2010	80	$197,007	$97,963	$2,463	$1,225	50%
2010-2011	121	$281,331	$148,238	$2,325	$1,225	50%
2011-2012	68	$173,130	$82,142	$2,546	$1,208	50%
2012-2013	13	$24,809	$12,376	$1,908	$952	50%
2013-2014	45	$210,434	$96,407	$4,676	$2,142	50%
2014-2015	52	$222,240	$104,784	$4,274	$2,015	50%
2015-2016	20	$50,536	$24,360	$2,527	$1,218	50%
2016-2017	19	$78,035	$37,904	$4,107	$1,995	50%
2017-2018	23	$144,214	$69,205	$6,270	$3,009	50%
2018-2019	6	$18,856	$9,224	$3,143	$1,537	50%
Total	628	$1,860,994	$910,460	$2,963	$1,450	50%

Costs for each year have been normalized using Consumer Price Index (CPI) inflation rates, as provided by the Bank of Canada's Inflation Calculator. Cost-share rates were rounded to the nearest multiple of five.

It is not possible to calculate the proportion of soil testing costs due to database limitations and integrity concerns relating to digitization of cost-share claim information. Detailed cost items for each project are simply not available, this includes soil sampling and analysis costs on the final invoice, the number and type of samples (basic soil fertility, comprehensive, etc.) as well as sample price. While some of this information was captured in the data management system, it was not validated to ensure consistency. Different vendors provided different levels of detail on the invoices. As well, some cost-share programs employed different data capture procedures (i.e. enter the costs as they appear on the claim form versus how they appear on the invoice etc.). As mentioned earlier, some costs were simply entered as "Invoice to prepare crop nutrient plan" etc.

We can estimate the soil testing proportion by looking at projects that did report acres impacted, and by using cost information provided by soil testing labs. Two OMAFRA accredited soil testing labs were interviewed to acquire up-to-date soil testing costs (Table 18).

Table 18: General soil sampling and analysis costs in Ontario, 2020

Laboratory	Cost	Comments
Honeyland Ag Services	$17/acre (basic)	"The basic soil test meets requirements for nutrient management ($17). Producers may choose to do more sampling to obtain a more comprehensive analysis."
SGS Agri-food Laboratories	$25/acre (average)	"The average cost of a soil sample is about $25 (nutrients only, physical testing is rare). Soil testing is still predominantly from a nutrient standpoint. Although there is a lot of buzz about soil health, very, very few samples are actually tested from a biological/physical/soil health perspective. I would suggest that 4R is driving more soil testing than soil health."
Minimum number of samples: 1 per 25 acres		Custom sampling (field collection): $1.50 per acre

Note: Above labs are accredited soil testing laboratories listed on OMAFRA. The labs also reported they do not always know if a sample was submitted to check fertility or if it is part of a formal plan. IPNI Soil Test Surveys suggests Ontario has a total of approximately 100,000 soil samples annually.

A shortlist of projects that provided acreage was summarized in Table 19. Nearly 40 percent of total planning projects were included (335 out of 842). To estimate the proportion of costs attributed to soil testing, the following assumptions were made:

Assumption	Challenges and Limitations
Each plan required one sample for every 25 acres	Samples may have been represented by a field, half a field, 25 acres, or even less than 25 acres
Each plan utilized custom sampling ($1.50 per acre) in addition to sample costs	Not all producers would have used custom sampling, some may have taken field samples themselves (one soil lab indicated most would have hired someone for this though)
All reported acres were considered as part of the final formal plan	The shortlist represents only 40 percent of total planning projects. It was not always specified in the database if the number of acres were proposed (application) or actual (claim)

As shown in Table 19, an estimated 4,235 samples were taken, this represents 316 acres per project (12 soil samples per project). This does not reflect the actual range seen in the data

however, as some projects reported acreages as small as 5 acres per plan to large plans representing in upwards of 4,000 acres. As shown in the far-right column, the proportion of costs varied each fiscal year, with an overall average of 38 percent. If we use 38 percent as the proportion of soil testing, that would be equivalent to an average soil testing cost of $1,482 per CNP ($3,900 X 38%) and $1,140 of soil testing for a NMP ($3,000 x 38%).

This is just an exploratory **estimate**, based on *very limited data* and assumptions that do not reflect the circumstances for all projects. It may still be useful in helping to devise a future methodology to best answer the question: what is the cost of routine soil testing, and is it widely adopted as a standard practice? Some alternative ways would be through surveys, data mining exercises with detailed paper invoices at the OSCIA head office, or obtaining detailed quotes from labs (accredited or otherwise) using various soil health indicators etc.). As mentioned above, the labs indicated that the driving force behind most soil testing is still 4R, and not necessarily soil health. This suggests there is still work to be done in designing alternative program models to drive long term behavior change, however those questions go beyond the scope of this particular report.

Table 19: Estimated Soil Testing Costs (based on Projects that Reported Acres)

Fiscal Year	Number of Projects	Total Eligible Claim Cost	Number of Acres	Number of Samples	Estimated Soil Testing Costs	Proportion of Claim Costs
2008-2009	138	$323,608	34,959	1,398	$ 87,397	33%
2009-2010	32	$63,043	10,698	428	$ 26,745	50%
2010-2011	58	$114,693	15,963	639	$ 39,908	40%
2011-2012	42	$83,230	16,610	664	$ 41,525	57%
2012-2013	7	$12,759	2,386	95	$ 5,963	53%
2013-2014	-	-	-	-	-	-
2014-2015	-	-	-	-	-	-
2015-2016	-	-	-	-	-	-
2016-2017	19	$23,225	1,428	57	$ 3,570	16%
2017-2018	27	$147,010	14,966	599	$ 37,414	27%
2018-2019	12	$91,247	8,854	354	$ 22,135	25%
Total	**335**	**$858,815**	**105,863**	**4,235**	**$ 264,658**	**38%**

Note: The Estimated Soil Testing Costs = (Number of Samples x $25) + (Number of Acres * $1.50/acre);
Proportion of Claim Costs = Estimated Soil Testing Costs / Total Eligible Claim Cost

Farmland Health Check-Up

The Farmland Health Check-Up (FHCU) workbook was developed by technical staff at the Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA) to address farmland health. The program has provided a unique opportunity to collect information on select Best Management Practices (BMPs) including cover crop and soil testing behaviors. Since 2015, when the pilot version was launched under the Great Lakes Agricultural Stewardship Initiative, over 1,000 Checkups have been completed. The program continues to be delivered as part of the Lake Erie Agricultural Demonstrating Sustainability (LEADS) program.

Completing a Checkup is a mandatory process to access funding through the complementary cost-share programs, but it is voluntary if producers want to apply for funding. The data collected in the workbook can be used, in aggregation, to assess various farmland health indicators, including the use and prevalence of specific BMP behaviors. It is also possible to review the cost-share participation history of producers that completed a Checkup in the context of BMP adoption as well.

Table 20: Farmland Health Checkup participation[6]

Fiscal Year	Number of Checkups	Number of Producers
2015 - 2016	164	160
2016 - 2017	557	533
2017 - 2018	133	132
2018 - 2019	95	94
2019 - 2020	140	139
Total	1,089	1,058

This report analyzed 1,089 Checkups from a comprehensive database which houses all of the responses to each question in the workbook. As shown in Table 20, the majority of Checkups were completed in the 2016-2017 fiscal year, corresponding to the second year of the Farmland Health Incentive Program (FHIP) which saw the highest Checkup participation to date. To be eligible to participate, producers must be located in the Target Area (largely southwestern Ontario).

Since the 2015, 562 producers (that completed a Checkup) have reported planting some kind of cover crop, while 474 producers did not report any usage in the past five years. For the producers that identified as non-users, (116) **24% went on to apply for cost-share funding to establish cover crops**, and 70% were successful in receiving funding (Table 21). It is not known whether the Checkup or the funding from the complementary cost-share program was the motivating factor to try cover crops. While it is good to see that 25% of previously identified non-users went on to establish cover crops, the majority did not (at least through OSCIA cost-share programs).

Table 21: Which programs did Checkup producers apply to (non-user)?

Program	Number of Producers	Percentage of Producers
Canadian Agricultural Partnership	2	2%
Farmland Health Incentive Program	50	61%
Growing Forward 2	6	7%
Lake Erie Agriculture Demonstrating Sustainability	20	24%
Soil Health Incentive Program	4	5%
Total	82	100%

As shown in Table 21, the majority of producers went on to apply for funding from the complementary cost-share programs associated with the Checkup. However, a small portion applied to other programs where the Checkup was not a requirement, including *GF2* and the Canadian Agricultural Partnership. Many of the producers that reported cover crops history in their Checkup, went on to apply for other BMPs such as conservation tillage equipment and/or organic amendments (through FHIP). As well, for those that met the eligibility requirements (less than three times), some producers with limited cover crop history on their Checkup went on to apply for cover crop funding. For those producers that did not go on to apply for funding, it is not known if they tried cover crops without financial support or sought out assistance from another funding partner.

According to Statistics Canada, the proportion of farms reporting field crops that used winter cover crops in the GLASI Target Area in 2015 was 37 percent[7]. This compares to 54 percent of producers that completed a Checkup indicating they have tried cover crops. Producers that participate in the

[6] The producer and Checkup numbers do not align because some producers completed more than one Checkup for a second or third farm location and/or business.
[7] https://www150.statcan.gc.ca/n1/pub/95-634-x/2017001/article/54903/catm-ctra-245-eng.htm

Checkup program are typically seen as more “conservation minded”, as they respond well to agri-environmental educational opportunities, and have connections to OSCIA or to their local CCA.

In Section 2.3, producers are asked to report their cover crop use within the last five years. Depending on the answers provided, crop rotations and the number of fields and years provided, a producer could theoretically report up to 15 instances of cover crops (if not more). For the purpose of this report, one instance refers to one field crop that used cover crops in one field (field 1, 2 or 3).

The data indicates that Checkup participants have planted cover crops on average 3.5 times in the last five years. However, 30 percent reported they have planted between 8 and 13 times in the last five years, suggesting that cover crops are more than just experimental (Figure 13). There is always variability depending upon the crop rotation, number of fields reviewed and the specific needs of the farm. Almost half of producers reported planting cover crops only a few times (less than 4) in the last five years preceding completion of their Checkup.

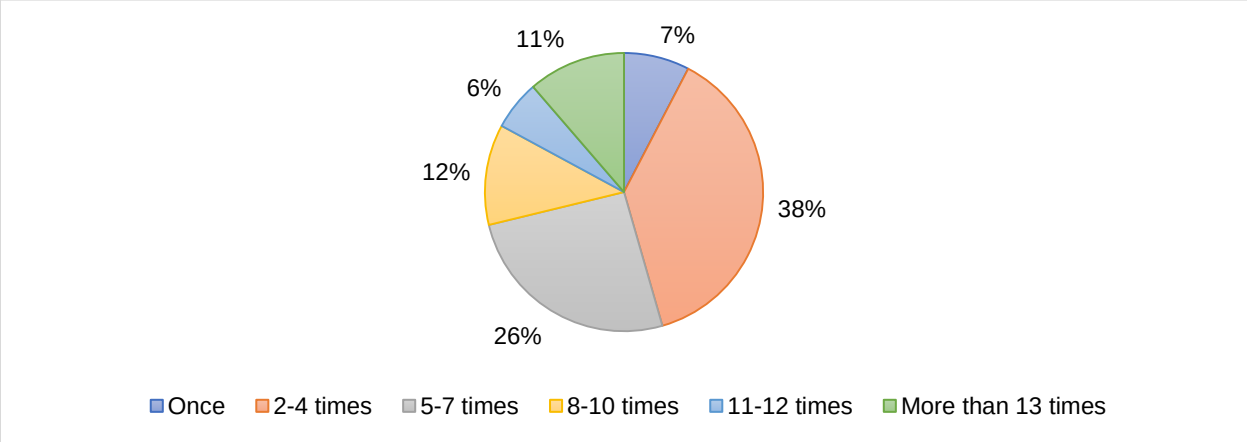

Figure 13: How often were cover crops planted in the last five years? (2011 – 2018)

Between 2011 and 2015 there appears to be an upwards trend in the use of cover crops in the Checkup data, which is self-reported by producers from their historical crop rotation and cover crop records (Figure 14). However, this trend reversed in 2016, the years following the launch of the program. There are several factors contributing to this.

Firstly, there were far more Checkups completed in 2016 than compared to any other year, therefore crop history records including cover crop information, generated more instances in the preceding five years. It may also indicate that cover crop use was not necessarily increasing, but instead it may just be a signal of record keeping. A similar pattern was revealed when no-till instances were graphed, and other conservation tillage practices as well.

Another possible factor is the influence of program restrictions on cost-share eligibility. Producers are not eligible for cost-share if they have grown cover crops of any kind in the last five years of applying. Many producers were restricted from accessing funding because of the detailed information provided in the Checkup, this was indeed a new process for producers to adjust to.

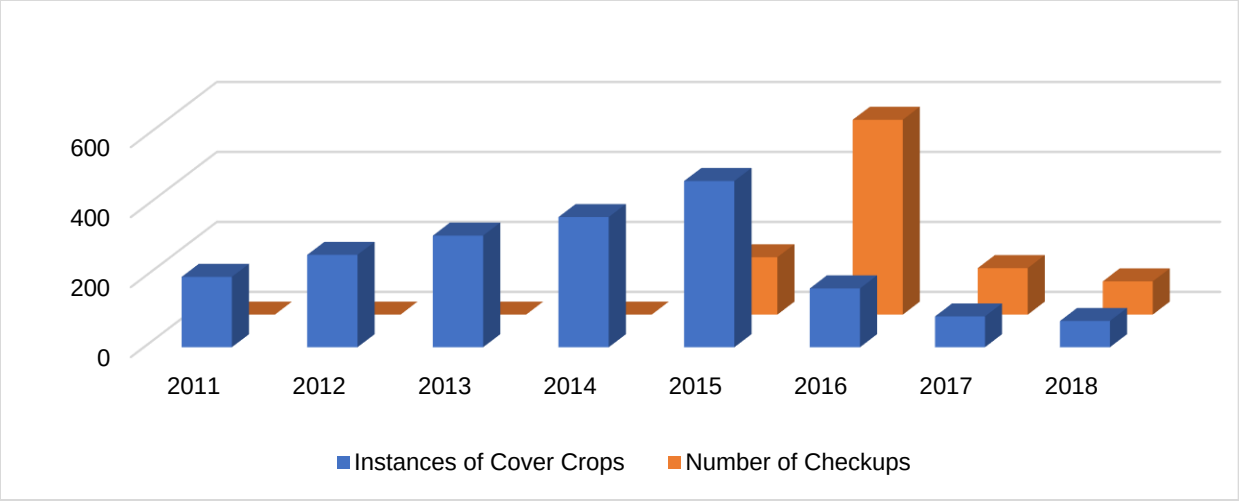

Figure 14: Cover crop prevalence and the number of Checkups

Recall that between 2012 and 2015, there was lower cost-share participation in cover crops across the available cost-share programs (e.g. *GF2*). While the Checkup showed many producers practicing cover crops over this same period (Figure 14), there didn't seem to be a strong appetite for cost-share funding to establish them, at least in the geography where the Checkup is offered. This may suggest other factors are at play.

We can also use the Checkup to review soil testing protocols. Indeed, many producers reported that soil testing was not a frequent behavior (Figure 15). Only 9 percent of producers reported completing a soil test for every crop rotation, and this was followed by one percent who tested annually. Checkup data revealed that almost 25 percent of producers wait more than five years between samples. Figure 16 shows the date spread of soil testing records collected for the Checkup. There were far less dates for a second soil test, and the trend clearly shows soil testing is not a routine practice for many producers that completed a Checkup. Out of the 1,011 producers that reported some kind of soil testing protocol on the Checkup, only 78 of them went on to complete a Crop Nutrient Plan with cost-share funding assistance (i.e. FHIP and GF2).

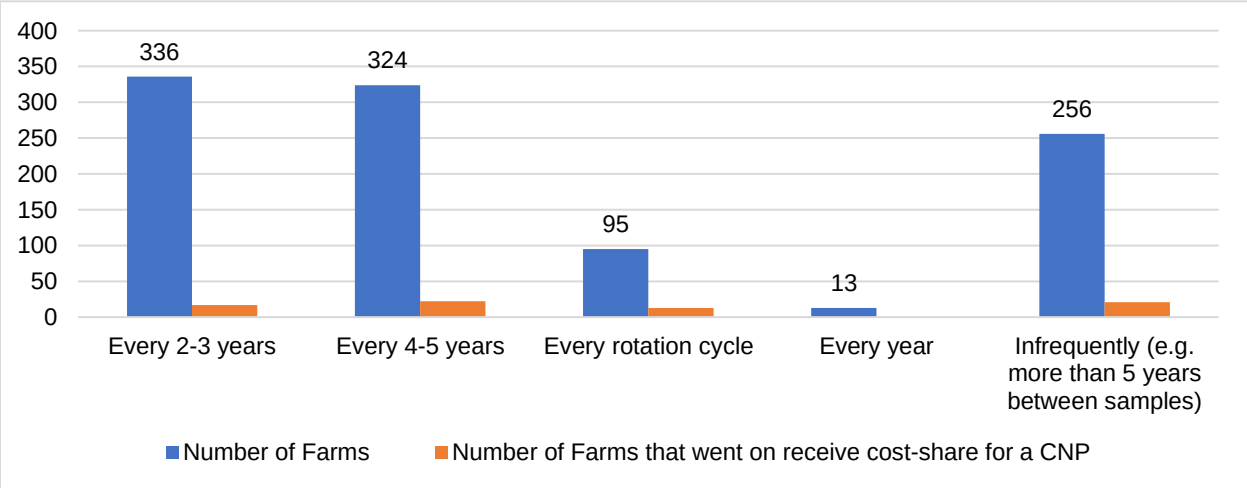

Figure 15. Soil Testing Protocol Reported in the Checkup

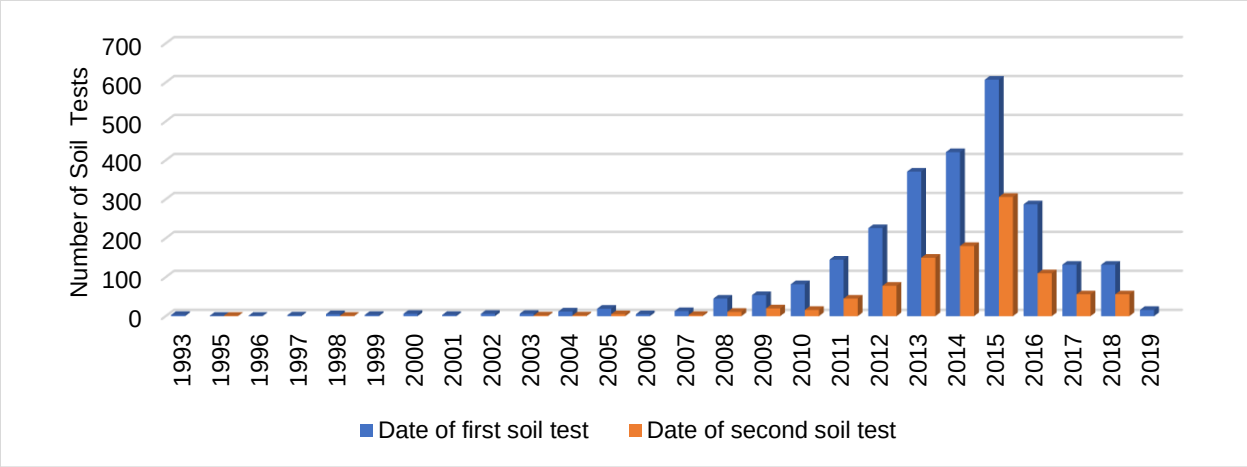

Figure 16. Dates of Soil Test Records

Conclusion

Cost-share data has many applications that go beyond the administrative and financial functions it was initially collected for. This analysis has provided a wealth of information that aims to support future applied research into lower cost BMPs, like cover crops and soil testing. It seems clear from the report that cost-share programs are certainly helping farmers to adopt BMPs like cover crops, and that in order to make these practices more routine, financial and technical support is still required. However, it should be pointed out that this data only examines OSCIA records. Undoubtably there are many other delivery partners that support cover crops, including Conservation Authorities and other non-profit organizations throughout Ontario. So, while there is a picture of success with cover crops here, the data also indicates that participation isn't necessarily growing with these program models. In the absence of data from other partners, it isn't possible to make wide ranging assumptions about whether these practices are becoming more routine or not. The survey did provide some reassurance that these programs are helping to drive long term behavior change, but there are many areas in the report that identified stagnating participation. For example, when one compares past participation of programs to current ones, participation in cover crops has not increased despite significant investments in soil health outreach and education. Indeed, cover crops are not a new technology, so the fact that participation is not growing speaks to other limiting factors that will hopefully be explored in other phases of this project.

It also has to be noted that the data was not particularly helpful in understanding the prevalence of routine soil testing, and further research into this practice is required. It does seem from the cost-share data and the Checkup data, that this is a practice not widely practiced as much as it should be. But the data is limited here, and it would be inaccurate to comment further on what the data story is really telling, without first developing a better methodology to understand soil testing habits.

It is also worth mentioning that compiling this data, and collating it, can be very tedious and time consuming. Particularly when looking back on historical records, where procedures or program design keys were not well documented (i.e. full listing of eligibility criteria, clear capital costs, reasons for declining projects missing from the database etc.) as this prevented a more fulsome analysis in some areas. As well, the inability to directly contact producers with the survey was huge limiting factor in obtaining a larger number of responses, so this was disappointing. The best way to improve upon these programs, is to engage directly with the stakeholders that participate and rely on them. It is the hope of this report that OSCIA can continue to design and deliver innovative programming to further environmental behavior change across agricultural lands throughout Ontario.