OFFICE OF AUDIT AND EVALUATION

Evaluation of the Pesticide Risk Reduction Program

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Agriculture and Agri-Food Canada
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Canada

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«*Evaluation of the Pesticide Risk Reduction Program*»

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Abbreviations

AAFC	Agriculture and Agri-Food Canada
IPM	Integrated Pest Management
PRRP	Pesticide Risk Reduction Program

EXECUTIVE SUMMARY

Purpose

The evaluation of the Pesticide Risk Reduction Program (PRRP) was undertaken by Agriculture and Agri-Food Canada's (AAFC) Office of Audit and Evaluation as part of the Five-Year Integrated Audit and Evaluation Plan (2017-18 to 2021-22). The evaluation examined the relevance, effectiveness, and efficiency of the Program. The results from this evaluation are intended to inform future program, policy and funding decisions.

Methodology and Scope

The evaluation assessed activities and results achieved by the Program from April 1, 2012 to March 31, 2017. The evaluation used multiple lines of evidence, including a document review, administrative data analysis, a stakeholder survey, and interviews to assess the relevance, effectiveness and efficiency of the Program.

Background

The Program focuses on developing and disseminating reduced risk solutions for pest management issues that have been identified as priorities by growers. AAFC works with Health Canada's Pest Management Regulatory Agency, industry and the provinces to increase the availability and adoption of reduced risk tools and practices to control pests in agriculture.

Findings

The Program remains relevant and fills an ongoing need to develop and implement pesticide risk reduction strategies and improve access to reduced-risk pesticides for agricultural use. Without government support, the environmental sustainability of the Canadian sector would be compromised, the agricultural sector would be at a competitive disadvantage internationally, and public concerns with the long-term impact of pesticide use would not be addressed. Specific findings include:

- The Program is consistent with federal and departmental priorities, roles and responsibilities. The Department's role in delivering the Program is appropriate, given that its scientific and technological expertise enable AAFC to respond to needs that cannot be met by the provinces or the industry.
- The Program is achieving its intended objective of improving grower access to low-risk, environmentally and economically sustainable pest control tools and practices. From 2012-13 through 2016-17, 15 risk reduction strategies were developed and 159 integrated pest management tools were made available, exceeding the targets set out by the Memorandum of Understanding between AAFC and Health Canada.

- The Program remained within budget in each of the five years examined while meeting or substantially exceeding its performance targets. This disparity is due to low initial performance targets and to an increase in program efficiency.
- The Program has contributed to increased awareness of safer pest management products and practices through knowledge transfer activities.
- The adoption of new practices and products is encouraged by the grower-driven priority-setting process. There is limited evidence to quantify the adoption of safer pest management practices and products.

Recommendation

- ***Recommendation 1***: The Assistant Deputy Minister, Science and Technology Branch, should review Pesticide Risk Reduction Program logic model and the associated performance measures to:
  - Assess program contribution to the achievement of outcomes and ensure outcome statements are measurable; and
  - Create targets that more accurately reflect activity levels and future program aspirations.

1.0 INTRODUCTION

The evaluation examined the relevance and performance of Agriculture and Agri-Food Canada's (AAFC) Pesticide Risk Reduction Program (PRRP). The Program is a joint initiative of AAFC's Pest Management Centre and Health Canada's Pest Management Regulatory Agency (here after referred to as the Regulatory Agency), which works to reduce the risks to human health and the environment from pesticides used in agriculture. The results of this evaluation are intended to inform future program, policy, and funding decisions.

2.0 METHODOLOGY AND SCOPE

The evaluation was conducted in accordance with the Treasury Board *Policy on Results*, and AAFC's 2016-17 to 2020-21 Integrated Audit and Evaluation Plan.

This evaluation reports on the PRPP relevance, effectiveness, and efficiency, focusing on results achieved by the Program from April 1, 2012 to March 31, 2017. While the Program involves both AAFC and Health Canada, the evaluation was led by AAFC and focused on the components of the Program delivered by AAFC's Pest Management Centre.

The evaluation used multiple lines of evidence including document review, administrative data analysis, a stakeholder survey, and interviews to assess relevance, effectiveness, and efficiency of the Program.

The detailed evaluation methodology is in Annex A.

3.0 PESTICIDE RISK REDUCTION PROGRAM BACKGROUND

3.1 Objectives

The Program is a joint initiative of AAFC's Pest Management Centre and Health Canada's Regulatory Agency, which works to reduce the risks to human health and the environment from pesticides used in agriculture. The Program creates a framework through which stakeholders–including growers, grower organizations, provincial crop specialists, and pest management experts–contribute to the prioritization and development of pesticide risk reduction strategies. These strategies help growers develop an integrated approach to manage pests, and encourage the adoption of alternative pest management approaches, practices, and technologies. These include the use of resistant crop varieties, crop rotation, farm management practices to reduce or avoid pest infestations, monitoring the level of pest infestations to determine when intervention is needed, and the use of new physical and biological control methods.

The intended outcomes of the Program are:

- Increased awareness of, and access to, safer pest management products and practices.
- Adoption of safer pest management practices and products.
- Improved pesticides resistance management, crop protection, practices, and competitivenesss.
- Improved sustainability and competitive parity.
- Canadians are informed and protected from health risks (Health Canada).

For details, see the logic model in Annex B.

3.2 Activities

The Program facilitates an industry-driven process by which biopesticide products for Canadian registration are identified and prioritized at an annual workshop conducted in concert with the Minor Use Pesticide Program. Biopesticides are pest management agents derived from a natural source and provide an alternative to traditional synthetic chemical products. The Program coordinates IPM development and demonstration projects involving biopesticides, and provides regulatory support for priority biopesticide products. In addition, it develops, updates, and maintains crop profiles focused on pest management. The crop profiles serve to inform stakeholders, government, and regulators on the pest management status of target crops. The Program coordinates risk reduction strategy development and implementation, including soliciting and overseeing research, development and demonstration projects to address priority pest management issues with reduced risk solutions. The Program provides advice and assistance to biopesticide researchers at AAFC in developing biopesticides, and to companies in developing and assembling regulatory data submissions. Up until 2014, the Program provided support for field trials carried out with priority biopesticides. These trials were carried out to generate efficacy data to support submission packages; subsequently the focus was shifted to trials to develop and demonstrate use of biopesticides within Integrated Pest Management (IPM) systems.

3.3 Resources / Expenditures

The Program has seven full-time employee equivalents, including entomologists, pathologists, and biologists. The employees work in collaboration with AAFC researchers, academic scientists, regulators, grower organizations, value chain stakeholders, and provincial specialists. The Program supports the development of decision support tools, which lead to pesticide risk reduction, and non-chemical pest control alternatives, including cultural or biological practices, and biopesticide products, all in the context of enabling and promoting IPM. The Program achieves this by funding focused projects conducting applied research and development, as well as technology transfer work. Table 1 provides details of actual Program spending from April 1, 2012 to March 31, 2017.

Table 1: Pesticide Risk Reduction Expenditures, 2012-13 through 2016-17 (in 000s)

	2012-13	2013-14	2014-15	2015-16	2016-2017
FTEs	7	7	7	8	7
Salary	$594	$533	$620	$656	$661
Operating	$1,085	$527	$457	$862	$586
TOTAL	**$1,679**	**$1,060**	**$1,077**	**$1,518**	**$1,247**

Source: AAFC Document, PMC Funding 2012-17 Budget vs Actual

3.4 Governance

The Pest Management Centre, located within the Science and Technology Branch at AAFC, is responsible for delivering the Program. The Program is led by an executive director who reports to the Director General (DG) of the Coastal Directorate, who reports to the Assistant Deputy Minister of the branch. The Program was established in 2003, as part of the multi-departmental Building Public Confidence in Pesticides Initiative.

The Program is included as an Annex to the 2013 Memorandum of Understanding between AAFC and Health Canada. An AAFC-Health Canada Interdepartmental Working Group oversees the general objectives as described in the Memorandum. The Working Group reports annually to a director general-level Joint Management Committee, which in turn reports to assistant deputy ministers at both AAFC and Health Canada.

The Pesticide Risk Reduction Technical Working Group provides operational expertise on scientific and technical issues, and promotes information exchange in areas related to activities of the Program.

4.0 PROGRAM RELEVANCE

4.1 Continued Need

The Program fills an ongoing need to develop and implement pesticide risk reduction strategies and improve access to reduced-risk pesticides for agricultural use, helping Canadian growers compete in the global market.

There is a demonstrable need for the activities of the Program. The Program was established in 2003 under the Agriculture Policy Framework, as part of the Building Public Confidence in Pesticides Initiative, to address issues raised by the Federal Standing Committee on Agriculture and Agri-Food that remain relevant today:

- public concern with the long-term impact of pesticide use and the need for more information in this area; and

- limited access by growers to reduced-risk and minor use pesticides, impairing their ability to compete in international markets and improve environmental sustainability in their production systems.

The Program answers a growing need for, and interest in, reduced-risk methods and integrated pest management methods, which incorporate a combination of pest management tools to optimize benefits and minimize risks. The 2016-17 biopesticide priority candidates list included over 70 products, grouped under entomology, pathology, weeds and growth regulators, and animal repellents, considered for first time registration or major new use-site registration.

The evaluation found that Program's non-chemical pest management strategies are seen as evidence-based, effective, practical, and economically viable for growers. The Program enables Canadian growers to manage risk and remain competitive in a global market. The Program is especially important given its role to address increased pesticide resistance as growers struggle to address the impacts of climate change, and other new challenges.

4.2 Alignment with Government and AAFC Priorities

The Program is aligned with the AAFC priority to support an environmentally sustainable agriculture sector.

The Program was designed to address gaps and stakeholder concerns raised in the 2002 Report to the House of Commons Standing Committee on Agriculture and Agri-Food, Registration of Pesticides and the Competitiveness of Canadian Farmers. These concerns included the availability of, and access to, minor use and reduced-risk pest management tools, and are still valid in 2018. The Program has the mandate to enable a competitive and innovative agricultural sector that responds to grower priorities for an environmentally sustainable sector. This mandate aligns with AAFC's current expected results, particularly, an "agriculture and agri-food sector that utilizes science to improve agriculture's efficiency, increase availability of new products and contribute to the Canadian economy" and a "sector [that] is increasing its ability to be resilient and self-sustaining."

The Program supports the Health Canada strategic outcome that Canadians are informed and protected from health risks associated with food, products, substances and environments.

4.3 Alignment with Federal Roles and Responsibilities

The Program supports the development and implementation of pesticide risk reduction strategies that Canada's pesticide industry or the provinces would not undertake on their own.

The federal government role in delivering the Program is clear and responds to needs that cannot be met by the provinces or the industry. The evaluation found that the Department's role in pesticide risk reduction is appropriate given AAFC's access to funding and scientific and technological expertise. Eighty-one percent of survey respondents noted that AAFC's involvement in developing lower risk alternative strategies and tools for pest management was very important. The Program responds to the feedback of stakeholders (i.e., growers, industry, provinces, and the Regulatory Agency) and encourages strong partnerships and successful involvement with the Pesticide Risk Reduction Program working group.

Federal government support for the Program is appropriate given that Canada is an advocate for a clean environment, international regulatory harmonization, and risk reduction cooperation. Global markets are moving away from products that are harmful to the environment and are turning to cleaner and more sustainable options. By providing support for the reduction of risks associated with pesticides use, the federal government is contributing to the development of a clean environment and a competitive Canadian economy.

Although a comparative analysis of the Program with similar programs was out of the scope of this evaluation, available evidence suggests that international governments support pesticide risk reduction as demonstrated by their respective promotion and pesticide registration programs. Examples included:

- The Office of Pesticide Program's Conventional Reduced Risk Pesticide Program (United States Environmental Protection Agency): Expedites registration for conventional pesticides that pose less risk to human health and the environment than the existing conventional alternative.

- The Organization of Economic Co-operation and Development Pesticide Risk Reduction Project: Promotes pesticide risk reduction and sustainable pest management.

- Pesticide Use-and-risk Reduction in European (PURE) farming systems with Integrated Pest Management (The European Commission – Community Research and Development Information Service (CORDIS)): Builds a toolbox of approaches, methods, and tools for implementing efficient IPM solutions in the challenging European context.

There does not appear to be an alternative model to this program in Canada. The Program represents an approach reflecting world standards in pesticide reduction and integrated, non-chemical pest management.[1] [2]

5.0 PERFORMANCE

The Program successfully delivered expected outputs and met or exceeded most output targets. Program strengths include an effective needs identification and priority setting process, and good collaboration and engagement with both research scientists and stakeholders.

5.1 Identification and Prioritization of Pesticide Risk Reduction Issues: Development of Priority Lists

The first of three main Program activities involves consultations and other communications with stakeholders culminating in the annual setting of priority issues. Stemming from these activities is the annually updated pesticide risk reduction priority list, developed by the Program in partnership with growers, grower organizations and the industry. The evaluation found evidence that the priority-setting process has successfully engaged stakeholders and that selected issues reflected their priorities. The collaborative, grower driven, and consensus-based approach of the priority setting process allows the Program to answer high priority needs and leads to successful projects.

5.2 Development and Dissemination of Pesticide Risk Reduction Strategies and Other Tools

Another main Program activity is the development and dissemination of solutions associated with the identified priority issues. Activities undertaken by the Program lead to three types of outputs.

Pesticide Risk Reduction Strategies are detailed plans to reduce risks to human health and the environment associated with pesticide use in agricultural crops. Strategies define in detail the issue that needs to be addressed, including problems associated with current approaches, and specify the steps and resources required to address the issue. During the evaluation period, 15 strategies have been developed, 7 of which are still active. The development of each strategy begins with the establishment of a working group and ends with the completion of the last project addressing the pest issue. Between 2012 and 2017, a minimum of 7 strategies were active simultaneously, which exceeded the performance target of 4 active strategies per year. For details, see the risk reduction strategies timeline in Annex C. The issues with which the strategies are associated are shown in Table 2, along with details from a sample strategy.

[1] Organization of Economic Co-operation and Development Pesticide Risk Reduction Project
[2] Proceedings of the 2017 Global Minor Use Summit-Montreal, QC

Table 2: Pesticide Risk Reduction Strategies: 2012-13 to 2017-18

Field Crop
- Fusarium Head Blight in Wheat
- Foliar Insect Pests of Prairie Field Crops (see below)
- White Mold Disease in Field Crops

Fruit
- Apple Scab
- Apple and Pear Fire Blight
- Insect Pests of Berry Crops
- Insect Pests of Pome Fruit

Ornamental
- Greenhouse Floriculture
- Insect Pests of Outdoor Nursery Ornamentals

Vegetable
- Downy Mildew in Cucumber
- Cabbage Maggot in Brassica Crops
- Integrated Weed Management in Field Vegetables
- Root Insect Pests of Carrot, Parsnip and Onion
- Soil Fumigant Alternatives for Soil Borne Pests
- White Mold Disease in Vegetable Productions
- Wireworm in Potato

Sample Strategy: Foliar Insect Pests of Prairie Field Crops Strategy

- Initiated 2011, nearing completion in 2017-18, aims to reduce reliance on chemical insecticides on 52 million hectares of Prairie farmland (major crops)
- Three Goals:
  - Develop biological control options
  - Improve pest management decision making
  - Develop IPM technologies, and transfer new information and tools to growers
- Outputs/Outcomes:
  - Prairie Pest Monitoring Network: online predictive tools for 7 insect pests of wheat, oilseeds and pulses
  - New Field Guide on pests and natural enemies (update of 1989 guide)
  - Improved spray action thresholds which account for natural enemies' control of pests
  - Raising and relocating biological control agent of cereal leaf beetle
- Transfer to growers:
  - Alerts, guides, apps and recommendations transferred to growers through industry and provincial partners involved in the strategy working group

Source: Pesticide Risk Reduction Program Website. The examples cover the evaluation period of 2012-13 to 2017-18

The second output consists of IPM tools, practices, publications, and transition strategies. These are designed to assist producers in implementing IPM practices and transitioning from a pesticide to another approach. Rather than relying on a pesticide, IPM typically involves multiple measures to combat pests including tillage, crop rotation, and nonchemical options such as biopesticides. As shown in Table 3, during the evaluation period, the Program developed 74 IPM tools, which exceeded the target of five tools per year. Demonstration projects included early season row covers in cabbage maggot control, an identification workshop for Delia species related to cabbage maggot strategy, and a session on plant parasitic nematodes and their management. Beneficial management practices developed between 2012 and 2017 included row covers for insect management, recommendations for weed management in vegetable production, resistant rutabaga lines for commercialization, a cover crop decision tool, IPM program for leek moth, and apple scab resistance testing for growers.

Table 3: Program Performance – Tools and Crop Profiles: 2012-13 to 2016-17

Result	Target	2012-13	2013-14	2014-15	2015-16	2016-17	Total 2013-2017
IPM Tools, Practices and Publications	5 annually	9	17	16	15	17	74
Crop Profiles	No target	5 published, data for 7 collected	6 published, data for 9 collected	7 published, data for 7 collected	8 published, data for 10 collected	7 published, data collected for 10 crops	33 published

Source: Report to Assistant Deputy Minister Joint Committee, Overview 2013-17

The third output consists of Crop Profiles that contain crop production and pest management information by commodity, identifying issues in pest management associated with the commodity. They support the development of pesticide risk reduction strategies and the work of the Regulatory Agency, and provide current pest management information for AAFC scientists, the provinces, industry players, growers, and grower organizations. Crop profiles are developed through an extensive consultative process with stakeholders in producing provinces. During the evaluation period, the Program developed and/or updated 33 crop profiles (Table 3). Table 4 lists the commodities for which crop profiles were developed.

Table 4: Crop Profiles Updated and/or Developed: 2012-13 to 2017-18

- Allium vegetables (dry onion, green onion, shallot and garlic)
- Apple
- Asparagus
- Bean (dry)
- Blueberry (lowbush)
- Blueberry (highbush)
- Brassica vegetables (cabbage, broccoli, cauliflower and Brussels sprouts)
- Canola
- Carrot
- Cherry
- Chickpea
- Corn (field)
- Corn (sweet)
- Cranberry
- Cucumber (greenhouse)
- Grape
- Lentil
- Lettuce (greenhouse)
- Ornamentals (container)
- Ornamentals (field)
- Pea (field)
- Peach
- Pear
- Pepper (greenhouse)
- Potato
- Raspberry
- Rutabaga
- Soybean
- Strawberry
- Tomato (greenhouse)
- Wheat (Spring)
- Wheat (Winter)

Source: AAFC website

5.3 Improved Access to Biological Pesticides

The third Program activity focuses on improving access to biological pesticides for agricultural use. Biological pesticides, or "biopesticides," are pest management agents and chemicals derived from natural sources such as bacteria, fungi, viruses, plants, animals, and minerals. They provide an alternative to synthetic chemicals used by growers to control pest populations in crop production. Like chemical pesticides, biopesticides must be registered by the Regulatory Agency.

Research and testing activities by Program scientists, as well as AAFC/ Regulatory Agency collaboration on risk reduction through the Biopesticide Working Group, have led to the development of biopesticide regulatory data packages and recommendations. During the evaluation period, 28 biopesticide submissions were made to the Regulatory Agency, exceeding the target of 20 (4 annually, Table 5). Submissions during the evaluation period include: Suffoil-X (paraffinic oil), BioCeres (B. bassiana), Oxidate (hydrogen peroxide), Dazitol (mustard oil and oleoresin of capsicum), Botector (Aureobasidium pullulans strains), and Regalia (extract of Reynoutria sachalinensis).

Table 5: Program Performance – Biopesticides Submissions: 2012-13 to 2016-17

Result	Target	2012-13	2013-14	2014-15	2015-16	2016-17	Total 2013-2017
Biopesticides Submissions	4 annually	6	6	5	7	4	28 biopest-icides product submissions to the Regulatory Agency

Source: Report to Assistant Deputy Minister Joint Committee, Overview 2013-2017

5.4 Increased Awareness of Safer Pest Management Products and Practices (Immediate Outcome)

Through the Program, stakeholders have an increased awareness of pest resistance and mitigation approaches. Awareness could be improved with increased demonstration trials and interactions with grower associations.

The Pest Management Centre has a leadership role in ensuring stakeholders have improved knowledge of, and access to, reduced risk pest management tools and strategies. Examples of integrated pest management tools made available to growers over the evaluation period include decision tools, field guides and recommendations, factsheets, posters, and updated crop profiles. For the evaluation period, the Program responded to direct inquiries, sent out 78 listserv announcements (an email list containing some 1,000 addresses of stakeholders including provincial representatives, scientists, producers, and industry representatives) regarding the Program, posted updates on the AAFC website, and organized activities, such as workshops, webinars, and grower meetings.

The Program tracks a number of indicators related to the expected immediate program outcome: increased awareness of, and access to, safer pest management products and practices. One indicator is IPM tools, practices and publications. As shown in Table 3 and discussed in the previous section, the Program has exceeded its targets with respect to this indicator. Table 6, below, shows performance with respect to the second indicator considered by the Program to demonstrate increased awareness of, and access to, safer pest management products and practices, i.e., product use registrations. The number of product-use registrations during the evaluation period exceeded its targets: 122 product-use registrations were reported, compared to the target of 20.

The variance between performance targets and actuals was found to be a common theme throughout the evaluation. The number of IPM tools product use registrations, and outreach activities far exceeded the targets set in the Program performance measurement strategy. This disparity was largely the result of low performance targets combined with refinements to the Program such as:

- streamlined data collection and presentation system for the national crop profiles;
- updated prioritization process for selecting biopesticides for regulatory support; and
- the Pest Management Centre transferred emphasis from generating efficacy data for a specific biopesticide/crop/pest use to supporting regulatory work for first time product registrations with labels including as many relevant uses as possible, which has resulted in more uses being registered for a given priority product and;
- carrying out projects that develop and demonstrate IPM programs involving the newly registered biopesticide products, which has increased the number of outreach activities being delivered

Table 6: Program Performance – Product Use Registrations: 2012-13 to 2016-17

Result	Target	2012-13	2013-14	2014-15	2015-16	2016-17	Total 2013-2017
Product Use Registrations	4 annually	37	10	25	27	23	122 Product Use Regis-trations

Source: Report to Assistant Deputy Minister Joint Committee, Overview 2013-2017

Through the Program, stakeholders, including growers, have increased their awareness of, and access to, pest resistance management and mitigation approaches. Eighty-two percent of survey respondents were in agreement that the Program had a “positive impact” on increased awareness of, and access to, safer pest management products and services. Awareness could still be improved, however, by organizing more demonstration trials allowing growers to observe how risk reduction strategies and technologies are executed in the field, through other direct contact methods, and through working with grower associations.

5.5 Adoption of Safer Pest Management Practices and Products (Intermediate Outcome)

The Program has had a positive impact on the adoption of safer pest management practices and products. Measuring adoption of safer pest management practices and products is not built into the Program.

Adoption of safer pest management practices and products is an expected intermediate outcome of the Program. The Program tracks the delivery of outreach events including workshops, symposia, and other kinds of meetings. Although data were only available for two years, the target for outreach events was exceeded over the five-year evaluation period (Table 7). Examples of outreach events include workshops on bacterial diseases, and presentations at the eighth International IPM Symposium in Salt Lake City.

Table 7: Program Performance – Outreach Events: 2012-13 to 2016-17

Result	Target	2012-13	2013-14	2014-15	2015-16	2016-17	Total 2013-2017
Outreach Events	2 to 3 annually	7	5	5	5	5	27

Source: Report to Assistant Deputy Minister Joint Committee, Overview 2013-2017

Seventy-six percent of survey respondents were in agreement that the Program had a "positive impact" on the adoption of safer pest management practices and products. As noted above, more strategies and other products were created during the evaluation period than targeted. Furthermore, the adoption of new practices and products is encouraged by the grower-driven priority-setting process.

While the Program has increased the number of risk reduction strategies available to growers, it is difficult to assess the exact extent to which practices and products are being adopted by growers on the ground because adoption by growers is not directly assessed. Growers are not asked to report on adoption of safer pest management practices. Adoption can be limited by the cost of products, and by the perceived downside associated with adopting new products that may not work as quickly or effectively as chemical solutions. Moreover, adoption is related to the situational requirements of pest management. Pest problems can be cyclical and may be present one year and absent the next. Pest problems are also regional; a pest may be a problem in the prairies but not in the eastern provinces.

5.6 Improved Pesticides Resistance Management, Crop Protection, Practices and Competitiveness (Intermediate Outcome)

The Program has had a positive impact on resistance management and improvements in crop protection practices.

The evaluation found evidence that pesticide resistance management has improved. Sixty-five percent of survey respondents reported that the Program had a “positive impact” on improved pesticide resistance management. Stakeholders consulted for the evaluation provided specific examples in which the Program has impacted pesticide resistance management. For instance, non-synthetic oil (“summer oil”), which was submitted for registration with the help of the Program, eliminated a number of pest problems (e.g., mites, scales) with no negative health or environmental effects.

Strategies and tools are intentionally designed to contribute to sustainable practice by extending the useful life of existing products and minimizing the grower’s reliance on chemicals. The Program supports the product approval process at Health Canada, which expands the range of pesticide options available to growers.

Performance met or exceeded targets contained in the Memorandum of Understanding between AAFC and Health Canada, and supported commitments established in departmental plans contributing to a sustainable, innovative agricultural sector that proactively manages risk, and ensuring that Canadians are informed and protected from health risks related to pesticide use associated with food, products, substances and environments.

5.7 Improved Sustainability and Competitive Parity (End Outcome)

The Program has contributed to improved sustainability and competitive parity of the Canadian agri-food sector.

The evaluation found evidence that the Program has had a positive impact on the sustainability and competitiveness of the Canadian food sector with respect to pest management. Seventy-five percent of survey respondents reported that the Program had a “positive impact” on improved crop protection practices and competitiveness of the Canadian food sector with respect to pest management.

The Canada-United States Regulatory Cooperation Council (established in 2011) has brought together Canadian and American departments with health, safety, and environmental protection mandates, to foster the alignment of regulatory systems between the two countries. Under the Council, Health Canada's Regulatory Agency and the American Environmental Protection Agency's Office of Pesticide Programs have been collaborating to advance regulatory cooperation. Agriculture and food production is one of the designated areas where the two countries are trying to align, seeking to improve the long-term sustainability of the sector in both countries. Stronger empirical evidence is needed to definitively state the extent to which the Program has contributed to improved sustainability and competitive parity.

5.8 Economy and Efficiency

Program activities are an economical means of delivering desired outputs; the Program remained within budget in each of the five years examined while output targets were met or exceeded.

The Program has remained within its budget over the period of the evaluation. Actual expenditures fluctuated slightly year-over-year, but overall came in under budget (Table 6). Over the five-year evaluation period, salary expenditures were $65,000 under budget (98% of budgeted) and operational spending was $695,000 under budget (83% of budgeted).

Table 8: Program Expenditures – 2012-17 Overview (in 000s)

Risk Reduction Program Expenditures												
	2012-13		2013-14		2014-15		2015-16		2016-17		Total	
FTEs	7		7		7		8		7			
	Budget	Actual	Budget	Actual	Budget	Actual	Budget	Actual	Budget	Actual	Budget	Actual
Salary	$582	$594	$608	$533	$702	$620	$619	$656	$619	$661	$3,130	$3,064
O&M	$1,254	$1,085	$604	$527	$550	$457	$967	$862	$837	$586	$4,212	$3,517
Total	$1,836	$1,679	$1,212	$1,060	$1,252	$1,077	$1,586	$1,518	$1,456	$1,247	$7,341	$6,581

Source: AAFC Document, PMC Funding 2012-17 Budget vs Actual

Pesticide Risk Reduction Program activities are an economical means of delivering desired outputs and achieving desired outcomes, demonstrated by the fact that the Program exceeded – in some cases, considerably – nearly all of its performance indicator targets. The Program facilitates a collaborative process ensuring a focus on the highest priority pesticide risk reduction issues. Often the Program partners with grower groups or other external stakeholders to conduct work aimed at promoting the adoption of risk reduction strategies. The Program leverages expertise within the Minor Use Pesticides Program and the AAFC Science and Technology Branch directing that expertise toward specific priorities and IPM tools and approaches.

6.0 CONCLUSIONS AND RECOMMENDATION

6.1 The Program Remains Relevant

The Program works with grower groups, industry, provinces, and researchers to identify gaps in pest management and opportunities for safer pest management, and to develop and implement strategies to address these gaps. The evaluation found a demonstrated link between Program objectives and federal government priorities and departmental strategic outcomes. Without federal government support for strategies to reduce the risks to human health and the environment from pesticides, the Canadian agricultural sector would be at a competitive disadvantage internationally, the environmental sustainability of the Canadian sector would be compromised, and public concerns with the long-term impact of pesticide use would not be addressed.

6.2 The Program is Economically Delivered

Program activities are an economical and efficient means of delivering desired outputs and achieving desired outcomes. The Program makes good use of its resources and leverages expertise wherever possible. The Program responds well to input from stakeholders and the priority-setting process has successfully engaged stakeholders and selected issues that reflected their priorities.

6.3 The Program is On-Target to the Achieve Immediate and Intermediate Outcomes; End Outcome Achievement is Progressing

The Program is exceeding its targets with regards to the number of tools, transfer products, and activities developed and delivered to inform growers and support the adoption of safer pest management products and practices. Activities are in place to inform key players about the Program and this has increased the number of risk reduction and transition strategies available to growers.

Through the Program, the management of pesticide resistance has improved. While there is some evidence that the Program has contributed to expected immediate and intermediate outcomes, limitations in data availability restricted the assessment of the extent to which growers are adopting safer pest management practices and products. Additional empirical evidence is needed to state the extent to which the Program has contributed to the end outcome of improved sustainability and competitive parity, and improved crop protection, practices and competitiveness, as the Program does not directly track resistance management.

During the evaluation period, program results significantly exceeded performance targets, due to low initial performance targets in some areas and refinements to program activities.

Recommendation 1: The Assistant Deputy Minister, Science and Technology Branch, should review Pesticide Risk Reduction Program logic model and the associated performance measures to:

- Assess program contribution to the achievement of outcomes and ensure outcome statements are measurable; and
- Create targets that more accurately reflect activity levels and future program aspirations.

7.0 MANAGEMENT RESPONSE AND ACTION PLAN

RECOMMENDATION	MANAGEMENT RESPONSE AND ACTION PLAN (MRAP)	TARGET DATE[3]	RESPONSIBLE LEADS
The Assistant Deputy Minister, Science and Technology Branch should review the Pesticide Risk Reduction Program logic model and the associated performance measures to: • Assess program contribution to achievement of outcomes and ensure outcome statements are measurable; and • Create targets that more accurately reflect activity levels and future program aspirations.	AGREE The Pest Management Centre (PMC) will: 1. The Pest Management Centre (PMC) will work with Strategic Policy Branch's Research and Analysis Directorate to determine how best to collect the data to report on outcomes. 2. Review the logic model and targets to take into account anticipated resourcing and changes in how the work, in particular biopesticides work, is being conducted	March 2019 August, 2018	Director General, Coastal Region, Science and Technology Branch

[3] When long-term target dates are required for action items, the management response should explain why the target date is in the long-term.

ANNEX A: EVALUATION METHODOLOGY

The evaluation is based on four sources of evidence. Where possible, multiple sources were used to generate findings for each evaluation issue:

- ***Document Review.*** Documents were reviewed including program foundational documents, departmental performance and other reports, documentation on program activities, international agreements and, internal studies.
- ***Review of Administrative Data.*** Program data were reviewed related to financial expenditures and program activity data (submissions, regulatory decisions, and joint submissions).
- ***Interviews.*** AAFC program area provided a list of potential interviewees, who were chosen from various stakeholder groups for their knowledge of the Program. In total, 15 stakeholders were interviewed:
    - **Internal interviews**
      AAFC staff (n=5)
      Health Canada staff (n=2)
    - **External Interviews**
      Growers and representatives of grower groups (n=5)
      Provincial representatives and experts (n=2)
      Representative of the industry (n=1)

  As the evaluation of the Pesticide Risk Reduction Program was conducted concurrently with the Minor Use Pesticides Program, 8 respondents were interviewed using a combined guide covering evaluations of both programs.

- ***Survey.*** An online survey of stakeholders was conducted to collect information on stakeholder satisfaction with the Program; their views on program impacts; achievement of outcomes and suggestions for improving the Program. Survey respondents included representatives of federal and provincial governments, grower associations, growers, biopesticide product registrants or manufacturers, academia and consultants. Of the 144 respondents, 48 (33.3 percent) worked for the federal government and 96 (66.7 percent) worked for other organizations.

Methodological Limitations

Methodological limitations were taken into account in interpreting the data:

Limitation	Impact on Evaluation	Mitigation Strategy
The representativeness of the stakeholder survey data is not known and the sample size for sub-groups such as growers is quite small.	Stakeholder views may not be fully represented.	Stakeholder views were canvassed through interviews and survey; results are triangulated with other lines of evidence.

ANNEX B: PESTICIDE RISK REDUCTION PROGRAM LOGIC MODEL

The logic model visually describes the linkages between the Pesticide Risk Reduction Program activities, outputs, immediate outcomes, intermediate outcomes, and end outcomes. Also included are the AAFC and Health Canada Strategic Outcomes supported by the Program.

Objective: To improve access to and adoption of reduced risk pest management tools, products and practices					
Activities	**Outputs**	**Immediate Outcomes**	**Intermediate Outcomes**	**End Outcome**	**Strategic Outcomes**
Identify and prioritize pesticide risk reduction issues Develop and implement pesticide risk reduction strategies Improve access to reduced-risk pesticides for agricultural use activities	Pesticide risk reduction priority lists developed Reduced-risk pest management tools, practices, products and publications Regulatory data packages and decisions for reduced-risk and biological pesticides	Increased awareness of and access to safer pest management products and practices	Adoption of safer pest management practices and products Improved pesticide resistance management Improved crop protection, practices and competitiveness	Improved sustainability and competitive parity of Agriculture and Agri-food sectors with respect to pest management	**AAFC Strategic Outcomes:** A competitive and innovative agricultural sector; A sector that responds to society's priorities for an environmentally sustainable sector **Health Canada Strategic Outcomes:** Canadians are informed and protected from health risks associated with food, products, substances and environments

Source: Memorandum of Understanding, Annex B, Logic Model and Performance Plan Risk Reduction Program, 2013

ANNEX C: PESTICIDE RISK REDUCTION STRATEGIES TIMELINE